Strategic consumption: Archaeological evidence for costly signaling among enslaved men and women in the eighteenth-century Chesapeake

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A Dissertation presented to the Graduate Faculty
of the University of Virginia in Candidacy for the
Degree of Doctor of Philosophy

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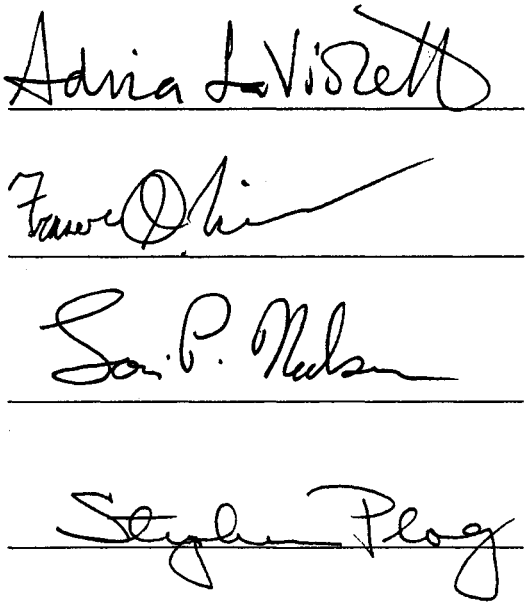
May 2006



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Abstract

This broadly comparative study explores the complex social, economic, and ecological dynamics that facilitated the participation of enslaved African Americans in the eighteenth-century Consumer Revolution. The application of signaling theory to archaeological data from 19 slave quarter sites in the greater Chesapeake region of Virginia underpins this analysis. This study demonstrates that throughout the eighteenth century slave consumption of costly imported goods was influenced by a number of contextual variables. The extent to which increasing urban populations, economic and agricultural diversification, and a slave quarter's proximity to the owner's house shaped consumption are modeled using multiple regression. The significant positive relationship of costly goods with agricultural diversification and the growth of urban centers suggests that a slave's ability to consume such items was linked closely to the increasingly competitive social and economic environment within the eighteenth-century Chesapeake.

The data used in this study indicate that four main signaling strategies were at work in the Chesapeake. Since metal buttons are associated primarily with eighteenth-century male garments, quarters with high button discard and low refined ceramic discard suggest the persistence of single-sex residences for young adult men throughout the eighteenth and into the early-nineteenth centuries. Households that almost exclusively invested in refined ceramics and those that were able to consume similarly high amounts of both buttons and refined ceramics may point to kin-based households anchored by women and men who worked extraordinarily hard to establish a foot-hold in a culture and economic system that sought to exclude them in every way. These households may have included few to no children, thereby enabling their members to translate their labor more easily into imported

consumables. This study uncovers the complex processes that drove the consumption of costly goods and demonstrates that they likely functioned as essential components of localized and regional signaling systems that provided social and economic benefits to the most competitive and successful signalers.

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Acknowledgements

I am indebted to many colleagues and friends who have generously provided time, advice and support during this project. I am grateful to Adria LaViolette for serving as chair of my committee after James Deetz, my original chair, died in 2000. Her gentle yet challenging critiques have helped shape this project in important ways. I have not only profited from her fastidious editorial skills but also her steadfast guidance over the years.

I have had the good fortune of Stephen Plog's advice and friendship for the past 12 years. He has played a crucial role in my development as an archaeologist and scholar. Through thoughtful discussions and incisive critiques, he has helped me find the bridge between processual, post-processual, and evolutionary approaches to the archaeological record.

Louis Nelson, serving generously as my outside reader, sharpened several critical aspects of my argument. This study has benefited from his careful reading and insightful comments and I appreciate the time he has given to this project.

My greatest debt is to Fraser Neiman. His intellectual and personal support of this project has been unstinting. He invested weeks in reading and rereading these chapters and patiently taught me more than I ever thought I'd know about multiple regression. He showed remarkable amounts of humor and patience throughout this process, even at its lowest points.

I have benefited greatly from the advice, encouragement, and time offered by professors, colleagues and friends over the years, including Anna Agbe-Davies, Jennifer Aultman, Alison Bell, Malcolm Bell, Joanne Bowen, Laurie Burgess, David Brown, Stephen Cox, Clifton Ellis, Garrett Fesler, Ben Ford, Gina Haney, Jeffrey Hantman, Barbara Heath,

Julie King, Larry McKee, Drake Patten, Charles and Nan Perdue, Doug Sanford, Hal Sharp, Brian Thomas, Steve Thompson, Patricia Wattenmaker, Camille Wells, and Aaron Wunsch.

Garret Fesler, Barbara Heath, and Doug Sanford were exceptionally helpful, and were always ready to talk with me about the Utopia, Poplar Forest, and Stratford Hall sites used in this study. Barbara was particularly generous with her data on Poplar Forest slave families. My discussions with her about consumption in general and buttons in particular have proved essential to the development of this project.

I owe much to my colleagues at Monticello who have provided an exciting and supportive intellectual community over the past five years. Daniel Jordan and Andrew O'Shaughnessy kindly supported my leave-of-absence from my position as project manager of the Digital Archaeological Archive of Comparative Slavery. Fraser Neiman made this project a priority and provided me with the time that I needed to complete it. Derek Wheeler, Jesse Sawyer, and Leslie Cooper created the spectacular archaeological site maps that are reproduced in this study. They are also available through the DAACS website (www.daacs.org). Sara Bon-Harper and Karen Smith have offered insightful and helpful comments on my work over the years. As archaeological analysts for the archive, Beatrix Arendt, Leslie Cooper, and Jesse Sawyer generated the tremendous amount of high-quality data used in this study. In addition to their Herculean data analysis, they have filled my work days with good humor and kept the archive running smoothly while I was writing. I am thankful for their support and friendship.

It is my good luck to have many friends who have supported this project with encouragement, warm meals, and much-appreciated albeit distracting boondoggles over the years. They include Beatrix Arendt, Sara and Nick Bon-Harper, Liz Chang, Barbara Clark-

Smith and Daniel Bluestone, Kathy Crichton, Kate Destler and Johann Neem, Mark Edwards and Mary Michaud, Clifton Ellis, Gina Haney and Glenn Foulds, Barbara Heath and Mark Freeman, Debbie and Andy Lockman, Martha Hill and Fraser Neiman, Judith Kucharski, Drake Patten, Hal Sharp, and Dell Upton and Karen Kevorkian.

My parents have fostered this project in more ways than they know. My brothers have been my best friends along the way. My husband, Aaron Wunsch, has kibitzed, cajoled, and kept my spirits high throughout. This would not have been completed without them.

Chapter 1: Slavery and consumption in the eighteenth-century Chesapeake

Introduction

The past two decades have witnessed a growing consensus among social and economic historians that the "consumer revolution" was among the most important developments in the history of the early-modern Atlantic World (Brewer and Porter 1993; Carson et al. 1994). The availability and importance of material culture at all scales, from houses to household linens, accelerated throughout the seventeenth, eighteenth, and early nineteenth centuries. During this same period, the Atlantic World was transformed by the influx of people who spoke unfamiliar languages and employed different social customs. As they came together in living and working situations, old ways of identifying status, such as bloodlines, property ownership, and religious affiliation, were no longer easily identified or universally understood (Carson 2003). It was in this new world that the acquisition and use of consumer goods played an essential role in the strategies invented by people to communicate shifting social identities and conceptions of self.

By the 1760s, residents across the English-speaking Atlantic sought artifacts made in newly fashionable styles to adorn their bodies and their tables. In North America, even slaves found ways to earn money that was then used to purchase items such as sugar, alcohol, tools, cloth, ribbon, mirrors, tablewares, and objects of adornment such as buttons and buckles (Baumgarten 1988; Fox-Genovese 1988; Heath 2004a; Martin 1993; Penningroth 2003; Schlotterbeck 1995). In addition to these cash-based transactions, slaves traded and bartered with other slaves, free blacks, white store merchants, and even their owners for items that were not part of their weekly or yearly rations (Berlin 1998; Brown 1996; Genovese 1976:537; Heath 2004a; Walsh 1994).

Archaeological evidence from excavated eighteenth-century slave quarter sites confirms what the documentary record has begun to reveal: slaves found ways to earn money, and a portion of what they earned was spent on acquiring fashionable consumer goods. However, few historical or archaeological studies have sought to measure systematically these patterns or to understand the factors underlying these consumer activities. This dissertation is one of the first systematically comparative archaeological studies to explore the complex social, economic, and ecological dynamics that facilitated the participation of enslaved African Americans in the eighteenth-century Consumer Revolution.

In doing so, this study draws from the literature on consumption produced by scholars in a number of academic fields, including archaeology, anthropology, history, and economics.[1] From broad theoretical explorations of how social structures are revealed through consumption choices to studies that focus on the minutia of shifting styles within specific forms of material culture, scholars of consumption have sought to address the complex relationship between goods and society by asking a range of questions: How is material culture used to create and express identity? In what ways does consumption determine social, political, and economic hierarchies? Why do people want goods and why is consumption a seemingly cross-cultural attribute? In seeking to address this last question, I apply signaling theory to archaeological data from 19 slave dwellings in the Chesapeake region of Virginia in an attempt to understand why slaves spent valuable energy and time pursuing fashionable European and American goods. In doing so I address the following

[1] For influential anthropological literature on consumption see Appadurai 1986; Bourdieu 1977, 1984; Braudel 1981; Deetz 1996; Douglas and Isherwood 1978; McCracken 1988; Miller 1987, 1995; Veblen 1898. For general material culture studies/historical literature on consumption see Bushman 1992; Brewer and Porter 1993; Campbell 1987; Carson et al. 1994; Forty 1986; Glennie 1995; Martin 1993b; McKendrick et al. 1982; Shammas 1990; Weatherill 1988.

questions: What factors drove the consumption of particular types of material culture and what did those items represent to the person who acquired them? In what ways did slaves use material culture to signal their identity and position within their plantation as well as to other slaves, free blacks, and whites within the larger colonial Chesapeake world? How was this new material realm used to create social and economic connections among enslaved individuals?

Signaling theory serves as the foundation for this study (Bliege Bird and Smith 2005). It helps answer these questions by offering expectations about the factors that drove slaves to acquire particular types of material culture and by providing a model for how artifacts used in signaling systems should pattern across sites. I argue that slaves sought material goods as a way to communicate abilities, achievements, and personal attributes that made them valued social allies and mates as well as formidable competitors. I suggest that the acquisition of European goods functioned as a form of symbolic communication that facilitated strategic competitive behavior, which benefited both individuals and the collective group within precarious enslaved communities, situated within a colonial context. If so, the strategic use of difficult-to-acquire goods should be revealed through patterns in the archaeological data.

Organization

This study is organized into seven chapters. The remainder of this chapter provides the historical context for slavery and consumption in the greater Chesapeake region[2] of Virginia during the eighteenth century. I then review recent archaeological approaches to slavery and consumerism.

[2] The greater Chesapeake region includes the areas traditionally referred to as the Tidewater and Piedmont areas of Virginia.

Chapter 2 provides an overview of the anthropological and archaeological literatures that shape my use of signaling theory. I focus specifically on different theoretical approaches to conspicuous consumption, stylistic behavior, and feasting. Two recent theoretical movements that have had particular influence on post-medieval archaeology, agency theory and Marxism, are discussed.

I introduce signaling theory in Chapter 3 and provide a detailed explication of the signaling model that guides this study. I suggest that six independent historical and demographic variables should impact a slave's ability to participate in the market economy. They include: a slave quarter's proximity to an urban center, its proximity to the main house, whether it is located on an agriculturally diversified plantation, whether the owner is present on the property, whether slaves living at a site were owned by Thomas Jefferson, and the date of the structure. After developing the signaling model, I discuss seven artifact classes essential to understanding consumption patterns in the Chesapeake. I suggest that metal buttons and refined ceramics were particularly important as signaling media. I provide expectations for how these objects should pattern across sites in light of the independent variables identified in the signaling model.

Chapter 4 introduces the 19 structures that contribute data to this study. I also discuss the significance of using artifactual and contextual data from the Digital Archaeological Archive of Comparative Slavery (DAACS, http://www.daacs.org). DAACS is a Web-based initiative that encourages inter-site, comparative archaeological research on slavery by bringing together standardized data from sites excavated by different archaeologists throughout the Chesapeake, Carolinas, and the Caribbean.

In Chapter 5 I tackle the first goal of this study: to devise methods that reliably estimate artifact use and discard rates throughout the eighteenth century. Abundance indexes and multiple regression models are used to test the influence of time and independent signaling variables on the consumption of the artifact classes introduced in Chapter 3. These models provide clear clues to regional signaling trends as expressed through the consumption of costly goods.

In Chapters 6 and 7 I move beyond the general consumption trends seen in Chapter 5 by exploring the use and discard of two costly artifact types: metal buttons and refined ceramic wares. A close analysis of changing button and ceramic styles reveals that four different consumption strategies were at work on slave sites throughout the Chesapeake. Multiple regression and principal component analysis are used to reveal individual and household-specific signaling strategies. They not only provide clues to the different audiences targeted by the consumer but my results also suggest ways of identifying different household compositions. These analyses may well reveal that gender-based housing arrangements were in use on certain plantations throughout the eighteenth century. Chapter 7 draws together the analyses of buttons and refined ceramics and concludes with plans for future research.

Historical Dynamics in the Eighteenth-Century Chesapeake

The eighteenth century was a dynamic period in Virginia's history, with the colony experiencing rapid population growth, economic successes and failures, and the influx of disparate ethnic and social groups (Isaac 1982; Morgan 1998; Walsh 1995a, 1995b, 2001). Growth and change in the use of and demand for enslaved labor was one defining

characteristic of this century. Despite the steady growth in the colony's enslaved population in the last decades of the seventeenth century, by 1690 only 15 percent of the Chesapeake population was black (Kulikoff 1986). A significant portion of these people were creolized slaves who lived and worked alongside white indentured servants during the last quarter of the seventeenth century (Kulikoff 1986:319; Walsh 2000). However, the growing population of African-born slaves spurred the passage of strict laws regulating slave behavior and social interactions. Despite these laws, many slaves continued to live and work in close proximity to their owners and white indentured servants, all of whom shared frequently the same living spaces (Kulikoff 1986; Neiman 1977, 1993).

As foreign demand for tobacco skyrocketed in the early eighteenth century, the economic success of the Virginia Colony appeared bright. Success depended, however, on plentiful land and a steady supply of permanent labor, and planters as well as small farmers began investing wholeheartedly in slaves. By 1750, social dynamics within the colony had changed dramatically as a result of slavery. An estimated 54,000 slaves were brought into Virginia and Maryland between 1700 and 1740 and approximately 49,000 of these were African-born (Kulikoff 1986:320; Morgan 1998). Sex ratios among these slaves were disproportionate as slavers imported two men for every woman. One fifth of the imported persons in the first decades of the eighteenth century were children and one in four of these new slaves died within their first year in the Chesapeake (Kulikoff 1986:321-326). Much of the slave population was dispersed over a wide geographic area, with nearly half of all slaves living on plantations with fewer than 10 slaves in the 1730s (Kulikoff 1986:330). These demographic factors made it difficult for slaves to create stable families and communities

during the first decades of the eighteenth century (Fesler 2004a, 2004b; Kulikoff 1986; Morgan 1998; Walsh 1995b).

The spike in the slave population during the first decades of the eighteenth century was primarily the result of importation, not natural increase (Morgan 1998). Although enslaved Africans at that time were from different ethnic groups, it appears that language and cultural similarities were shared by the majority of individuals coming from the Bight of Benin and Angola regions. This may have helped in the creation of a Creole language and an African-American culture (Kulikoff 1986:321; Walsh 2000). A number of slave conspiracies and group runaway attempts throughout the 1720s, 1730s, and 1740s suggest that some African-born slaves quickly formed friendships and alliances (Kulikoff 1986:328-330).

The ethnic make-up of the Chesapeake remained diverse until the mid-1700s (Carson 2003; Morgan 1998; Walsh 2000). By 1750, the majority of all Chesapeake residents were born in Virginia, although a majority of American-born slaves did not emerge until the mid-1760s (Walsh 2000). It took over 25 years for a community of Chesapeake-born adult slaves to form, a process that resulted in a shift from "support networks based on co-resident strangers, quasi-kin, and country men and women to networks rooted primarily in biological kin ties" (Walsh 2000:2). Archaeological and architectural evidence, such as a decrease in both house size and the number of architectural features known as subfloor pits, corroborates this transition from co-resident strangers to cooperative, kin-based households (Fesler 2004a; Galle 2002; Neiman 1997, 2005).

Demographic changes were not the only factor influencing slave life during the eighteenth century. Tobacco cultivation quickly exhausted soil fertility and its success under the traditional swidden system required regular field rotation and long fallow periods

resulting in the need for large quantities of agricultural land. As the Chesapeake population grew, competition for fertile farmland drove people west toward the Piedmont. A drop in tobacco prices in the 1730s followed by a period of international volatility--beginning with the American Revolution and continuing through the Napoleonic wars--greatly impacted Chesapeake tobacco culture (Kulikoff 1986; Walsh 1995b). Embargos combined with a decreased demand for tobacco and decreasing soil fertility created economic instability that reverberated throughout the region. Planters reacted by committing larger percentages of their land holdings to wheat, maize, and other grains as a way to reestablish economic viability.

Large-scale agricultural diversification affected slave life in a number of ways. Replacing tobacco with wheat and maize involved more than simply replacing one plant with another. As agricultural strategies shifted, lifestyles were irrevocably changed. Tobacco cultivation supported by a gang-based system of labor required slaves to work from sunup to sundown (Morgan 1998; Penningroth 2003; Walsh 1995a, 1995b). Wheat cultivated with a plow, however, did not entail constant tending by gangs of slaves. Instead, grain cultivation required intense periods of labor in the spring for planting and again in the fall for harvesting. Summer and winter were slack periods in which slaves were given other tasks such as mending fences, tending livestock, and procuring fuel. In shifting to mixed agriculture, large plantation owners found it necessary to restructure labor within their plantation and many sold slaves south where demand for labor was increasing due to successful rice and cotton cultivation (Berlin 1998; Morgan 1998; Walsh 1995b). The most elite planters, such as George Washington and Thomas Jefferson, who had both the resources and the interest, created new occupations for their slaves. Washington began a large fishing venture on the

Potomac River while Jefferson strove to make his plantation self-sufficient by building mills, naileries, and joineries that supplied new occupations to former field laborers and other slaves. Archaeological work at Monticello has illuminated the impact of diversification on slaves by linking pollen evidence for the emergence of agricultural fields with the movement of slave housing from flat areas to steep and marginal land that could not support the cultivation of wheat (Bon-Harper et al. 2000, 2001; Wheeler and Bon-Harper 2005).

The post-revolutionary economy, as well as population increases, led to a rapid geographic expansion within the Chesapeake that resulted in the growth of small, previously unimportant towns (Walsh 1995a). As these towns grew, so did the number of non-agriculturally based jobs. Industries such as iron forges and quarries provided a way for owners to divest themselves of slave labor, while retaining economic rights over their human property (Dew 1994; Penningroth 2003). The hiring-out of slaves became commonplace during the last quarter of the eighteenth century. It not only provided owners with money but "afforded new opportunities for slaves to earn cash rewards for their labour and offered some a wider range of occupations" (Walsh 1995a:113). It also provided slaves, especially men, with greater degrees of mobility.

As an American-born slave generation coalesced, agricultural regimes shifted, towns grew and non-agricultural opportunities expanded, consumer demand for goods not produced in the home, such as ceramics, fabrics, and adornment items, skyrocketed. The market responded nimbly to consumer demand. By 1760, the Consumer Revolution was in full swing and the social and economic conditions in the eighteenth-century Chesapeake were ripe for the appearance and use of costly signaling through material status displays (Bliege Bird and Smith 2005; Neiman 1997). I argue in later chapters that these demographic,

economic, and social changes played an important role in shaping the signaling strategies of slaves.

Historical Approaches to the Consumer Revolution

Twenty-five years ago historians turned to the study of consumption as a means for understanding social and economic changes in the early modern world (Bushman 1993; Campbell 1987; Carr and Walsh 1994; B. Carson 1990; C. Carson 1994, 2003; deVries 1993; Martin 1989, 1994; McKendrick et al. 1982; Shammas 1993; Weatherill 1988). Since then, a number of approaches have been popular. Throughout the 1980s, scholars located the impetus for the Consumer Revolution in eighteenth-century technological innovations and the development of industrial manufacturing systems. It was argued that the ability to produce inexpensive and fashionable goods in large quantities created consumer demand. Novel marketing techniques linked to fast-paced stylistic changes were seen as further driving consumption (McKendrick et al. 1982). Within the last 15 years, however, scholars have argued that consumer demand and motivation, not changes in production, drove consumption (Carson 1994, 2003; Shammas 1993:177). In making this argument, historians tackled the question of consumer demand in early modern England and the Chesapeake by delving into the intricacies of probate inventories and wage and price indexes (Carr and Walsh 1994; de Vries 1993; Shammas 1993). By focusing on the motivation for consumption, complex and sometimes surprising relationships between consumption choices, household wealth and consumer prices were uncovered.

Just as archaeologists and architectural historians tracked the increasing individualization of ceramic use and growing symmetry in house plans (Deetz 1972, 1996;

Glassie 1975), historians used probate inventories to reveal the dramatically shifting consumption practices of early modern Europeans and Americans. The increased consumption of groceries, such as tea and sugar, and consumer durables by households spanning the economic ladder was identified as the key indicator of the onset of the Consumer Revolution. By the 1730s what was once a distinctly premodern sensibility in which even the economic elite in the Chesapeake went without bed linens, chairs, and chamberpots, had given way to a society where all levels of wealth were gradually increasing their levels of consumption (Carr and Walsh 1994:64). By the 1760s even poor and middling households were using objects related to dress and social ceremonies, such as tea drinking, to display status (Carson 1994; Carr and Walsh 1994:66-70; McKendrick et al. 1982; Roth 1988).

Carole Shammas's (1993) research on the demand for groceries and consumer durables in eighteenth-century England and the Chesapeake, and Lois Carr's and Lorena Walsh's (1994) work with 7,500 probate inventories from four counties in the Chesapeake, plotted consumer activities over time and space, and across wealth categories. They demonstrated that factors such as market accessibility, household size, occupational status, urban residence, and level of education all shaped the consumption habits of eighteenth-century colonists. Shifts in the Chesapeake economy, particularly the diversification of economic activities, resulted in stable local economies that were no longer solely reliant on a fluctuating tobacco market (Carr and Walsh 1994:122). In addition, the increasing number of women in Virginia contributed to the rise in families that consumed much more than bachelors had (Carr and Walsh 1994:126-127).

Although understanding the social, economic, and demographic changes that influenced purchasing patterns is essential to explaining the growth of consumer demand, uncovering the motivation for consumption is perhaps the most difficult part of consumption studies (Carson 2003). Historians have proposed two possible explanations for the sharp increase in consumer activity in the eighteenth century. Proponents of emulation theory argue that the desire to emulate the elite drove the explosion in new fashions and fast-paced consumption (Carr and Walsh 1994; McKendrick et al. 1982; see also Veblen 1931 [1899]). Carr and Walsh (1994:134) suggest that economic diversification and population growth combined with emulative desires encouraged the use of fashionable goods in regional status systems. Quickly changing fashions promoted emulative acquisitive behavior that further encouraged entrepreneurship, resulting in a self-perpetuating process of production and consumption. Although emulation theory is popular among a number of scholars (Breen 1986; Bushman 1992; Carr and Walsh 1994; McKendrick et al. 1982) others argue that emulation theory doesn't explain the complexities of consumption, citing examples of popular styles and consumer goods that first sprang from the lower and middling classes rather than originating with the wealthy (C. Campbell 1987; Lears 1989; Weatherill 1988).

A second explanation for the sudden increase in acquisitive behavior in the eighteenth century rests not on an analysis of consumption or production data but rather on evidence for an increasingly far-flung movement of people and goods. Cary Carson (1994, 2003:358) describes the early modern world as a "patchwork quilt of commonplaces" that quickly unraveled as Native Americans, Europeans, and enslaved Africans came into contact in the New World. As the Atlantic World, especially the American colonies and Caribbean, became an amalgamation of unfamiliar languages and customs, the old European ways of

identifying status and position such as bloodlines, property ownership, and religious affiliation were no longer universally understood (Carson 2003:335; Wobst 1977). Carson contends that material culture became increasingly a system for status identification that was portable, affordable, understandable and acknowledged. The acquisition and use of chairs, individual place settings, and specialized dining equipment established hierarchy within the household and served to divide people into "finely calibrated user groups" (Carson 1994:505).

New social ceremonies and systems of gentile manners developed that required not only the consumption of fashionable goods but also the appropriate knowledge to use and display the newly acquired items. Dancing the minuet not only required social skills that constituted a form of specialized knowledge, but also the fashionable garments appropriate for a ball (Carson 1994). Tea drinking required not only the acquisition of expensive imported ceramic teawares, silver, and tea, but also the leisure time and knowledge to properly take tea each day (Roth 1988). As population density in the colonies increased and agricultural regimes diversified, Carson (2003:356) argues that "fashion bearing goods solved specific social problems better than anything else." The ownership and correct use and display of costly clothing, ceramics, and houses produced difficult-to-fake signals of one's position within colonial society. Public debates among the elite over the accessibility of luxury goods expressed concern that the growth of less costly, nonessential consumables would mask social distinctions. These arguments emphasize the value placed on consumer goods as modes of social distinction and highlight the threat felt by the elite as such goods became widely accessible (Carson 1994:520-522). As material culture became the primary mode of social communication within an increasingly diverse Atlantic World, the elite

demanded novel fashionable goods that were used to reestablish and perpetuate closely guarded social divisions (Carson 2003).

Microscale historical analyses of consumer behavior, exemplified by Carr and Walsh's (1994) research, provide invaluable data on how and when colonists began their headlong rush into the consumer world. Carson's work builds on microscale analyses by providing an explanation for why elite and middling classes eagerly entered into what seemed a nearly unbreakable cycle of consumption. These studies contain analytical problems, however, for which archaeology can offer solutions. Despite the wealth of data probate inventories provide, they do not record the flow of goods though a lifetime, only at the moment of inventory. Documents do not reveal yearly per capita expenditures or shifts in generational consumption patterns. Apparent inconsistencies arise when probate inventories clearly show that the percentage of wealth invested in consumer goods declined throughout the eighteenth century while store inventories suggest the quantity of goods consumed such as sugar, ceramics, tea, furniture, and linens, increased during that same period (Carr and Walsh 1994; de Vries 1993:101-102; Shammas 1993). As the consumption of less durable, "socially strategic commodities" such as clothing, ceramics, food, and newspapers, rose, the money invested in these goods was not captured by the probates (de Vries 1993:100; Martin 1989; Shammas 1993:191). The growing acquisition of less durable goods beginning in the mid-eighteenth century meant that an increasing amount of money was being invested in goods that were purchased and discarded without ever appearing in an inventory (Carson 2003; de Vries 1993).

Unlike documents, archaeological assemblages can be used to estimate per-capita discard rates that reveal the flow of goods through time and the complexity of purchasing

patterns on a range of sites. In addition to filling these gaps, the archaeological record provides data on individuals and groups not represented in primary documents. Carson's model, which remains relatively unpopulated by slaves and the poor, can be melded with signaling theory and tested with archaeological data to aid an understanding of the consumer motivations of slaves.

Historical Approaches to Slave Consumption

Historical research uses probate inventories, wills and price and wage indexes as its main sources of information about consumer behavior. The result is that little is known about the consumer practices of individuals--such as slaves and the poor--who left little trace in record books. Over the last decade innovative work has emerged that highlights enslaved individuals' participation in the market economy. However, many of these studies focus on market practices in the Caribbean where slave participation in marketing activities was widespread due to plantation work regimens and provisioning expectations (Beckels 1995; McDonald 1993, 1995; Mullins 1995). Much more documentation also exists about the economic activities of slaves during the antebellum period in the American South (J. Campbell 1995, Corrigan 1994; Dew 1993; Hudson 1994a, 1994b; Penningroth 2003).

Recent research using store accounts and court records reveals that slaves participated actively in the American market economy of the eighteenth and early nineteenth centuries (Berlin and Morgan 1995; Heath 2004a; Hudson 1994; Martin 1993; Penningroth 2003; Schlotterbeck 1995; Walsh 1992, 1995b, 2001). Merchants' account books and slave owners' journals demonstrate that by the 1770s enslaved Africans and African Americans in the New World were actively pursuing the acquisition of cash money. Just as the elite and

middling classes were scrambling for the latest fashions, primary sources indicate that slaves sold vegetables, chickens, eggs, crafts, and, in some cases, their own labor to earn money to purchase European goods from stores and urban and rural markets (Berlin and Morgan 1995; Heath 1999b, 2004a; Hudson 1994a; Martin 1993; Penningroth 2003; Schlotterbeck 1995; Walsh 1995). They worked into the night cultivating their own gardens, making brooms, baskets, and quilts, and occasionally completing jobs for which they were paid (Heath 2004a; Morgan 1998; Perdue et al. 1996; Walsh 1995b). Other slaves, such as those assigned to work close to their owners, had the opportunity to acquire money through tips and gifts. Although the majority of slaves earned only a small amount of money, a handful accumulated substantial wealth, which they used to make large purchases such as livestock, their own freedom, and the freedom of others (Corrigan 1994; Genovese 1976:392; Hudson 1994a:87-88; Stanton 1996:38).

Possessing cash was essential to a slave's ability to purchase goods at a store because, unlike their owners, slaves were generally not extended credit. Merchant's accounts and ledgers show that sugar and alcohol top the list of items most frequently purchased by slaves in the greater Chesapeake region. Cloth, ribbon, adornment items such as buttons and buckles, mirrors, and tools were also popular (Baumgarten 1988; Fox-Genovese 1988; Heath 2004a; Martin 1993; Penningroth 2003; Schlotterbeck 1995). Slaves also traded and bartered with other slaves, free blacks, white store merchants, and even their owners (Berlin 1998; Brown 1996; Genovese 1976:537; Walsh 1994).

Despite the lack of literature explicitly focused on slave participation in the Consumer Revolution in the eighteenth-century Chesapeake, it is possible to develop a picture of slaves' market activities using more general histories of the region (Berlin 1998; Brown 1996;

Genovese 1976; Heath 2004a; Martin 1993; Morgan 1998; Stanton 1993, 2000; Walsh 1995a; White 1999). Slaves' economic opportunities in the Chesapeake were perhaps greatest in the mid-seventeenth century when many were given access to provisioning grounds. In addition to growing tobacco and vegetables, slaves raised cattle, rented land, acquired debt, and hired out their labor (Berlin 1998:34-35). These considerable opportunities were curtailed during the last quarter of the seventeenth century when legislation was passed that made it illegal to trade with servants (Berlin 1998:35). Despite this, the economic activities of slaves grew and diversified throughout the eighteenth century. Virginia slave codes passed in the 1790s again prohibited free individuals from purchasing or trading with slaves and made it illegal for slaves to sell any "goods, wares or merchandise" (Schlotterbeck 1995:171). Neither whites nor blacks were deterred by these new laws and slaves continued to find ways to earn and spend money, with much of the activity sanctioned by their owners.

Slaves in the Chesapeake acquired goods from two main sources, their owners and themselves. Owners provided shelter, food, and clothing to their slaves, although it is difficult to know how much food and clothing was given. It is likely that most owners provided some amount of food each week and clothing once or twice a year, but the amount of both varied greatly (Breeden 1980). By the mid-seventeenth century most adult slaves and indentured servants received one peck of shelled corn a week and some amount of preserved meat or fish, a standard which appears to have remained constant throughout the eighteenth century (Walsh 1995a:98-99). Slaves were encouraged to maintain gardens and raise chickens in order to supplement their rations with vegetables, eggs, and meat. Despite early interpretations of gardens as places where "slaves learned to value their own land and work

for themselves but not how to defend and expand their interests in vigorous marketplace competition" (Genovese 1976:539), it is now clear that gardens and poultry yards provided extra food and were important ways to earn money (Berlin 1998; Heath 2004a; Morgan 1998:359-360; Stanton 1993:38; Walsh 1994:22, 1995a:102-104, 1995b)

Slaves throughout the region also made items, such as baskets, brooms, leather, and quilts, which they sold or traded to their owners and others living in the area (Berlin 1998:34; Heath 2004a:23; Morgan 1998:361; White 1999[1985]:128). Barbara Heath's (2004a:23) investigation of Jefferson's granddaughter's account books reveals that slaves at Monticello sold vegetables, eggs, beeswax, and items they had made to the Jefferson family. Monticello slaves expected they would receive cash rather than credit for these items. In addition to paying their slaves for produce and crafts, some owners, most notably Thomas Jefferson, gave their slaves money for doing particularly onerous jobs or for working beyond daily requirements (Schlotterbeck 1995:174; Stanton 1993:27, 2000:77,130). Jefferson established a profit-sharing system for certain slaves, such as the man who oversaw the nailery and received a small percentage of its profits (Stanton 1993:27).

Hiring out or "jobbing" become an increasingly common practice by the mid-eighteenth century when the shift from tobacco to wheat and mixed grains served to restructure labor requirements on large plantations. Slaves were frequently hired out at planting and harvesting times, which gave men opportunities to travel and earn money. After the Revolution, increasing industrial production, such as ironworking, required a constant supply of labor, a demand that was often met by hired slaves. Although their owners received payment for the initial "hire," slaves occasionally received a direct payment for working beyond the requirements of the lease (Berlin 1998:270; Dew 1993; Morgan 1998).

Skilled slaves such as carpenters, who were hired out, were also occasionally given wages for their work (Schlotterbeck 1995:175; Stanton 2000:104-105; Walsh 1995a:114). Agricultural diversification and other changes in the post-revolutionary economy offered primarily new opportunities for male slaves, giving them more mobility and the opportunity to not only earn money as a reward for their labor, but also to perform a wider range of occupations (Berlin 1998:271; Walsh 1995a:113).

Although enslaved men had greater mobility and economic opportunities away from their home plantation, women were clearly important actors when it came to earning money. Heath's work with the Randolph account book sheds light on the demographics of the eighteenth-century slave economy. At Monticello, the majority of people who traded with Randolph were single young men living on their own and older adult women and men whose children were no longer living in their household. Although young women do not appear in the account book, Heath suggests that their activities were "absorbed by the households in which they lived," therefore their labor would have been represented in the goods sold to Randolph (Heath 2004a:26). Not surprisingly, families with small children were poorly represented, "perhaps due to a combination of limited time and an increased household consumption that precluded the production of surplus for market" (Heath 2004a:26).

Documents also reveal that some slaves traded in stolen goods (Brown 1996; Morgan 1998:370-371; Walsh 1995a). Slaves occasionally took a share of the material provided for the job they were assigned. For example, some carpenters stole and sold nails and tools while spinners took wool for their own textile needs from the amount they were required to process (Walsh 1995a:116). Lorena Walsh suggests that slaves who pilfered meat from owners may have used it as underground currency (1995a:105). Despite laws forbidding

trade with slaves, some enslaved women established relationships with poor white women in the Chesapeake specifically for the illicit trade of food and other goods stolen from their owners. Using court records, Kathleen Brown uncovered several instances in which white women were punished for purchasing stolen goods, such as corn and tallow, from enslaved women (1996:305). In one case a white woman was convicted of stealing a dress from Jenny, a slave with whom she had established illegal trading relations (Brown 1996:292).

Although some slaves saved the money they earned for large purchases such as livestock or their freedom, the majority used their cash to purchase groceries, cloth, adornment items, and tools from local stores. Heath combined evidence from Ann Cary Randolph's[3] account book with accounts from six stores in five Piedmont Virginia counties[4] to model the purchasing habits of slaves in the late eighteenth century.
Like her reading of Randolph's ledger, Heath's detailed work with account books provides a fascinating look at both the items enslaved individuals purchased, as well as the demographic profile of the purchasers. Although both women and men purchased items, men made the majority of the purchases. It is likely, however, that enslaved men purchased items not just for their own use but for their families and friends as well (Heath 2004a; Martin 1993).

What did slaves buy with the money they earned? Store account books in central Virginia provide a view into the purchasing habits of slaves in the late eighteenth and early nineteenth centuries. Men appear to have shopped more regularly than women and they frequently purchased tools and raw materials, such as iron, that may have been used to create

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[3] Randolph was Thomas Jefferson's granddaughter. She recorded her weekly purchases from slaves living at Monticello and at Jefferson's outlying Tufton and Lego quarters. Randolph recorded purchases made between 1805 and 1808 (Heath 2004a).
[4] Heath (2004a) analyzed daybooks and ledgers, dating from the 1770s through 1810, from six businesses in Bedford, Buckingham, Fauquier, King William and Orange counties.

saleable items (Heath 2004a:29). Items that alleviated some of the harshest edges of slavery such as rum, sugar, and molasses were among the most popular.

Slaves also purchased buttons, buckles, ribbons, hats, textiles, thread, and tablewares (Genovese 1976:557; Heath 1999b, 2004a; Martin 1993:309; Schlotterbeck 1995:177). They were aware of current styles and purchased high quality goods, as seen in the account books of the John Hook store in Franklin County, Virginia where the "better quality textiles made up a larger percentage of their [slaves'] purchases than any other sub group" (Martin1993:309). In addition to silks and fine linens, slaves in central Virginia purchased equipment required for processing fiber and making clothing, such as pins, scissors and dyes (Heath 2004a:29). Complete garments, such as shirts, vests, stockings, and hats were also purchased (Schlotterbeck 1995:177). The desire and ability to purchase dress-up clothes was repeatedly mentioned in ex-slave interviews and narratives, indicating the importance of non-provisioned garments (Baumgarten 1988, 1991; Fox-Genovese 1988; Mellon 1988; Perdue et al. 1976:316; Rawick 1972).

As I will contend in later chapters, the acquisition of European goods required sacrifices, compromises, and physical risks that made them ideal signals of a person's underlying qualities. On the most basic level, European goods were monetarily costly. As we've seen, the primary way slaves earned money was by growing or making items that could be sold or traded. To a lesser extent, slaves may have received cash through tips or as a small compensation for being hired out. The time and skills required to earn money and to shop for goods demonstrated a person's skill as well as their ability to endure the physical costs incurred by spending time producing these items. The majority of slaves worked from sunrise until sunset everyday except Sunday, with some occasionally receiving Saturday

afternoons off as well. Gardens were tended, clothes mended and crafts made and these activities competed with the time required for food preparation, child care, and sleep. Jan deVries (1993:107) has suggested that the Consumer Revolution began slowly in Europe with the reallocation of household labor. Families secured employment for underused household labor and found ways to occupy the downtimes in the agricultural schedule. They also reallocated and intensified labor within the home by pressing women and children into household production. These choices allowed households to produce surpluses that enabled them to consume items made outside their own economy.

It is likely that similar decisions about household labor were made by slaves. The time needed to produce extra vegetables or to weave an additional basket would have been carved from time needed for sleeping or caring for a family. Barbara Heath's data on slave producers at Monticello clearly suggest that household composition influenced an individual's ability to produce items to sell or trade. Only three of the 17 families selling produce to Ann Cary Randolph, Jefferson's granddaughter, had a child under the age of 10. Single men, young couples without children, couples with only one child under the age of one, and couples with adult children participated most frequently in the market economy at Monticello (Heath 2004a:23-25).

Using Heath's data, it is possible to argue that enslaved families with young children could not bear the costs of producing goods or vegetables to sell. Although Jan deVries (1993:115) does not believe that the need to meet daily caloric requirements prevented Europeans from participating in the market economy, this may have been a very real concern for laboring enslaved families with young children. It is clear from both documentary sources and the archaeological record that slaves supplemented their food provisions with

wild animals and fish they captured, and with vegetables and poultry they raised. For some, there was extra produce that could be turned into money. For others, all food procured and grown may have gone directly to women bearing the high metabolic costs of pregnancy and breast-feeding. Once women stopped breast-feeding, food that had been allocated for a lactating mother was most likely given directly to young children in an effort to encourage growth and prevent debilitating disease. Additionally, the care required of young children probably absorbed all extra time. Household size and composition was one clear factor in a person's ability to signal with non-provisioned goods. The ability to sell produce or meat that could have gone to meet the caloric needs of the individual or family was a strong signal of successful strategies that met basic household requirements while also producing a surplus.

In addition to household composition, access to markets was another important factor in a slave's ability to acquire European goods. Carr and Walsh (1994:91) have shown that whites of all wealth categories living in or near urban centers such as Annapolis, Williamsburg, or Yorktown consumed more than their country cousins. Although the distance to markets and stores did not affect the consumption patterns of wealthy white families living in rural areas, poor and middling households living in rural areas did not conspicuously consume in a manner equivalent to their urban counterparts. Carr and Walsh (1994:91) note that "Town living revolved around clock time and offered many more opportunities for social intercourse than country living did...town dwellers with property less than 50 pounds had watches, table knives, forks, good china, table linen, and teaware more often than did their country counterparts." Proximity to a market or urban center most likely had a direct effect on a slave's ability to participate in the market economy. Extrapolating

from Carr and Walsh's work, it is possible that urban slaves more easily and frequently purchased goods than slaves living in rural areas.

Although traveling even short distances to a market demonstrated some degree of mobility, the acquisition of goods for rural slaves required longer trips. Items purchased during those trips may have symbolized the mobility granted to them by owners or they may have represented a person's resourceful ability to travel surreptitiously (Upton 1988). Slaves who did travel to stores and markets also accepted the dangers of traveling off the plantation. Even if they had permission from their owner, traveling on roads and moving outside the influence sphere of the plantation brought with it the very real risk of harassment or attack. For Virginia slaves in Bedford, Buckingham, Fauquier, King William, and Orange Counties, traveling in groups to markets and stores may have been a method for reducing the risks of harassment (Heath 2004a:28). Store accounts indicate that slaves arrived and shopped in groups on Saturday afternoons and Sundays. In addition to providing protection, group shopping excursions were social events, opportunities to interact with slaves, free blacks, and whites in urban and rural public spaces outside of their home plantation.

Historians are revealing the active and complex consumer world with which slaves engaged. Much of this work, however, focuses on the late eighteenth through nineteenth centuries and on a few specific geographical areas. Broad temporal and spatial comparative research that uses archaeological data to understand the larger context of, and the motivations for, slave consumption during the eighteenth century has not been undertaken.

Archaeological Approaches to Slavery and Consumption

Since the 1970s, archaeologists have contributed much to our understanding of the conditions of slavery in early America. Researchers have provided unparalleled data about daily slave life through the investigation of living and work spaces, uncovering evidence of inter- and intra-plantation social, economic, and religious activities (Fesler 2004a; Galle and Young 2004; Heath 1999a; McKee 1992a; Neiman 1997; Samford 2000; Singleton 1999; Stine et al. 1996). Archaeological investigations have exposed the violence and oppression of slavery while also uncovering material evidence for connections to African traditions (Ferguson 1992; Heath 2004a; Kelso 1986a; McKee 1996; Samford 1996; Singleton 1988; Wilkie 2004; Yentsch 1995). Other archaeological research has explored the relationships among enslaved, free, and indentured populations within the built plantation environment (Deetz 1996; Fesler 2004a; McKee 1992a, 1995; Neiman 1990).

Archaeologists are only beginning to explore the ways slaves interacted with the market economy during the eighteenth and nineteenth centuries (Arendt et al. 2003; Galle 2004, Galle and Neiman 2003; Heath 1999b, 2004a; Thomas 1998). Until recently the majority of archaeological studies addressing slave material culture have interpreted material acquisition in two ways: either as a means of expressing remembered African traditions and culture (Brown 1990; Emerson 1994; Ferguson 1992; McKee 1995; Patten 1992; Russell 1997; Samford 1996, 2000; Stine et al. 1996; Wilkie 2000, 2003) or as a direct result of theft and/or regular provisioning from an owner (McKee 1995; Orser 1987, 1988; Otto 1984; Samford 1996).

Much attention has been given to the presence of certain artifact types that scholars have argued are connected with African spiritual or cultural traditions. As a result, blue

beads and bottles, pierced coins and utensil handles, marked ceramics and marbles, smooth stones and water worn ceramics, small religious charms and crystals, bones such as chicken feet and raccoon bacula, and iron pots are frequently used to identify slave sites. Acquisition or creation of these goods by slaves is interpreted as having been driven by a cultural need and by a desire to both actively and passively resist the dominant European culture (McKee 1995; Russell 1997; Samford 1996, 2000).

Although many archaeologists acknowledge that slaves acquired small quantities of goods apart from their rations, such consumption is rarely seen as having much impact on the archaeological record. Charles Orser (1988:741) best represents this view, having noted that although the acquisition of items by slaves could be influenced by an individual's ability to obtain goods "secretly" by theft or barter: "...this kind of acquisition...must be viewed as sporadic and insignificant overall". Orser and other scholars conclude that the material patterning observed on slave quarter sites reflects primarily owners' choices and that the acquisition of goods by slaves was thus a function of a planter's power (1988:743). The inferred routes by which slaves acquired non-provisioned goods, such as theft and barter, not only discount the real monetary and strategic efforts that slaves invested in consumption but also imply that slaves consumed goods primarily in retaliation and resistance to their enslavement.

Brian Thomas' (1998) investigation of slavery at the Hermitage plantation, the home of Andrew Jackson located outside Nashville, Tennessee, takes a more agent-centered approach through the material remains from quarters in different areas of the plantation. Drawing on Orser's work, Thomas agrees that material culture plays a key role in establishing and maintaining social relations of power and inequality. However, Thomas

suggests that while planters exerted tremendous control over the distribution of material goods, slaves had a hand in shaping their own identities and were adept at negotiating the power dynamics on each plantation (Thomas 1998:535). Thomas attributes the majority of the ceramic and faunal remains to Jackson's provisioning choices but believes that slaves used items like blue beads and hand-charms as symbols of resistance and a shared African belief system. Thomas argues that these items helped to create "alternative images of community" for slaves that allowed them to express their African heritage (Thomas 1998:546).

Another recent approach uses the Hermitage data to argue that slaves with specialized skills used their occupations strategically to build social and economic relationships both within and outside their plantation community (Galle 2004). An examination of data from four slave quarter sites indicates that the enslaved seamstress and her family had far greater access to consumer goods than other slaves who worked in both the field and the house at the Hermitage. I suggested that a seamstress's ability to provide other slaves with remnants of fine fabrics, the occasional fancy button, and knowledge of fashion were important commodities that she could trade for goods as well as the services of other skilled slaves.

Barbara Heath's research is the first archaeological approach to specifically address the consumption practices of slaves (1997, 1999b, 2004a). Using data from quarter sites at Poplar Forest, Heath focuses on how "enslaved individuals from diverse backgrounds began to form materially recognizable subcultures grounded in regional economics, community size and demographics, access to market and common experiences that eventually resulted in a shared African-American ethnic identity" (1999b:48). Archaeological and documentary data are brought together to demonstrate that slaves at Poplar Forest earned money and had some

degree of consumer choice. She focuses specifically on what she considers the conspicuous consumption of fashionable adornment items such as buckles, beads, and buttons that were used to personalize clothing and enhance identities through the display of current fashions.

Heath supports her hypothesis regarding conspicuous consumption and identity formation with several lines of evidence. The slave quarter button assemblage contained buttons with unique backstamps and markings, suggesting they did not come off uniforms or purchased clothing. Heath uses the range of buttons to argue for "a piecemeal strategy of button acquisition, perhaps more characteristic of episodic purchase by individuals rather than of purchase in bulk by the overseer for the entire slave population" (1999:62). Evidence for conspicuous consumption also comes from button data that demonstrate Poplar Forest slaves discarded usable, unbroken white metal buttons and replaced them with more fashionable gilt buttons. Sixty-five percent of the gilt buttons in the quarter's archaeological assemblage were broken while only 37 percent of the white metal buttons were broken at the time of discard (Heath 1999b). These data clearly suggest that individual adornment choices were important to slaves at Poplar Forest.

Despite these recent studies, the motivation for, and impact of, the Consumer Revolution remains under-theorized by archaeologists. For 20 years social and economic historians have wrestled with how to measure consumption and debated the persistent consumption question: which came first, supply or demand? Archaeologists, on the other hand, have used material culture and the archaeological record to address questions related to the identity triumvirate: race, class, and gender (Brewer and Porter 1993; Carson 2003; Carson et al. 1994; Delle 2000; Franklin and Fesler 1999; McKendrick et al. 1982; Orser

2001; Scott 1994; Singleton 1999). However, archaeological data are uniquely suited to address the consumption of goods in situations of political, economic, and social domination such as colonialism and slavery. The archaeological record is qualitatively different from colonial texts produced by the dominant culture as it provides us with the materials for understanding and estimating discard rates, a direct testimony to the consumption choices of those living at each site.

Archaeologists who have undertaken regional comparisons of slave sites have used architectural data as evidence for both the development of the enslaved household and the retention of African architectural and ritual traditions. These studies benefit from site plans that provide easily accessible information about house types, sizes, locations, and architectural features such as subfloor pits (Adams 1990; Affleck 1990; Fesler 2004a, 2004b; Neiman 1990, 1997b; Samford 2000). In this study I use detailed artifactual data to address questions related to century-long material patterning on slave quarter sites. This analysis of artifact data from 19 slave quarters excavated by different archaeologists over a 20-year period is made possible through the use of standardized data from the Digital Archaeological Archive of Comparative Slavery (www.daacs.org).

Subsequent chapters demonstrate that a comparative approach grounded in artifactual data is essential to understanding why Chesapeake slaves strove to participate in the eighteenth-century market economy. Signaling theory, introduced in Chapter 3, provides expectations about the factors that drove slaves to acquire particular types of material culture and it offers a model for how artifacts used in signaling systems should pattern across sites. In applying the model to the archaeological data, I will argue that slaves sought material goods as a way to communicate the abilities, achievements, and personal attributes that made

them valued social allies and mates as well as formidable competitors. Following Carson (1994, 2003), I suggest that the acquisition of European goods functioned as a form of communication that cemented social and economic relationships while also clearly drawing boundaries among groups. I hope to demonstrate that among Africans and African-Americans, whose skin color and genealogy were generally unambiguous determinants of their enslavement, consumer goods facilitated strategic competitive behavior which benefited both individuals and the collective group within precarious enslaved communities situated in a colonial context.

Chapter 2: Consumption as communication: the strategic use of material culture

Archaeologists have identified a wide range of human activities as forms of consumption, from big game hunting and public feasting to the construction of monumental architecture and the purchase of Victorian bric-a-brac (Bell 2002; Bray 2003; Delle 2000; Dietler 1988, 1990, 2003; Dietler and Hayden 2001; Franklin, 2001; Hall 2000; Hayden 2001; Mullins1999a; Neiman 1997a, 1999). They have employed a similarly wide range of theories when trying to understand consumption in pre-capitalist, prehistoric, post-medieval and post-modern societies. Here I focus on five approaches to material culture which I have drawn upon in this study. Although each is grounded in different theoretical frameworks, they all grapple with the communicative nature of material culture. I begin with economic and anthropological approaches to conspicuous consumption as a form of strategic human behavior. Anthropological and archaeological theories of stylistic behavior, especially those that focus on style's communicative role in the exchange of goods, are also influential. Finally, I turn to three theoretical positions that address consumption and that are especially popular among archaeologists: commensal politics, Marxism, and agency theory. These paradigms raise important questions about how archaeologists have come to understand consumption in the context of the household, the region, and the Atlantic World.

Conspicuous Consumption as Strategic Behavior

Economist and sociologist Thorstein Veblen first proposed that the extravagant expenditure of time and money, along with the conspicuous display of disinterest in economic profit, were direct signals of a person's social status that functioned as a way to gain competitive advantage over others (1934 [1899]). In his best known work, *The Theory of the Leisure Class* (1934 [1899]), Veblen articulated a model in which the lavish

consumption of goods and leisure time was a form of what has become known as costly signaling. Using examples drawn from observations about late nineteenth-century New York elite lifestyles, Veblen demonstrated that the consumption of both goods and leisure communicated not only wealth but also other generally unobservable characteristics such as physical prowess and strength, familiarity with elite social rituals and access to desired resources (1934 [1899]:69).

In building this argument, Veblen observed that the level and type of consumption varied depending on the social and spatial distance between individuals and groups. He argued that consumption and leisure worked equally well as extravagant advertisements within a small, close-knit community. He made it clear, however, that the exchange of information and knowledge about intangible forms of wealth such as leisure was harder to transmit over large spatial distances or social gaps. Within increasingly large and mobile populations, individuals had fewer ways of assessing a person's wealth or breeding. As a result, Veblen argued that the conspicuous consumption of goods replaced leisure as a form of communication when large and more differentiated groups of people need to be reached (1934 [1899]:86).

Veblen not only observed that the consumption of goods replaced leisure as the most effective form of communication within large groups, he also discovered that there were unspoken rules that governed the strength and intensity of consumption. He showed that once people began consuming, consumption became a nearly impossible cycle to break. After an initial foray into the market, New York elite tended to develop a constant striving for better and more desirable goods (1934 [1899]:73). This growth of "punctilious discrimination" not only displayed wealth but it also exhibited a person's ability to discern

quality and display taste through highly desired, high-quality objects (Veblen 19314 [1899]:73). In communicating with large, disparate groups, it was essential that the type and quality of the goods used were universally understood. Veblen noted (1934 [1899]:87):

> The only practicable means of impressing one's pecuniary ability on these unsympathetic observers of one's everyday life is an unremitting demonstration of ability to pay. In the modern community there is also a more frequent attendance at large gatherings of people to whom one's everyday life is unknown; in such places as churches, theatres, ballrooms, hotels, parks, shops, and the like. In order to impress these transient observers, and to retain one's self-complacency under their observation, the signature of one's pecuniary strength should be written in characters which he who runs may read.

Veblen suggested that the failure to continue consuming at a sustained level of quality, as well as an inability to understand the signals, became a "mark of inferiority and demerit" (Veblen 1934 [1899]:74). This concept of correctly and effectively communicating with different audiences, especially individuals and groups that are spatially and culturally distant, is a key concept that also appears in the literature on stylistic behavior.

Veblen's theory that consumption functions as a signal of one's status, and that individual consumption patterns vary based on spatial and cultural distance with other individuals and groups, developed out of his Darwinian evolutionary views. Although he acknowledged the importance of an active, individual agent, he also rejected methodological individualism, leading him to propose that both agency and structure were the outcome of a causal, evolutionary process (Hodgson 1998:423-425; Mayhew 1998). In his treatise, *Why is economics not an evolutionary science?* (1998 [1898]), Veblen suggested that economic institutions, as well as the individual, functioned within a larger guiding structure. He argued that,

> The individual is but a single agent in each case; and he enters into each successive action as a whole, although the specific end sought in a given action may be sought avowedly on the basis of a particular interest; as e.g., the economic, aesthetic, sexual,

> humanitarian, devotional interests. Since each of these passably isolable interests is a propensity of the organic agent man, with his complex of habits of thoughts, the expression of each is affected by habits of life formed under the guidance of all the rest. (1998 [1898]:412-413)

Stemming from this, he saw evolutionary economics as "a theory of a process of cultural growth as determined by the economic interest, a theory of a cumulative sequence of economic institutions stated in terms of the process itself" (Veblen 1998 [1898]:413). Together, decision-making individuals, institutions, and structures were directly involved in socio-economic evolution (Hodgson 1998:426).

In *The Theory of the Leisure Class*, Veblen posited that conspicuous consumption is an overarching cultural force propelled by an individual self-interest that does not benefit the larger community. Andrew Trigg (2001) has recently argued that a similar structuring force is also reflected in Pierre Bourdieu's concept of the *habitus*. Defined by Bourdieu as "systems of durable, transposable dispositions, structured structures predisposed to function as structuring structures" (1990:53), the *habitus* can be understood as an adaptable framework of principles that shape people's cultural, economic, and social behavior. It is within the structuring yet malleable *habitus* that individuals acquire cultural capital and, through the use of "transverse mobility," convert both cultural and economic capital into symbolic capital, defined by Bourdieu as social prestige or honor (Bourdieu 1990 [1977], 1984; Jenkins 1992; Trigg 1998).

Bourdieu argued that the acquisition of symbolic capital frequently requires large economic investment. Through examples of livestock consumption and bride wealth negotiations among the Kabyle of Algeria, Bourdieu demonstrated that the irrational expenditure of money generated "symbolic patrimony" or "credit-worthiness," capital that

allowed individuals or a group to "acquire prestigious affines...and defines the group's capacity to preserve its land and its honour...in short, the capital of material and symbolic strength which can actually be mobilized, for market transactions, contests of honour or work on the land" (1990 [1977]:120). Bourdieu's examples of how symbolic capital is strategically used to gain prestige are akin to Veblen's conspicuous consumers who used goods to not only communicate their economic and social standing but to also manipulate relationships with other people.

Veblen and Bourdieu believed that the waste of time and money through conspicuous generosity, exemplified by feasts or charity balls, were also strategies employed by individuals to gain symbolic capital. Although overly generous acts might have the appearance of contributing to a greater social good, Veblen and Bourdieu both argued that the end result of conspicuous generosity is that the costs of such projects are outweighed by the benefits received by the host/signaler. In addition, the costs of such displays, combined with the benefits accorded to the signaler, maintained a social structure in which only the extremely wealthy or powerful could conspicuously consume and donate at an elite level (Bourdieu 1990 [1977]; Veblen 1934 [1899]).

Unlike Bourdieu, who saw transverse mobility as a way for people to gain both economic and cultural capital, Veblen believed that hierarchical social structures were created and reinforced through high-end consumption. Even though Veblen acknowledged that lower classes consumed goods beyond what was needed for subsistence, he argued that the dominant patterns of consumption, and its resulting cultural influences, were established at the most elite levels (Lears 1989:74). The consumption of luxuries by the wealthy contributed to their comfort and cultural supremacy while the consumption of luxuries by the

"industrious" or lower classes did nothing but contribute to their own misery and oppression (Veblen 1934 [1899]:72). Signaling theory, which draws heavily on both Veblen and Bourdieu, suggests that individuals at all economic levels used consumption as a strategic method for establishing relationships and acquiring social prestige. All three theories arrive at costly signaling through consumption as a reliable form of communication that is an effective tool for establishing social and economic relationships within and between social groups.

Style and Material Communication

The communicative power of material culture, as expressed through consumption and exchange, is a persistent theme in the archaeological literature on style. Style in material culture, and its role in human societies, has long been foci of archaeological debate and discussion (Conkey 1978; Conkey and Hastorf 1990; Deetz 1965; Dunnell 1982, 1986; Hodder 1998, 1990; Neiman 1995; Plog 1978, 1983, 1990; Renfrew 1986; Sackett 1985, 1990; Wiessner 1983, 1984, 1988, 1990; Wobst 1977). Until the late 1960s, archaeologists trained in the culture history school used primarily artifact styles to create typologies, which were in turn used in seriation and to draw boundaries around culture areas (Deetz 1965; Ford 1952; Hill 1970). Style was understood as a direct expression of a culture's world view. It became increasingly a tool which culture historians used to "read history" from artifact patterning (Conkey 1990:8).

By the mid-1970s, the archaeological focus on style as the sole determinant of artifact types, and by extension chronology, had shifted to the study of style as a specialized system of non-verbal communication that played an important role in the formation and

solidification of political and ritual structures, exchange systems, and ethnic identities. During this same period, anthropologists Pierre Bourdieu (1977) and Mary Douglas and Baron Isherwood (1978) introduced books that explored material goods as social and symbolic representations of cognitive structures. These authors suggested that individuals, acting as agents as well as in groups, expressed their interests through the selection and use of specific objects, thereby transforming consumption into an act of social and symbolic significance. Douglas and Isherwood argued that goods made cultural categories visible and stable and that they were essential for creating and maintaining social relationships (1978:59-60). The consumption of goods was seen as a "nonverbal medium for the human creative faculty," in other words, a form of communication. As we saw earlier in this chapter, Bourdieu argued that social differences and taste as expressed through the consumption of goods revealed a deeply seated, almost unconscious social structure that he termed the *habitus* (1977). Douglas and Isherwood's and Bourdieu's links between the social and symbolic aspects of material culture prompted a surge in consumption studies and impacted archaeological discussions of style and its role in communication.

Although coming from different theoretical backgrounds, Martin Wobst (1977) and Ian Hodder (1982; 1990) were among the first archaeologists to begin investigating style's ability to transmit information and legitimize power structures. Wobst's classic article, *Stylistic Behavior and Information Exchange* (1977), focused on stylistic patterning in artifacts but with an emphasis on style as a "strategy of information exchange" (Wobst 1977:317). Wobst's processual approach is arguably an early variant of signaling theory. He began by positing that style is "part of the formal variability in material culture that can be related to the participation of artifacts in processes of information exchange" (1977:321).

Style in material culture was, however, only one aspect of Wobst's notion of stylistic behavior. Stylistic behavior encompassed not only the stylistic attributes of an object but also how objects were selected and used as non-verbal messages in information exchange. His model for stylistic behavior as information exchange took into account the effectiveness of certain types of material culture for communication (1977:329), the category of person receiving the message (immediate household, close friends, target group, or strangers) and the "costly energy for the signal," i.e. what is took to produce and transmit the information (Wobst 1977:322-325). As we'll see in Chapter 3, many of Wobst's expectations for stylistic behavior are mirrored in my expectations for signaling behavior in the Chesapeake.

Although Wobst acknowledged that stylistic messages could transmit a wide array of information, he focused specifically on how stylistic choices summarized an individual's economic and social position and were effective as markers of group affiliation (1977:327-328). Drawing on Wobst, Pauline Wiessner (1983, 1985), James Sackett (1985), and Stephen Plog (1990), identified three forms of style that had different communicative functions: isochrestic, stylistic (Wiessner 1983) or symbolic (Plog 1990), and iconographic style. Wiessner's work with the Kalahari San and Plog's research in the prehistoric Southwest, both demonstrated that an increase in stylistic variability was directly linked to growth in population density in their respective research areas. A greater range of stylistic variability allowed members of large social groups to distinguish themselves while also establishing social and economic ties across a large geographic region (Plog 1978, 1990; Wiessner 1984, 1990).

The emergence of post-processual archaeology in the early 1980s prompted a movement away from quantitative approaches to the archaeological record and brought with

it a call for more contextual epistemologies. Although the processual paradigm had begun to link the material past with the social past, post-processualists called for more reflexive approaches to style and argued that archaeologists should be addressing symbolic and ideological relationships in the archaeological record. By the early 1990s, Ian Hodder was loosely defining style as "'a way of doing' where 'doing' included the activities of thinking, feeling, and being" (1990:45). He complicated the concept by declaring that style can and should be interpreted through a series of personal, subjective, and historical references. Hodder pointed out that while style is a form of non-verbal communication, its meaning is constantly in flux, determined both the actor and the observer. As it only exists in reference to certain events, the communicative aspect of style is forever variable depending on the context (1990:51).

Hodder offered three components of style that he argued were visible in the archaeological record (1990:46). Style, as manifested in material culture, has spatial and temporal patterns. He argued that it is also interpretive and evaluative, and that individual interpretations of style are reflected in the similarities and differences in objects. Finally, Hodder connected style to power, arguing that the control over stylistic forms results in the control of meaning and communication. His emphasis on the "duality" of style--that style is both a statement and interpretation of that statement and involves an object and a subject--asked archaeologists to consider the multiple contexts in which individuals and groups use and receive stylistic information (1990:51).

Commensal Politics

Commensal politics, the study of how food and drink are used to shape power negotiations, is currently at the forefront of archaeological studies of complex societies. Since Michael Dietler's first major article on the role of drinking in colonial Greek contexts in France (1990), archaeologists working around the world have explored the extent to which consumption rituals involving food and drink are an archaeologically measurable, structuring feature of a society's political and social economy (Bray 2003; Dietler 1988, 1990, 1998, 2003; Dietler and Hayden 2001; Hayden 2001; Phillips and Sebastian 2004; Wills and Crown 2004). The search for feasting rituals has proven particularly attractive, since it is a form of consumption that can occur on multiple levels. Feasting not only provides a model for investigating the domestic economy of an individual household but it also promises a paradigm for exploring the factors that promote social and economic complexity on a large scale.

The ritual consumption of food and drink is now recognized as a common element in a wide range of human activities, from the creation of social solidarity and interaction networks to the establishment of hierarchical relationships. Despite its use by archaeologists of divergent theoretical backgrounds (e.g., Dietler 1998, 2003; Hayden 2001), commensal politics has quickly become one of the most influential models for understanding the emergence of status differentiation and social complexity. From this literature, three functional modes of commensal politics have emerged and become accepted. These three functions can generally be summarized as follows: 1. to negotiate relationships between people, 2. to legitimize institutional social asymmetries and 3. to affirm ranked social differences (Dietler 2001:75; Wills and Crown 2004:154).

The emphasis on feasting as a method of establishing social, political, and economic relationships has had a significant impact on those trying to understand the emergence of complex societies. Specifically, Dietler and his colleagues have pushed other archaeologists to develop paradigms for understanding the development and establishment of socio-political complexity that transcend the search for prestige goods and other signs of rank. As Chip Wills and Patricia Crown (2004:153) note, some of the more important models for the emergence of status differentiation in the American Southwest now investigate the "use of food to create social relationships beyond the family." Large quantities of feasting-related vessels or previously unidentified ritual architecture are now often linked to commensal politics and are central to demonstrating the role that feasting plays in a wide range of human activities.

Dietler and others have clearly demonstrated that feasts effectively mobilize labor, establish and solidify economic and political associations, as well as communicate authority and status. For those studying commensal politics, feasting creates and reinforces relationships, a theme that is also prevalent in the literature on style and stylistic behavior. The consumption of food and drink, not material goods, has the ability to function as a form of communication that signals the host's ability to mount a costly celebration and draw groups of people together for multiple purposes.

Approaches to Consumption in the Post-Medieval World

Since the late 1970s, three theoretical positions have dominated archaeological approaches to the material record of the post-medieval world: structuralism, Marxism, and agency theory. These approaches gave archaeologists the theoretical tools to explore consumption in a manner that moves beyond interpreting an artifact as simply a commodity

that can be used to assess status or to calculate economic scales (Miller 1991; Otto 1984). The way in which these theories have been applied to the archaeological record of Colonial America has been most influenced by James Deetz's structuralist paradigm known as the Georgian worldview (Deetz 1988, 1996 [1977]). Deetz's *In Small Things Forgotten* (1996 [1977]) challenged archaeologists not simply to describe how the consumption of material culture changed in eighteenth-century America, but also to seek explanations for what prompted or activated these changes. Structural anthropology, whose main theoretical premise is that human thought is organized into oppositional structures mediated by culture, provided the theory that grounded Deetz's heuristic model of the Georgian worldview. By tracking stylistic developments in houses, gravestones, ceramics and other forms of material culture, Deetz argued that objects reflected and reproduced changes in the mental oppositional structures of American colonists (Deetz 1988:222). Using data from New England, and later eighteenth-century Virginia and nineteenth-century South Africa, he posited that material culture demonstrated a shift away from a medieval mindset toward a Renaissance-influenced Georgian worldview, a transformation that resulted in an emphasis on the intellectual over the emotional, the private individual over the corporate entity, and the refined and artificial over the natural. The explanation for this shift, as demonstrated by the increasing privatization and specialization of domestic space, the whitening of ceramics, house facades, and gravestones, and the emphasis on individual place settings and chairs, was that society needed to maintain control over its increasingly economically and ethnically diverse population (Deetz 1996). The shift in the form and consumption of material culture was a direct indication that the "old communal order was in disarray" (Deetz 1988:228).

Deetz's structural approach was a watershed contribution to how scholars thought about early American culture and it significantly influenced two popular theoretical approaches in historical archaeology, critical materialism or Marxism and agency theory. Much of the research conducted on post-medieval sites in the past 20 years has been guided by some variant of Marxist or agency theory. As the following section demonstrates, the line between Marxist and agency theory has been fluid in historical archaeology, with theories of Marxism, gender, race, agency, and identity all forming what Lynn Meskell terms the "conceptual space of post-processual archaeology" (2001:194).

Marxist and agent-centered approaches to consumption

In the 1980s archaeologists began adopting Marxist theory as a structuring framework for understanding power and class through the archaeological record (Leone 1987, 1988; McGuire 1992; Orser 1988, 1999; Tilley 1982). It was a particularly attractive theoretical approach for those excavating sites of striking inequality, such as plantations and urban contexts. Charles Orser's examination of power relations on southern plantations (1988, as discussed in Chapter 1) and Mark Leone's work on elite and slave contexts in Annapolis, Maryland (1988) were some of the first studies to address eighteenth- and nineteenth-century power relations in an explicitly Marxist framework. Over the years, Leone's work has retained its Marxist roots by providing a number of arguments about the manner in which material culture is used by the elite to manipulate and control lower social and economic classes.

Inspired by Deetz's Georgian worldview, Mark Leone sought an explanation for how and why Georgian ideas about modernity spread (Leone 1988:236, 1999:198-199; Leone and

Potter 1999). Drawing on Marxist theory, Leone argued that capitalism, as both a cultural and economic system, was responsible for the emergence of the Georgian worldview in eighteenth-century Annapolis, Maryland (1988, 1999). Leone argued that the Annapolis elite used three novel types of material culture as cultural and economic capital to legitimize their place in the social hierarchy of the city. He suggested that objects symbolizing Enlightenment principles, including scientific and musical equipment such as clocks, microscopes, and stringed instruments, were used by the elite not only to display wealth but to justify the emergence of individualism within society. The introduction and use of individual table settings allowed the elite to demonstrate their knowledge of social rules related to hygiene and food consumption rituals. Finally, Leone argued that the Annapolis elite demonstrated their control over the environment by shaping the landscape with designed gardens and platted surveys. He concluded that this was a capitalist motive to prove that the owners of such gardens were worthy of a leading position in the looming American Revolution (1988:240).

In Leone's work, and that of his students, most notably Paul Shackel (1993, 2003) and Paul Mullins (1999a, 2001), consumption is a strategy of the elite for solidifying knowledge and communicating power structures. Through consumption, material objects coalesced to create a "performance" in which the autonomous self was established and sustained (Leone 1988:247). It was also through this type of performance that the ideology of individualism was established, an ideology that legitimized the growth of unequal wealth in such a way that prevented violent resistance from the poor (Leone 1999). Within this brand of Marxism, with its focus on the individual, agent-centered approaches to the post-medieval world germinated.

As interest in Marxist approaches remained strong throughout the 1990s (Johnson 1996; Leone and Potter 1999), the number of studies addressing how variables such as race, gender, age, sexuality, and identity shaped power relations skyrocketed (Delle et al. 2000; Epperson 1999; Franklin 2001b; Hodder 2001; Meskell 2001; Mullins 1999a, 1999b; Potter 1999; Thomas and Thomas 2004; Orser 2001; Scott 1994). Initially driven by Marxist agendas, scholars tackled agency questions through inquiries about the relationship between individuals, groups, and economic and ideological structures (Tilley 1982). Although scholars currently using agency theory argue that there is little consensus about what agency is (Bartlett 2000; Brumfiel 2000; Dobres and Robb 2000:3; Gero 2000; Shackel 2000), and many would not explicitly call their work agent-centered, much recent archaeological research intersects with agency theory. Elizabeth Brumfiel points out that archaeologists writing about agency agree that it explores "the intentional choices made by men and women as they take action to realize their goals" (2000:249).

Paul Shackel and Martin Hall are perhaps the most explicit in their agent-centered approaches which look specifically at consumption as a way of understanding power relationships. Coming out of Leone's school of critical materialism, Paul Shackel employs agency theory to move beyond the power play of the Annapolis elite by adding non-elite actors to a critical materialist analysis (2000). Shackel suggests that through the process of production and consumption of material goods, elite and non-elites act together to reproduce or change societies' structuring principles (2000:232). Departing from Marxist theory, he argues against false-consciousness by suggesting that individuals are well aware of how society operates and that they act consciously within that dynamic structure. In the case of

nineteenth-century Harper's Ferry, West Virginia, Shackel proposes that domestic consumption is a powerful tool for not only constructing identities but for also expressing one's acceptance or rejection of the oppressive new industrial capitalistic ethos.

Using archaeological data from two occupations at a wage-laborer's house and one occupation at a master armorer's house in Harper's Ferry, Shackel concluded that people first occupying the wage laborer's house and those in the master armorer's household bought into the new industrial ethos by purchasing fashionable ceramics. Archaeological evidence from the second wage-laborer occupation shows that the household owned only inexpensive and well used ceramics. Shackel uses agency theory to suggest that even though laborers during the second occupation made much less money than the previous generation of wage laborers, the absence of fashionable ceramics was not a result of poverty. He argues instead that women in the second wage laborer's household, who were primarily in control of domestic consumption, used material culture to express resistance to the new industrial culture and the social position into which they were forced (2000:243). In resisting the traps of the new industrial work ethos, Shackel believes that these women "registered their protest through the use of a material culture whose meaning and use they could control, one that had been fashionable generations earlier, when they had some control over their everyday lives beyond the domestic sphere" (2000:242).

Martin Hall's recent book, *Archaeologies of the Modern World* (2000), also presents a strongly argued agent-centered approach to the archaeology of consumption, domination, and colonialism. He draws on but moves beyond critical materialism, suggesting that only an agent-centered approach can provide access to the non-elite. Hall's book is set up as a discussion of how one should read material culture as the "remnants of the repetitive

insistence on difference and, in this repetition, evidence of the anxiety of those with power to regulate the spaces and places of their authority" (2000:39). Although Hall argues that an agent-centered archaeological approach will help to reveal the inconsistencies and ambiguities that are "key to interpreting the colonial order," he relies almost exclusively on primary texts, maps, paintings, extant buildings, and landscapes (2000:150).

Despite the lack of archaeological data in his study, Hall's agent-centered approach highlights a number of the issues raised by Veblen, Wobst, Hodder, Leone and Shackel, all of whom were trying to decipher the multivalent meanings embedded in material culture and the act of its consumption. For example, Hall's notion that "...consumers (who were at the same time wage laborers) were coupled to the dominant elite not through persuasiveness of false consciousness, but by the desire to signify status in a competitive, class-conscious world" clearly reflects the influence of Veblen's pioneering study on conspicuous consumption (Hall 2000:196-197; Veblen 1934 [1899]). His discussion of the performative aspects of power, in which material culture plays a key role in the performance, reflects aspects of Wobst's concerns with stylistic behaviors and the audiences that they target as well as Leone's analysis of "performances" by the Annapolis elite. Although Hall does not focus specifically on style, he discusses the performative elements of material culture and the importance of understanding the audience at whom the performance is directed (Hall 2000:19-20). Hall suggests that all performances have locational stages on which material culture is the "inscribed text" that is ultimately a "declaration of relative status" (2000:99).

For Hall, as with Hodder, material culture is a "site of ambiguity," in which objects, architecture and landscapes have multiple meanings depending on the context. Within these contexts, power can take a variety of shapes contingent on the "varying forms of agency that

include the ever-present dimensions of gender, class, and race, and the contradictions set up by their intersections" (2000:27). Hall emphasizes that understanding these contextual consistencies and ambiguities in material culture are key to interpreting the colonial order (2000:150).

Discussion

The preceding scholars were selected because of the significant impact their ideas about material culture have had on their respective intellectual communities. However divergent theoretically, several themes in their work intersect in conscious and unconscious ways. Veblen and Bourdieu, in particular, continue to have far reaching effects across disciplines.

Material culture as a form of communication is the most pervasive theme in the literature reviewed. The notion that goods have communicative properties that are skillfully employed by individuals and groups for their own benefit is essential to signal theory. Wobst (1977), Wiessner (1983), and Plog (1990) argue that style and stylistic behaviors imbue artifacts with meanings that are then used to mark a range of boundary types, from ethnic to geographic. Less concerned with the exact workings of style but equally concerned with the messages embedded in goods are Dietler (1990), Hodder (1982), Leone (1988), Shackel (2000) and Hall (2000) who all work to understand the multiple ways in which objects communicate, create, and maintain power structures. Hall's contention that the global circulation of goods is directly related to colonial domination, and that the establishment of cultural norms and boundaries relates directly to the manner in which material goods were used in colonial situations, intersects with Cary Carson's (1993, 2004) suggestion that the

Consumer Revolution developed as the form of communication in the multi-cultural and linguistic milieu of colonial situations.

The effectiveness of conspicuous consumption in establishing power relations is also an important concept, but it is one that often only identifies the dominant or elite strategy. Even though Veblen focuses on the extremely wealthy and Bourdieu on the bourgeois, their ideas about the strategic competitive individual also apply to the non-elite agent in those societies that use consumption as a tool for establishing competitive and cooperative relationships. Agent-centered studies such as Hall's also remind us of how individuals of different ages, genders, and ethnicities consume in ways that transmit messages about their different states of being. Barbara Heath's research (2004a) highlights this exact concept by showing how consumption patterns among slaves fluctuated depending on household size and moments in a person's life cycle.

Perhaps most significantly, each author recognizes that the performative nature of material culture, from its creation and acquisition to its display, is what gives material culture its communicative strength. All acknowledge that the nature of the audience, its size and composition, has the ability to influence both the physical shape of material culture as well as the messages communicated by the object. I will suggest in upcoming chapters that material signals were embraced by enslaved African Americans and used in a variety of "locational stages," ranging from stores and marketplaces to urban backlots and quarter yards to establish social and economic relationships.

Martin Hall (2000) brings together many of the themes discussed in this chapter by consciously tying the literature on material culture, consumption, colonialism, and style together into a package designed to give voice to the subalterns that colonial authority wished

to silence. This is an admirable task but one that ultimately remains divorced from archaeological data. Hall's distance from archaeological data reveals concerns that many archaeologists have about post-processual approaches such as symbolic archaeology, critical materialism and agency theory (see Brumfiel 2000). These approaches lack the tools to produce testable models and leave many unanswered questions. For Leone and Shackel, one is left asking: What motivated wage-laborers to rebel? What were the costs and benefits of not participating in the capitalist system? Why are financial constraints *not* a convincing reason for acquiring inexpensive and outmoded ceramics? For Hodder and Hall: How and why are certain forms of material culture selected for use in the creation and maintenance of power structures? For Dietler and those studying commensal politics: If, as Wills and Crown point out, we want to understand feasting as central to social change rather than simply identifying it in the archaeological record, how do we predict the conditions that give rise to behaviors such as feasting, resistance, or compliance (2004:155-156)? For all: How might we understand the communicative, performative, competitive and cooperative aspects of consumption that allow archaeologists to engage with individual agents and structuring aspects of their lives such as gender, age, and class?

Accepting that material culture has different meanings in different contexts and that no single material trait can be linked solely to acts such as resistance or feasting, makes it very difficult to define the conditions under which consumption is a significant societal process. We will be unable to fully understand the power and motivation behind consumption until predictive theoretical approaches are developed. Deetz recognized the difficulties of understanding causal mechanisms when he admitted that the identification of

the Georgian mindset was easy, but understanding why that mindset emerged was an essay of probabilities (Deetz 1988:231).

A recent turn toward cultural relativism has impacted the ways in which many archaeologists engage with archaeological data. As a result, a number of archaeologists specializing in the post-medieval period are hesitant to offer explanations, and often use artifacts for purely descriptive purposes or work on a theoretical level that engages the data selectively. As James Deetz reminds us, however, "the use of archaeological data to explain rather than simply to describe depends on the effective explication of those critical links that exist between human behavior and it material products" (1973:15). Building on Deetz, Fraser Neiman has recently pointed out that archaeologists "need to develop theoretical and methodological tools that allow us to test critically our inferences about the past" (1999:147). Archaeological data, when combined with a rigorous theoretical approach, are uniquely suited to building models and identifying causes that in turn are essential to understanding human behavior

One major goal of this study is to employ a theoretical approach that provides an understanding of the causal mechanisms behind the consumption of goods while also understanding specific agent-centered cases of consumption in comparative contexts. Signaling theory provides the broad theoretical framework that allows one to model consumption among eighteenth-century Chesapeake slaves while also addressing the question of why people pursue the acquisition of non-essential goods. This study gathers threads from the approaches discussed here and weaves them into a causal theoretical framework that is uniquely suited to archaeological data. Hall avoids archaeological data in the study cited above because he believes that "subalterns" such as slaves and women, the

"engines" of colonial society, "did not even leave Deetz's 'small things forgotten' in the archaeological record" (2000:97). On the contrary, strategies employed by individuals to survive their enslavement, including the development of strong social relationships and the acquisition of economic success, are visible archaeologically. The remaining chapters present a number of tools for uncovering these strategies.

Chapter 3: Modeling signaling strategies among enslaved African Americans

A common thread that connects often theoretically disparate literature on stylistic behavior, feasting, and consumption is the emphasis on material displays as visual forms of communication that transmit information about the person responsible for the display (Dietler and Hayden 2001a; Hawkes and Bliege Bird 2002; Leone 1988; Plog 1990; Wiessner 1984, 1990; Wobst 1978). Influenced by Veblen's theories on conspicuous consumption and grounded in behavioral ecology, signaling theory is premised on the argument that the consumption of material goods in excess of the minimum required for subsistence is a form of communication essential to successful strategic human behavior. Over the past ten years, anthropologists and archaeologists have successfully used signaling theory to model wasteful and inefficient behavior such as conspicuous consumption in a variety of ethnographic and archaeological contexts (Bird and O'Connell in press; Bliege Bird and Smith 2005; Boone 1998, 2000; Hawkes and Bliege Bird 2002; McGuire and Hildebrandt 2005; Lundquist 2002; Neiman 1997, 1999, 2005; Plourde 2004; Smith and Bliege Bird 2000; Sosis 2000). I first introduce the central tenets of signaling theory and discuss recent anthropological and archaeological applications. I then use signaling theory to develop a model for testing whether slaves used conspicuous consumption as a form of costly advertising that resulted in social and economic benefits for both the signaler and the recipient of the signal. The model provides expectations for artifact patterning among slave quarter sites in the greater Chesapeake region of Virginia, which will be tested using archaeological data in subsequent chapters.

Signaling Theory

Signaling theory is grounded in the idea that material and physical displays function as forms of communication among individuals and social groups. Such displays, especially those that involve economic or physical risks, can provide a range of essential information about an individual, from a person's economic and social standing to more intangible qualities such as psychological character, physical skills and stamina, and esoteric and cultural knowledge. Signaling theory contends that the successful communication of these often difficult-to-observe personal attributes is vital to establishing and maintaining relationships, especially with strangers or new acquaintances. Honest and costly signaling in the form of material and physical displays facilitates personal and group relationships by convincing the receivers of the signal that social, economic, and political benefits can be gained through interaction with the signaler (Bliege Bird and Smith 2005; Getty 1998; Graffen 1990; Gurven et al. 2000; Hawkes and Bliege Bird 2002; Johnstone 1997; Zahavi and Zahavi 1997). Benefits, such as social status, successful trading partnerships, and the selection of long-term mates, can be turned into resources that influence a person's short- and long-term fitness (Boone and Kesler 1998:259). In addition--and critically--signaling theory suggests that the actions of the people receiving the signal in turn benefit the person sending the signal. The feedback in a signaling system is therefore the result of a co-evolutionary dynamic between signal senders and signal receivers.

Anthropologists have found signaling theory particularly useful for understanding unconditional generosity, artistic and decorative variability in craft traditions, religious rituals and commitment, and wasteful behaviors such as inefficient subsistence activities and the excessive consumption of goods (Bliege Bird and Smith 2005:6). Recently Rebecca Bliege

Bird and Eric Alden Smith (2005:224-225) have outlined four conditions that, when met, give rise to active and stable signaling systems, systems that are frequently based on the conspicuous and wasteful expenditure of time, labor, and money. I suggest that these conditions were in place in the Chesapeake during the eighteenth century and that signaling in the form of the consumption of costly goods occurred among and within most social groups.

The first condition that gives rise to signaling systems is that members of a social group must have underlying personal qualities that vary among individuals and that are difficult or impossible to observe. Examples of such attributes may be a person's physical condition, their artistic ability and craft knowledge, their ability to procure subsistence resources and other forms of wealth, or their possession of esoteric and cultural knowledge. Variations in these qualities can be reliably signaled through a range of media.

Since individuals within a group should also possess different levels of each attribute, correct information about of a person's skills would benefit members of the group. An observer's ability to understand the variability in the level of the attribute being signaled, and their ability to gain from this knowledge, is the second condition for the development of a communication system that uses costly signals. Individuals who participate in signaling do so at different levels. Receivers of the signal must be able to read the signal and discern the different signaling levels. People receiving the signal also understand that they gain from honest, reliable signals and therefore choose with whom to interact based on the information gleaned from the display (Bliege Bird and Smith 2005:224).

The third condition is that signalers and receivers have conflicting interests. People sending signals benefit from deceiving the receivers of the signal, but the people receiving

signals benefit from not being deceived. Since both parties are seeking to form advantageous relationships, this conflict of interest ensures that the quality and honesty of the signal is of utmost importance to both parties. A receiver might expect, for example, that a person will try to appear more wealthy or attractive than they actually are in hopes of acquiring knowledge, goods, or allies that would benefit the signaler at the expense of the receiver. A person who interacts with someone who is not giving an honest signal will most likely incur personal fitness costs, therefore it is in the best interest of those reading the signal to test the quality and honesty of the signal in a way that discovers deceit (Bliege Bird and Smith 2005:224).

The final condition is that the marginal cost of the signal, or the marginal benefit to a person, is correlated with the quality of the attribute being signaled (Bliege Bird and Smith 2005:224). The acquisition cost of a material signal is directly linked to an element of signaling theory known as the handicap principle, which argues that, in situations of potential competition, the only honest signals are those that incur substantial costs (Johnstone 1997:167). Honest signals should have such high fitness costs that low-level signalers would and could not attempt to match them (Graffen 1990; Johnstone 1997:167). It is precisely the cost of an honest signal that distinguishes between low- and high-quality signalers. Low-quality signalers have a lower optimal signaling level, meaning that it costs them more, and they receive fewer benefits when displaying a costly signal.

As Rufus Johnstone (1997) illustrated, the relationship between signal intensity and the costs and benefits to low- and high-quality signalers are useful tools for understanding how the handicap principle works (Figures 3.1 and 3.2). In Figure 3.1 we see that although

all signalers receive the same benefits, low-quality signalers pay a higher cost for a given level of signal intensity then a high-quality signaler.

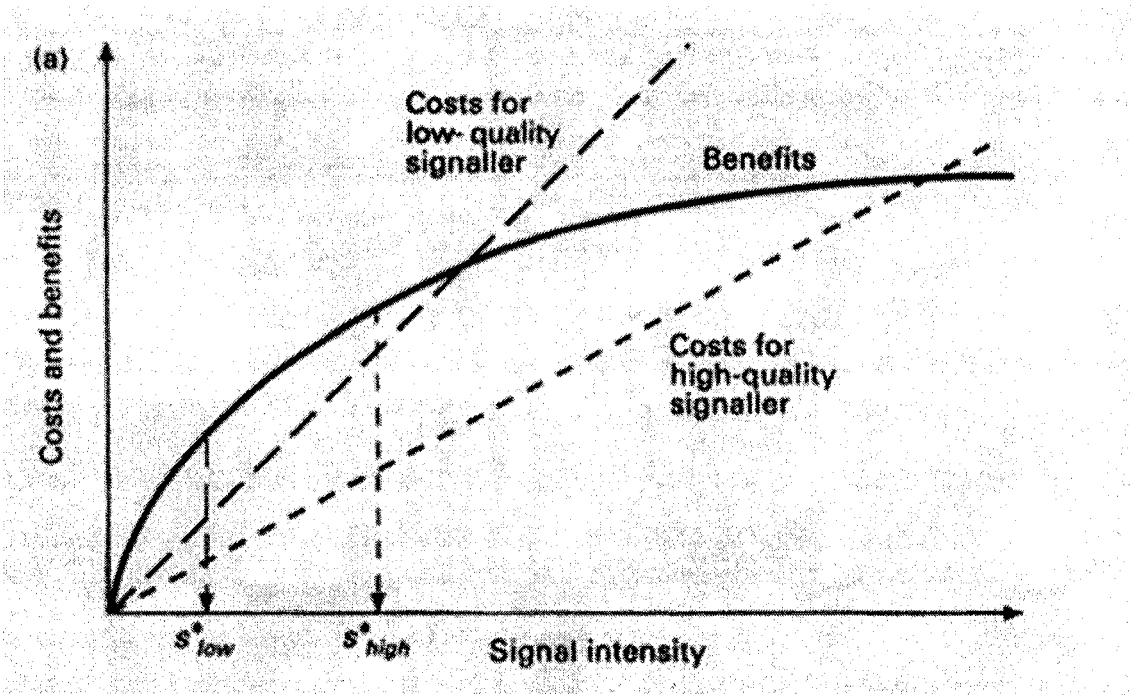

Figure 3.1: High-quality versus low-quality signalers: same benefits, different costs (from Johnstone 1997:168)

Figure 3.2 brings added complexity to this situation. It shows that when both low- and high-quality signalers pay the same costs for signal intensity, the higher quality signaler gains many more benefits than the lower quality signaler (Johnstone 1997:168).

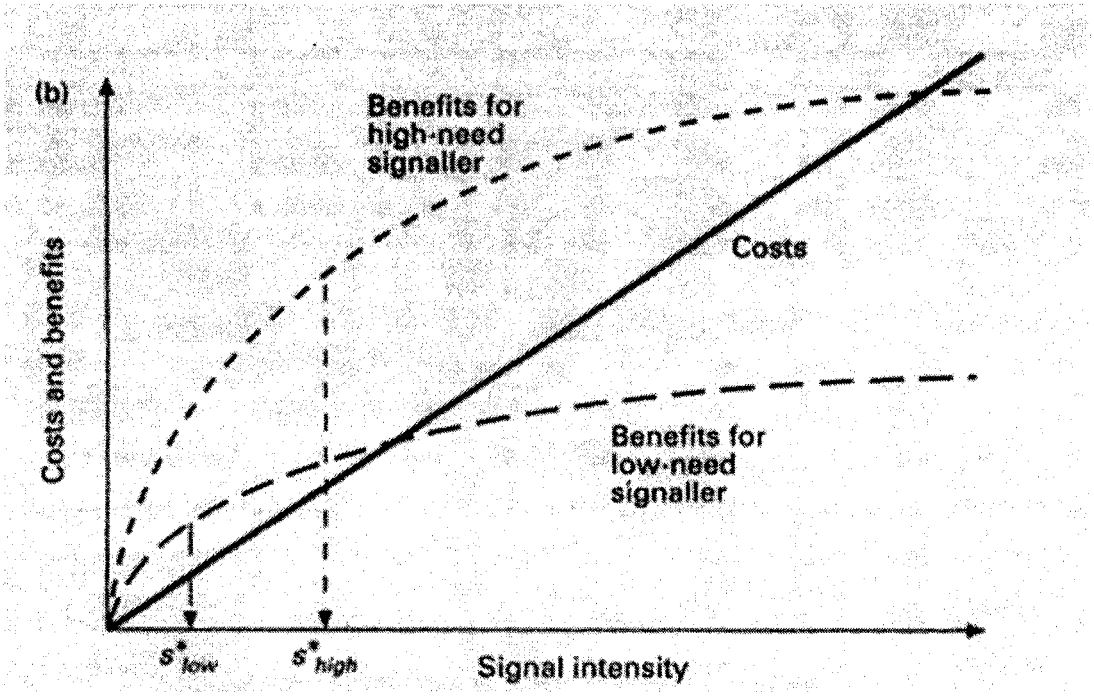

Figure 3.2: High-quality versus low-quality signalers: same costs, different benefits (from Johnstone 1997:168).

The fact that the costs are greater and the benefits less for low-quality signalers means that the optimal signal intensity for low quality signalers will be lower than the optimal signal intensity for high-quality signalers. James Boone also points out that in addition to either the physical and/or monetary cost of the signal, the entire process of choosing with whom, and when, where, and how to interact with others is often costly enough to impose some fitness-related handicap on the sender of the signal (Boone 2000:89).

A number of ethnographic and archaeological examples demonstrate how these conditions give rise to communication systems that rely on costly material and physical displays. They also add nuance to Bliege Bird and Smith's conditions by showing how specific social environments can create or constrain competition in ways that promote signaling. To date, most anthropological applications of costly signaling theory have focused on three main themes: 1. food procurement strategies ranging from big game hunting to

foraging systems, 2. public generosity through feasting and 3. monumental architectural displays (Hawkes 1993; Hawkes and Bliege Bird 2002; Gurven et al. 2000; McGuire and Hildebrant 2005; Neiman 1997; Smith and Bliege Bird 2000; Sosis 2000).

Although signaling is understood as a phenotypic behavior that serves to enhance a person's fitness, the form of the signal is a direct result of individual choices that are embedded in, and influenced by, the larger cultural system. Signaling is by definition a social activity that requires signalers and receivers whose interactions actively shape the form and intensity of displays (Bird 2000:52; Bliege Bird and Smith 2005; Boone 2000; Neiman 1997). Successful signalers not only choose appropriate signaling media but are also able to gauge the response of receivers and modify or change their signal as status values and other signal costs shift. New signals often develop within pre-established guidelines for the signal, so that, in the case of eighteenth-century Virginia, yellow metal buttons replace white metal buttons as fashionable clothing decoration and refined ceramic plates replaced pewter plates as the choice table ware (Heath 1999b; Martin 1989, 1994).

In addition to helping us understand the relationship between individual consumer choices and specific cultural and historical variables, signaling theory provides a useful approach to understanding how specific social environments created or constrained competition in ways that promoted signaling. The theory suggests that the cost and signal intensity will vary based on the benefits the result from a signal. One critical variable that controls the resulting benefits is audience size (Neiman 1997:270). Costly signals that reach large audiences are generally more beneficial than signals aimed at smaller audiences because the benefits for any given signal increases as the signal influences larger numbers of competitors.

The character of the audience is also an important component of signaling strategies. As discussed by both Veblen (1934[1899]), in reference to conspicuous consumption, and Wobst (1977), in reference to stylistic behavior, costly signaling is less likely to be directed at groups that contain a large number of kin since signals are less effective when directed at groups that are composed of allies, not direct competitors. The result is that the payoff for signaling to a kin group is less than signaling to a group of unknown and/or unrelated individuals (Neiman 1997:270-271). For example, it is likely that signaling by males and females will extend for longer periods in societies that condone polygyny or serial monogamy whereas signaling between men and women will be restricted in societies that discourage divorce. In addition, when there are high endogamy rates within a community, information about mates should be readily available whereas signaling will be much more intense in communities when mates come from other communities or localities (Bliege Bird and Smith 2005:17-18).

Whether conspicuous consumption takes the form of monumental architecture or massive feasts, both Boone and Neiman argue that the expenditure of energy is a "universal currency" for displaying fitness potential and underlying qualities that may not be readily apparent to most people (Boone 2000; Neiman 1997). The level of the signal benefits not only the sender by establishing relationships that may result in the acquisition of allies, mates, and goods but also the receiver who may also benefit from the qualities that are being signaled (Neiman 1997:270). Parallel to Carson's suggestion that conspicuous consumption was essential to reliable communication in Colonial Virginia, consumption and wasteful advertising are essential to costly, competitive, and reliable signaling.

Signaling theory and a variant of signaling theory known as the "show-off" model (Hawkes 1993) also provide the tools for modeling gender relations. Recent work by Smith, Bliege Bird, and Bird (2003) and McGuire and Hildebrant (2005) have demonstrated both ethnographically and archaeologically that wasteful but physically risky, or otherwise costly, subsistence behavior by males credibly signals hidden personal attributes and result in greater reproductive success. Male and female signaling strategies are likely to be different since the costs and benefits, as well as the desired outcomes of signaling, will differ between genders as well as among individuals.

As Neiman has recently pointed out (2005a), signaling models provide,

> concrete suggestions about what aspects of artifact form we should measure, what the measurements might mean, the kind of diachronic and synchronic patterning we can expect among the measurements, and how formal variation in those measurements should pattern with other, independently measurable qualities that describe the historical context in question.

Systems for gaining prestige through costly displays should be archaeologically visible. Identifying patterns in the archaeological signatures for such displays can provide a number of key insights into gendered consumption strategies and household composition.

Signaling Strategies among Chesapeake Slaves

As we saw in Chapter 1, rapidly changing social and economic conditions during the last half of the eighteenth century made some degree of non-essential consumption viable for almost everyone in the Chesapeake. Women and men responded by participating in the market economy at a number of levels, with some purchasing only the occasional refined ceramic ware while many others kept current with quickly changing fashions by updating tea sets and clothing styles with regularity (Ashelford 1996; Carson 1994; Martin 1993, 1994). Slaves clearly participated in the consumer revolution. However, few historical or

archaeological studies have sought to measure systematically slave consumption patterns or to address the factors motivating these consumer activities.

In seeking to understand the patterns and processes underlying slave consumption, I start by building a model that is informed by signaling theory and our historical knowledge of slavery. The model is based on the contention that the sacrifices, compromises, and physical risks required for the acquisition of non-essential goods made them ideal costly signals for slaves. Through consumption, slaves discovered a particularly effective means of expressing personal qualities that were potentially difficult for others, especially non-kin, to assess. These difficult-to-assess personal qualities might have included psychological strength in the face of the conditions of slavery, social and political facility, specialized skills and artistic abilities, physical strength and prowess, a keen ability to hunt or procure subsistence resources, and esoteric knowledge. I suggest that honestly and effectively advertising these abilities would have been important for establishing social and economic relationships, and would have been crucial for success when competing for mates and allies, better food, a choice garden plot, the best house site and even a warm place to sleep within a large crowded quarter. Slaves who received the signal, would have gained knowledge from reliable communication and in turn used that information to aid in their own selection of friends, mates, or cooperative household members. Merchants and other whites in the community may have relied on signals to help them decide which slaves with whom to enter into trade or other business relations, legal or clandestine.

The arrival of thousands of enslaved Africans in the first four decades of the eighteenth century produced communities of ethnically, culturally, and linguistically different people whose only common bond may have been their collective enslavement. As

they were thrown together, forced to live and work in close proximity with strangers, slaves needed reliable signals of their personal qualities; signals would have been important for helping them gauge the benefits and consequences of interacting with each other.

By the 1760s natural growth resulted in a large population of American-born, English-speaking slaves with multi-generational connections (Kulikoff 1986; Morgan 1998; Walsh 1995a). Even as the Chesapeake slave population became more homogeneous, family and residential units remained inherently unstable. Diversification of agricultural techniques in the mid-eighteenth century resulted not only in the sale of underused slaves, but also in the retraining and hiring-out of many others, which removed people from established families and communities and placed individuals in new social situations (Berlin 1998; Morgan 1998; Walsh 1995a, 1995b). Even the rearrangement of housing within a single plantation served to restructure social dynamics within an enslaved community. With each move or sale, enslaved people were confronted with establishing relationships with individuals and groups that had little or no prior knowledge of their personality or skills. It is not unlikely that the introduction of new slaves into an established community generated conflicting interests. In addition to competing for mates and allies, slaves may have vied for access to fertile gardens, better housing locations, and possibly for work positions that would have provided training in skilled occupations, which, in some cases, gave slaves geographic mobility and access to goods and food not available to field workers.

In all types of interactions, especially competition, the quality and honesty of a signal would have been of utmost importance to both parties. The person sending the signal would have transmitted the highest-quality signal possible, but they may have also tried to appear

more wealthy or attractive in hopes of acquiring knowledge, goods, or allies. It was in the best interest of those reading the signal to test the quality and honesty of the signal.

Opportunities for signaling outside of one's quarter increased in the last half of the eighteenth century. As population grew, urban centers expanded and towns, large and small, increased in number, providing slaves with more opportunities to interact with other slaves, free blacks, and whites in public spaces. Eighteenth-century account books from central Virginia stores indicate that shopping excursions on Saturday afternoons and Sundays attracted groups of slaves, lending a social nature to store and market visits while also providing large and diverse signaling audiences (Heath 2004a). I suggest that portable material objects, such as clothing and adornment items, were probably among the most effective signals in large-group interactions. However, even the publicly visible act of shopping, in which a slave was required to pay with cash, would have been a clear signal of one's abilities. People would have observed the purchase of tools, ceramics, mirrors, and other goods that they might not actually see displayed or used in the signaler's dwelling.

In addition to demographic changes, economic diversification led to increased signaling opportunities for more slaves. Variation in agricultural regimes resulted in the development of a corps of slaves with non-agricultural skills, some whose labor was leased to other plantations or to business owners. Slaves with skilled occupations frequently had greater mobility within their job and they were also more likely to be hired out to work on other plantations or in urban workshops. Slaves who were hired out would have had frequent opportunities to interact with larger and more varied groups of individuals. Successful signaling could have facilitated the exchange of knowledge and gossip, as well as opened doors for collaboration with potential mates, partners, and allies in non-economic endeavors

such marriages, runaway attempts, rebellions and the development of social and religious organizations.

Michael Johnson's analysis of early nineteenth-century South Carolina runaway advertisements demonstrates just how important building such non-kin relationships may have been to slaves (1981). Runaway ads placed between 1799 and 1830 demonstrate that many of South Carolina's urban runaways were skilled slaves who had developed bonds with men and women who were not family members. His study shows that between 1799 and 1830, two-thirds of "small-group" runways were "work groups" composed of two unrelated individuals who appear to have known each other through their work (Johnson 1981:236). Runaway partnerships between men of the same profession were most common, although women did partner with men for escapes. Johnson notes that women's work took them outside the urban backlot for errands and marketing activities and suggests that these tasks provided opportunities to meet people outside their place of enslavement. This may have been how "Delia, a cook who was hired out, came to know her runaway companion Bob, or how Tena became acquainted with her runaway partner Jim, a sailor in the Georgetown trade, or how Diana cooperated with Peter, a carter" (Johnson 1981:425).

Although skilled laborers were more common in urban settings, Johnson's runaway data also show that 35 percent of rural runaway "work groups" composed of unrelated individuals contained at least one skilled tradesperson. These runaway groups contained one skilled person and usually several individuals whose occupations were not listed. Trades held by these skilled runaways ranged from bricklayers and carpenters to a barber who worked in Charleston (Johnson 1981:430). This suggests that non-agriculturally based

occupational skills provided access to, and knowledge about, the white world outside of the plantation, knowledge that other slaves knew could benefit their chances as runaways.

Johnson's work is just one of many examples that indicate unrelated slaves with different backgrounds came together to form mutually beneficial relationships. Historians have been able to reveal the presence and the complexity of relationships in which slaves bonded together for activities from rebellions to revivals (Finkelman 1989; French 2004; Newman 2003; Johnson 1981). Unfortunately, the nature of the documentary record leaves many questions unanswered. How were these relationships forged? What markers did slaves use to determine the honesty and reliability of unrelated and unfamiliar individuals? What were the important signals that influenced the formation of social and economic relationships?

I suggest that signaling through consumption played a crucial role in forging such relationships. If signaling though consumption was a behavioral strategy at work in the eighteenth century, consumer goods, the signaling media, should be measurable through the archaeological record. Signaling theory helps make sense of the mechanisms that drove slave consumption by providing expectations for how artifacts should pattern across slave sites. In the following signaling model, measures of these media represent dependent variables that should scale with the independent variables that drove slave consumption such as temporal, demographic, and agricultural changes. Variations in individual signal levels should be measurable based on the type and abundance of the material culture being consumed. Differences in the quantity and quality of the artifacts ought to point to the maintenance of an active and honest costly signaling strategy (Neiman 1999:16).

It is necessary to acknowledge that at least some of the consumer goods found on slave quarter sites were the result of special provisioning, defined here as gifts and hand-me-downs given for certain occasions or to a select group of slaves. Just as Thomas Jefferson gave a bed and a pot to any enslaved couple at Monticello who married (Heath 1999b), many other owners gave gifts to slaves they particularly valued. Primary accounts indicate that gifts ranged from fashionable hand-me-down clothing to ceramics and money (Foster 1997; Fox-Genovese 1988; Perdue 1976; Morgan 1998). Such gifts were usually not distributed uniformly throughout an enslaved community; rather slaves working in or near the house, or those with specialized skills, were the most likely recipients of this type of provisioning.

The acquisition of goods through special provisioning does not take away from the signal value of these items. In fact, I argue that the display and use of provisioned items were as effective as goods acquired through purchase or trade. The same attributes that made individuals competitive in the market economy were also skills that may have made their owners take notice of them. Whether slaves were purchased specifically for their talents or whether they rose above other slaves on the plantation through their leadership qualities or personal appearances, individuals used their skills to gain material and social benefits not afforded to the rest of the enslaved community. Their proximity and value to their owners most likely provided them and their families with better quality food, clothing, housing, and other material objects. Access to objects not given to the rest of the enslaved population may have helped individual slaves establish economic and social connections with slaves living in different quartering areas both within and outside of the plantation community. Such goods may have also been signals to free blacks and whites that these individuals possessed skills that made them desirable trading partners.

Modeling Signaling Strategies

Signaling theory suggests that variation in signal levels among women and men will be a function of 1. the level of a hidden quality in the signaler, 2. the payoff to the signal, and 3. the cost of the signal, including the costs associated with the acquisition and use of the items being displayed. Generating a model of variation in signal levels within slave communities in the Chesapeake requires linking these theoretically specified variables to variation in the historical contexts faced by slaves. Six contextual variables seem especially important: 1. a slave's proximity to both the main house, 2. a slave's proximity to an urban center, 3. the constant presence of owner, 4. the extent of agricultural diversification at a given plantation, 5. whether a plantation was owned by Thomas Jefferson, and 6. the progression of time.

Agricultural Diversification

Agricultural diversification that began in the mid-eighteenth century revolutionized planting practices in the Chesapeake by the 1790s. As planters decreased their reliance on tobacco and introduced new crops and agricultural activities, planters were faced with surplus slave labor. Many of these surplus slaves were sold but those that remained in the Chesapeake found themselves either working a task-based agricultural schedule or being retrained to perform specialized occupations. Those that were assigned to task-based work most likely had extra time during certain parts of the year which they may have devoted to their gardens and household craft production. Those who were given training for occupations such as blacksmith, cooper, carpenter, or seamstress may have developed skills that provided them with a small cash income. Specialized skills frequently gave many men

mobility by either providing them with jobs that required travel, such as being a wagoner, or that allowed them to be hired out to another plantation. Women could also benefit from job training, although they had fewer opportunities to travel. Skilled positions available for women most often included weaving, sewing, and cooking.

Mobility and travel broadened an individual's community and brought with it new audiences for signaling. They also gave slaves more opportunities to visit stores and markets, possibly providing access to a variety of goods not offered by merchants near their home plantation. Skilled slaves had greater ability to take on small jobs or to retain some portion of their leased value, both of which provided cash money. These factors would have further increased the competitive ability of an individual.

As we've seen, the payoff for signaling personal qualities was directly related to the size and type of audience in which the signaling occurred. A large interaction sphere increased the benefits available to a high quality signaler (Neiman 1997:270). Those with access to larger audiences also entered into a more competitive environment, one in which the variance in the competitive ability of the group was larger. An increase in group competitive ability should encourage other competitive individuals to increase the intensity of their signals since increased social advertising requires those higher on the quality scale to advertise more. Signal theory tells us that public costly signaling to large groups of unfamiliar people would have provided a bigger payoff for high quality honest signals.

Proximity to Main House

Slaves who worked in specialized occupations likely had more signaling opportunities. Slaves working as trades people or in the main house frequently had more

access to money and fashionable goods than those working in the field. Such work also brought enslaved individuals in close proximity to their owner. Although this proximity exposed some slaves to greater physical and emotional abuse, others clearly received benefits from these types of relationships. Goods received from an owner or items purchased with money earned through tips may have signaled a slave's intelligence, resourcefulness, and/or appearance that first brought them to the attention of their owner.

The historical and archaeological data are such that I cannot measure whether individuals within a household were trained in specialized occupations. Despite the lack of data on specific individuals' occupations, the location of a dwelling in relation to a main house can be measured. I posit that the majority of slaves with skilled occupations most likely lived within a third of a mile of the main house. This one-third mile radius includes many slaves who would have not only worked in the house but also its gardens and dependencies. It probably also captures individuals who did not hold specialized occupations but who lived close enough to interact daily with skilled slaves. Slaves living close to the main house may have also had more opportunities to interact with their owner than slaves working in distant field quarters. At Poplar Forest and Monticello, for example, an easy walk to the mansion may have meant that a person was more visible to Jefferson, possibly putting them in a situation in which they might be hired to work additional jobs.

It is also expected that enslaved individuals living within a third of a mile of the main house lived in a more competitive social and economic network. Slaves with specialized occupations were most likely high quality signalers and their access to goods, both provisioned and purchased, raised the quality and intensity of the signal that they could produce. Honest signaling within this milieu would have required clear and costly signals.

Distance from Urban Center

Distance to a major urban center is another factor expected to directly influence both an individual's incentive and ability to signal. Proximity to an urban center promoted signaling in a number of ways. Slaves living near cosmopolitan areas had easier and more frequent access to stores and markets. They would have been able to select from a broader range of goods, with opportunities to learn about and consume the most current fashions. A town or city naturally contained and attracted a wide range of people, both enslaved and free therefore providing more choices in regards to social and economic interactions. As we have seen, signaling theory suggests that more people and bigger audiences represent higher levels of important qualities that need to be discerned. In the Chesapeake, skilled slaves lived and worked in urban centers in greater quantities than rural areas and many of these slaves had opportunities to acquire cash for some percentage of their work. The payoffs to signaling within this milieu were much greater than signaling conducted in small or familiar audiences, therefore costly displays should be more competitive in or near urban centers. Signaling incentives and opportunities were most likely much reduced for those living further away from major urban centers.

Presence of Owner

As with the variable that measures proximity to an owner based on a household's location within a plantation, I suggest that slaves living on a plantation where an owner was present on a regular basis may have been able to earn money and to work in positions that had some material rewards system. Owners required individuals to work in the house, tend

the garden, and conduct other jobs not required of a purely agricultural operation. Slaves living on plantations with absentee owners may have been less supervised, perhaps allowing them more opportunities to leave the quartering area and to work on their own gardens or crafts which could provide money. However, most quarters with absentee landowners had overseers living in close proximity. Overseers, who were not personally invested in the welfare of the slaves, tended to be more brutal both in the field and living quarters.

Thomas Jefferson, owner

It has been argued that slave quarter sites at Monticello and Poplar Forest contain disproportionate amounts of high-style ceramics and personal items such as mirrors, combs, and toys because the inhabitants were owned by Thomas Jefferson. Almost all of the sites in this study were controlled by elite men who owned more than 50 slaves at any given time. Seven of the 19 structures analyzed here were owned by Jefferson. Despite his time in Philadelphia, Paris, and Washington, Jefferson was a regular presence in the lives of the people he owned at Monticello. He did not spend time at Poplar Forest until the second decade of the nineteenth century, however, and those living at Poplar Forest would have rarely had contact with their owner. Did being owned by a prominent statesman, one with great mobility who took select slaves with him to northern and European cities, impact the material life of slaves at Monticello and Poplar Forest? This variable provides an opportunity to estimate the influence of Jefferson's ownership on the material culture of slaves living on his plantations.

Time

Time is the sixth independent variable in this signaling model. It is expected that the consumption of non-essential goods should increase throughout the eighteenth century.

Signaling theory suggests that during the second and third quarters of the eighteenth century, factors such as a non-diversified gang-based labor system, the lack of jobs that provided slaves with mobility and access to both money and goods, and a low population density contributed to a lower quality of signalers and small variances in the quality of signalers within a group. In addition, the lack of a Creole or native-born slave majority and small urban centers resulted in smaller payoffs to signaling.

As population densities rose, urban centers expanded and the number of mid-size towns grew throughout the eighteenth century. Rising agricultural diversification afforded some slaves mobility and skills that provided greater occasions for earning money and visiting or working in cosmopolitan areas that offered social and economic opportunities not available on their home plantation. It is expected that by the later eighteenth century, access to markets, increased mobility, and greater quantities of affordable goods contributed to the increase in the signaling level of even the worst signaler. As the signaling ability of the worst advertiser increased, more competitive slaves should have responded by increasing the amount they consumed to continue to distinguish themselves from others.

The Signaling Media

Signaling theory suggests that the honest communication of difficult-to-assess personal traits was essential to identifying mates and allies, establishing economic partnerships, and forming social networks. The acquisition and use of fashionable goods was a particularly effective signal of a person's social and competitive abilities. Community members could guarantee honesty by insisting that signals be so costly that inferior signalers could not afford to send them. I present five artifact types whose acquisition by slaves

incurred substantial costs and several of these also conveyed little practical benefit. These include clothing buckles, buttons, refined ceramics, coins, and imported tobacco pipes. Important costly attributes and contexts of use are discussed. I then introduce two artifact classes, coarse ceramic wares and wine bottles, whose acquisition and use I expect to either decrease or remain constant throughout the eighteenth century. As we'll see, these two artifact classes are crucial for effectively estimating variation in discard rates of other artifact classes at these sites.

Clothing Buckles

Clothing buckles were one of the most highly visible and costly elements of men and women's dress during the eighteenth century. The acquisition and use of buckles was driven in large part by the desire for the most current fashion. Although buckle prices varied depending on material, decoration, size, and type, even a relatively inexpensive buckle was costly compared to other adornment items (White 2002:240-241). A prominent element of high-style costume, the elite and aspiring elite regularly purchased the most current and most expensive buckle fashions. Frequently found on quarter sites, clothing buckles from archaeological contexts also point to their acquisition and use by slaves. Runaway advertisements often mentioned that clothing buckles were worn by escaped slaves (Heath 1999b). Despite the cost, enslaved individuals in the Chesapeake made occasional buckle purchases at stores and markets (Heath 1999b, 2004a; Martin 1993). Buckles may have also intermittently been given to house slaves as presents or as part of a required uniform (Baumgarten 1988, 2001; Heath 1999b, 2004a; Martin 1993).

Despite their regular appearance in archaeological contexts and store records, the majority of buckles were not essential and many eighteenth-century clothing styles could function without the aid of buckles. Several shoe styles did not require buckles and many people, particularly slaves, did not wear shoes on a regular basis. Men's breeches could be tied at the knee, rather than buckled. Stocks and hatbands did use specialized buckles and, while essential elements of high-style dress, these elements of dress were usually not associated with non-elite clothing.

Buckles not only carried information about acquisition costs, they were also embedded with information about gender and aesthetic choices. Although women in the eighteenth century wore shoe buckles and relied on small buckles for securing ribbons, belts, and girdles, most buckle types were associated with men's attire. In addition to wearing buckles on their shoes, men who invested in buckles used them to attach stocks, tighten their breeches at the knee, and to secure straps and belts that supported swords, spurs, and other masculine accoutrements (White 2002).

Since both men and women wore large and small shoe buckles, it is nearly impossible to assign gender to shoe buckle size or style. Large, decorative shoe buckles were not only the most visible clothing buckle type; they were also the most expensive. As a result, they may well have carried more signaling power than other buckles. Despite being less visible, other buckles would have been useful in signaling systems. Hat buckles, used to secure bands of fabric around the hat, were prominent items that spoke of both financial costs and aesthetic choices. Although stock and knee buckles were less visible due to their location on the body, observers would have been aware that an individual was wearing clothing that required the purchase of special buckles. Buckles, and clothing that required buckles, were

ideal mediums for demonstrating one's knowledge of current fashions, for expressing one's identity, and for signaling the direct and indirect costs of acquiring such items.

Buttons

Despite being one of the more common archaeological finds, the analytical importance of buttons has only recently been explored (Heath 1999b; Hinks 1988; White 2002). Produced in large quantities between the seventeenth and nineteenth centuries, buttons were made in a wide range of materials, sizes, decorative styles and prices, resulting in a close correlation between button types and wealth (White 2002). Like buckles, buttons are closely tied to gender. Primarily associated with men in the seventeenth and eighteenth centuries, buttons were used to fasten men's breeches, vests, waistcoats, and jackets. Elite, high-style clothing employed buttons not only as decorative fasteners but also as non-functional decoration, such as plated metal buttons sewn opposite false buttonholes on jackets and waistcoats (Baumgarten 2002). Buttons were rarely used on eighteenth-century women's clothing, since most women's garments were fastened with hooks, eyes, lacings, and straight pins (Ashelford 1996; Baumgarten 2002; White 2002:246). Women's riding habits, which imitated men's jackets, were the exception, being adorned with both functional and decorative buttons (White 2002).

The availability, expense, and highly decorative nature of metal buttons ensured their popularity as a consumable among both free and enslaved men. Store accounts in Virginia indicate that buttons ranked among the most popular items purchased by slaves (Heath 1999b, 2004a). Barbara Heath's survey of runaway advertisements published between 1760 and 1790 also reveals that buttons were the most frequently mentioned aspect of a runaway's

attire, suggesting that slaves prominently displayed the buttons they had acquired (Heath 1999b:58). Heath's archaeological analysis of buttons also demonstrates convincingly that slaves at Poplar Forest were discarding usable but out-of-fashion white metal buttons and replacing them with more current yellow metal buttons (Heath 1999b).

Bone and wood buttons have been excluded from the following analyses. Both types of buttons were easily made, and evidence for bone button production has been found at several Monticello slave quarter sites. Bone and wood buttons were also the most frequently used button types on slave clothing provisioned by owners. Buttons made from metal, glass, and shell were more likely chosen and purchased by slaves, or they came on assigned uniforms or hand-me-downs. Those who could supplement their provisioned clothing with more decorative items would have most likely opted for metal and glass buttons, types that they would not have made. As with buckles, variability in the abundance of different button types among sites may be a strong indicator of differences in signaling abilities. Basic patterns of button consumption are explored in Chapter 5 while I examine the gendered signals embedded in the changing patterns of button material, size, and decoration in Chapter 6.

Coins

Many enslaved individuals had regular access to cash money (Heath 2004a; Hudson 1994; Morgan 1998). Discard rates of coins may be important indicators of an individual's access to cash money. However, the presence of coins is only one indicator of earning potential and signaling ability. As noted earlier in this chapter, the act of spending money may have been a costly signal. Although coins may highlight a slave's ability to consume

non-provisioned goods, a greater abundance of other costly artifact types on a site may well demonstrate that people were turning cash into more visible forms of wealth.

Imported Tobacco Pipes

The majority of Virginia slaves spent much of their lives cultivating, harvesting, and curing tobacco. As the primary crop grown for export during the first half of the eighteenth century, tobacco was also consumed in substantial quantities by those who produced it (Agbe-Davies 2004; Morgan 1998; Walsh 1997). Slaves of all ages and genders regularly used tobacco, benefiting from the narcotic effects of nicotine, which dulled hunger and provided stimulation to the nervous system. Large quantities of tobacco pipe fragments, as well as osteological evidence for pipe smoking, are just some of the archaeological signatures of tobacco consumption on slave quarter sites.

Although I focus primarily on the use and discard of imported tobacco pipes, it is difficult to discuss their consumption without acknowledging the use of locally-made Chesapeake pipes. Chesapeake tobacco pipes[5], which range in color from light tan to red and brown, were used from the mid-1600s until the end of the first quarter of the 1700s, when they cease being present on archaeological sites in meaningful quantities. Their manufacture and use overlap with imported English-made white tobacco pipes, which were used in Virginia throughout the seventeenth, eighteenth, and nineteenth centuries. Although imported and Chesapeake pipes were being used at the same time, several archaeological studies have produced competing theories about the different groups who made and used them.

[5] Also referred to as Aboriginal pipes, Colonoware/Colono pipes, Red-clay pipes, Virginia-made pipes (Agbe-Davies 2004; Mouer et al. 1999).

The focus of much tobacco pipe research and debate has been on understanding who made Chesapeake pipes. Although this debate is not the focus of this analysis, it is important to review the themes that have shaped the majority of research on pipes. Three popular arguments have emerged about their origins. The first, put forward in various forms by James Deetz, Matthew Emerson, and Cameron Monroe, argues that the "African-style" decorative motifs point to the African origins of their makers (Deetz 1993; Emerson 1989, 1999; Monroe 2002). A second group of scholars contend that decorative elements on Chesapeake pipes point to Native American manufacture while a third group suggests a combination of African and Native American influences converged to create a creolized form of tobacco pipe (Mouer et al. 1999; see, especially, Agbe-Davies 2004 and Neiman and King 1999 for reviews of these debates).

Only recently have scholars begun to ask for whom were the pipes made and in what situations were they used and discarded. Fraser Neiman and Julia King show that clear patterns of tobacco pipe use can be seen when the distribution of both imported and Chesapeake pipes are examined across the core of the plantation landscape. Based on the association of pipe fragments with different building types on individual plantations, they demonstrated that indentured servants primarily smoked Chesapeake pipes, whereas planters smoked the more costly imported pipes (Neiman and King 1999; Neiman 2004). By the late seventeenth century, as imported pipes became more affordable to the middling and lower classes, the production and use of Chesapeake pipes decreased (Agbe-Davies 2004; Neiman 2004; Neiman and King 1999). Chesapeake pipes all but disappeared during the transition to slavery, suggesting that these locally-made pipes were primarily marketed to, and used by, indentured servants.

Neiman (2004) has also shown an association between the decreasing bore diameter and the increasing length of pipestems among imported pipes. Since smoking frequently took place in social situations, the type and style of the pipe could convey important messages about the smoker. He suggests that the longer the pipestem, the higher the breakage rates, therefore making imported long stem pipes more costly to use. His analysis of pipe stems from Jamestown and the Cliffs Plantation demonstrates that, in the late seventeenth century, small diameter pipes (5/64^{ths} and 6/64^{ths} of an inch) are more frequently associated with elite planter contexts while larger bore diameters (7-9/64ths of an inch) are associated with indentured, free laborer, and slave contexts. This also fits nicely with the hypothesis regarding the disappearance of Chesapeake pipes: once indentured servants were free, their ability to purchase imported tobacco pipes increased, and they began selecting goods not associated with their indenture. It seems likely, then, that a decrease in imported pipe bore diameters, combined with the decrease in Chesapeake pipes, reflects the increased purchasing power and signaling ability of the non-elite. Their ability to purchase large-bore imported pipes, as opposed to using Chesapeake pipes, spurred planters to demand and use longer and more costly imported pipes as a means of setting themselves apart from their former servants.

Imported tobacco pipes may be important early signaling media on slave sites. I expect this will be particularly true for sites that date to the first half of the eighteenth century when refined ceramics, buttons, and buckles were only accessible to the very elite. Just as the elite sought imported pipes with longer and thinner stems and white indentured servants acquired kaolin pipes, Chesapeake slaves in the first half of the eighteenth century may have eschewed locally-made pipes in favor of more costly imported pipes.

Refined Ceramics

Ceramics are perhaps one of the most informative, and as a result most studied, groups of artifacts. In addition to giving archaeologists insight into all aspects of foodways, from food production to consumption, different ware types and stylistic attributes can provide clues to the organization of craft production, the development of social hierarchies, gender systems, trade networks, and even ritual behavior. Ceramic use in the eighteenth-century Chesapeake was no exception and the analysis of ceramic assemblages has been a mainstay for not only dating sites but for also understanding social and economic relationships at and among sites.

Ceramic research in the Chesapeake has focused on three aspects of the same phenomenon: the sudden increase in the consumption of ceramic wares in the Chesapeake after 1770. James Deetz argued that the shift from the medieval to the Georgian worldview created a demand for tablewares that catered to the private individual rather than the corporate body (1996). Changing standards for food preparation and consumption spurred a movement away from food served communally in trenchers without the use of utensils, to the acceptance of multiple-vessel place settings that included plates, bowls, drinking glasses and utensils for each person at the table (Deetz 1996). Deetz argues that these behavioral changes are reflected in the mid-eighteenth century explosion in the ceramic ware types and forms that facilitated individual use.

A second and not mutually exclusive line of research suggests that ceramic consumption was a form of emulation spurred by the brilliant marketing campaigns of ceramic producers such as Josiah Wedgwood (McKendrick et al. 1982; Martin 1994). Other

scholars, like Cary Carson, argue that ceramic production changed dynamically to meet consumer's needs, as opposed to consumers bending to the will of manufacturers. Whether ceramic use changed as a result of manufacturing innovations, consumer demand, or the rise of the Georgian worldview, it is agreed that it changed dramatically after 1750. During the first half of the eighteenth century, only the elite could afford refined stonewares, Chinese porcelains, and tin enameled wares such as Delft (Martin 1994). Chinese porcelain was the most costly of these ware-types throughout the entire eighteenth century. The expense of refined earthenwares and stonewares was tied to the cycles of fashion, with white salt glaze stoneware, initially the most costly and poplar non-porcelain ware-type, quickly falling out of fashion when refined earthenwares were introduced. Early refined earthenwares, such as Whieldon-wares and refined agate-wares, appeared on the market in the 1750s. The introduction of creamware and pearlware, the most popular and fashionable white-bodied refined earthenwares, occurred in the 1760s and 1770s. For more than 30 years, quickly changing creamware designs and forms insured that the ware-type remained one of the most costly and desirable in the market place. Creamware found its competitor in pearlware, another white-bodied earthenware. As pearlware replaced creamware, prices of creamware fell and innovative pearlware decoration linked to price followed a trajectory similar to its predecessor. Despite the introduction of pricey novel ware-types and designs that pushed the cost of other ceramics lower, substantial and widespread reduction in refined ceramic prices did not occur until the nineteenth century (Martin 1994; Miller 1988, 1990)

These new ware-types were made in novel vessel forms associated with the consumption of new, exotic and costly beverages such as punch, tea, and coffee (Martin 1994; Roth 1988). Mugs, cups, and plates made of refined earthenwares, refined stonewares,

and porcelains replaced functional equivalents that had traditionally been made in wood and pewter (Martin 1989, 1994). The introduction of new forms and new ware-types represent an increase in the costs paid by ceramics consumers. Replacing traditional pewter vessels with ceramic ones involved additional expenses because ceramics had shorter use-lives and old pewter could be profitably recycled (Neiman et al. 2000). Ann Smart Martin's research demonstrates that by the 1770s, stores in the Chesapeake that catered to middling farmers stocked fashionable refined ceramic wares as well as forms once reserved for elite dining practices such as tea drinking (1994:174). Perhaps most significantly, ceramics quickly outpaced the consumption of pewter plates (Martin 1989, 1994). As Martin documents, until 1770 colonists consumed tablewares made from a range of materials, such as pewter, wood, porcelain, Delft, and refined earthenwares (1994:178). After 1770, the majority of tablewares being purchased were made from refined earthenware, not pewter or wood. Although certainly less expensive than pewter, the high breakage rates of ceramics required frequent replacement, in the end making the transition away from pewter a more costly decision (Martin 1989).

Throughout the eighteenth century less expensive and locally-made coarsewares were readily available for use as tablewares and for cooking and storage. Despite the availability of low-cost alternatives, slaves acquired stylish refined wares in two ways: from their owners and through purchases at stores and markets. Merchants recorded that slaves regularly purchased ceramic tablewares, and ingredients such as sugar and rum, that may have been used in the consumption of tea and punch (Genovese 1976:557; Heath 1999b, 2004a; Martin 1993:309; Schlotterbeck 1995:177).

Refined ceramics were the perfect costly signal as they functioned on multiple levels. Form, ware-type, and decoration were each carefully calibrated to social rituals. They required both financial resources and knowledge of the new dining and tea rituals (Martin 1994; Neiman et al. 2000; Roth 1988). Vessel forms linked to tea, coffee, or chocolate consumption required the purchase of costly ingredients. Although vessel forms linked to dining did not need to be filled with specialized foods, plates and other tableware forms made from fashionable ware-types were much more expensive than teawares. Variations in all of these attributes are archaeologically measurable and refined ceramic use and discard rates have the potential to reveal nuances in signaling levels and abilities.

Coarse Ceramic Wares and Wine Bottles

Coarsewares and glass wine bottles are two artifact classes that I expect were not used in Chesapeake slave signaling systems. The use and discard of these artifact types should have remained fairly constant throughout the eighteenth century, although a decrease in coarse ceramic wares during this period correlated with the increased consumption of refined ceramics, would not be unexpected. These assumptions will be tested in Chapter 5 and, as will be seen, these artifact classes serve as key comparative data sets in the upcoming analyses.

Following Deetz (1972), coarsewares in this study consist of earthenware and stoneware vessels of both European and American manufacture Throughout the eighteenth century, both locally made and imported coarsewares were less expensive than refined ceramic wares and they were readily available for use as basic communal tablewares and for cooking and storage. The discovery of large quantities of coarsewares has often been

interpreted as evidence for kitchens and dairies, areas related to food preparation and storage. Some archaeologists have suggested that low numbers of coarsewares on slave quarter sites may point to a centralized plantation kitchen that provided meals for slaves. The abundance of coarsewares excavated from the quarters in this study, as well as the structure of the plantations, suggests that this was not the case for the sites used herein. It is expected that the use and discard of coarse ceramic vessels should remain fairly constant throughout the eighteenth century, as slaves were provisioned with inexpensive ceramic wares and as their need for basic kitchen and storage containers persisted. It would also not be unexpected to see a slight decline in coarseware use once refined ceramics were introduced mid-century.

Although imported wine was plentiful and, in the case of some vintages, relatively inexpensive, the glass bottles in which wine was stored or "binned" were not (Mishkin 1975; Pittman 1990). Wine was most often shipped to the colonies in casks and then bottled and binned for individual customers. The first successful glass works in the colonies was not established until 1739 and glass making was still struggling to become a viable industry by the 1780s (Noël Hume 1961:60). The characteristic dark green wine bottles found on archaeological sites throughout Virginia were most likely imported, of English manufacture, and expensive. As a result, the reuse of bottles was common during the eighteenth and nineteenth centuries, with wine, liquor, and water bottles being refilled with oils, homemade spirits, or used for food preparation and storage. Eighteenth-century probate inventories list caches of wine bottles that were being stored and saved for reuse and alcohol distributors' advertisements offered discounts for people who returned or brought in their own bottles to be refilled (Busch 1987:76). Archaeological evidence for reuse includes the discovery of

cherries and other fruits preserved in wine bottles that were stored in the dry well at Monticello (Kelso 1997:41).

Wine bottles were less likely to enter the archaeological record due not only to their monetary and reuse values but also because they did not rapidly change styles in a manner linked to their cost or display. Unlike changing stylistic patterns on porcelains or creamwares, there were no incentives to discard reusable wine bottles in favor of a more costly and fashionable alternative.

Expectations for Artifact Patterning in the Chesapeake

Signaling theory indicates the ways in which the six independent contextual variables should act on the dependent variables, the artifact classes. If signaling is at work among slaves in the Chesapeake, variation in the cost of signals will be controlled by the personal qualities possessed by the signaler as well as by the benefits received from a successful signal. For example, individuals with the talent and opportunity to grow and sell vegetables during off-work hours should invest in higher-cost displays of non-essential costly goods. As the eighteenth century progressed, we should expect to see greater discard of clothing buckles, buttons, and refined ceramics than items such as coarse ceramic wares, tobacco pipes, and wine bottles. Holding variation in skill constant, signaling theory predicts that people should invest more in costly goods when they interact more with larger numbers of people and when they interact with people who know little about them. It also expects increased investment when important personal qualities are difficult to assess nor likely to change. I hypothesize that the greater per capita discard of costly goods that were easily portable and displayable, such as shoe buckles and buttons, may point to individuals who

interacted with a greater range of people on a regular basis. This would hold true for those slaves with specialized skills, abilities that may have provided them with better access to goods, cash, and mobility that in turn gave them access to groups outside of their home plantation. We should therefore see greater intensity of signaling at structures on diversified plantations located near mansions and urban centers.

Finally, the theory anticipates that signalers at a given level should be anxious to acquire novel forms of material culture, such as new ceramic patterns or new button styles, as soon as increased availability or lower costs makes them affordable. However, that individual should quickly abandon those same goods when further decreases in cost make the once novel styles affordable for those farther down the scale. Artifact patterns that acknowledge an attention to changing fashions should indicate higher-quality signalers that were intent on maintaining costly and honest signals by keeping up with the rapidly changing market. Individuals who maintained their signaling level were also more likely to be in contact with individuals, signal receivers, who actively established parameters and set the "requirements" or standards for the signal. It might also be the case that positive per capita discard rates of costly items reflect households with a greater number of single individuals, or partners without children, who both had greater incentive and more time to participate in costly social advertising.

Signaling theory provides a powerful approach for explaining unique historical trajectories as well as providing an understanding of specific agent-centered cases within comparative contexts. Its theoretical framework allows me to generate precise expectations about patterns in signaling strategies, expectations that will be evaluated against archaeological evidence from 19 slave quarters located throughout the greater Chesapeake

region. The following chapter introduces each of these sites and describes how each site was affected by the independent historical variables presented in this chapter. A signaling matrix, in which each site is scored based on the occurrence of each historical variable, is established for these sites. This signaling matrix is used in the multiple regression analyses presented in Chapters 5 and 6.

Chapter 4: Comparative archaeology in the Chesapeake: an introduction to the problems and the sites

This study is one of the first broadly comparative analyses of artifact assemblages from slave quarter sites in the United States. This is due primarily to the availability of fine-grained data generated by the Digital Archaeological Archive of Comparative Slavery (DAACS), a Web-based initiative that provides standardized quantitative artifact and context data from excavated slave quarter sites throughout the Chesapeake, Carolinas, and Caribbean. Presently, the majority of comparative archaeological studies of slavery only compare sites located at the same plantation that were usually excavated by the same excavator or by excavators using similar methods (Armstrong 1990; Fesler 2004a, 2004b; Heath 1999a; Higman 1998; Thomas 1998). Archaeologists who have executed successful comparative studies of sites from multiple plantations either focus on a single artifact class, such as tobacco pipes (Agbe-Davies 2004; Neiman and King 1999), or they limit their study to architectural features such as subfloor pits (Neiman 1996; Samford 2000).

One significant challenge for comparative studies is the development of analytical methods that acknowledge that each assemblage was excavated from sites with different depositional and excavation histories. This chapter addresses a number of these methodological concerns, from defining the site to establishing its chronology. I then introduce the sites, focusing specifically on the extent to which each of the five independent historical variables introduced in Chapter 3 impacted the individual sites.

Using Data from the Digital Archaeological Archive of Comparative Slavery

The lack of comparable data has been a major problem for archaeologists wishing to understand regional and temporal change in the institution of slavery. Research that has addressed long-term trends in slavery has focused primarily on architecture using data that can be gleaned from site plans. Those wishing to undertake studies that require standardized and detailed data about specific artifact attributes, such as comparisons of foodways or discussions of temporal changes in stylistic attributes on ceramics, have encountered problems due to the lack of appropriate data. As one would expect, this is especially true for consumption studies. There are two main reasons for this lack of comparative data. First, in Virginia artifact collections are not housed in one central curation facility. Rather, collections are usually located at the institutions and museums that sponsored the excavations and are frequently difficult to access. Secondly, and perhaps more significantly, comparisons between sites are difficult and in many cases impossible due to different measurement and classification schemes used to describe artifacts and the contexts in which they were found. Recently archaeologists have begun to address seriously issues of data access and comparability (www.chacoarchive.org; www.daacs.org).

This dissertation is able to be so broadly comparative due to the availability of standardized data generated by the Digital Archaeological Archive of Comparative Slavery (DAACS). In 2004, DAACS launched its website, giving researchers and the public free access to high-quality artifactual, contextual, and spatial data (http://www.daacs.org). Initially known as the Digital Archaeological Archive of Chesapeake Slavery, DAACS began as a four-year collaborative initiative funded by the Andrew W. Mellon Foundation. Its goal was to help scholars from different disciplines use archaeological evidence to advance our

historical understanding of slave-based society during the colonial and *ante-bellum* periods by providing Internet access to fine-grained quantitative data from 20 excavated slave quarter sites in the Chesapeake. These data include information on artifacts, faunal remains, the stratigraphic and spatial contexts in which they were found, archaeological site plans, stratigraphic sections of major site features, and images of artifacts. The DAACS artifact attributes used in my analyses will be described in subsequent chapters.

Today DAACS has expanded to become the Digital Archaeological Archive of Comparative Slavery. By 2007 it will contain data from 43 excavated quarter sites located in Maryland, Virginia, North Carolina, South Carolina, and Jamaica. With continued funding from the Mellon Foundation, and an endowment from the National Endowment for the Humanities, DAACS's initial goal remains the same: to promote research and understanding of slave-based societies throughout the Atlantic World by providing access to previously inaccessible archaeological data.

DAACS's success at providing accessible and standardized archaeological data stems from several approaches that were employed during the creation of the Archive.[6] First, the backbone of the Archive is a large, robust relational database (SQL Server) that contains highly refined artifactual, contextual, and spatial data from each site. DAACS data systemically describe both artifacts and the archaeological contexts from which they were excavated. They are recorded using a single set of classification and measurement protocols thereby allowing straightforward multiple-site comparisons through standardized cataloging terminology and recording protocols. As the project manager of DAACS, I worked collaboratively with archaeologists in the region and at Monticello to create the DAACS

[6] As the project manager of DAACS from its inception to present, I was directly involved in the creation and development of the Archive, including the design of the database. I continue to oversee the DAACS project, from the reanalysis of the collections to the management of the DAACS SQL Server database.

database and data standards. The database structures, as well as a complete listing of the fields recorded and terms used in recording the data are available at http://www.daacs.org/aboutDatabase/structure.html.

Second, DAACS ensures data standardization by bringing each collection, including all artifacts, field notes, maps, and images, to the DAACS lab for analysis by trained archaeological analysts familiar with the cataloging protocols. The information from these collections is then entered into the SQL database and ported to the DAACS website for easy querying. Although some protocols have shifted over the past four years, the existing data were updated to accommodate new protocols, thereby insuring data remain comparable. I currently oversee the analysis of these collections and make ongoing decisions regarding any changes made to the cataloging protocols.

Third, DAACS is a community resource, built and maintained in the Department of Archaeology at Monticello, in collaboration with Colonial Williamsburg, the James River Institute for Archaeology, Mary Washington University's Center for Historic Preservation/Robert E. Lee Memorial Association, Mount Vernon, Poplar Forest, the William and Mary Center for Archaeological Research (WMCAR) and the Department of Anthropology, College of William and Mary. Faunal remains are analyzed in the Zooarchaeological Laboratory at the Colonial Williamsburg Foundation. DAACS staff prepares feature summaries, stratigraphic analyses, and intrasite chronologies. Site research summaries are developed with the help of the institutions and archaeologists who curate the collections involved. In addition, an archive Steering Committee of over 30 archaeologists and historians were directly involved in the creation of the cataloging protocols used in the artifact and context reanalysis. The collaborative nature of the project insures that the data

are recorded in a manner that is analytically useful to archaeologists working in the region. For this dissertation, I will be using data from sites that were excavated and curated by archaeologists at the Colonial Williamsburg Foundation, The Corporation for Thomas Jefferson's Poplar Forest, the James River Institute for Archaeology, Mary Washington University's Center for Historic Preservation/Robert E. Lee Memorial Association, and the Thomas Jefferson Foundation.

Sites versus Structures: Defining the Unit of Analysis

Five of the nine plantation sites used in this dissertation contain more than one excavated structure that housed slaves. Since I am interested in measuring signaling strategies of individuals and households, I have focused my analysis on data excavated from inside and around these individual quarters. Table 4.1 provides a list of the plantation sites and individual structures used in this dissertation.

Table 4. 1: Excavated slave quarters used in this analysis, grouped by plantation.

Monticello	Poplar Forest	Utopia II	Utopia III	Utopia IV	Richneck	The Palace Lands	Governor's Land	Stratford Hall Plantation
Building l	Quarter Site	Structure 1	Structure 40	Structure 140	68AL	Palace Lands Quarter	44JC298, Structure 104	ST116
Building o	North Hill	Structure 10	Structure 50	Structure 150				
Building s		Structure 20		Structure 160				
Site 7								
Site 8								

A number of significant methodological concerns influenced my analysis of these structures. These concerns included variation in the way structures were excavated and the extent to which sites sustained modern intrusions or post-depositional processes. For

example, eight of the 19 structures have plowzone samples. Three sites had stratified deposits but were later so substantially altered by modern intrusions and a range of excavation techniques that their sediments are treated here as plowzone. Excavators at eight other sites mechanically removed and discarded the plowzone level without sampling it. As a result, I have chosen to analyze separately artifact assemblages excavated from plowzone and subfloor pit contexts. This means that for every structure, two abundance measures are calculated: one for assemblages from plowzone contexts and another for assemblages from subfloor pit contexts. I will discuss further my analytical methods in Chapter 5 but for now it is sufficient to say that for every artifact class analyzed, there will be two abundance measures, one for plowzone contexts and one for subfloor pit contexts. Of the 19 structures analyzed, 11 sites have plowzone assemblages, 16 of the structures have subfloor pit assemblages, and eight have assemblages from both plowzone and subfloor pits (Table 4.2).

Analyzing assemblages from different deposit types separately provides a number of advantages. First, the total number of structures that I can use is increased when I independently analyze data from both types of assemblages. I would not want to compare subfloor pit data with plowzone data due to site formation differences. There is more independence among artifacts in plowzone assemblages than in feature assemblages where a single deposit many contain many sherds from a single ceramic vessel. In the case of the logistic regression model used in Chapter 5, this lack of independence can cause overdispersion. Although plowzone contexts may prove to be more homogenous and therefore statistically better behaved than assemblages from feature contexts, it is essential to develop statistic methods that work with feature contexts since many of the important sites in the Chesapeake only have features.

Dating the Structures using BLUE Mean Ceramic Dates

Before introducing each plantation site and its structures, I want to discuss the manner in which these sites and assemblages are dated. For each site, I provide a Mean Ceramic Date that is calculated by a query provided by the DAACS website. This provides a general base-line date for the entire area, whether it has a single structure or multiple structures. However, since I am interested in measuring household signaling strategies through time, I also needed dates for individual structures, not the entire site. I therefore calculated two Mean Ceramic Dates (MCD) for every structure, one generated from plowzone assemblages and another generated from subfloor pit assemblages. Following Neiman and Smith (2005), I used the Best Linear Unbiased Estimator Mean Ceramic Date (referred to here as BLUE MCDs), which is calculated using: $MCD_{BLUE} = \sum m_j p_j \left(\frac{1}{s_i / 6} \right)^2$, where m_j is the manufacturing midpoint of the j'th type, p_j is its relative frequency, and s_j is its manufacturing span. The idea behind BLUE MCDs is to give less influence to ceramic types with long manufacturing spans. In doing so, we assume that type frequencies are Gaussian over time, with standard deviations set to $1/6^{th}$ the mandatory span. The BLUE MCDs were generated using SAS code written by Fraser Neiman and which I later modified.

Although structure-based BLUE MCDs allow for more specific dating of intra-site variations, the major concern is that calculating MCDs using a subset of contexts from a site reduces the sample size of ceramics that contribute to the date. Both large and small samples that include many ware types with long manufacturing spans can produce MCDs that are suspiciously early or late but small sample sizes are particularly apt to produce erroneous mean ceramic dates when dominated by types with long manufacturing spans. To better see

the effects of sample size and manufacturing spans, I calculated 95 percent confidence limits for plowzone-based and subfloor pit-based BLUE MCDs for each structure. I then ranked the BLUE MCDs by sample size and plotted the results. All but one plowzone structure had MCDs with a .95 confidence limit of six years or less (Figure 4.1).

The BLUE MCD for Utopia III-Structure 50 had the greatest span, with an MCD of 1765 that could fall anywhere between 1756 and 1774. The sample size for Structure 50 was respectable (91 sherds) and the BLUE MCD for plowzone contexts from the entire Utopia III site, including Structures 40 and 50, is 1756. Since the confidence interval for Structure 50 overlaps with the Utopia III site-wide MCD, and because the sample size is not too small, I made no adjustments to the BLUE MCDs derived from plowzone ceramic assemblages (Table 4.2).

BLUE MCDs derived from subfloor pit ceramic assemblages were more problematic (Figure 4.2). Small sample sizes and large manufacturing spans had a pronounced influence on dates for two structures, Utopia IV-Structure 150 and 44JC298. Only 5 ceramic sherds contributed to Utopia IV-Structure 150's date of 1802. This date is exceptionally late compared to what we know from primary sources as well as from the entire archaeological record. For example, the BLUE MCD for the entire Utopia IV site is 1755.

In addition to the small sample size, four out of the five ceramic sherds were ware types that had long manufacturing spans (American Stoneware, 1750-1920 and Redware, 1700-1900). Sample size, broad ware-type manufacturing spans, and the discrepancy in the feature MCD and the site-wide MCD suggested that the Utopia IV-Structure 150 BLUE

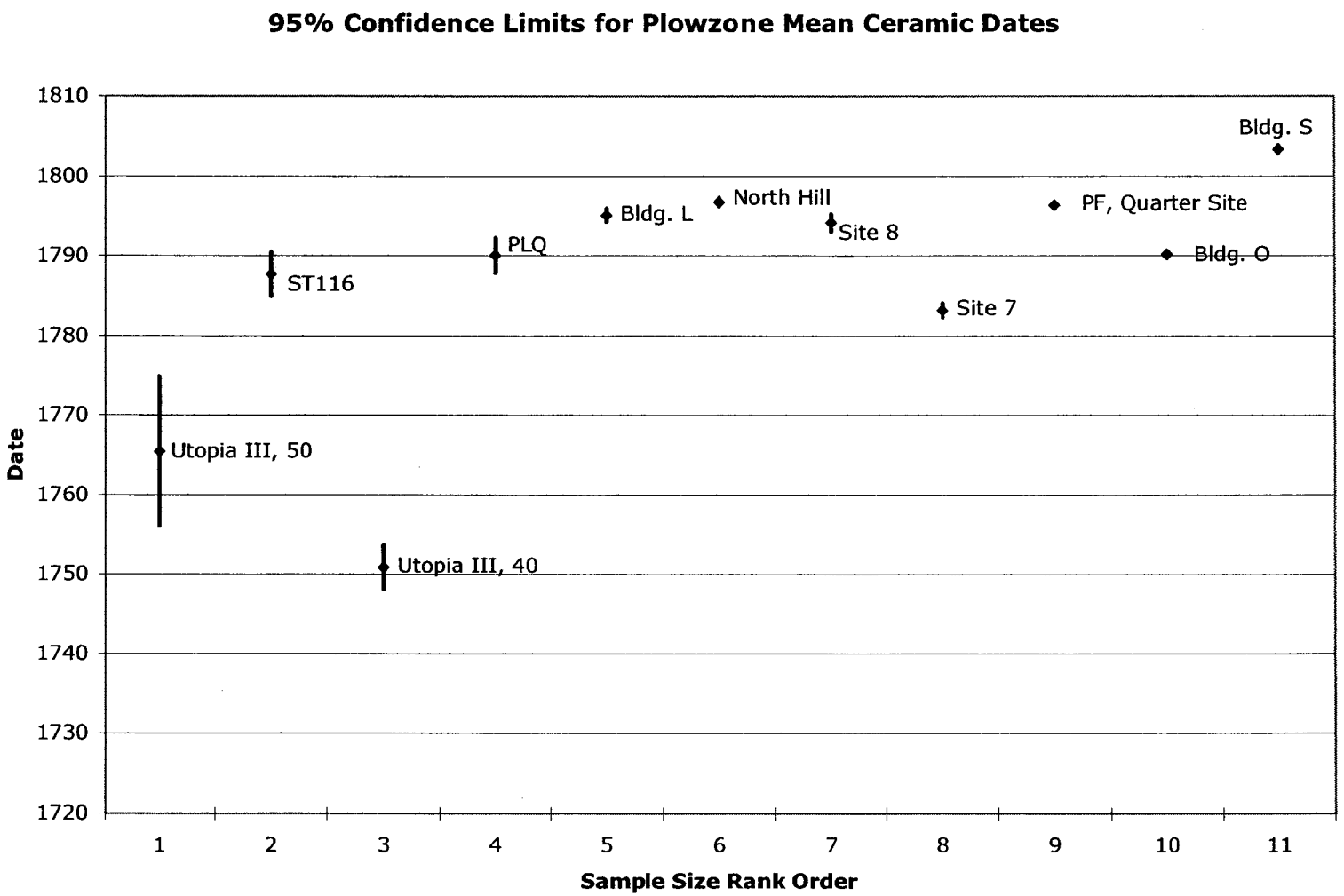

Figure 4.1: 95% confidence limits for BLUE mean ceramics dates generated from plowzone ceramic assemblages.

Table 4.2: Mean Ceramic Dates for each structure by deposit type.		
Structure	**Plowzone BLUE MCD**	**Subfloor Pit BLUE MCD**
44JC298	N/A	1700
Utopia II, Structure 1	N/A	1732
Utopia II, Structure 20	N/A	1734
Utopia IV, Structure 160	N/A	1737
Utopia II, structure 10	N/A	1741
Utopia IV, Structure 140	N/A	1750
Utopia IV, Structure 150	N/A	1754
Richneck	N/A	1757
Utopia III, Structure 40	1750	1761
Site 7	1783	N/A
Site 8	1794	1764
ST116	1787	N/A
Palace Lands Quarter	1789	1765
Utopia III, Structure 50	1765	1767
Building o	1790	1792
Building l	1795	N/A
North Hill, Poplar Forest	1797	1793
Building s	1803	1799
Quarter Site, Poplar Forest	1796	1802

MCD of 1802 was not reliable. For the following analyses I use the entire site's BLUE MCD (1755) for Structure 150 instead of the structure MCD of 1802.

Unlike Utopia IV-Structure 150, 44JC298 had an unexpectedly early subfloor pit-based BLUE MCD of 1654 with a wide confidence limit span. Like the preceding Utopia IV example, the site-wide BLUE MCD of 1659 is derived from a small sample size (9 sherds) made up of ceramic ware types with long manufacturing spans (Delftware 1607-1802, North Italian Slipware 1610-1675, Redware 1700-1900). Finally, primary sources suggest that the site dates to the early eighteenth century. Based on the documentary record, and the error introduced by small sample sizes and long manufacturing dates, I assigned a MCD of 1700 to 44JC298.

The Signaling Variables

The signaling model in Chapter 3 provides the basis for ranking each structure by the measurable signaling potential of its inhabitants. As is the case with most slave quarter sites, there is no documentary information available that tells us about the individuals living in each structure such as their age, sex, occupation, ethnic and familial backgrounds. I can, however, make some assumptions about their signaling potential based on variables that are measurable using either archaeological data or historical documents. The six variables that were discussed in the preceding chapter that can be used to predict the amount that signalers should be willing to invest in costly signaling include: 1. a structure's distance from a major urban center, 2. if a structure is located within one third of a mile from the main house, 3. whether the plantation had an absentee owner, 4. whether the structure is located on plantation with a diversified agricultural routine, 5. if a structure and its inhabitants were owned by Thomas Jefferson and 6. the passage of time.

I used archaeological and historical data to score the signaling variables for each structure. Table 4.3 provides a summary of the independent variable scores for each structure, where 0=no and 1=yes. Distance from a major urban center was measured by taking the inverse distance from the nearest urban center (1/distance in miles). This insures that structures located further from an urban center had lower distance scores then those closer to a urban center. Time was assigned using the appropriate BLUE MCD for the assemblage being measured. These scores are used in the generalized linear models in Chapter 5. The remainder of this chapter provides archaeological and historical backgrounds that situate each plantation and structure in relationship to these signaling variables.

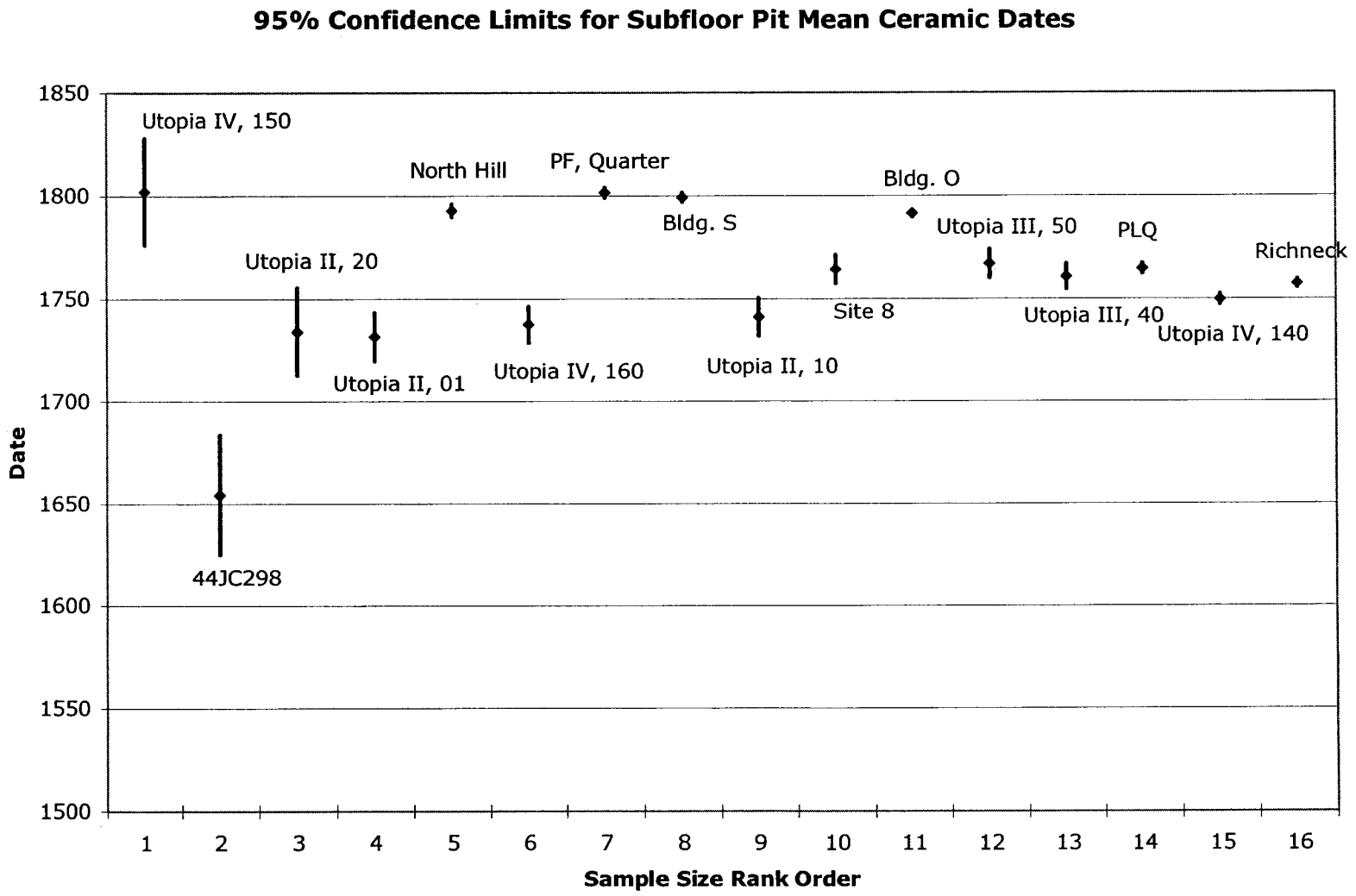

Figure 4.2: 95% confidence limits for BLUE mean ceramics dates generated from subfloor pit ceramic assemblages.

Table 4. 3: Signaling variables where 0= no and 1= yes.						
Structure Name	**Distance to nearest Urban Center**	**Transformed Mileage to Urban Center (1/miles)**	**Within one-third of a mile of the main house?**	**Owner Present?**	**Agriculturally Diversified?**	**Owned by Jefferson?**
44JC298	Williamsburg (8.9 miles)	0.122	0	0	0	0
Richneck	Williamsburg (1.5 miles)	0.666	0	0	1	0
Utopia II-Structure 1	Williamsburg (4.3 miles)	0.232	0	1	0	0
Utopia II- Structure 20	Williamsburg (4.3 miles)	0.2	0	1	0	0
Utopia II- Structure 10	Williamsburg (4.3 miles)	0.2	0	1	0	0
Utopia III- Structure 40	Williamsburg (4.3 miles)	0.2	0	1	1	0
Utopia III-Structure 50	Williamsburg (4.3 miles)	0.2	0	1	1	0
Utopia IV- Structure 140	Williamsburg (4.3 miles)	0.2	0	1	1	0
Utopia IV-Structure 150	Williamsburg (4.3 miles)	0.2	0	1	1	0
Utopia IV- Structure 160	Williamsburg (5 miles)	0.2	0	1	1	0
Palace Lands Quarter	Williamsburg (.8 miles)	1.25	1	1	1	0
Site 8	Charlottesville (4.5 miles)	0.222	0	1	0	1
Site 7	Charlottesville (4.5 miles)	0.222	0	1	0	1
Building o	Charlottesville (4.5 miles)	0.222	1	1	0	1
Building s	Charlottesville (4.5 miles)	0.222	1	1	1	1
Building l	Charlottesville (4.5 miles)	0.222	1	1	1	1
North Hill	New London/ Lynchburg (8 miles)	0.125	0	0	0	1
Poplar Forest Quarter	New London/ Lynchburg (8 miles)	0.125	1	0	1	1
ST116	Fredericksburg (43 miles)	0.023	1	1	1	0

The Greater Chesapeake Region

The sites used in this dissertation are located within three sub-regions of the greater Chesapeake, all of which experienced, to varying degrees, the demographic, economic, and agricultural changes discussed in Chapter 3. The sub-regions, collectively referred to here as the greater Chesapeake region, extend from the southern shore of the Potomac River to the southern bank of the James River. The eastern edge is bound by the Chesapeake Bay and the western edge stretches to the Blue Ridge Mountains (Figure 4.3). The geography of these sub-regions played a significant role in shaping the nature of slavery in the greater Chesapeake.

The climate and soil of the central Chesapeake region was ideal for tobacco cultivation. Oronoco tobacco, the most common variety of tobacco, was the predominate cultivar in the Northern Neck of Virginia, located between the Potomac and Rappahannock Rivers. Although oronoco was grown until the 1770s, its production peaked in the 1730s. Subsequent volatility in the tobacco markets prompted planters to introduce grain crops to their agricultural regimes. As a result of this diversification, corn and wheat contributed to half of the crop yield on major plantations by the mid-eighteenth century (Walsh 1995b). ST116, a Stratford Hall plantation quarter included in this study, is in the region of oronoco growth.

Plantations in the York River basin, and parts of the Rappahannock and James River basins mainly produced a sweet-smelling strain of tobacco that was most popular on the European markets. Prices for this tobacco dipped sharply in the 1720s and early 1730s due to low demand and bouts of poor weather. However, yield and prices rose in the 1730s, prompted by the passage of tobacco inspection acts. Despite the increase in prices and

production, planters began introducing maize by the third quarter of the eighteenth century (Walsh 1995b:181). The Rickneck and Palace Lands Quarters, as well as 44JC298 and the Utopia plantation sites are all located in this area.

Tobacco production began in the Piedmont region west of the fall line in Richmond and between the Potomac and James Rivers in the 1730s. Plantations in this area quickly began producing larger tobacco yields than plantations in the tidewater. Piedmont planters began growing maize and wheat for commercial sale by the third quarter of the eighteenth century and these crops dominated the market by the last decades of the century (Walsh 1995b:181). The five Monticello sites and the two Poplar Forest sites are located in the Piedmont region.

The sites used in this study are sampled from rural and urban sites as well as agriculturally diversified plantations and plantations that only practiced tobacco monoculture. They also span the entirety of the eighteenth century, with some structures inhabited well into the early nineteenth century. The following section discusses each site, placing it the context of the eighteenth-century Chesapeake's economic and demographic landscape.

The Sites

44JC298, The Quarter Dwelling (Structure 104):

The Quarter Dwelling at 44JC298 (Structure 104) was excavated in 1992 by the James River Institute for Archaeology (JRIA), under the supervision of Garrett Fesler. This dwelling, located 8.9 miles southwest of present-day Williamsburg, was situated on a bluff above the Chicahominy River. It is located on land patented in the1630s and documentary evidence suggests that the quarter was constructed in the 1670s (Fesler 2004c). Others

structures near 44JC298, Structure 104 were uncovered during testing but it was not determined if they were contemporary with Structure 104.

Structure 104 was excavated by JRIA prior to the construction of a golf course and housing subdivision. The topsoil and plowzone were removed mechanically from the site. They were not screened and no artifacts were collected from topsoil or plowzone contexts. All artifactual and contextual data for 44JC298 come from the subfloor pit and posthole features that define the site. All features were hand-troweled and feature sediment was dry-screened through quarter-inch hardware cloth (Fesler 2004c). Flotation samples were removed from some posthole features and from the majority of the subfloor pits. Site measurements were taken in feet and tenths-of-feet.

The 16' by 26' post-in-ground structure had three bays, each containing multiple subfloor pits (Figure 4.4). The west bay, measuring 10' by 16', contains a scorched earth area identified as a hearth and a subfloor pit complex consisting of 11 pits whose placement and cutting patterns indicate several periods of pit construction and use. The center bay measures 10' by 16' and contains two subfloor pits. The east bay/shed addition extends about 6' off of the east end of the building. Although it apparently had no heat source, it contains four pits that suggest it may have also been a living area for slaves. Structure 104 had an early subfloor pit-based BLUE MCD of 1654 with a wide confidence limit span. Documents related to the Governor's Land, and the error introduced by small sample size, suggest that the site was not inhabited prior to 1700. I therefore assigned the subfloor pit assemblages from Structure 104 of mean ceramic date of 1700.

Signaling Variables

Structure 104 was located almost nine miles from Williamsburg, a full day's walk from markets and stores. No documents exist that mention the inhabitants or construction of the Quarter Dwelling. Fesler believes that the site's date (DAACS TPQp90=1700), its placement near a ferry crossing, and the building's architectural features point to slaves who worked the ferry crossing as well in the surrounding fields inhabited this building (Fesler 2004c). He also suggests that the multiple subfloor pits scattered throughout the three bays, many of which cut each other, indicate that a group of unrelated people lived in the quarter. It is not known whether the plantation was agriculturally diversified, if an owner lived on the property, or if the building was located within one-third mile of the owner's house. Slaves living at Structure 104 were most likely owned by Bridges Freeman II (Fesler 2004c).

Utopia Quarter Overview:

Acquired by James Bray in the late seventeenth century, the Littleton/Utopia property comprised 1,280 acres. At least two outlying quarters housed enslaved workers and one of those quartering areas known as Utopia sat on a high bluff overlooking the James River, a little over four miles to the southeast of Williamsburg. A ravine near the site most likely gave its residents access to the James River and soil around the Utopia quartering area was conducive to the cultivation of tobacco and other crops. Artifacts indicate that the Utopia quartering area was occupied consistently from c. 1670 until 1775 (Fesler 2004b).

William Kelso and the Virginia Research Center for Archaeology initiated archaeological investigations at the Utopia quarter in 1973. One year of excavation revealed evidence of two phases of occupation, which have come to be known as Utopia I and Utopia II. Utopia I, consisting of a 38' by 18' post-in-ground structure, was interpreted as a house for indentured servants or tenants of Thomas Pettus II, the owner of the Utopia property prior

to Bray (Fesler 2004a:19). This period of occupation was subsequently dated to c.1675-1700 (Fesler 2004a:21). Testing by Kelso's crew indicated the presence of later dwellings in the area, although no significant archaeological work was conducted as these sites until the 1990s. Data from Utopia I are not used in this dissertation.

Excavations directed of Garrett Fesler began in 1993. From 1993 through 1997 the James River Institute of Archaeology and the University of Virginia's Archaeological Field School uncovered three additional areas of occupation at the Utopia Quarter: Utopia II 1700-1730, Utopia III 1730-1750, and Utopia IV 1750-1775 (Fesler 2004a). This dissertation uses data from eight dwellings spread across these three areas. As the principal investigator for all the 1990s excavations at Utopia, Fesler used the same excavation methods at each occupation area. The topsoil and plowzone were mechanically stripped and discarded at all sites. Although artifacts were collected during the stripping of the plowzone, these do not significantly contribute to the analysis at Utopia II and IV. Shovel-test pits and larger quadrats of plowzone were removed around Structures 40 and 50 at Utopia III and artifact collection was substantial enough to allow for the analysis of both plowzone and subfloor pit assemblages from the structures at Utopia III.

Removal of the plowzone at all three sites exposed an extensive and complicated array of features ranging from architectural postholes, subfloor pits, and ditches to human burials. Three dwellings were uncovered and excavated at Utopia II (Structures 1, 10, and 20), two were exposed and excavated at Utopia III (Structures 40 and 50) and three quarters were excavated at Utopia IV (Structures 140, 150, and 160). Data from burials excavated at Utopia are not used in this dissertation.

All features were 100 percent excavated. One hundred percent of the sediment from subfloor pits excavated from dwellings at Utopia II and III was floated. A 50-liter sample of sediment from all Utopia IV subfloor pits was collected for flotation. The remaining Utopia IV pit sediment was dry-screened through quarter-inch hardware cloth. Site measurements were taken in feet and tenths-of-feet (Fesler 2004c).

Utopia II:

Excavations at Utopia II exposed three domestic buildings, Structures 1, 10, and 20, and one outbuilding. All four buildings were of earthfast construction. Structures 1 and 20 measured 12' by 28'. Structure 10 measured 16' by 32' (Fesler 2004a:164-165). Structure 1 contained six subfloor pits, the majority clustered around a brick hearth located on the southern gable. Structure 10 contained eight pits arranged along the eastern walls of the structure while a large complex of multiple pits was located in front of a hearth located along the western wall. Structure 20 contained one large subfloor pit. These three domestic structures were arranged to form an open central courtyard that contained a small cooking pit (Figure 4.5).

Over 30,000 artifacts were recovered from features at Utopia II. Using pipestem bore diameters and mean ceramic dates, Fesler concluded that the Utopia II was occupied between 1700 and 1730 (Fesler 2004a:166-169). He did not provide dates for individual structures or subfloor pits within structures. BLUE MCDs for subfloor pit assemblages from each structure suggest that the site's chronology is more complex. Structure 1's BLUE MCD is 1732 and Structure 20's BLUE MCD is 1734. Structure 10 dated to 1741, perhaps indicating that it was occupied longer than the other dwellings.

In his dissertation, Fesler concludes that Structure 1 was a barracks-style coresidential unit, Structure 20 a kin-based household, and Structure 10 a combination of the two types (2004a). He based these conclusions on architectural features and artifact assemblages. As has been convincingly argued by several archaeologists, multiple subfloor pits with different cutting episodes are indicative of transient, coresidential groups whereas units with one or two pits suggest that the building was lived in by cooperative, possibly kin-based households. Fesler also argued that kin-based households should not only have more material items as a result of resource sharing but also objects reflecting the activities of both men and women should be equally present. At Utopia II, he posits that unrelated but coresidential women occupied House 1 while a household of cooperative women lived in House 20. He believes that House 10 may have been a duplex that had a single-sex coresidence on one side and a kin-based or cooperative household on the other (Fesler 2004a:392-393).

Signaling Variables

All three structures from Utopia II were approximately 4.3 miles from the center of present-day Colonial Williamsburg, what was once the center of colonial-period Williamsburg. This quarter site was within 2 miles of James Bray's house and Bray was thought to have visited his quarter sites several times a week, if not daily (Fesler, personal communication). All three structures therefore received a score of 0 for distance from mansion and a score of 1 for owner presence. Bray's landholdings were not diversified when the Utopia II site was inhabited. Tobacco was the primary crop and it is likely that residents at Structures 1, 10, and 20 were field workers. These structures received a score of 0 since they were not located on an agriculturally diversified plantation

Utopia III:

Utopia III consists of two domestic buildings, Structures 40 and 50 and one outbuilding, Structure 107 (Figure 4.6). As with Utopia II, all structures were of post-in-ground construction. Structure 40 measured 12' by 16' and it contained three centrally-located subfloor pits that were altered by modern disturbances (Fesler 2004a:169). Fesler's analysis indicates that Structure 40 had the "the highest degree of resource consumption" at Utopia (Fesler 2004a:393). Fesler also interpreted its artifact content as being skewed toward female activities. He therefore concluded that Structure 40 was most likely a household occupied predominantly by women (Fesler 2004a:393-394).

Structure 50 appears to have been constructed in phases. The central core of the building measured 12' by 16' and contained 12 subfloor pits. Two 6' by 16' sheds were attached to the western and eastern ends of the core unit. The western shed contained four subfloor pits while two pits were dug in the eastern addition (Fesler 2004a:170). Fesler believes that the shed additions were a response to the introduction of newly purchased African slaves (Fesler 2004a:174). Intensive subfloor pit construction and use, as well as a neutral "gender profile", led Fesler to conclude that it was a coresidence for both sexes (2004a:394).

Several landscape features shape the Utopia III site. A fence line north of Structure 50 perhaps served as the northern boundary of the site. Ditches extending south of Structure 40 appear to form some sort of enclosure, which Fesler suggests was entered from a gate next to Structure 40 (Fesler 2004a:170). Utopia III residents also used several nearby trash pits.

Fesler again used pipestem bore diameters and mean ceramic dates to arrive at a median activity date of 1740, with occupation beginning in the 1730s and extending into the

1750s (Fesler 2004a:173-174). Fesler did not date the individual structures or subfloor pits within structures. I calculated BLUE MCDs for both subfloor pit and plowzone assemblages from each structure. Plowzone contexts from Structure 40 had a BLUE MCD of 1750 and a subfloor pit MCD of 1761. Structure 50 plowzone dated to 1765 and its subfloor pit assemblages dated to 1767.

Signaling Variables

Utopia III's structures had signaling variable scores similar to Utopia II. The exception is that by the mid-1750s, Bray's landholdings had become agriculturally diversified. In addition to growing tobacco, Bray sold wheat, corn and other crops for profit. Felser also notes that Bray maintained a corn and wheat mill that his neighbors used for a fee (Felser 2004a: 123-124). As a result, I have coded Utopia III as an agriculturally diversified plantation.

Utopia IV Site

Excavations at Utopia IV uncovered three domestic buildings identified as Structures 140, 150, and 160 (Figure 4.7). Unlike dwellings at Utopia II and Utopia III, structures at Utopia IV were constructed using either ground-laid sills or piers. The buildings left faint traces in the archaeological record, although the piers used in the construction of the south wall of Structure 140 remained visible. Due to the lack of clear architectural footprints, the sizes of the structures are estimates (Fesler 2004a:182).

Structure 140 appears to have been the largest of the three structures, measuring approximately 22' by 32'. Using evidence taken from the location of the southern pier holes, Fesler argues that this quarter was a duplex, with each side having separate entrances. Ten

subfloor pits were found in the western duplex and 12 pits were found in the eastern duplex (Fesler 2004a:182-183). High resource consumption and neutral gender profiles led Fesler to conclude that Structure 140 consisted of two units that held kin-based or otherwise cooperative households (2004a: 394-395).

Less can be concluded about Structures 150 and 160. Each contained a single subfloor pit. Structure 150 measured approximately 15' by 17' and Structure 160 may have been slightly smaller (Fesler 2004a:183). Several borrow and trash pits were arrayed around the three domestic structures. Fesler believes that the lack of fence posts indicates a shift to using worm fences to demarcate space. The spatial distribution of artifacts as well as a soil chemistry tests suggested to Fesler that a worm fence was constructed directly west of Structure 140. Due to a lack of artifacts, Fesler made no conclusions about household or gender arrangements at Structures 150 and 160 (2004a:395).

Pipestem bore diameters and pipe bowl shapes indicate that the site was occupied by the beginning of the 1750s and that occupation ceased by 1780. The mean ceramic date for the site was initially problematic. After removing intrusive sherds from his analysis, Fesler arrived at an occupation range of 1745-1765 (Fesler 2004a:185-188). As with the other Utopia sites, individual structures or subfloor pits within structures were not dated. BLUE MCDs for subfloor pit assemblages from individual structures point to a more complex chronology that suggests that occupations at Utopia II, III and IV were not temporally distinct. Structure 160 has a BLUE MCD of 1737, suggesting that it may have been occupied at the same time as Structure 10 at Utopia II. Structures 140 and 150 date to 1750 and 1754 respectively, suggesting that there may have also been contemporaneous occupations at Utopia III and Utopia IV.

Signaling Variables

Utopia IV structures were scored identically to Utopia III. Each structure at Utopia IV was around 4.3 miles from Williamsburg and they were more than one-third of a mile from the main house. It is likely that the owners visited the quarter and surrounding fields on a regular basis and the plantation lands surrounding Utopia IV were diversified.

Richneck Plantation, 68AL:

The Richneck Slave quarter was part of a large, multi-component site located one and a half miles southwest of Williamsburg and five miles north of Jamestown (Franklin 2004a:2). Excavated by Colonial Williamsburg's Department of Archaeological Research, preliminary Phase II testing began 1993. Maria Franklin directed the Phase III excavations that occurred between June 1994 and February 1995.

Occupation at Richneck Plantation began in the mid-seventeenth century when a large brick manor house and several outbuildings were constructed for Richard Kemp, then Secretary of State for the colony. By the early 1700s, the property had passed onto the Ludwell family. During the first decade of the eighteenth century the Ludwells moved to Greenspring, maintaining Richneck as a quartering area (Franklin 2004a:19-34). The Richneck Slave quarter dates from the second and third quarters of the eighteenth century and consists of two dwellings, 68AL and 68AP. Franklin indicates that enslaved residents at Richneck did not have daily contact with their owners and she is skeptical about the presence of a white overseer (2004a:23). Although both 68AL and 68AP are interpreted as slave quarters, this dissertation only uses data from 68AL. The multiple subfloor pits at 68AL are

almost certain indicators that it was a slave quarter. 68AP's single large cellar is an unusual feature for an early-to-mid-eighteenth-century slave quarter, perhaps indicating that it was home to an overseer or driver.

Philip Ludwell III's 1767 probate inventory provides the names and relative ages of the 21 slaves living at Richneck at the time of his death. They included 10 adult men, five adult women, three boys and three girls (Franklin 2004a:25). Table 4.4 provides their names and relative ages. Franklin suggests that there was at least one, and most likely two married couples living at the quarter. The imbalanced sex ratio also suggests that a number of young men were either single or married to women living away from the Richneck quarter (Franklin 2004a:210-214).

As with 44JC298, the Richneck 68AL quarter was excavated prior to the construction of a modern housing subdivision known as Holly Hills. The area over the structure was excavated in 2 by 2 meter units, and 100 percent of the topsoil and plowzone from these quadrats was dry-screened through quarter-inch hardware cloth (Franklin 2004a:6). All features, except for two, were bisected and excavated with a trowel. One hundred-percent of all sediment from every feature at Richneck 68AL was floated. Site measurements were taken in meters and centimeters and were converted to feet and tenths of feet for this study.

Table 4. 4: Names and approximate ages of slaves living at the Richneck Slave Quarter in 1767 (From Franklin 2004a:28).

Name	Sex	Estimated Age in 1767	Value in Pounds
Daniel	Male	Mid 20s-40s	70
Tom	Male	Mid 20s-40s	70
Guster	Male	18-41	60
Harry	Male	18-41	60
Jemmy	Male	18-41	60
John	Male	50s to 60s	30
Bacon	Male	60+ or infirm	25
Tom	Male	60+ or infirm	20
Peter	Male	60+ or infirm	20
Shocker	Male	60+ or infirm	10
Judith	Female	17 to 37	50
Dinah	Female	17 to 37	50
Jenny	Female	40s to 50s	40
Mary	Female	40s to 50s	40
Hester	Female	Late 50s+	10
Ben	Male	15-17	45
Nero	Male	4 to 6	12
Isham	Male	Toddler	5
Nanny	Female	8 to 10	25
Fanny	Female	5 to 7	20
Peg	Female	5 to 7	17

The main architectural feature of 68AL is the remains of an H-shaped chimney base, with burnt subsoil suggesting the location of the fireboxes. Due to the absence of any additional architectural features, it is likely that 68AL was a two-room structure with ground-laid sills and a central H-shaped chimney (Franklin 2004b). Fifteen subfloor pits were located within the structure, with the majority of them clustered in front of the hearths (Figure 4.8). Many of these pits cut each other, indicating that they were not all in use at the same time. A DAACS Phasing Query confirms this by indicating that there were three

phases of pit construction and use at the quarter (http://www.daacs.org/resources/sites/RichneckQuarter/phase.html). These phases suggest that the population may have been less stable than originally hypothesized by Franklin (1997, 2004a).

Signaling Variables

Richneck was located 1.5 miles from the center of eighteenth-century Williamsburg. Slaves living at this satellite quarter had little or no contact with their owner, Philip Ludwell III, and did not live within one-third of a mile of Green Spring, Ludwell's home plantation. Although originally a tobacco plantation, Richneck had shifted to a more diversified agricultural regimen by mid-century. Residents may have therefore engaged in a more varied work routine than that dictated by swidden agriculture.

Palace Lands Quarter (44WB90):

Maria Franklin, under the auspices of the Department of Archaeological Research at Colonial Williamsburg, also conducted excavations at the Palace Lands Quarter in 1996. Located on the outskirts of historic Williamsburg, the Palace Lands Quarter was situated on the park lands associated with the Virginia Governor's Palace. The Palace Lands included the governor's mansion, outbuildings, and gardens while the Park Lands encompassed pastures, fields, woodlands, and orchards (Franklin 2004c). Although no documentary evidence exists placing slaves at the quarter, all three governors who served while the dwelling was occupied owned slaves. The site appears in a clearing on a 1781 military map of Williamsburg and suggests that the area around the site may have been used as either

pastureland or for crops. Franklin believes that slaves living at the Palace Lands Quarter were in charge of growing subsistence crops and tending livestock (Franklin 2004c).

The Palace Lands Quarter consists of four major feature groups: a large subfloor pit, a brick chimney base, a series of ditches, and two fence lines (Figure 4.9). Although Franklin has interpreted these feature groups as belonging to the same occupation period (Franklin 2004c), DAACS analysis suggests otherwise. The mean ceramic dates for the feature groups send a clear chronological signal. Most notably, the subfloor pit is much earlier than the ditch features and fence lines, with a MCD of 1761 and a TPQp90[7] of 1762. The ditches and postholes contained slightly later eighteenth-century ceramics suggesting they were dug and filled after the site with the subfloor pit had been abandoned. Although it contains no ceramic evidence, the brick hearth's position in respect to the subfloor pit, as well as its alignment with the southern fence line suggest that it was associated with a later, nineteenth-century occupation (Bon-Harper and Wheeler 2004).

An area measuring 20 by 28 meters was excavated around the Palace Lands Quarter site. Site measurements were taken in meters and centimeters. One hundred eleven 2 by 2 m, two 1 by 2 m, and 10 1 by 1 m plowzone units were excavated. The sampling strategy varied for each unit, with 25 to 100 percent of the plowzone, redeposited subsoil, and silt layers screened through quarter-inch hardware cloth. Sediment from nine 2 by 2 m units was not screened at all. Sediment from four major features, the subfloor pit and three ditches, received various levels of treatment from dry and wet screening to flotation. Flotation samples ranging from five to 50 liters were taken for nearly every context in the subfloor pit

[7] TPQp90 is a *terminus post quem* estimate that is based on the 90th percentile of the beginning manufacturing dates for all the artifacts comprising it. This measure is less sensitive to excavation errors and taphonomic processes that might introduce a small amount of anomalously late material into an assemblage (www.daacs.org).

and ditches. The majority of the posthole fill from the two fence lines was dry-screened, although some contexts were simply trowel-sorted (Franklin 2004c).

Signaling Variables

The Palace Lands Quarter is the most urban site in this study. Located .8 miles from the center of eighteenth-century Williamsburg, residents at the quarter may have had the opportunity to make daily excursions into the city. The site was located with one-third of a mile of their owner and was part of agriculturally diversified land holdings.

ST116, Stratford Hall Quarter:

Stratford Hall Plantation, home to the Lee family beginning in 1737, is located on the Potomac River in Westmoreland County, Virginia. Few documents that describe daily plantation activities survive. Much of what is known about plantation operations and building locations comes from archaeological research conducted on the property in the 1970s and 1990s (Neiman 1977; Sanford 1999a, 1999b, 2000). ST116 was identified during Fraser Neiman's 1976-1977 shovel test pit survey of the property and was fully excavated between 1998 and 2000 by Douglas Sanford, staff from Mary Washington University's Center for Historic Preservation and students from Mary Washington University's Department of Historic Preservation.

ST116 is a small 8' by 8' earthfast dwelling located in a field 300 feet northeast of the Stratford Hall mansion (Figure 4.10). Extensive plowing during the past century created a plowzone site that has only a small number of surviving features. During three field seasons, MWU excavated over 850 square feet of sediment in quadrats ranging from 3' by 3' to 5' by 5' in a block area around ST116's earthfast dwelling (Sanford 2004).

In addition to the plowzone contexts, ST116 contained a number of features, including four large postholes and postmolds that represent the four corners for the structure as well as a single-course brick foundation wall between the northwestern and northeastern postholes. This repair foundation wraps around the northwest and northeast posts and was apparently placed there to support what was presumably the sagging north wall of the structure. No evidence of a hearth or chimney survives, although Sanford hypothesizes that a small posthole on the eastern side of the structure may point to the chimney location on the east side. There were no subfloor pits in this dwelling.

All sediment excavated at ST116 was dry-screened through quarter-inch hardware cloth. None of the features contained more than five ceramic sherds, therefore DAACS was unable to produce a seriation-based chronology for the site. The Mean Ceramic Date for the site is 1783 and the TPQp90 is 1775 (DAACS 2005).

Signaling Variables

Sanford believes that the inhabitants of ST116 once resided at outlying Stratford field quarters and were relocated to ST116 after the Lee's shifted from tobacco production to wheat and mixed agriculture (2004). This shift resulted in a consolidation of operations, and buildings and slaves were moved closer to the main mansion complex. The impermanence of ST116, as well as the fact that it was not aligned with the stone and brick structures related to the mansion complex, all contribute to the idea that ST116 was a later addition to the Stratford plantation landscape.

ST116 was therefore part of a diversified plantation and was located within one-third mile of the Stratford Hall mansion that housed the Lee Family. Unlike Palace Lands Quarter residents, those living at ST116 were the furthest removed from urban life. Slaves living at

Stratford Hall lived 43 miles from Fredericksburg, the nearest urban center. They were 75 miles from Richmond and almost 100 miles from Washington, D.C.

Poplar Forest

This study includes two excavated quarter sites from Poplar Forest, Thomas Jefferson's 5,000-acre Bedford County plantation. Jefferson inherited Poplar Forest along with several other properties in 1773 upon the death of his father-in-law, John Wayles. Tobacco was being grown at Poplar Forest in 1773 but only one enslaved family appears to have lived on the property. Over the next decade Jefferson reorganized his entire labor force, so that by 1783, 35 slaves lived at Poplar Forest (Heath 1999a:9-12). Like Monticello, Poplar Forest was not agriculturally diversified until the early 1790s when Jefferson introduced wheat to the plantation's tobacco monoculture. By the early nineteenth century, slaves were also growing corn, oats, and hemp (Heath 1999a:19-26). Jefferson spent little time at Poplar Forest until 1809, the year the octagonal brick mansion was completed.

Excavations at both the Quarter and North Hill sites were directed by Barbara Heath. Excavation methods were nearly identical at each site. The sites were excavated using a 10' x 10' grid, although some 5' by 10' and 5'x 5' units were dug. Topsoil and plowzone contexts were removed with a shovel and dry-screened through quarter-inch hardware cloth. Features were toweled and all feature sediment was dry-screened through quarter-inch hardware cloth. Flotation samples were also taken from feature contexts (Heath 2004b). For more information on excavation strategies please see: http://www.daacs.org/resources/sites/NorthHill/background.html and http://www.daacs.org/resources/sites/QuarterSite/background.html.

The North Hill Site:

Discovered by staff archaeologists in 1993, the North Hill site represents an early slave occupation at Poplar Forest. Occupied between 1770 and 1785, North Hill was abandoned prior to Jefferson's redesign of the plantation landscape in the early nineteenth century. The main feature of the site was a subfloor pit; the dimensions of the structure are not known since no structural posts, sill stains, or foundations survived (Figure 4.11). The single pit suggests that the North Hill site consisted of a single dwelling that perhaps housed one family (Heath 1999; 2004c).

Signaling Variables

At the time this site was occupied, a tobacco monoculture was in place at Poplar Forest. Both Wayles and Jefferson did not live on the property, although a contemporary overseer's house was located nearby (Heath 2004c). Wayles did not have a house on the property and Jefferson's mansion was not completed until 1809; therefore the North Hill site was not located near an owner's house. The site is eight miles from Lynchburg, a long day's walk to a large urban center. Slaves from Poplar Forest did go to New London, a smaller town located about 6.5 miles from Poplar Forest, to purchase items (Heath pers. communication; Martin 1993)

The Quarter Site:

The Quarter Site was also discovered in 1993 by Poplar Forest staff archaeologists. Dating from around 1790 until 1812 and located 600 feet east of Jefferson's mansion, the Quarter site was one component of a large, active plantation (Heath 1999a, 2004b). By 1810,

87 slaves lived and worked at Poplar Forest, with around 57 living in the vicinity of the Quarter Site, an area known as "Tomahawk." Nineteenth-century maps indicate that an overseer also lived near the Quarter site. In addition to field laborers, enslaved Tomahawk residents included "...members of the Hubbard family including Nace, 'the former headman and the best we have ever known,' his stepsister Hanah 'who cooks and washes for me,' her husband Hal, who along with Will worked as a smith, and Hal's mother Bess who made butter and spun" (Heath 2004b).

Features and sediments layers from the site have been interpreted as coming from three structures, five fence lines, and two large erosion gullies (Figure 4.12). Structure 1 was most likely a log duplex with two rooms each measuring 12.5' by 15'. Exterior postholes and interior holes for a central partition wall are the main architectural evidence for the structure; there was no evidence of the chimneys' locations, although Heath suggests that they were located along the gable end (Heath 1999a; 2004b). Three subfloor pits were found in this building, one in the southwestern room and two pits that cut each other were located in the northeastern room.

Structures 2 and 3 are not as easily defined. There is little architectural evidence for Structure 2 except for the presence of a large ash-filled pit and sediment layers that Heath interprets as "episodes of intentional fill over an earthen floor, perhaps as a response to the gradual erosion of the original floor surface over time" (Heath 2004b). Structure 3 is even more amorphous, with little supporting architectural evidence. Poplar Forest archaeologists have concluded from the presence of daub with log-impressions that Structures 2 and 3 were also of log construction. The remains of numerous small postholes provide a picture of the landscape crisscrossed by post-in-ground and worm fences.

Signaling Variables

Unlike North Hill, the Quarter site's occupation began around the time that wheat cultivation was introduced to Poplar Forest. Not all slaves living at the Quarter site worked in the fields and possibly two residents were skilled slaves, one a blacksmith and another a spinner (Heath pers. communication). Like North Hill, the Quarter site was six and one-half miles from New London and eight miles from Lynchburg. The Quarter site was still occupied when Jefferson's house was completed in 1809. The dwelling was less than one-third mile from the house. Jefferson, however, was not a regular presence on the property.

Monticello:

In 1774, at age 31, Thomas Jefferson became the second largest slaveholder in Albemarle County, Virginia. Over the next 52 years, Jefferson would own an average of 200 slaves, a number that waxed and waned in concert with Jefferson's financial situation (Finkelman 1989; Stanton 1996). Jefferson's slaves were scattered throughout his land holdings, although most resided at Monticello, Jefferson's primary residence in Albemarle County or at Poplar Forest in Bedford County. Although the majority labored in the tobacco and wheat fields, there was clearly room for advancement to skilled occupations. Jefferson had enslaved men trained in carpentry, coopering, joinery, stone working, blacksmithing and general carpentry tools. He used the nailery as an industrial training ground for young boys. These young men came to the nailery from outlying field quarters as well as Poplar Forest. Women from Poplar Forest were also brought to Monticello and taught spinning and weaving, pointing to the types of skilled positions available for enslaved women. At

Monticello, members of the extensive Hemings family tended to all aspects of Jefferson's domestic life, serving as butlers, maids, cooks, and body servants (Stanton 1996, 2000)

Five Monticello slave quarters contribute to this analysis. Three of these sites, *Buildings l*, *o*, and *s*, are located along Mulberry Row. Often described as the main street of Monticello, Mulberry Row was located east of the mansion and was populated with domestic and industrial dependencies that served as housing and work spaces for slaves and white laborers (Figure 4.13). Along Mulberry Row enslaved African Americans and white laborers worked in close proximity; privileged Hemings family members lived alongside young boys brought from the fields to work in the nailery. Jefferson monitored, and his visitors observed, the novel industrial activities occurring in the workshops along the road.

The three Mulberry Row quarters used in this study were located well within one-third mile of the Monticello mansion. Although he was gone for long periods of time, Monticello was Jefferson's primary residence. In addition to living on a diversified plantation, many of the Mulberry Row residents were skilled slaves. They lived less than on quarter mile from the mansion and were just 4.5 miles from the center of Charlottesville. Jefferson gave a number of Hemings men, as well as other skilled male slaves, substantial amounts of mobility. Jefferson allowed Martin and James Hemings to hire themselves to other people while he was in France, and allowed them to keep the wages they earned (Stanton 2000:104). Robert Hemings, Jefferson's body servant, accompanied Jefferson to Philadelphia and Washington and both James and Sally Hemings attended Jefferson and his daughters for two years in Paris. Many other slaves living and working near the house also received money or tips for their work (Stanton 2000).

Sites 7 and Site 8 were lived in by a very different group of Monticello slaves. Located approximately one half mile northeast of the Monticello mansion, Sites 7 and 8 were occupied by enslaved men and women assigned to work in the field. These sites had multiple occupations and Site 7 also appears to have had an early overseer occupation. Site 8 is currently being excavated and, although subfloor pits have been recently discovered and some have been partially excavated, only plowzone from this site is used in these analyses.

Building l:

Identified in Jefferson's 1796 Mutual Assurance Declaration as "a storehouse for nail rod and other iron" (Kelso 1997:62), *Building l* was excavated in two phases, the first occurring in 1957 with subsequent explorations beginning in 1979. In 1957, Oriel Pi-Sunyer sunk two parallel trenches across a large portion of Mulberry Row in search of architectural remains and artifacts for a type collection. He encountered the brick paving now identified as part of *Building l*, designating it "Structure III". William Kelso and Monticello Archaeology staff returned to the *Building l* site in 1979 and continued excavation there through 1982. Kelso's team uncovered a 16' by 10' brick and cobble floor, a brick base for a forge, and a posthole that was used to support an anvil (Hill 2004a) (Figure 4.14).

Documentary evidence and the presence of domestic artifacts indicate that *Building l* was not only used as a storehouse and nailery but also as a residence, one that most likely housed the young enslaved men who worked in the nailery. Preliminary analysis with DAACS data suggests that there was an earlier occupation of the site that dates to the mid-to-late 1780s. The DAACS chronology indicates that *Building l* was constructed around 1790 and was occupied until around the time of Jefferson's death in 1826. It should be noted, however, that the phases established for the *Building l* site are the most massively time

averaged of the sites along Mulberry Row. This is a result of site formation processes and excavation and analytical errors that combined deposits from different time periods, producing phases that overlap and represent many decades (DAACS 2005; Scholnick et al. 2001).

Excavation Methods:

Pi-Sunyer did not excavate in stratigraphic layers nor collect artifacts; the majority of the artifacts were returned to the trenches when the site was backfilled (Hill 2004a; Scholnick et al. 2001). Unlike those of Pi-Sunyer's, Kelso's excavations followed stratigraphic levels. However, sediment from *Building l* contexts was not screened; every context was carefully hand-troweled. Additional methodological problems occur due to the varying quadrat sizes employed. Excavation units ranged from 8' by 8' and 2' by 2' to 4' by 10' (Hill 2004a; Scholnick et al. 2001). Measurements were taken in feet and tenths-of-feet.

Building o:

Like *Building l*, the *Building o* site has a complex history with at least two different domestic occupations. William Kelso and Monticello Archaeology staff excavated a 24' by 58' area around *Building o* between 1979 and 1982. This 1382 square foot excavation uncovered evidence of three dry-laid stone foundation segments, two subfloor pits, brick paving, and the remnants of a gable-end, wattle-and-daub chimney (Figure 4.15). The *Building o* site sustained some minor disturbances, primarily along the northwestern site of site. Modern intrusions occurred along the area bordering Mulberry Row and the roots of a large Kentucky coffee tree inflicted extensive damage to the north side of the *Building o* structure, effectively obliterating the northern portion of the structure's stone foundation.

Building o was initially interpreted as a single 20.5' by 12' building with one long domestic occupation (Kelso et al. 1984; Sanford 1995). More recent analyses suggest that the stone foundation segments represent two distinct buildings on this site (Hill 2002a, 2002b, 2004a; Galle and Neiman 2002; Neiman et al. 2003; Schumate 1992). The DAACS chronology for *Building o* supports this conclusion, suggesting that the southeast corner foundation segment dates to the early 1770s, the first occupation of the site. The southern and western wall segments, as well as the two subfloor pits, date between 1785 and 1790, the second occupation at *Building o* (DAACS 2005).

Excavation Methods:

Building o was excavated using the "Wheeler Box" system of 8' by 8' quadrats with 2' by 2' balks. These balks were subsequently removed, resulting in quadrat sizes that ranged from 8' by 8' and 2' by 2' to 4' by 10'. Measurements were taken in feet and tenths-of-feet. Sediment from *Building o* contexts was not screened; every context was carefully hand-troweled (Hill 2004b).

Building s:

Excavations at *Building s* began in 1983. *Buildings r* and *t*, two dwellings flanking *Building s*, were also excavated at the same time. William Kelso was the principal investigator for the *Building s* excavations. *Building s* was chosen for this analysis due to its relatively undisturbed contexts and the quality of surviving primary documents that refer to it. *Buildings r* and *t* were greatly affected by early 20th-century construction and the extent of the modern intrusions would have introduced additional methodological difficulties (Hill 2004c).

Like *Buildings l* and *o*, *Building s* was located on the 1796 Mutual Assurance Declaration and was described by Jefferson as a 12' by 14' wood "servants house" (Kelso 1987:58). Letters written by Jefferson indicate that *Buildings r*, *s*, and *t* were constructed by the spring of 1793, when he requested that Critta Hemings be moved to *Building r* (Hill 2004c; Stanton 2000). Lucia Stanton (2000:111) has suggested that Sally Hemings probably lived with Critta prior to her move to *Building r*. If that is the case, and Critta indeed moved into *Building r* in 1793, then it is possible that Sally was moved into *Building s*. Although Building *s* remained standing and in use until the time of Jefferson's death, it appears that by 1808, the Hemings sisters and their families may have been relocated to the quarters in the south dependencies of the Monticello mansion (Hill 2004c; Stanton 2000:113).

Excavations by Kelso and his team demonstrate that Building s did indeed measure about 12' by 14'. Although the site was affected by the construction of a 1925 parking lot, remnants of a dry-laid stone foundation, packed earth floor, and wood-lined subfloor pit were uncovered. Two postholes and a scatter of stones pinpoint the location of a chimney. Two brick piers belonging to a post-Jefferson structure that straddles the Building r and Building s sites were also discovered (Hill 2004c).

The DAACS chronology's Phase 1 TPQp90 of 1795 supports the documentary record. Phase 1 represents the early occupation of the structure whereas Phase 2 and 3, with TPQp90s of 1820 but with Mean Ceramic Dates of 1808 and 1818 respectively, are comprised of later Jefferson-era assemblages. Phase 4, with a MCD of 1834, represents deposits from the post-Jefferson pier structure that spans *Buildings r* and *s* (DAACS 2005).

Excavation Methods:

A 10' by 10' grid system was laid-out over the *Building s* site, although initially only 8' by 8' units were opened, leaving 2' by 2' balks between the units. Eventually the balks were removed and the resulting quadrats ranged from 2' by 2' to 2' by 10'. Measurements were taken in feet and tenths-of-feet. Sediment from *Building s* contexts were not screened; every context was carefully hand-troweled (Hill 2004c).

Monticello Home Farm Quarter Sites

Located approximately one-half mile from Mulberry Row and the Monticello Mansion, Sites 7 and 8 comprise Monticello's Home Farm Quarter. Although they are different quartering areas, the two sites are situated near each other and were occupied at approximately the same time, between 1770 and 1800. Excavation began at these sites in 1997 and it continues to date at Site 8. Excavations have been under the direction of Fraser Neiman with Sara Bon-Harper supervising the daily excavations. A number of conference papers and posters, as well as DAACS site narratives, provide the bulk of the information about these sites (Bon-Harper et al. 2000; 2001, 2005; Bon-Harper and Wheeler 2005; Neiman 2000; Neiman and Smith 2005).

Excavation methods:

Sites 7 and 8 were discovered in 1997 during the first year of the Monticello Archaeological Survey (Bon-Harper 2005). Both sites had reverted to agricultural use by the early nineteenth century, and plow cultivation transformed Sites 7 and 8 into plowzone sites. After discovery and comprehensive investigation using shovel test pits, quadrat excavation

began in 1998 at Site 7 and in 2000 at Site 8.[8] Stratified random sampling was used at these sites, specifically randomly chosen 5 x 5 foot units were excavated within 20-foot grid units. Additional 5 x 5 foot quadrats were also excavated near features or artifact scatters that warranted further investigation (Bon-Harper 2005).

Sediment from Sites 7 and 8 was sampled in a variety of ways. All sediment that was not saved for special processing, such as flotation, water screening, chemical and pollen analysis, was screened through one-quarter inch mesh. Water screen samples were regularly processed from plowzone contexts until 2003. Chemical and phytolith samples were taken from the corner of every excavated quadrat at both sites. Pollen samples from Site 8 were collected and processed. Finally, all sediment from excavated features at Site 8 was floated. All measurements were taken in feet and tenths-of-feet (Bon-Harper 2005).

Site 7

Despite having the longest and most complex occupational history of the two home farm quarter sites, Site 7 remains the most archaeologically ephemeral of the two. This is not for lack of archaeological investigation. From 1997 through 2004, over 140 5' by 5' quadrats were excavated by Monticello archaeology staff and students from the Monticello-University of Virginia Archaeological field school. Shovel-test pits were used during the first season to identify the spatial limits of the site (Bon-Harper 2005; Bon-Harper et al. 2003). Although only one architectural feature was found at Site 7, excavations have revealed at least three discreet settlement areas.

The earliest occupation at Site 7 is marked by a scatter of brick and cobble that comprises a hearth base, the only identifiable architectural feature at the site. Artifacts

[8] Papers by Derek Wheeler, Sara Bon-Harper, and Fraser Neiman provide in-depth description of the Monticello Archaeological Survey and the shovel-test-pit methodology employed (Bon-Harper et al. 2000, 2001; Bon-Harper and Wheeler 2005).

associated with the hearth area provide a date of around 1750, suggesting that Site 7 was an outlying quarter for Shadwell plantation, owned by Thomas Jefferson's father, Peter Jefferson (Bon-Harper 2005). The quarter was most likely constructed using a ground-laid sill resulting in the lack of an architectural foot print for this structure.

A number of survey notes, letters, and *Garden Book* entries written by Thomas Jefferson indicate that at least one overseer's house was located at Site 7. The earliest reference indicates that an overseer's house was in the vicinity of Site 7 by 1778. The latest reference to an overseer's house comes from Jefferson's 1809 survey notes (Bon-Harper 2005). Artifact assemblages and Jefferson's plats suggest that the overseer's house may have been located south of the Farm Road (Bon-Harper 2005; Neiman 2000; Neiman and Smith 2005). No architectural remains were discovered. Spatial distribution of artifacts also point to the presence of at least one, if not more, late eighteenth-century slave dwellings along the southern edge of the site. Artifact assemblages indicate that this area was occupied between 1770 and the early 1800s (Neiman and Smith 2005).

Site 8

Although no primary sources exist that refer directly to structures at Site 8, architectural remains of at least three slave dwellings have been found. As with Site 7, over 140 5' by 5' quadrats were excavated by Monticello archaeology staff and students from the Monticello-University of Virginia Archaeological field schools between 1997 and 2005. Excavations will continue at Site 8 in subsequent years.

Subfloor pits cut into subsoil have been the primary means for identifying structures at Site 8. House 1 contained three subfloor pits and was most likely constructed using

ground-laid sills, since no architectural foot print was found. The three subfloor pits at House 1 were completely excavated (Bon-Harper 2005). House 2 was identified when an approximately 10' x 10' cellar was revealed during excavations. Although it has yet to be excavated, the top layer of cellar fill contains many bricks and cobbles, perhaps suggesting that the pit was constructed near a brick and cobble hearth and chimney. Another small feature cut into the subsoil may be a subfloor pit also related to House 2. To date, this pit has also not been excavated. House 3 contains at least two subfloor pits, which were both sampled for the first time during the 2005 field season. The artifacts from these pits do not contribute to this analysis because they had not yet been processed.

The Comparative Analysis of Plowzone and Feature Sites

Excavation techniques, sampling strategies and post-depositional processes in the greater Chesapeake region have affected each of these 19 structures, resulting in a range of site-types. In order to compare structures from these sites, I sorted the assemblages into two groups: assemblages from plowzone contexts and assemblages from subfloor pit features. Many sites in the greater Chesapeake consist of a plowzone layer that seals features cut into subsoil. The Richneck Quarter, Palace Lands Quarter, ST116, 44JC298, Utopia II, Utopia III, Utopia IV, Site 7 and Site 8 are examples of this type of site. However, only the plowzone sediment from the Richneck Quarter, Palace Lands Quarter, Utopia III, ST116, Site 7 and Site 8 was excavated and sampled, thereby providing plowzone artifact assemblages. The plowzone from 44JC298, Utopia II, and Utopia IV was mechanically

removed and discarded. All artifacts in assemblages from these sites come from the features found beneath the plowzone.[9]

The Poplar Forest Quarter and North Hill sites consisted of both plowzone sediments and undisturbed stratified deposits. The relatively few stratified deposits at these sites are considered plowzone for the following analyses. Both Poplar Forest sites also contained features cut into the subsoil.

Mulberry Row sites at Monticello were not affected by plowing and are stratified sites with features. Unfortunately, several different site formation processes have altered the Mulberry Row sites to such an extent that deposits at these sites are also best analyzed as plowzone. These processes included extensive modern disturbances in the early 20th-century (*Building s*) and excavations in the 1950s that impacted large areas of the site (*Building l*). The lack of clear stratigraphic control during excavation, and the decision not to screen sediment from all Mulberry Row sites in the 1980s, contributed to my decision to analytically treat artifacts from Mulberry Row sites as plowzone assemblages. As with the Poplar Forest sites, Mulberry Row sites contain features cut into the subsoil.

In order to reduce the sampling effects on sites with a variety of feature types, analysis conducted on feature assemblages has been limited to artifacts from deposits within subfloor pit features. Restricting the analysis to subfloor pits reduces the variability introduced by the wide range of features found within and around each structure. For example, variability is reduced by simply comparing subfloor pit deposits, rather than

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[9] It should be noted that the treatment of plowzone and feature sediments is highly variable among sites. At some sites, the plowzone was excavated and sampled while the plowzone at other sites was mechanically removed and discarded, with no artifacts being recovered. The treatment of features among sites is also variable. In general, the majority of feature sediment was at least dry screened through ¼ inch hardware cloth. However, some excavators did not use screens at all while 100 percent of the feature sediment from other sites was floated.

comparing artifacts from postholes and subfloor pits at one structure to artifacts from erosion gullies, fence trenches and subfloor pits at another structure. Although some sites have only plowzone assemblages and others have only subfloor pit assemblages, many sites produced assemblages from both types of contexts as seen in Table 4.2.

Conclusions

Spanning 100 years and distributed across 100 miles, these 19 structures provide an ideal data set for investigating how the consumption of goods was integral to the development of signaling systems among slaves throughout the greater Chesapeake region. Eleven slave households lived on agriculturally diversified plantations while another seven were tied to tobacco monoculture. Six households lived within one-third of a mile of their owners while 12 households were located on outlying quarters. Fifteen of the 19 households experienced the regular presence of an owner, and seven of those 15 were owned by Jefferson. Finally, two households could access easily an urban center on a daily basis while 16 others had substantial but manageable day-long walks to markets and stores. Only one site was more than a day's journey from an urban area.

The temporal and spatial depth embodied in these sites not only allows rigorous testing of assemblage variation within the region at a specific point in time, it also allows for the investigation of temporal consumption patterns. Such within-plantation spatial diversity most likely represents an array of the tasks assigned to slaves, allowing me to test assumptions about signaling capacity based on occupations and quarter location within plantations as well as throughout the entire Chesapeake region during the eighteenth century.

Chapters 5 through 7 use these data to test the expectations raised by the signaling model presented in Chapter 3.

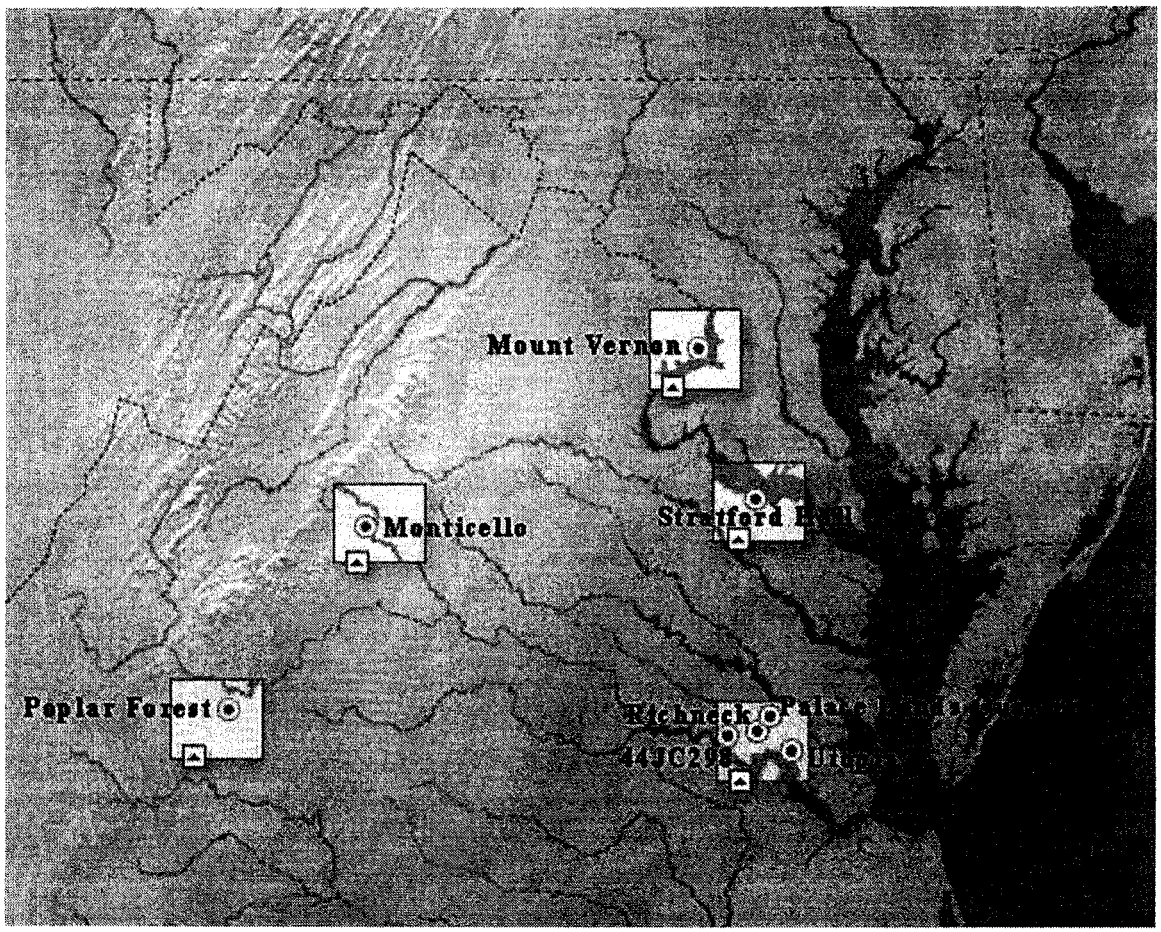

Figure 4. 3: Map of the greater Chesapeake region of Virginia (DAACS 2005).

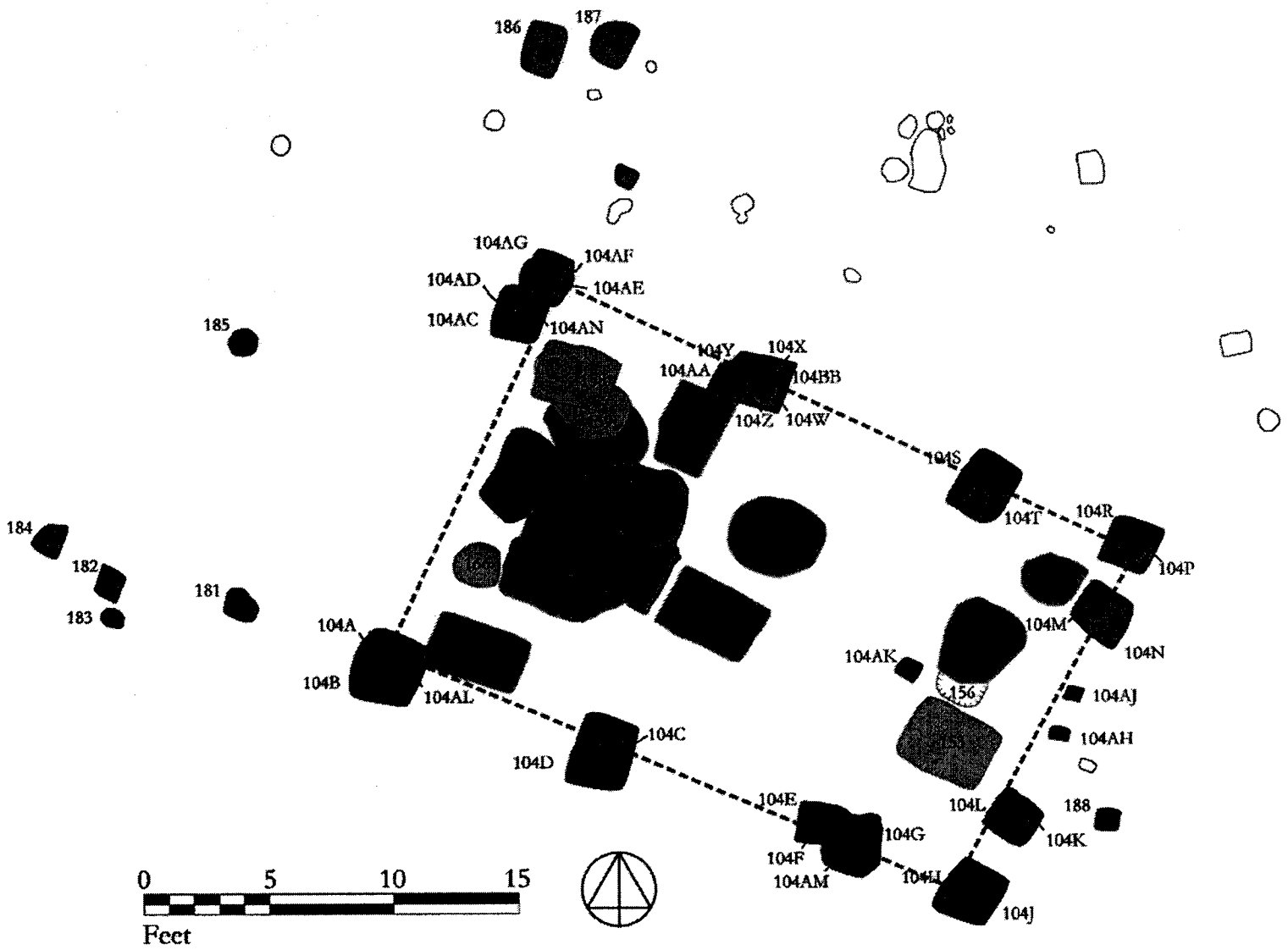

Figure 4.4: 44JC298 site plan digitized by Derek Wheeler (DAACS 2005).

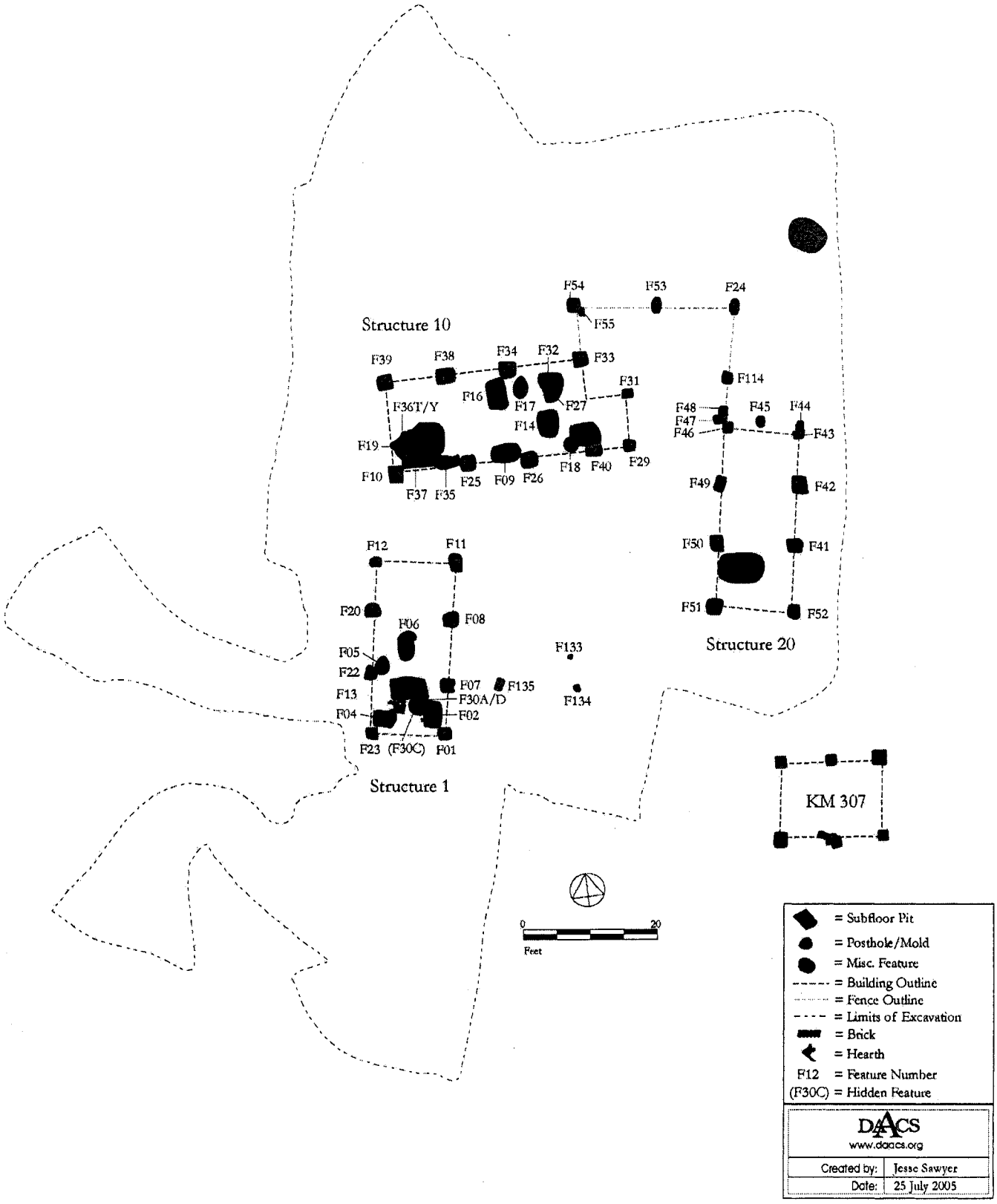

Figure 4.5: Map of Utopia II digitized by Jesse Sawyer (DAACS 2005).

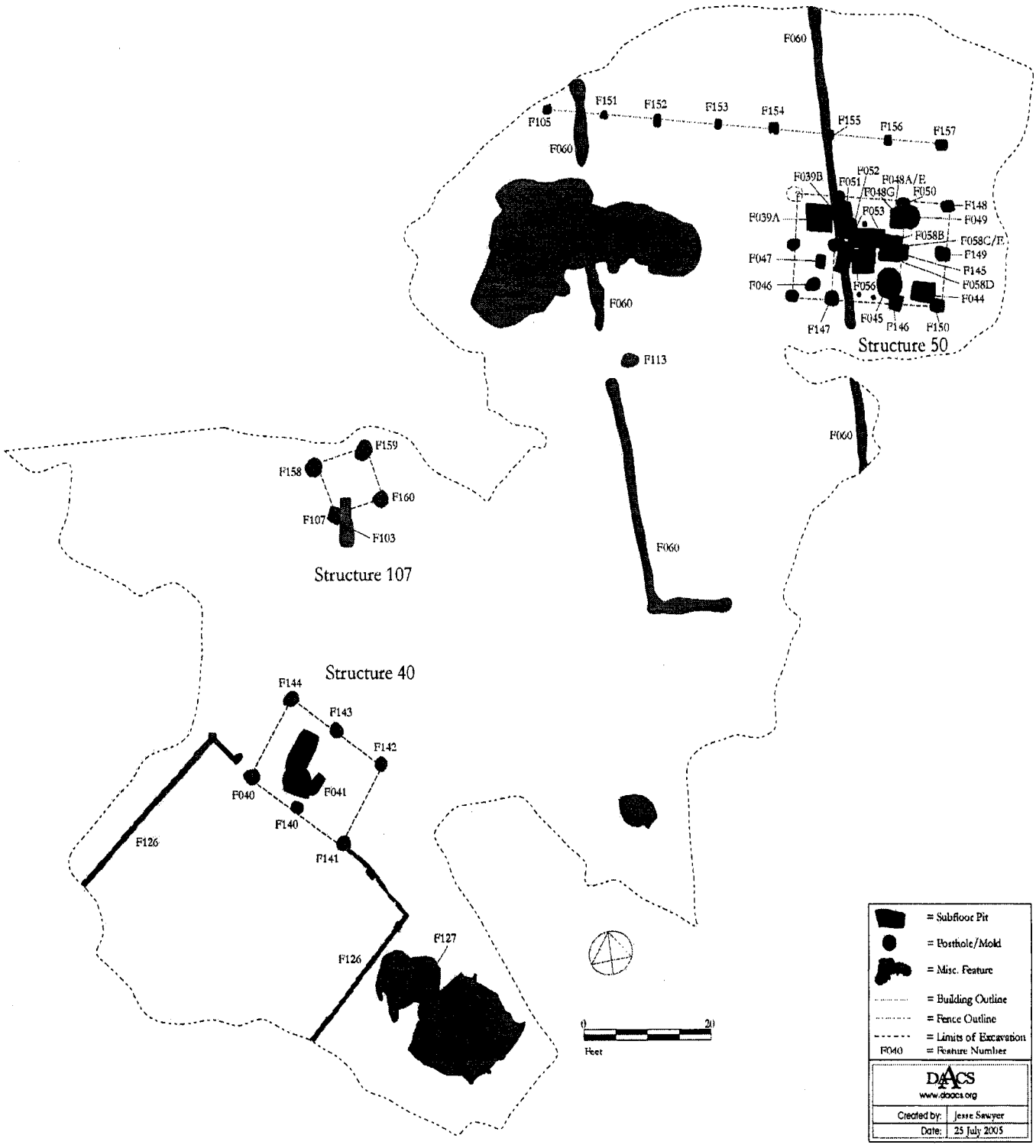

Figure 4.6: Map of Utopia III digitized by Jesse Sawyer (DAACS 2005).

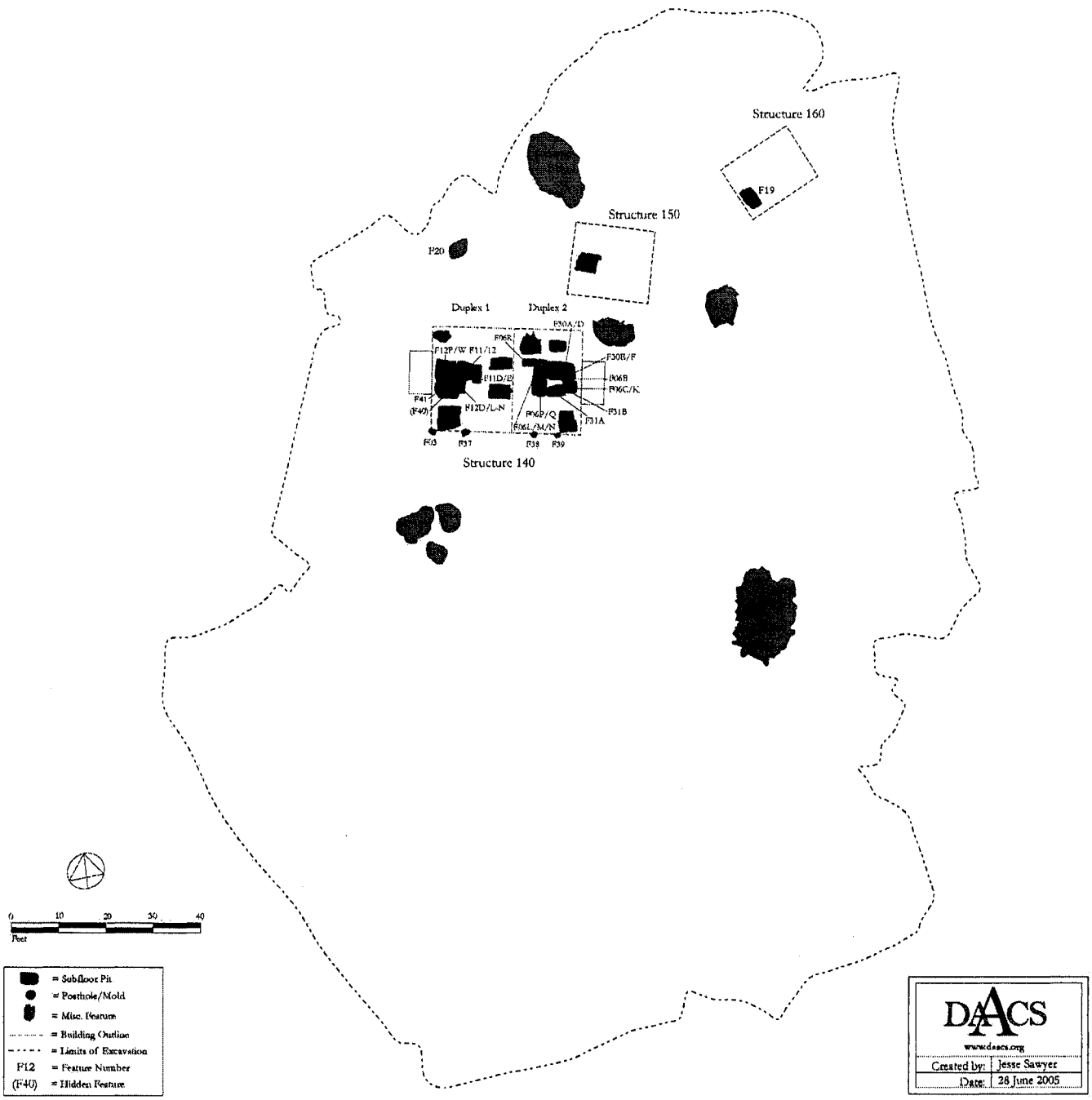

Figure 4.7: Map of Utopia IV digitized by Jesse Sawyer (DAACS 2005).

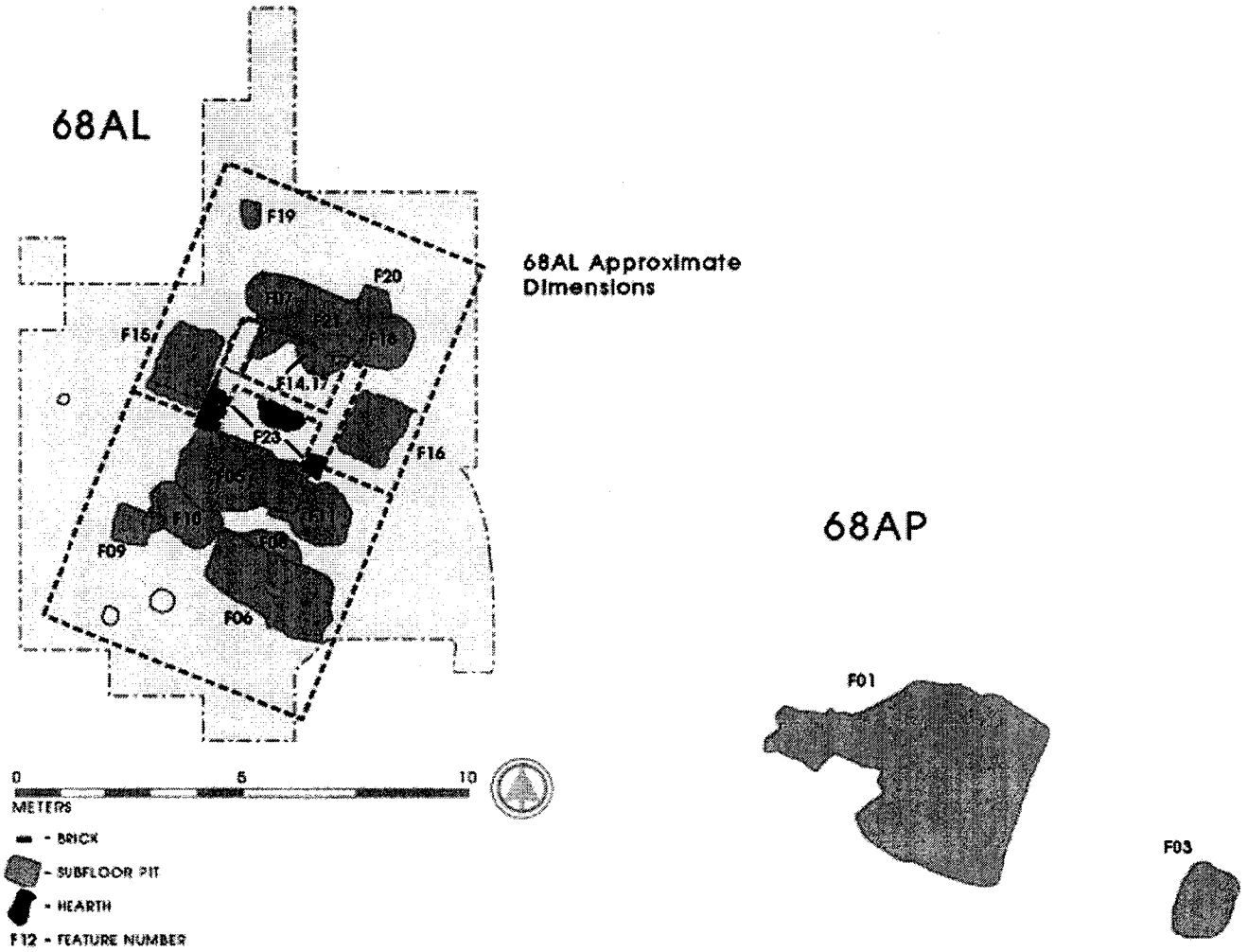

Figure 4. 8: Richneck Slave Quarter site plan digitized by Derek Wheeler and Leslie Cooper (DAACS 2005).

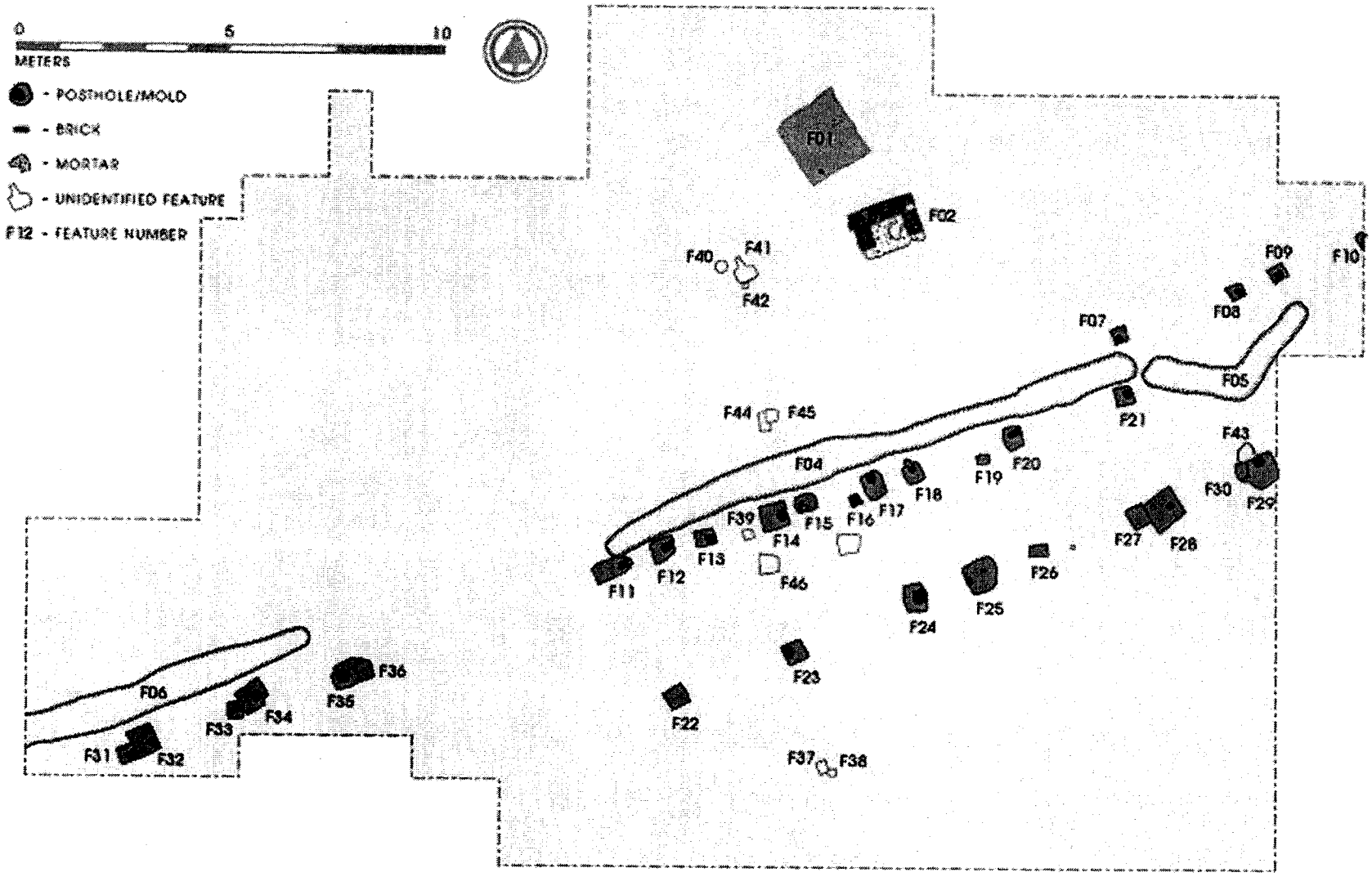

Figure 4. 9: Palace Lands Quarter site plan digitized by Derek Wheeler (DAACS 2005).

44ST116,
Stratford Hall

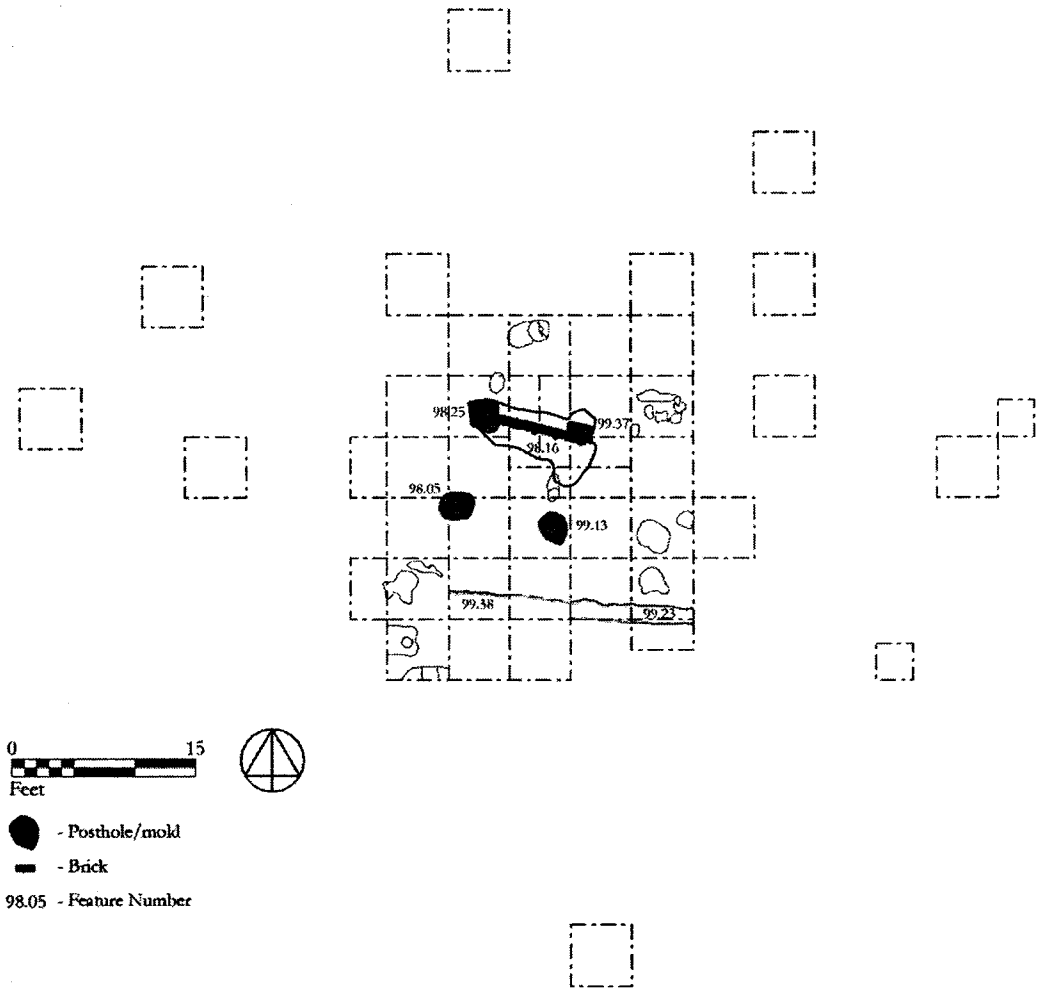

Figure 4.10: Stratford Hall Quarter, ST116 site plan digitized by Derek Wheeler (DAACS 2005).

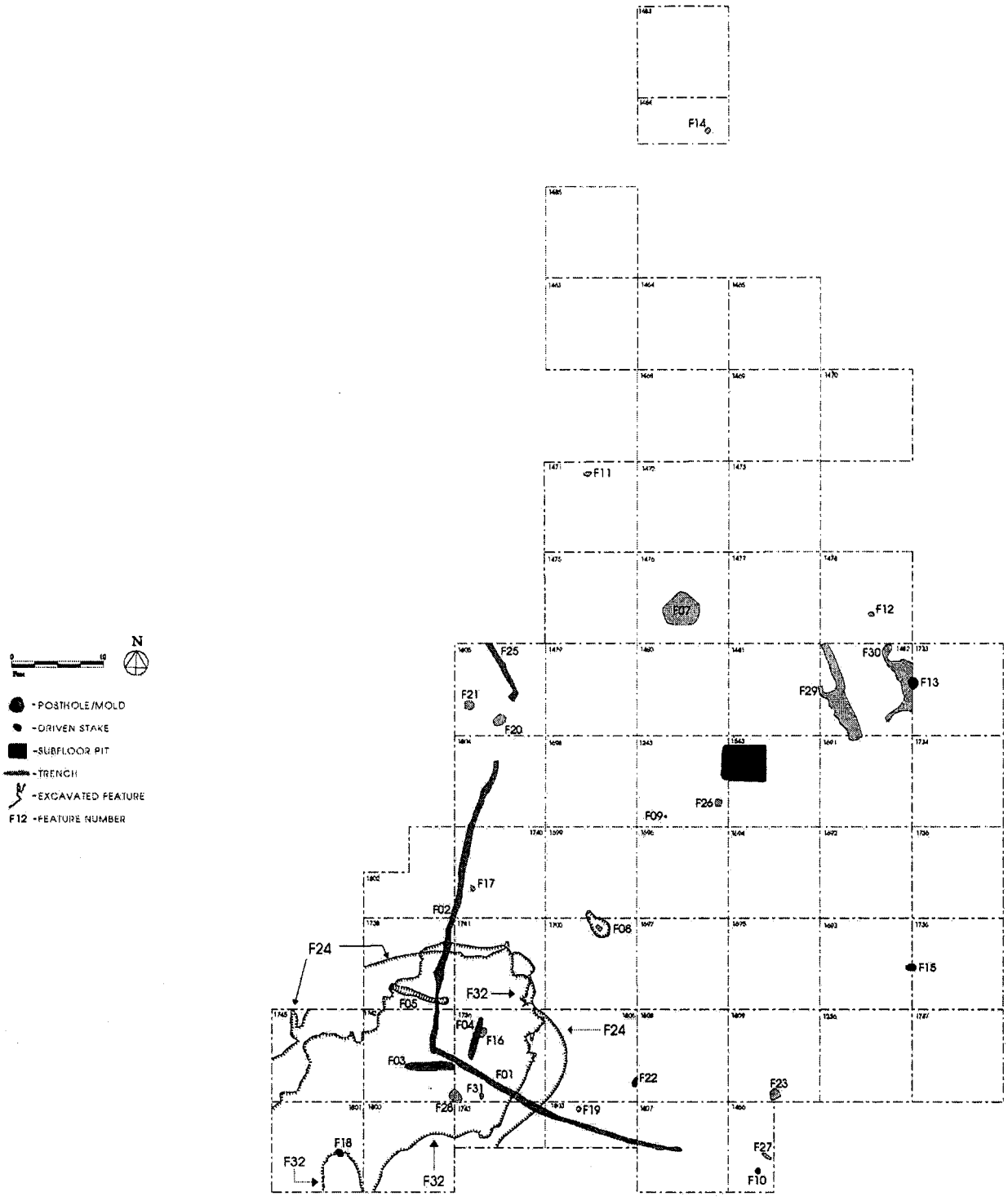

Figure 4.11: Poplar Forest North Hill site plan digitized by Leslie Cooper (DAACS 2005).

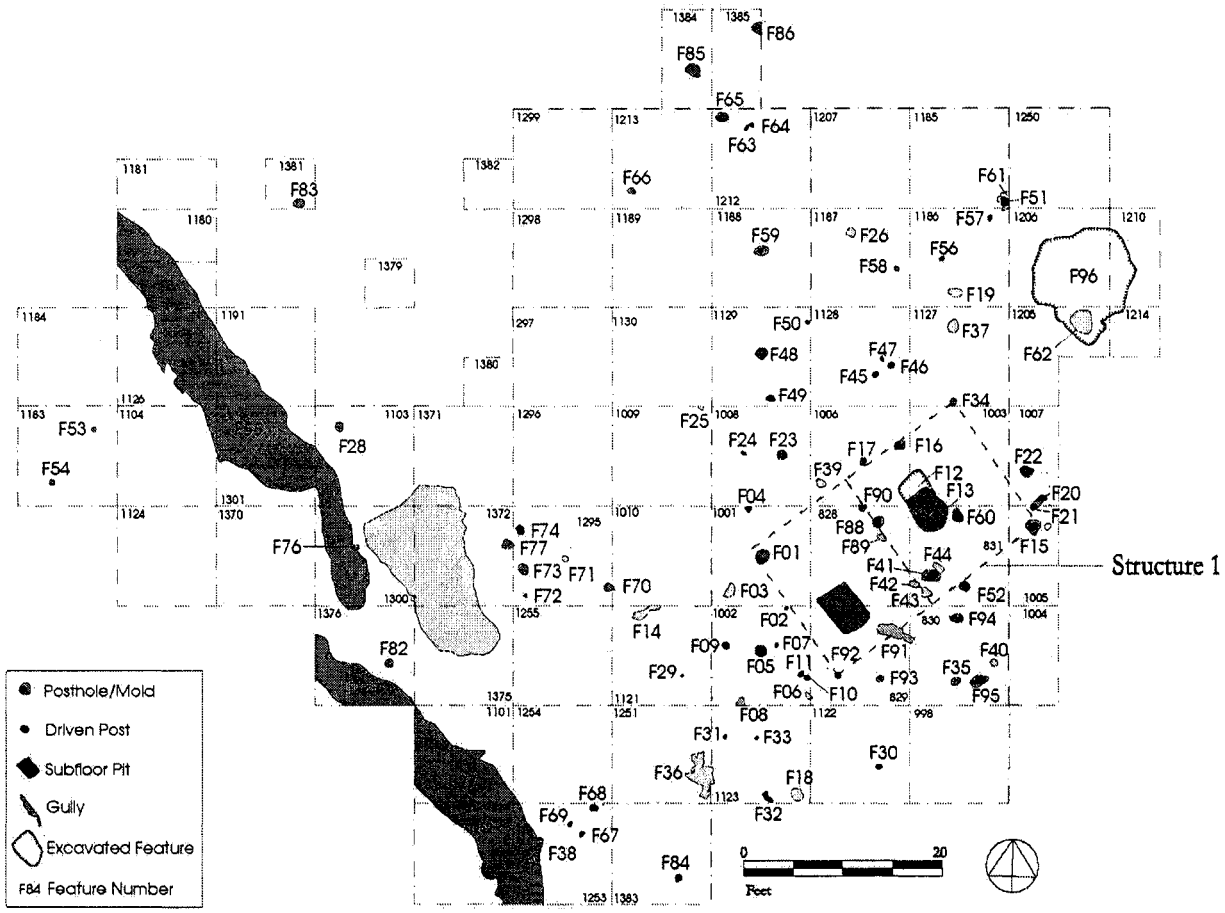

Figure 4. 12: Poplar Forest Quarter site plan digitized by Leslie Cooper (DAACS 2005).

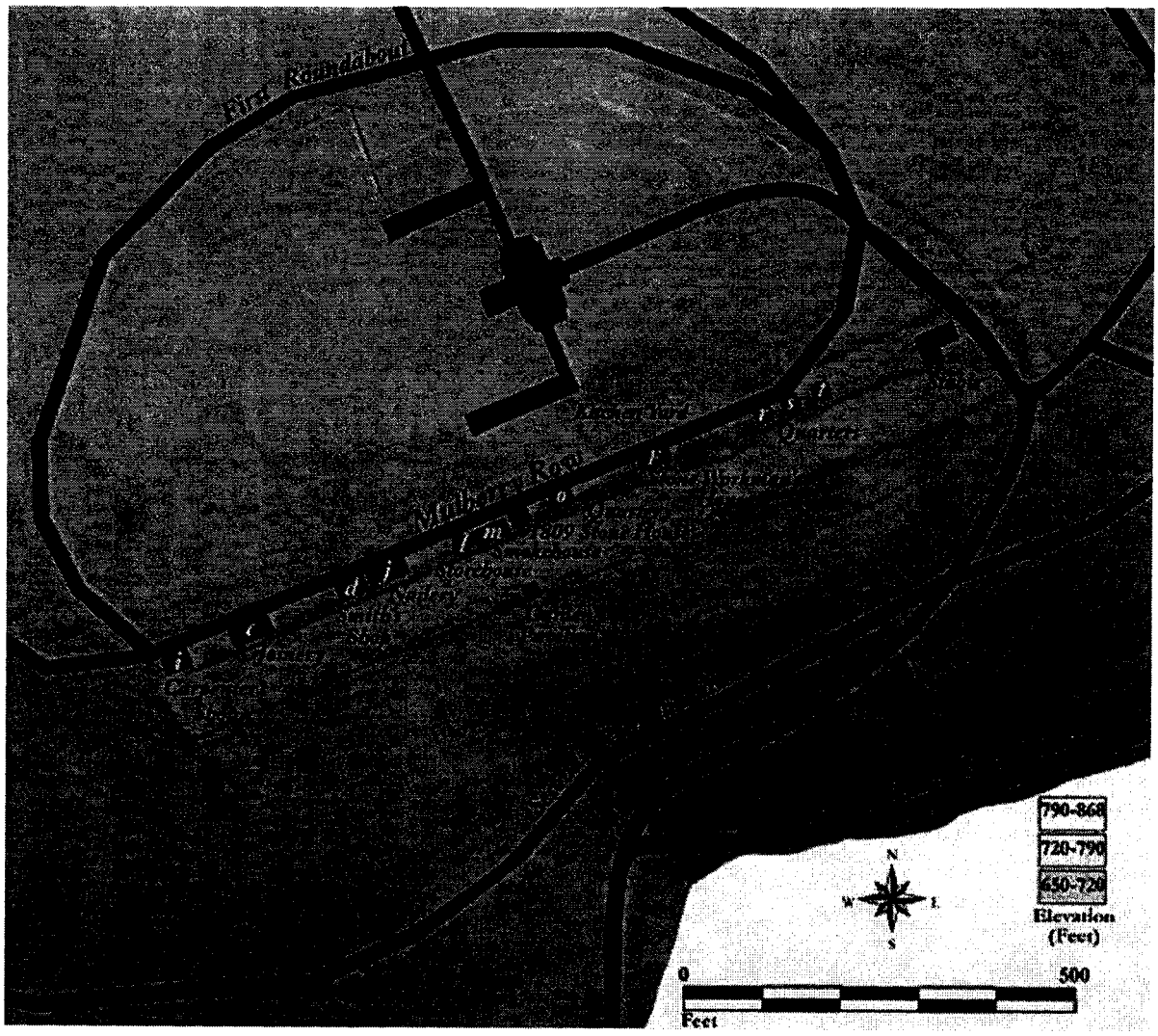

Figure 4.13: Monticello Mulberry Row plan digitized by Derek Wheeler (http://www.monticello.org/archaeology/research/mulberryrow/index.html).

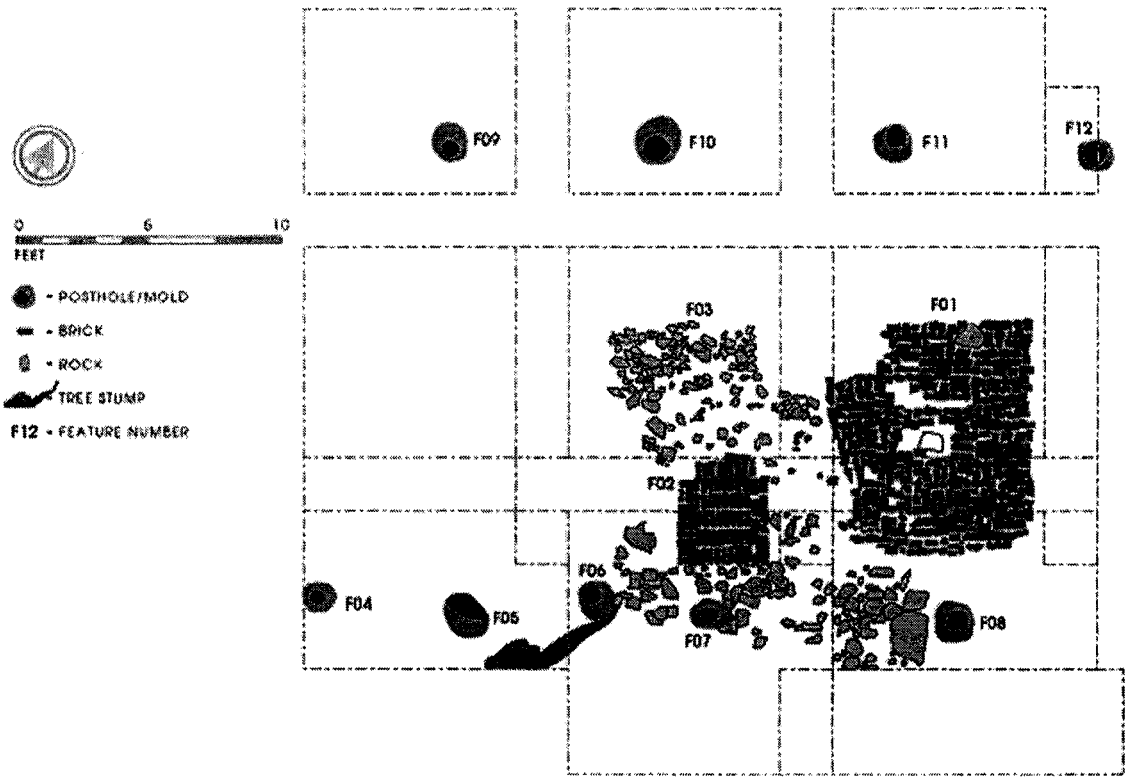

Figure 4.14: Monticello, *Building l* site plan digitized by Derek Wheeler (DAACS 2005).

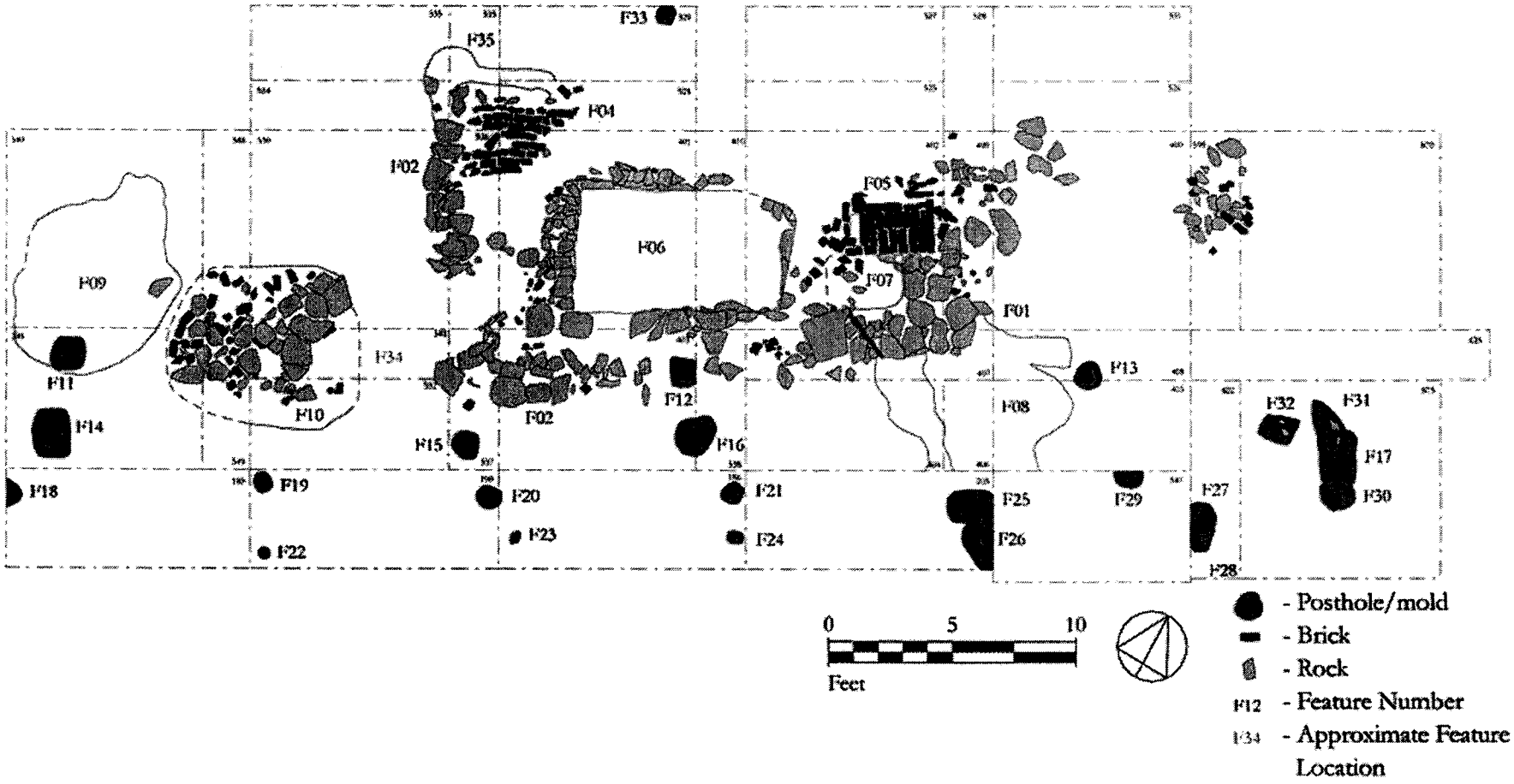

Figure 4.15: Monticello, *Building o* site plan digitized by Derek Wheeler (DAACS 2005).

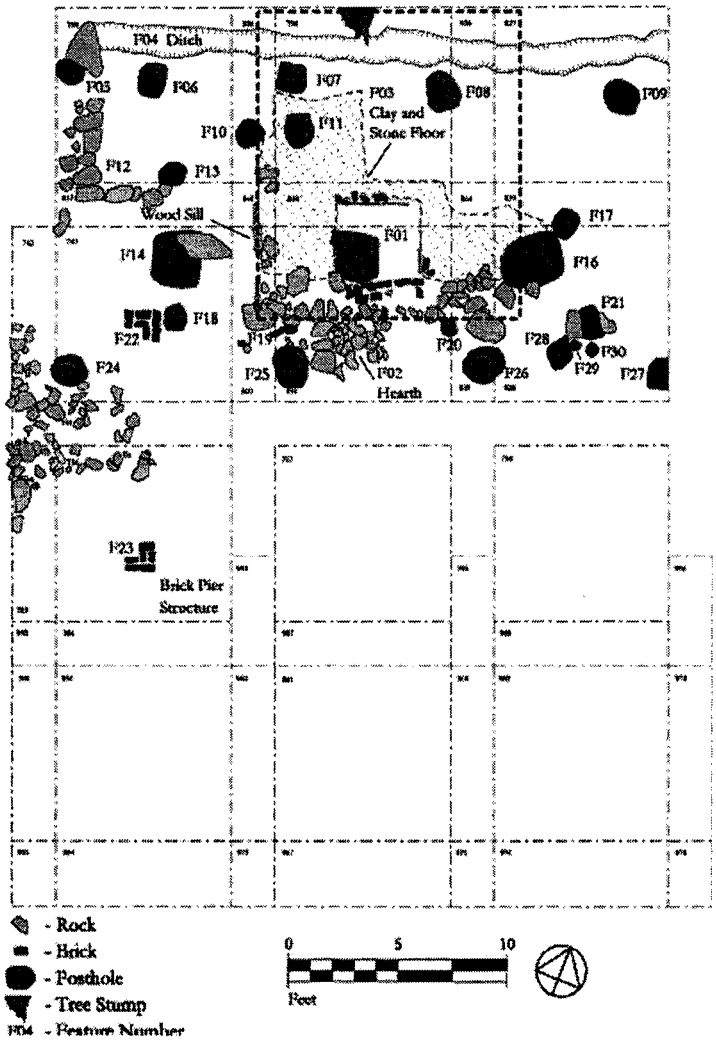

Figure 4.16: Monticello, Building s site plan digitized by Derek Wheeler (DAACS 2005).

Chapter 5: Measuring signaling trends: methods and patterns

According to my argument, slave society in the eighteenth-century Chesapeake was ripe for the development of and increase in the level of costly signaling. Agricultural and economic diversification provided many slaves with new skills and more personal time to devote to their gardens or craft production, both of which may have offered financial rewards and the prospect of traveling off the plantation. Growing populations and burgeoning urban centers provided new opportunities for interacting with a wide range of people. These developments were full of social and economic benefits for some slaves. Such benefits did not come without a cost, however, and those individuals willing and able to bear the emotional, physical, and financial costs of signaling should be archaeologically visible.

In this study, signals are identified by the use and discard of signaling media present in the archaeological record. Variations in signaling levels are defined by the cost of the signaling media and the rate at which such media were discarded. For example, the signaling level equals the cost of an object, such as a creamware plate, multiplied by the number of objects discarded per year (Signal Level or Discard Rate = $1.00 a creamware plate * 5 plates per year).[10] The discard rate therefore becomes a proxy for signaling levels. While signaling levels can be defined by an equation, how and why signaling levels differ is determined by the people consuming and discarding the objects.

The signaling model tells us that signaling levels should vary based on the level of hidden personal qualities of the signaler and the value and appeal of a social or economic

[10] Although the actual monetary cost of objects was not obtainable for this study, it is possible to place their worth on a scale relative to other artifacts in this study.

interaction that might result from a costly signal. The level of a signal therefore depends on the person's desire for successful social or economic interactions and their ability to produce a costly, high quality signal that might bring about such an interaction. For an enslaved person, hidden qualities might include an aptitude for languages and learning new skills, psychological strength in the face of slavery, skill at specialized trades, and physical stamina and prowess. The payoffs for signaling these qualities were directly related to the size and type of audience in which the signaling occurred. A large interaction sphere not only increased the variance in the competitive ability of the group, but it also increased the benefits available to a high quality signaler (Neiman 1997:270). A skilled enslaved seamstress who had access to customers in towns or cities might dress herself in stylish dresses made from costly fabrics as a way to display her sewing skills and knowledge of current fashions (Galle 2004). Although such signals could provide an entrée into new, lucrative relationships, personalities and other factors could then influence and determine the relationship.

In this study, which argues that the conspicuous consumption of costly goods is a form of signaling, abundance measures that serve as estimates of discard rates are correlated with signal levels. Discard rates of specific signaling media, such as buttons, refined ceramics, and buckles, are measures of signal intensity. Changes in the quantity and quality of the artifacts being discarded should point to the maintenance of active and honest costly signaling strategies (Neiman 1997). This chapter explores variation in signaling intensity by estimating the discard rates of seven artifact classes at each structure. I use negative binomial regression, a generalized linear model, to test the relationship between artifact abundance measures and the independent historical and

archaeological variables that comprise the six-variable signaling model developed in previous chapters.

Seven basic artifact classes are examined in this chapter's analysis. As noted in Chapter 3, material culture with European or Asian origins dominated slave quarter assemblages, and while artifacts such as glass beads, cowrie shells, and crystals may have also been important symbols for slaves, they are not abundant enough to constitute statistically significant samples. I begin by estimating the discard rates of all metal clothing buckles, all buttons except those made of bone and wood, all coins that predate 1830, all refined ceramic wares, all coarse ceramic wares, all wine bottle sherds, and all imported tobacco pipe sherds. In subsequent chapters detailed artifact attributes, such as ceramic ware types and vessel forms and button color and size, will play a significant role in revealing signaling strategies among Chesapeake slaves. For now, however, I follow Deetz (1973) by grouping refined ceramic wares into a single analytical group that contains porcelain, thin-bodied stonewares, and refined earthenwares, including delft (Table 5.1). I similarly combine coarse ceramic wares into a group comprised of stonewares and earthenwares that were primarily utilitarian in nature (Table 5.2).

In devising a method to reliably measure consumption and discard, this chapter wrestles with the challenges inherent in large-scale comparative archaeological analyses. I investigate which analytical tools can best uncover consumption trends among sites that span 100 years and that have very different depositional and excavation histories. In doing so I demonstrate how sample sizes, both in terms of the number of assemblages available and the quantity of artifacts in each assemblage, can impact the results.

Table 5. 1: Ceramic ware-types that contribute to the refined ceramic ware analytical category (Date range from DAACS Mean Ceramic Date Types, http://www.daacs.org/aboutDatabase/MCDTypes.html).

Ceramic Ware Type	Date Range
Astbury-Type	1725-1750
Black Basalt	1750-1820
Canary Ware	1780-1835
Creamware	1762-1820
Delftware (British and Dutch)	1600-1802
Faience	1700-1800
Jackfield	1740-1790
Nottingham	1683-1810
Pearlware	1775-1830
Chinese Porcelain	1660-1860
English Soft-Paste Porcelain	1745-1795
Refined Red Agate	1740-1775
Rosso Antico	1690-1772
Slip Dip Stoneware	1715-1775
Tin-Enameled, unidentifiable	1600-1802
Turner Type	1785-1825
Wedgewood Green	1759-1775
Wheildon-Type Wares	1740-1775
White Salt Glaze Stoneware	1720-1805

For these initial investigations, artifact densities and abundance indexes are calculated using the seven basic artifact categories found in plowzone contexts and subfloor-pit features. These measures are then used with generalized linear models to test the independent influence of the signaling model's independent variables on discard rates at each structure.

Table 5. 2: Ceramic ware-types that contribute to the coarse ceramic ware analytical category (Date range from DAACS Mean Ceramic Date Types, http://www.daacs.org/aboutDatabase/MCDTypes.html).

Ceramic Ware Type	Date Range
American Stoneware	1750-1920
British Stoneware	1671-1800
Buckley	1720-1775
Burslem	1700-1725
Coarse Earthenware, unidentifiable	N/A
Frechen Brown	1600-1800
Fulham	1671-1775
German Stoneware	1620-1775
Iberian Ware	1600-1780
North Devon Gravel Tempered	1600-1775
North Devon Plain	1600-1710
Red Sandy Ware	1600-1800
Redware	1700-1900
Slipware, North Italian	1610-1675
Slipware, North Midlands	1770-1795
Staffordshire Brown Stoneware	1700-1800
Staffordshire Mottled Glaze	1680-1780
Stoneware, unidentifiable	N/A
Westerwald/Rhenish	1650-1775

Estimating Discard Rates

As we saw in Chapter 1, economic and social historians have expressed frustration with the inability of probate inventories and other primary documents to show per capita increases in expenditures on consumer goods throughout the eighteenth century (Carson 2003; de Vries 1993). As the consumption of less durable goods increased throughout the eighteenth century, outmoded styles were discarded and fragile items such as ceramics entered the archaeological record at a faster pace. Unlike inventories, which capture only the items owned at one moment in a person's history, we

can use archaeological assemblages to estimate the per capita discard rate of goods through time.

One goal of this study is to develop methods for reliably estimating per capita discard rates at sites that experienced a range of occupation spans and intensities, excavation methods and post-depositional processes. Reliable proxies for discard rates are essential to testing the proposed signaling model since discard is expected to scale with signaling levels. Unfortunately measuring and comparing discard rates using archaeological data are complex tasks. After reviewing the methodological difficulties inherent in commonly used abundance measures, I employ artifact densities, abundance index measures, and generalized linear models to explore signaling patterns throughout the Chesapeake.

Relative Frequencies

Relative frequencies are a commonly used measure of assemblage variation. Although they are useful for within-site comparisons, relative frequencies as comparative measures of consumption among sites are problematic. This is because they are based on the assumption that the discard rate of the artifact class in the numerator is independent of the discard rates for all the artifact classes that make up the denominator and that create the total sample size. A positive correlation between the discard rates of the numerator artifact class and any other artifact class that contributes to the total sample size in the denominator would attenuate variation in percentages between sites (Galle 2004:45; Neiman et al. 2000:47). For example, in this study it would not be unexpected to find correlations between the use and discard of costly signaling media such as buckles

and buttons. Enslaved people or households with greater access to, or ability to acquire, costly buckles may have also had greater access to buttons. If relative frequencies are used to measure variation in the consumption of buckles and buttons, variation among the sites would be muted if the correlated artifact class remains in the denominator class. When trying to measure variation in the discard of buckles, it is therefore important to remove buttons from the denominator class.

Artifact Densities

Artifact densities might provide a good estimate of per capita discard rates if population density and occupation among sites are constant, and if site formation processes do not result in significant variation in artifact density among the deposits under study. In addition, excavation strategies among the sites should not have resulted in different artifact recovery rates. Unfortunately, the intensity and duration of site occupations as well as the effects of different excavation strategies are most always different among sites as they vary in extent and since each quarter site was occupied by different numbers of people for varying lengths of time.

Despite these concerns, densities are an improvement over relative frequencies. Since there is no reason to expect that trends in the critical historical variables would cause densities to depart from discard rates, we can use our theoretical expectations about the trends in the discard of the artifact classes to evaluate the trends in densities. If artifact densities match my expectations of artifact discard derived from the theoretical model, there is reason to suspect that densities may provide a good estimate of consumption. Reliable length, width, and depth measurements were available for most

subfloor pit contexts, which enabled me to calculate volume densities for subfloor pit assemblages. Unfortunately, depths were frequently not available for plowzone deposits therefore areal densities (length*width of plowzone contexts) were calculated for plowzone sites. Given that some sites were measured in feet and others were measured in meters, all density measurements were converted to feet and tenths-of-feet.

I began by calculating the sherd count densities for the seven dependent variable artifact classes: clothing buckles, buttons, coins, refined ceramic wares, imported tobacco pipes, coarse ceramic wares, and wine bottles (see Appendix 1 for histograms of densities for each artifact category). In plotting the densities, I transformed the count densities into the square roots of the count densities, which allowed the relationships between the densities to be more clearly expressed on the plots. The sqrtDensities from plowzone contexts were graphed against each structure's plowzone BLUE MCD and the sqrtDensities from subfloor pit contexts were graphed against each structure's subfloor pit BLUE MCD. Except in the case of refined ceramic wares and imported tobacco pipes (Figures 5.1-5.8), it was difficult to see clear relationships between time and artifact densities. In order to test to see if there were significant correlations between the density of individual artifact classes and time, I calculated Kendall's *tau* correlation coefficients for densities by the Mean Ceramic Dates.

Kendall's *tau* rank correlation coefficients revealed several statistically significant relationships between artifact class densities and time when $\alpha = .10$. Tables 5.3 and 5.4 show the clear positive correlations between time and the density of refined ceramic wares and buttons from both plowzone and subfloor pit contexts. Buckles from subfloor pit contexts are significantly positively correlated with time although there is no

correlation between buckles from plowzone and time. Imported tobacco pipes were the only artifact class that was negatively correlated with time. Coins, coarse ceramic wares, and wine bottle assemblage densities from both plowzone and subfloor pits had no significant correlation with time.

This initial evaluation of the densities of signaling media meet my expectations for temporal artifact patterning set forth in Chapter 3. The Kendall's *tau* coefficients suggest that the consumption of costly objects such as buttons, clothing buckles, and refined ceramics did increase throughout the eighteenth century. A negative correlation between time and imported tobacco pipes suggests two possible explanations. First, although it seems unlikely that slaves uniformly gave up tobacco by the end of the eighteenth century, agricultural diversification resulted in the reduction of tobacco cultivation which may have impacted the amount of tobacco available for personal consumption. Second, more fashionable and costly goods that had the same portable qualities as imported tobacco pipes, such as buttons and buckles, may have become a more attractive, and more costly way, to adorn the body. It may also be that tobacco-addicted slaves turned to new smoking media, such as cigars, that do not show up in the archaeological record but that were more costly than clay pipes, which by the late eighteenth century were relatively inexpensive.

The lack of correlation between time and coins, wine bottles, and coarse ceramic wares suggest that these objects had a relatively constant per capita discard rate through time. However, these artifact groups and their correlation coefficients warrant a closer look. The sample sizes of coins from both plowzone and subfloor pits contexts are quite small and this may well be affecting the coin results (Table 5.5).

As will be seen in future analyses, these small samples make it difficult to see significant patterns in the discard rates of coins. Sample size is not an issue for wine bottles (total wine bottle sherds from all pit contexts= 2,581, plowzone=10,842) or coarse ceramics (total coarse ceramic sherds from all pits contexts= 1,305, plowzone=3,092). Although the *p*-values for wine bottle and coarseware densities indicate that the rank correlation is not statistically significant, it is important to note that the correlation coefficients for wine bottles are much closer to zero than the negative correlation coefficient for coarse ceramics. This may indicate that the abundance of coarse earthenwares decreased slightly through time while wine bottle discard remained relatively constant. In the case of coarse ceramics from plowzone contexts, where the *p*-value is moderate (.13), it is wise to consider the results for coarse ceramics as ambiguous as opposed to accepting the null hypothesis that there is no change in coarse ceramic discard through time (see Cowgill 1977 for discussion of *p*-values).

Although the density results are intriguing, our knowledge of the variability in the intensity of site occupations and differences in sampling methods at each site raise concerns about the potential biases of comparative density measures for these 19 structures. Calculating an Abundance Index may provide an even better estimate of per-capita discard but this measure is contingent on the identification of an artifact class whose discard rate is relatively constant throughout the eighteenth century. The densities suggest that wine bottles fit this description, as I will illustrate below (Figures 5.5-5.6).

Table 5. 3: Kendall's tau rank correlation coefficients for each artifact class by time.

	Density		*Coarseware Index*		*Wine Bottle Index*	
	Subfloor Pits	*Plowzone*	*Subfloor Pits*	*Plowzone*	*Subfloor Pits*	*Plowzone*
Buckles	r=.32, p=.08	r=.37, p=.11	r=.31, p=.10	r=.41, p=.08	r=.26, p=.16	r=.41, p=.08
Buttons	r=.34, p=.06	r=.56, p=.01	r=.44, p=.01	r=.70, p=.002	r=.47, p=.01	r=.78, p=.0008
Refined Ceramic Wares	r=.43, p=.01	r=.38, p=.10	r=.51, p=.005	r=.60, p=.01	r=.48, p=.009	r=.49, p=.03
Coins	r=.29, p=.13	r=.03, p=.87	r=.35, p=.07	r=.07, p=.75	r=.37, p=.05	r=.07, p=.75
Coarse Ceramic Wares	r= -.20, p=.27	r= -.34, p=.13	N/A	N/A	r= -.28, p=.12	r= -.20, p=.39
Wine Bottles	r= -.01, p=.93	r= -.01, p=.93	r=.28, p=.12	r=.20, p=.39	N/A	N/A
Imported Tob Pipes	r= -.40, p=.03	r= -.52, p=.02	r= -.35, p=.05	r= -.38, p=.10	r= -.58, p=.001	r= -.60, p=.01

Table 5. 4: Correlation matrix based on Kendall's tau rank correlation coefficients showing the relationship between artifact abundance and time where NS=Not Significant, + = Signficant Positive Correlation (p<.10 and >.05), ++ Strongly Significant Positive Correlation (p≤ .05), − = Significant Negative Correlation (p<.10 and >.05), −− = Strongly Significant Negative Correlation (p≤ .05), and N/A = Not Applicable.

α=.10	*Density*		*Coarseware Index*		*Wine Bottle Index*	
	Subfloor Pits	*Plowzone*	*Subfloor Pits*	*Plowzone*	*Subfloor Pits*	*Plowzone*
Buckles	+	NS	+	+	NS	+
Buttons	+	++	++	++	++	++
Refined Ceramic Wares	++	+	++	++	++	++
Coins	NS	NS	+	NS	+	NS
Coarse Ceramic Wares	NS	NS	N/A	N/A	NC	NS
Wine Bottles	NS	NS	NS	NS	N/A	N/A
Imported Tob Pipes	−−	−−	−	−	−−	−−
Total Significance	4	3	5	4	4	4

Table 5. 5: Coins from plowzone and subfloor pit contexts used in these analyses.		
Structure Name	**Number of Coins from Plowzone Contexts**	**Number of Coins from Subfloor Pit Contexts**
44JC298	NA	0
Richneck	NA	12
Site 7	4	NA
Site 8	1	0
Utopia II-Structure 1	NA	0
Utopia II- Structure 20	NA	0
Utopia II- Structure 10	NA	0
Utopia III- Structure 40	0	1
Utopia III-Structure 50	2	1
Utopia IV- Structure 140	NA	2
Utopia IV-Structure 150	NA	0
Utopia IV- Structure 160	NA	0
Palace Lands Quarter	1	2
Building l	1	NA
Building o	1	0
Building s	3	1
North Hill	1	2
Poplar Forest Quarter	4	0
ST116	0	NA

Coarse ceramics have a more ambiguous relationship with time that will be further tested (Figures 5.7-5.8). If these artifact classes do indeed have constant discard rates, I should be able to see this by calculating and comparing two different Abundance Indexes, one which uses coarse ceramic wares in the denominator and another that uses wine bottles in the denominator. First, an explanation of the Abundance Index is in order.

The Abundance Index

Abundance indexes provide estimates of discard rates relative to a baseline discard rate (e.g., the number of discarded buttons in relation to the total number of discarded ceramic sherds), with the assumption that the base discard rate of the

denominator class either does not change or, if the base discard rate does change, it does so in a predictable manner. For this study the Abundance Index is estimated as:

$$AI = \frac{(Artifact\ Group\ 1)}{(Artifact\ Group\ 1) + (Artifact\ Group\ 2)}$$

where Group 1 is the artifact group whose discard rate variation we are interested in measuring and Group 2 represents the base discard rate. Unlike relative frequencies, the Abundance Index works by using a single artifact class as the *Artifact Group 2* denominator value. By reducing the *Artifact Group 2* value to a single artifact class, one only has to be concerned with correlated discard rate variation in a single denominator class, not in scores of artifact classes. The challenge for this study is finding an *Artifact Group 2* whose discard rate is either relatively constant across sites or that has a discard rate that varies predictably over time (Galle 2004).

This method for estimating discard rates is derived from large and small mammal measures used in optimal foraging applications (Ugan and Bright 2001). Abundance Indexes (AI) have been successfully used to analyze discard rates on late eighteenth-century slave quarter sites at Monticello (Arendt 2003; Galle 2003; Neiman 2000) and early-to-mid-nineteenth century sites at the Hermitage (Galle 2004). Abundance indexes are less affected by random variation in occupation intensities, durations, and site formation processes than densities since these factors equally affect both the denominator and the numerator artifact classes.

A close examination of the density measures suggest that wine bottle glass and coarse ceramic wares may be reliable *Artifact Group 2* classes. The lack of correlation between time and coarse ceramic ware and wine bottle densities may indicate that these two artifact classes were discarded at a fairly constant rate throughout the time period covered by the 19 structures used in this analysis. To determine the appropriateness of wine bottle and coarse wares as reliable *Artifact Group 2* artifact classes, I calculated two different abundance estimates. The first abundance measure calculated for both plowzone and subfloor pit assemblages at each structure uses the total sum of wine bottle sherds from each structure as the *Artifact Group 2* in the denominator (noted hereafter as the Wine Bottle Index for X artifact class[11]). The second abundance index, the Coarseware Index, uses coarsewares in the denominator. Appendices 2 and 3 include abundance index histograms for each artifact class as well as summary statistics.

The resulting Wine Bottle Index scores for the seven basic artifact classes have nearly identical rank correlations with time when compared to the density correlations (Table 5.3). They are significant at α=.10. Discard rates of buckles from plowzone contexts and buttons and refined ceramics from both plowzone and subfloor pits have positive correlations with time. Imported tobacco pipe assemblages from both plowzone and subfloor pit contexts are negatively correlated with time. Coins from subfloor pit contexts have a positive correlation with time while coins from plowzone contexts are not correlated with time. It is notable that there are no correlations between the Wine Bottle Index scores for coarse ceramic wares and time. However the scatterplots of the coarseware sqrtdensities and the plotted abundance index scores with 95 percent

[11] *Wine Bottle Index*= Artifact Group 1/(Artifact Group 1) + (Sum of all wine bottle sherds at the structure)

confidence intervals suggest a slight decrease in coarseware discard over time (Figures 5.7-5.10). Although coarse ware discard does not remain constant, it does vary predictably, suggesting that coarse wares may be a reliable *Artifact Group 2* class.

We can check to see if wine bottle sherds have no correlation with time by employing a second abundance measure referred to here as the Coarseware Index.[12] As Tables 5.3 and 5.4 demonstrate, the Coarseware Index results are nearly identical to the Wine Bottle Index scores. There are significant positive correlations between buttons and refined ceramics and time (α=.05). Imported pipes from subfloor pits are significantly negatively correlated with time when α=.05. When α is increased to .10, a significant negative correlation with time also appears for imported pipes found in plowzone contexts. Buckles and coins from subfloor pit contexts are also significantly positively correlated with time when α=.10. As anticipated, there were no significant correlations between time and the discard rates of wine bottle sherds from both plowzone and subfloor pit contexts, indicating that wine bottle discard remained relatively constant throughout the eighteenth century.

Two important conclusions can be drawn from these initial analyses. First, the use of Abundance Index measures provides important analytical benefits. In Figure 5.3 we saw that the *p-values* are lower and the correlation coefficients are higher for the indices than for the density correlations. This is consistent with the idea that densities have more noise, presumably due to uncontrolled site formation processes. This suggests that the abundance index is a proportional estimate of discard rates that offers a better correlate of per capita discard than densities. A number of powerful statistical methods

[12] *Coarseware Index*= Artifact Group 1/(Artifact Group 1) + (Sum of all coarse ceramic sherds at the structure)

also become available when measurements are in proportions or counts as opposed to densities. As I have just demonstrated, densities, Wine Bottle Index and Coarseware Index measures suggest that the discard rates of wine bottle and coarse ceramic sherds do not fluctuate significantly through time. Although coarseware discard estimates may decrease slightly throughout the eighteenth century, they appear to do so in a predictable manner. If this is the case, a decrease in coarseware discard should be reflected in slightly elevated slopes for all artifact classes when index scores are generated using the Coarseware Index relative to abundance scores resulting from the Wine Bottle Index. Since the discard rates of wine bottles are relatively constant and the discard rates of coarsewares are generally predictable, these artifact classes can be used as the baseline discard rate, *Artifact Group 2*, in the Abundance Index equation. Having found two artifact classes that will satisfy the *Artifact Group 2* requirements, I stopped calculating densities and use only the Wine Bottle Index and Coarseware Index scores in this chapter.

Second, these initial results meet the signaling model's expectations about the changing abundance of signaling media during the eighteenth century. There are significant positive correlations between time and the consumption of costly items such as refined ceramic wares, buttons, and buckles. The discard of coins was positively linked with time only in subfloor pit assemblages. Coins from plowzone contexts had no temporal correlations. Per capita discard of imported tobacco pipes was negatively correlated with time. These patterns raise a host of questions: Are the correlations simply the result of the increased influx of goods during the Consumer Revolution? Do falling prices on fashionable goods lag behind the discard rates of costly signaling media?

To what extent are the signaling strategies brought about by independent variables such as diversification, increased mobility and proximity to urban centers, which provided different work opportunities as well as contact with new and different social groups? Does one of these independent variables exert more influence over signaling levels than other variables?

One way to address these questions is to use a statistical method that estimates the overall effect of independent historical and archaeological variables on the abundance of a given artifact class, the dependent variable, in a given assemblage. It is important that the method provide estimates of the effect of individual independent variables on the dependent variable while holding constant the variation in the other independent variables in the model. A variety of methods can be used to evaluate the effect that these six variables had on artifact abundance.

I have already used Kendall's *tau* rank correlation with success to test the influence of a single independent variable on the artifact abundance indexes. Another type of rank correlation, Partial Rank Correlation using Spearman's *r*, provides greater analytical power by allowing me to look at the influence of time (MCD) and one other independent variable on artifact abundance while holding temporal variation constant. It would, for example, show the influence of agricultural diversification on artifact use and discard while holding the influence of time constant and, conversely, show the influence of time while holding the impact of diversification constant.

Having already successfully used rank correlation methods, why should I investigate other methods? Although partial rank correlation is familiar to archaeologists, it is much less powerful than other methods. The main concern with partial rank

correlation is that it treats each dependent variable as a single observation. Abundance index scores may appear to be a single number but, since they are proportions, they are composed of observations on many artifacts drawn from samples of varying size. Rank correlation methods do not model the complexity of such a dataset. By establishing reliable proportional abundance measures, a number of more powerful statistical methods, such as generalized linear models (GLIM), become available.

Generalized Linear Models

Generalized linear models (GLIM) are the most unified approach to multiple regression models in the social sciences (Gill 2001:2). Developed in the early 1970s, and most fully developed by McCullough and Nelder (1989), GLIMs subsume traditional approaches to classic multiple regression, analysis of variance and analysis of covariance, while also including relatively new methods such as logistic, Poisson, and negative binomial regression. Generalized linear models have two main properties that allow them to handle both linear and non-linear relationships as well as a number of different variable types and error distributions (Crawley 1993:167-168; Gill 2001).

First, generalized linear models allow researchers to define the error structure contained within the dependent response variables being analyzed. Archaeologists work with a variety of data types, each with its own error distribution. Continuous data, such as sherd thicknesses, rim diameters, and tobacco pipe bore diameters, can be modeled effectively using normal Gaussian distributions. Count data, such as the number of creamware sherds in a sample, and proportional data, such as an abundance index score which measures the proportion of beads in relation to the number of wine bottle sherds,

have non-normal distributions. GLIMs allow researcher to specify the error distributions that are appropriate to those data being modeled.

Second, generalized linear models use *link* functions to model nonlinear relationships between a set of linear predictors and the predicted or mean value of the dependent variable. Link functions are used to correctly identify the functional form of the relationship between the dependent (X) and independent (Y) variables and different *link* functions help distinguish one member of the GLIM family from another (Crawley 1993; Liao 1994:4). The type of *link* function used is dependent on the distribution of the dependent data (Liao 1994:5). Table 5.6 provides a summary of data types, their error distributions and the *link* functions considered below.

Table 5. 6: Summary of GLIM analyses, error distributions, and link functions considered in this dissertation (after Crawley 1993:170, 172; Gill 2001:31).

Analysis Type	**Response Variable (Dependent Y Variable)**	**Explanatory Variable (Independent X Variable)**	**Link Function**	**Error Distribution**
Classical Multiple Regression	Continuous	Continuous or Classed	Identity ($\eta=\mu$)	Normal, Gaussian
Logistic regression	Proportion	Continuous or Factor (binary)	Logit ($\eta=\log(\mu/n-\mu)$)	Binomial
Poisson Regression	Count	Continuous or Factor (binary)	Log ($\eta=\log(\mu)$)	Poisson
Negative Binomial Regression	Count	Continuous or Factor (binary)	Log ($\eta=\log(\mu)$)	Negative Binomial

A brief review of the relationship between different *link* functions, error distributions and the archaeological data helps make sense of the inner workings of GLIMs. Traditional linear regression techniques most frequently used by archaeologists,

which include analysis of variance and analysis of covariance (Shennan 1988), assume that the error distribution within the sample is a normal or Gaussian distribution. This means that standard linear regression requires a continuous dependent variable (Liao 1994:1). Continuous variables with assumed normal distributions include those such as sherd size and sherd thickness. For continuous data, GLIM provides an *identity link* function that connects the dependent Y variables to the linear predictor (η). With the *identity link* function, the independent X variables are used to predict the mean of Y, where $\eta = \mu$ where μ= the predicted mean value of Y given a particular X value. The *identity link* is functionally inappropriate for proportional or count data like those used here. When the *identity link* is used with count or proportional data, there is nothing in the model to prevent the results from producing negative counts or proportions that are greater than one or less than zero.

Fortunately, generalized linear models have *link* functions that allow us to use non-continuous and dichotomous data such as counts and proportions. The *logit link* is one *link* function that works well with proportional data. It produces a logistic regression that forces the predictions to fall between 0 and 1. Logistic regression transforms nonlinear relationships into linear ones. It is particularly effective for describing the relationship between dichotomous, or binary, variables and a group of independent "predictor" variables (Menard 2002; Pampel 2000).

Unfortunately, the *logit link* assumes that the data have a binomial error distribution. A binomial error distribution assumes that each artifact within a sample was sampled randomly and independently of other artifacts. This is a problematic assumption to make with archaeological data. Most artifacts are portions of objects, such as pots. It

is likely that pots were broken or discarded in a localized area. Contexts with several sherds of creamware, for example, are likely to have many more sherds of creamware, thereby creating a non-independent sample.[13] Data that are not independently sampled likely contain what is known as extra-binomial variation, which means that the variance (σ^2) of the real error distribution is much larger that the assumed binomial error , which is less than the mean of the observations.

Extra-binomial variance is also known as overdispersion. *Logit link* GLIMs that assume samples with binomial structure often mistake extra-binomial variance for some level of influence resulting from the independent variables. Overdispersion gives greater weight to the independent variables and often produces standard errors that are underestimated. Underestimated standard errors in turn contribute to overly sensitive and frequently small Wald confidence intervals. The result is that the estimates of independent variable effects on the dependent variable look more significant than they really are.

I encountered such errors during my initial exploratory data analysis. I employed logistic regression models for all seven artifact types from both plowzone and subfloor pit contexts. The abundance scores (dependent variable Y) and the independent X variables, were read into SAS statistical package v. 9.1 and the SAS *proc logistic* function was used to produce the regression solution. I constructed models for each artifact class that included all of the independent variables. This allowed me to test the influence of each variable while holding the effects of the other variables constant. For example, it allowed me to estimate how much agricultural diversification influenced the

[13] Non-independent samples are easily remembered as "contagion" samples, where the likelihood of catching the flu is not independent since catching the flu relies on others in the sample having the same bug.

consumption of buttons when time was held constant. However, I immediately encountered problems with overdispersion. Pearson Goodness-of-Fit statistics, which neared 100 when they should have been closer to one, combined with high Pearson residuals (≥ 2, ≤ -2) strongly suggested that the data contained extra binomial variation. I used several methods that can help correct for overdispersion. The inability of these methods to account for the extra-binomial variability in my data indicated that there was something fundamentally inappropriate in the binomial error model.

Happily, GLIMs have a *log link* function and error distributions that can better accommodate assemblage count data. The *log link* function predicts the log of the artifact count (for example, the log of the number of refined ceramic sherds). Hence negative predictions are impossible. Poisson error distributions can be applied to count data that refer to knowable cases, such as the number of sherds in a context or the number of flu cases, but that have no information on how many times something did not happen. A binomial models, on the other hand, require knowing both the number of times an incident occurs and the number of times it did not occur (Crawley 1993:227). Poisson distributions are, however, constrained in that they also assume independence within samples. The assumed Poisson error variance (σ^2) is equal to the mean of the dependent variable which does not allow for much variation in a sample.

The negative binomial error distribution has more forgiving requirements about variation. Unlike the Poisson error distribution, the negative binomial variance can be greater than the mean and it can be as large as necessary to account for lack of independence and the resulting extra-binomial variation within samples. A GLIM that uses the *log link* function and negative binomial error distribution was used with the

artifact abundance indexes and six signaling variables defined in Chapter 3. The Pearson Goodness-of-Fit statistics for the negative binomial GLIM were much closer to 1, indicating that the negative binomial models account for the overdispersion in the artifact samples used in this study. Heeding Cowgill's advice, I will compute confidence intervals for both the abundance index scores and the regression coefficients in the upcoming analyses. Confidence limits are particularly good at highlighting differences between sample populations by providing a range within which we can expect the abundance estimate to fall (Cowgill 1977:364-366). The results illuminate signaling trends in the Chesapeake.

Negative Binomial Regression Models

Model 1, bivariate: Mean Ceramic Dates

A bivariate negative binomial model was first used with the abundance index scores (dependent Y variables) and the mean ceramic dates for each structure (independent X variable). The model was applied to the four abundance index types for each artifact class. Results for the four models for each artifact type are presented in Figures 5.11-5.24 and in Table 5.7. Parameter estimates are given in Table 5.7. Estimates between 0 and 1 indicate that time had a positive influence on artifact abundance and numbers less than 0 indicate that time had a negative impact on artifact discard. It should be noted that the bivariate temporal regression (where x=MCD and y=AI) produced well-fitted models which had almost no residuals greater than 2 or -2.

The parameter estimates indicate that time exerted a significant (α=.05) positive influence on the abundance of clothing buckles, buttons, coins, and refined ceramics in each of the four models produced for these artifact classes (Table 5.7). My models also predicted the index value of these artifact classes at 10-year intervals beginning in 1700 for subfloor pit assemblages and 1740 for plowzone assemblages, with predictions ending in 1810 for both assemblages. By plotting the predicted index values and the actual discard rates against time, where predicted index values are symbolized by a line and actual index values for each structure are represented by dots, we see dramatic increases in the use and discard of clothing buckles, buttons, and refined ceramics during the last half of the eighteenth century (Figures 5.11-5.24). These artifact classes were not only difficult to obtain, they were also financially costly. As a result, they most likely carried substantial signaling power and their increased consumption through time perhaps points to greater investment in signaling strategies. Regression results for coins found in plowzone contexts did not produce significant results. Significant positive parameter estimates were produced for coins from subfloor pit data, suggesting that coin discard increased through time. The discard rates of these four artifact classes may well be associated with the other signaling variables, which will be tested in subsequent multivariate models.

The abundance of tobacco pipes in all assemblages was negatively impacted by time, with the parameter estimates, except for those generated by the Coarseware Index for plowzone, indicating a significantly negative influence (Figures 5.19-5.20). I will explore the possibility that the steady decrease in the discard of tobacco pipes may be

associated with the introduction of more novel and costly signaling media later in this study.

The parameter estimates for coarse ceramic wares and wine bottle sherds validate what densities and abundance index scores have suggested about the deposition rates of these two artifact classes (Table 5.7). The use and discard of coarse ceramic wares decreased steadily throughout the eighteenth century at almost exactly the same pace as imported tobacco pipes (compare Figures 5.19 and 5.20 to Figures 5.21 and 5.22). This confirms that the use of coarse ceramic wares as the *Artifact Class 2* in the denominator of the Abundance Index equation will result in Coarseware Index scores that overestimate temporal increases in index rates as well as elevated parameter estimates for all models using Coarseware Index values. Note that the parameter estimates produced using Coarseware Indexes are generally slightly higher than the estimates generated using Wine Bottle Index scores.

The parameter estimates for the Coarseware Index for wine bottle sherds were only very slightly above 0 (Table 5.7). Plotting actual index and predicted discard rates against time shows a slight steady increase in wine bottle discard throughout the eighteenth century (Figures 5.23-5.24). This trend is different from the other increases we have seen in that it does not spike during the last quarter of the century. The parameter estimates produced by the negative binomial model using abundance index scores and the mean ceramic dates reveal patterns similar to those shown in the Kendall's *tau* coefficients. Together these statistical tests indicate that these artifact classes met the expectations of my model.

Table 5. 7: Parameter Estimates and their confidence intervals for bivariate negative binomial regression model where Y=abundance index and X=MCD.

		Wald 95% Confidence Limits		
Independent Variables	Estimate	LCL	UCL	*p*
Buckles, Coarseware Index for Plowzone	.1165	.0186	.2143	0.0197
Buckles, Wine Bottle Index for Plowzone	.1131	.0026	.2236	0.0448
Buckles, Coarseware Index for Subfloor Pits	.05	.0155	.0845	0.0045
Buckles, Wine Bottle Index for Subfloor Pits	.0295	-.0054	.0644	0.0971
Buttons, Coarseware Index for Plowzone	.0811	.0476	.1145	<.0001
Buttons, Wine Bottle Index for Plowzone	.0589	.0214	.0963	0.0021
Buttons, Coarseware Index for Subfloor Pits	.0399	.0205	.0593	<.0001
Buttons, Wine Bottle Index for Subfloor Pits	.0385	.0183	.0587	0.0002
Refined Ceramics, Coarseware Index for Plowzone	.0346	.0245	.0447	<.0001
Refined Ceramics, Wine Bottle Index for Plowzone	.031	.0161	.046	<.0001
Refined Ceramics, Coarseware Index for Subfloor Pits	.017	.0093	.0247	<.0001
Refined Ceramics, Wine Bottle Index for Subfloor Pits	.0187	.0055	.032	0.0056
Coins, Coarseware Index for Plowzone	0.0145	-.0075	.0366	0.1957
Coins, Wine Bottle Index for Plowzone	-.103	-.041	.0214	0.5242
Coins, Coarseware Index for Subfloor Pits	.0762	.035	.1174	0.0003
Coins, Wine Bottle Index for Subfloor Pits	.049	.0038	.0942	0.0335
Imported Tobacco Pipes, Coarseware Index for Plowzone	-0.015	-.0534	.0237	0.4478
Imported Tobacco Pipes, Wine Bottle Index for Plowzone	-0.0394	-.0778	-.0009	0.0448
Imported Tobacco Pipes, Coarseware Index for Subfloor Pits	-0.0078	-.0144	- .0110	0.0218
Imported Tobacco Pipes, Wine Bottle Index for Subfloor Pits	-0.0198	.0305	.00910	0.0003
Coarse Ceramics, Wine Bottle Index for Plowzone	-0.0201	-0326	-.0075	0.0017
Coarse Ceramics, Wine Bottle Index for Subfloor Pits	-0.0149	-.0304	.0006)	0.0599
Wine Bottles, Coarseware Index for Plowzone	0.0087	.005	.0125	<.0001
Wine Bottles, Coarseware Index for Subfloor Pits	0.0053	-.0022	.0129	0.1677

Costly and novel signaling media during the latter half of the eighteenth century, such as clothing buckles, buttons, and refine ceramics increase through time while tobacco pipes, which I hypothesized were more popular during the early eighteenth century, decrease with time. As I will discuss later in this study, the discard rate for costly artifacts appears to outpace decreases in cost associated with the introduction of new styles.

The results also help solve a key methodological problem in regard to estimating discard rates of wine bottles and coarse ceramic wares. This is a methodologically critical result because the identification offers reliable estimates of discard rates for other artifacts during the eighteenth century.

Multivariate Negative Binomial Regression

We've just seen that use and discard of costly objects such as buttons and refined ceramics increased on slave quarter sites as the eighteenth century progressed. Within this region-wide temporal trend, discard rates vary among sites. If variations in discard rates point to variations in signaling levels (indicators of signaling ability and payoffs to signaling), how can we measure how signal levels were influenced by other historical and environmental variables such as those outlined in the signaling model? And since time is such a strong influence on signaling media, how can we ensure that its effects are being excluded from the model? Negative binomial regression enables a multivariate approach and allows us to estimate the influence of an independent variable on discard rates while holding the influence of time constant. The same model can also estimate the influence of time while holding the influence of that specific independent variable constant.

The negative binomial GLIM could theoretically produce a model that incorporated all six independent signaling variables outlined in Chapter 3 (see also Tables 5.8 and 5.9). However, multicollinearity, which occurs when independent variables are correlated with one another, is a concern. Highly correlated variables convey the same information and multicollinearity makes it impossible to isolate the impact of one independent variable on the dependent variable from another independent variable's impact. An early version of my signaling model, for example, included a variable that indicated the likelihood a structure was inhabited by slaves with specialized occupations. However, the specialized occupation and proximity to main house variables were identically coded, resulting in multicollinearity and the inability to determine the extent to which each variable was influencing discard rates. Since I could measure the distance of a structure from the main house with certainty but could not know if residents in the structures had a specialized skill, I removed the specialized skills variable from the model. Multicollinearity may also occur among the six variables that I have kept in my signaling model. To reduce the risk of multicollinearity, the following multivariate models contain three variables, the dependent artifact abundance index scores, the independent mean ceramic date variable and one other independent variable. Finally, the Abundance Index scores for coins were removed from the multivariate models. The rank correlation and bivariate regression models indicated that the small sample sizes do not produce reliable results for coins.

Table 5. 8: Signaling variables that contribute to subfloor pit multivariate regression models where 0= no and 1= yes.

Structure Name	Nearest Urban Center	Transformed Mileage to Urban Center (1/miles)	Within 1/3 of a mile of the main house?	Owner Present?	Agriculturally Diversified?	Owned by Jefferson?
44JC298	Williamsburg (8.9 miles)	0.122	0	0	0	0
Richneck	Williamsburg (1.5 miles)	0.666	0	0	1	0
Site 8	Charlottesville (4.5 miles)	0.222	0	1	0	1
Utopia II-Structure 1	Williamsburg (4.3 miles)	0.232	0	1	0	0
Utopia II- Structure 20	Williamsburg (4.3 miles)	0.2	0	1	0	0
Utopia II- Structure 10	Williamsburg (4.3 miles)	0.2	0	1	0	0
Utopia III- Structure 40	Williamsburg (4.3 miles)	0.2	0	1	1	0
Utopia III-Structure 50	Williamsburg (4.3 miles)	0.2	0	1	1	0
Utopia IV- Structure 140	Williamsburg (4.3 miles)	0.2	0	1	1	0
Utopia IV-Structure 150	Williamsburg (4.3 miles)	0.2	0	1	1	0
Utopia IV- Structure 160	Williamsburg (5 miles)	0.2	0	1	1	0
Palace Lands Quarter	Williamsburg (.8 miles)	1.25	1	1	1	0
Building o	Charlottesville (4.5 miles)	0.222	1	1	0	1
Building s	Charlottesville (4.5 miles)	0.222	1	1	1	1
North Hill	Lynchburg (8 miles)	0.125	0	0	0	1
Poplar Forest Quarter	Lynchburg (8 miles)	0.125	1	0	1	1

Table 5. 9: Signaling variables that contribute to plowzone multivariate regression models. Variables where 0= no and 1= yes.

Structure Name	*Nearest Urban Center*	Mileage to Urban Center (1/miles)	Within 1/3 of a mile of the main house?	Owner Present?	Agriculturally Diversified?	Owned by Jefferson?
Site 8	Charlottesville (4.5 miles)	0.222	0	1	0	1
Site 7	Charlottesville (4.5 miles)	0.222	0	1	0	1
Building *o*	Charlottesville (4.5 miles)	0.222	1	1	0	1
Building *s*	Charlottesville (4.5 miles)	0.222	1	1	1	1
Building *l*	Charlottesville (4.5 miles)	0.222	1	1	1	1
Utopia III- Structure 40	Williamsburg (4.3 miles)	0.2	0	1	1	0
Utopia III-Structure 50	Williamsburg (4.3 miles)	0.2	0	1	1	0
North Hill	Lynchburg (8 miles)	0.125	0	0	0	1
Poplar Forest Quarter	Lynchburg (8 miles)	0.125	1	0	1	1
ST116	Fredericksburg (43 miles)	0.023	1	1	1	0
Palace Lands Quarter	Williamsburg (.8 miles)	1.25	1	1	1	0

Model 2: Agricultural Diversification and Time

The first model estimates the influence of time and agricultural diversification on the use and discard of the six artifact classes from both plowzone and subfloor pit contexts (Appendix 4). The temporal patterns seen in the preceding bivariate model (where x=mean ceramic date and y=abundance index scores) were the same, with time positively influencing the abundance of buckles, buttons, refined ceramics and wine bottles when the effects of agricultural diversification were held constant. Time had a negative influence on the use and discard of imported tobacco pipes and coarse ceramic wares.

The influence of agricultural diversification was variable and no discernable trend emerged. As seen in Appendix 4, the discard of buckles in relationship to wine bottles

from plowzone contexts was likely to be less on diversified sites than on nondiversified sites. There is a possible increase in the use and discard of buttons at diversified sites, however the *p-values* are high. Diversification was not a significant influence on the consumption of refined ceramics if time is taken into account. Results for coarse ceramic wares, wine bottles, and tobacco pipes are highly variable, with no pattern of influence emerging.

These results were surprising as I expected agricultural diversification to play a significant role in the signaling abilities of slaves. A close look at the coding of the diversification variable reveals a concern about the site sample: all of the undiversified sites in the plowzone analysis have mean ceramic dates that fall in the last 15 years of the eighteenth century. They are also all sites owned by Thomas Jefferson, *Building o*, Site 7, Site 8, and the Poplar Forest North Hill site. These late undiversified sites owned by Jefferson may have more consumer goods than earlier non-diversified sites. For example, the Principal Component Analysis presented later in this chapter demonstrates that the non-diversified North Hill site has many more buckles than other sites, therefore it is most likely responsible for the unexpected parameter estimate that suggests that diversification should lead to a decrease in the abundance of buckles (Figures 5.11-5.14). In order to correct for this biased sample, I will need to include more undiversified sites dating from the first three quarters of the eighteenth century. While diversification may have a positive impact on signaling strategies, I will not be able to reliably test this variable until data from early undiversified sites become available.

Model 3: Proximity to Main House and Time

When proximity to the main house was held constant, time was a significant positive influence on the use and discard of all artifact classes except for tobacco pipes and coarse ceramic wares, which were negatively impacted by the progression of the eighteenth century (Appendix 5). In general, there were no significant relationships between the abundance of artifacts and a structure's proximity to the main house. The abundance of buttons in relationship to coarse wares from subfloor pits was greater at quarters located within one-third mile of the mansion. The same positive influence was seen for refined ceramics in relation to coarse wares from pits. Wine bottle sherds from plowzone contexts also appear in greater abundance on sites close to the main house. Despite the sporadic positive and negative parameter estimates, overall a structure's distance from the main house appears to have no significant effect on artifact discard.

Model 4: Distance to Urban Centers and Time

Only one structure with plowzone assemblages, the Palace Lands Quarter, was located within two miles of a major urban center. The remaining 10 structures with plowzone were four or more miles away from a cosmopolitan area. As a result, I did not use plowzone assemblages with this model because the lack of diversity in the distance variable would likely bias the parameter estimates.

Refined ceramics were the only artifacts influenced by a dwelling's proximity to an urban center (Appendix 6). Both the Coarseware Index and Wine Bottle Index for refined ceramics suggest that the abundance of refined ceramics increased the closer a structure was to an urban center. Proximity to, or distance from, an urban area has no

significant impact on the discard of the other artifact types. As we've seen in the other models, time had a positive effect on buckle, button, refined ceramic, and wine bottle use and discard while also having a negative effect on the abundance of imported tobacco pipes and coarse ceramic wares.

As with the agricultural diversification variable, the inconclusive results for subfloor pit contexts may be the result of the site sample. Out of the 16 sites used in the pit analysis, only two are located within two miles of a large urban center. Although not included in the pit analysis, only one of the 19 sites in the entire sample, ST116, is located more than one day's journey from an urban center. It may well be that a four to nine mile walk, which is coded as "far from urban center" in this study, was not far to travel in a day. Sites like Stratford Hall's ST116 quarter, located 43 miles from any large settlement, may well be the only site that should be coded as "far from an urban center". This would mean that all sites except one in this study were considered close to a large town or urban center. As a result, we will only be able to test this variable with any certainty once data from sites located more than 20 miles from an urban center are available.

Model 5: Owner Presence and Time

This model, which estimates the influence of time and an owner's presence on artifact abundance, was also only used with index scores from subfloor pit assemblages. Of the structures with plowzone contexts, only Poplar Forest's North Hill and Quarter Site had an absentee owner during their occupation.

An absentee owner negatively affected the abundance of buckles in relation to coarsewares and wine bottle sherds as well as the discard of buttons in relationship to wine bottles (Appendix 7). An owner's presence or absence had no significant influence on the other artifact classes. Time was once again a positive factor in the abundance of buckles, buttons, refined ceramics and wine bottles while it was a negative influence on the use and discard of tobacco pipes and coarse ceramic wares. As with the other models, time was the only clear factor affecting discard rates.

Model 6: Thomas Jefferson, Owner and Time

Both plowzone and subfloor pit assemblages were used to estimate the extent to which artifact abundance was the result of having Thomas Jefferson as an owner. The results were once again mixed with no distinguishable pattern (Appendix 8). The Coarseware Index for Buckles from subfloor pits and the Wine Bottle Indexes for buttons and refined ceramics from plowzone contexts were positively influenced by the TJ variable. Jefferson ownership had a negative influence on the Wine Bottle Index for imported tobacco pipes and the Coarseware Index for wine bottles from subfloor pits. Although being owned by Jefferson positively impacted the abundance of coarsewares in plowzone contexts, ownership by Jefferson negatively impacted the discard of coarsewares in subfloor pit assemblages. The passage of time influenced artifact classes in the same manner observed in the other models.

Modeling the Residuals: Principal Component Analysis

The six regression models indicate that the passage of time during the eighteenth century had the single greatest effect on the use and discard of artifacts at slave quarter sites. The abundance of clothing buckles, buttons, and refined ceramics spiked in the last half of the eighteenth century while the use and discard of tobacco pipes and coarsewares declined. Although the regression results estimated that some of the other signaling variables occasionally influenced artifact use and discard, no clear patterns emerged linking non-temporal signaling variables to artifact abundance. This may be the result of the small sample sizes used in this study. Although the 11 structures with plowzone assemblages and 16 structures with subfloor pit assemblages constitute the largest comparative sample used to date by historical archaeologists, this sample size may still be too small for reliably testing independent variables that exert more subtle influences.

It is also highly likely that other immeasurable independent variables, such as the number, age, and gender of the people living in a structure, influenced artifact abundance. Analyzing the residuals from the bivariate temporal models may not tell us what those other variables are but they can be used to highlight similarities and differences among dwellings. Principal Component Analysis (PCA) was used to analyze the residuals from the bivariate temporal model. PCA reduces the complexity of the residual datasets by transforming the Pearson residuals into vectors that can be plotted visually along two or three principal components. In doing so, PCA isolates and highlights components that account for the greatest variation within the dataset. For example, the first principal component should account for the greatest amount of variation, the second principal accounts for the next greatest amount of variation, and so forth. Together, the first and second principal component should account for at least 70 percent of the variation.

Pearson residuals for clothing buckles, buttons, refined ceramic wares, imported tobacco pipes, and coarse ceramic wares from each site were included in the PCA. The first analysis used residuals from the Wine Bottle Index bivariate regressions (x=MCD, Y=AI) for plowzone contexts. Principal component one accounted for 38 percent of the variation in the data and principal component two accounted for 33 percent of the variation. The eigenvectors for the artifact residuals from the Wine Bottle Index from plowzone contexts indicate that the distribution of refined ceramics, buttons, and coarseware are closely related while sites that had a lot of buckles tended to also have many imported tobacco pipes (Figure 5.25).

The large distance between the Utopia 3-Structure 50 and Utopia 3-Structure 40 assemblages is striking and indicates that very different consumption strategies were at work at these dwellings. People living at Structure 40 used and discarded more buttons and refined ceramics than predicted. Household consumption of buttons and refined ceramics at Structure 50 was less than expected while consumption of buckles and imported tobacco pipes fit the expectations. The Pearson residual plots show that Structure 50 has the lowest refined ceramic residual and a low button residual while Structure 40 has high refined ceramic and button residuals (Figures 5.26-5.27). The Poplar Forest Quarter site is also distinguished by its high button and refined ceramic outliers and a low buckle outlier. People living at the Poplar Forest North Hill site had greater quantities of tobacco pipes and buckles than anticipated by the model.

The distance between Utopia 3-Structure 40 and Utopia 3- Structure 50 is maintained in the PCA for Wine Bottle Index residuals from subfloor pit contexts (Figure 5.28). Here principal component one accounts for 48 percent of the variability and

principal component two accounts for 22 percent of the variability in the data. Use and discard of buttons and tobacco pipes are correlated and coarseware and refined ceramic abundance are correlated. In the biplot we see that the consumption of buttons and tobacco pipes are not correlated with the consumption of coarse and refined ceramics. Among the GLIM MCD regression, Structure 40 had high positive residuals for tobacco pipes, refined ceramics, and buckles while Structure 50 had negative residuals for refined ceramics and buttons. The Poplar Forest Quarter, *Building o*, and Site 8 are widely distributed on the PCA plot. These structures have either a single pit or, in the case of Site 8, very few artifacts deposited through multiple pits. It is likely that sampling error contributes to the position of these structures on the biplot. Site 44JC298's position is accounted for by an overabundance of buckles.

The PCA using residuals from the Coarseware Index once again show substantial distance between Structure 40 and Structure 50 (Figures 5.29-5.30). In the PCA for plowzone, Structure 40 is distinguished by its high button discard while Structure 50 has few buttons and refined ceramics. The Poplar Forest Quarter Site and *Building l* were high positive outliers due to the quantity of buttons at each site while *Building o* and ST116 grouped together due to the high abundance of refined ceramics and tobacco pipes. ST116 also contained more buckles and wine bottles that many of the other sites.

Site 44JC298 again has a high positive position on axis two of the subfloor pit PCA due to the over abundance of buckles. Residents at Poplar Forest North Hill and Utopia 2-Structure 10 also consumed larger quantities of buckles relative to other sites. Utopia 2-Structure 01 and Structure 20 had more buttons than expected by the model while Structure 40 was distinguished from the other sites due to the low abundance of

buttons, refined ceramics, and tobacco pipes. This unusual low result for Structure 40 is most likely influenced by the large quantity of coarsewares at this structure, which depress the quantities of items that appear to be high positive residuals in the Wine Bottle Index analyses.

Discussion

The process of developing reliable estimates of artifact discard revealed a number of methodological discoveries that archaeologists working on post-medieval sites may find useful when approaching both excavation and analysis. First, by using both density and abundance index estimates I discovered that the rates of wine bottle discard were fairly constant throughout the eighteenth century. Estimates of the discard rates of the other six artifact classes either increased or decreased significantly throughout the century. Wine bottle sherds are therefore a reliable artifact class to use as the control group for abundance indexes on eighteenth-century sites and become essential for comparing consumption among sites, not just within a single site. As a result, the remaining analyses in this study use only the Wine Bottle Index to estimate artifact discard.

Second, results from Kendall's tau rank correlation, the abundance indexes, and generalized linear regression models all suggest that plowzone assemblages provide more stable results than subfloor pit assemblages, which are more susceptible to sampling error. It is hoped that these findings are a clarion call for archaeologists to dig more plowzone or, at the very least, thoroughly sample plowzone prior to its mechanical removal. Finally, the lack of consistently significant results for independent variables

other than time in the negative binomial models hint that the sample size of 19 structures may still be too small. As noted earlier, some *p-values* suggest that other variables may have a significant impact on consumption of certain artifact classes. However, until sample size is increased to include earlier eighteenth-century sites, more undiversified sites, and more sites located both closer to and further from urban centers, significant results for all independent variables may be elusive.

What do abundance indexes, regression models, and principal component analysis tell us about consumption among slaves in the greater Chesapeake during the eighteenth century? It is clear that the progression of time has a consistently strong influence on the use and discard of costly signaling media such as refined ceramics, buttons, and buckles. On the other hand, the consumption of utilitarian artifacts, for example coarse ceramic wares, and objects lacking novelty, such as imported tobacco pipes, decreased as the eighteenth century progressed. Costly objects that remained useful but that were not portable and had relatively few fashionable attributes, such as wine bottles, continued to be discarded at relatively constant rates.

These results indicate that enslaved men and women were influenced by, and they responded to, the changing social and economic environment in the last half of the eighteenth century. As populations increased, urban centers grew, and venues for interaction expanded, many slaves found ways to acquire costly or difficult-to-obtain objects that were particularly suited to conveying rapidly changing fashions. The signaling model anticipated that signaling media such as clothing buckles, buttons, and refined ceramics would increase through time as the social and economic environment

within the Chesapeake became more competitive. The multiple regression models indicate that this was certainly the case. Some archaeologists have suggested that the explosion in the quantity of all classes of material culture on sites dating to the last half of the eighteenth century was the result of the increase in reasonably-priced goods. While increasingly inexpensive items no doubt increased consumption, the rapid spike seen here in the consumption of more costly items such as refined ceramics and buttons most likely moved much faster than the decrease in prices. George Miller's price index, for example, suggests that prices for refined ceramics wares only began to drop substantially by the early nineteenth century (1988, 1990). Slaves living at these 19 structures were acquiring and discarding costly items at rates that were well ahead of falling consumer prices.

The principal component analyses show us that certain households were better able to acquire relatively expensive buttons and ceramics. They include people living at the Poplar Forest Quarter, Utopia 3-Structure 40, Utopia 4-Structure 140, Richneck, *Building l*, and North Hill. Surprisingly, a number of these households were not owned by Jefferson nor were they located near mansions. This indicates that factors other than preferential treatment from an owner, living or working near the mansion, or having a specialized occupation contributed to a person's ability and desire to possess these types of items. Other households were clearly not able to consume any of the seven artifact categories.

The age, gender, and personal relationships between household members likely influenced the types of goods people sought as well as the amount they could acquire. A married couple with young children may have been forced to reinvest the fruit of their excess labor into their family by supplementing their weekly and yearly provisions with

vegetables and poultry they raised and the quilts and clothing they made. Any surplus went back into the family instead of going into a local market economy. A residential group of unrelated young men may have had very different requirements. Not beholden to those with whom they lived, these young men may have been free to spend excess money as they pleased. They may have purchased tools for independent craft production or selected fashionable items that demonstrated both their aesthetic and financial acumen. Fancy buckles and buttons, in combination with the clothing these items were attached to, would have been important means of signaling their ability to circumvent traditional provisioning systems. As costly signals, they may have attracted attention when young men went looking for romantic liaisons or other social and economic opportunities both within and outside a plantation.

A closer reading of artifacts with particularly fashionable and costly attributes may help refine our current understandings of the structure of slave households, as well as provide a better understanding of consumer motivations and the audiences that were being targeted. Despite sample size concerns, exploring variation within signaling media, for example the patterns in different styles and sizes of buttons and different ceramic ware types and forms, reveals discrete signaling strategies that suited specific types of households.

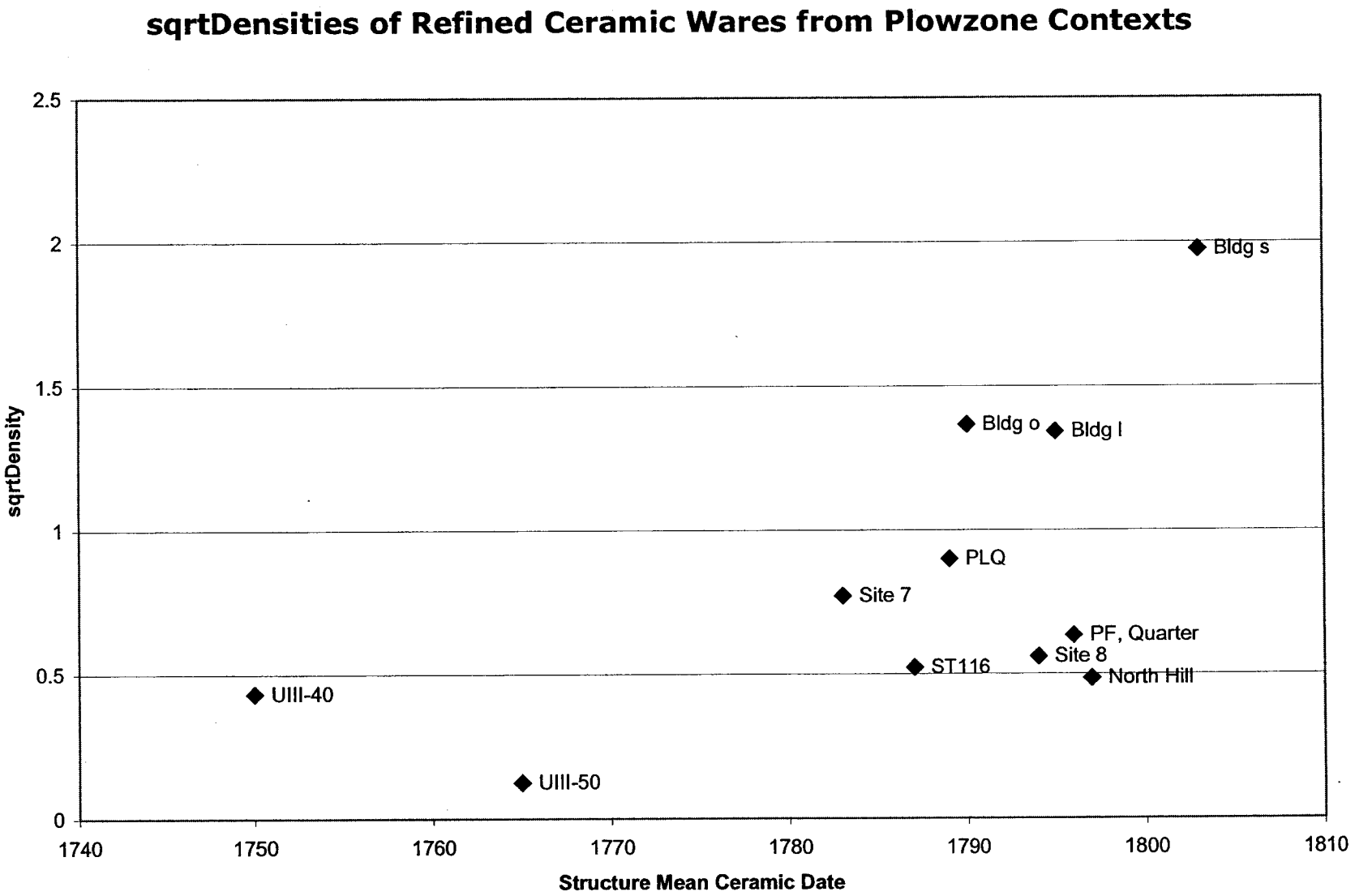

Figure 5. 1: Square root densities of Refined Ceramic Wares from Plowzone Contexts.

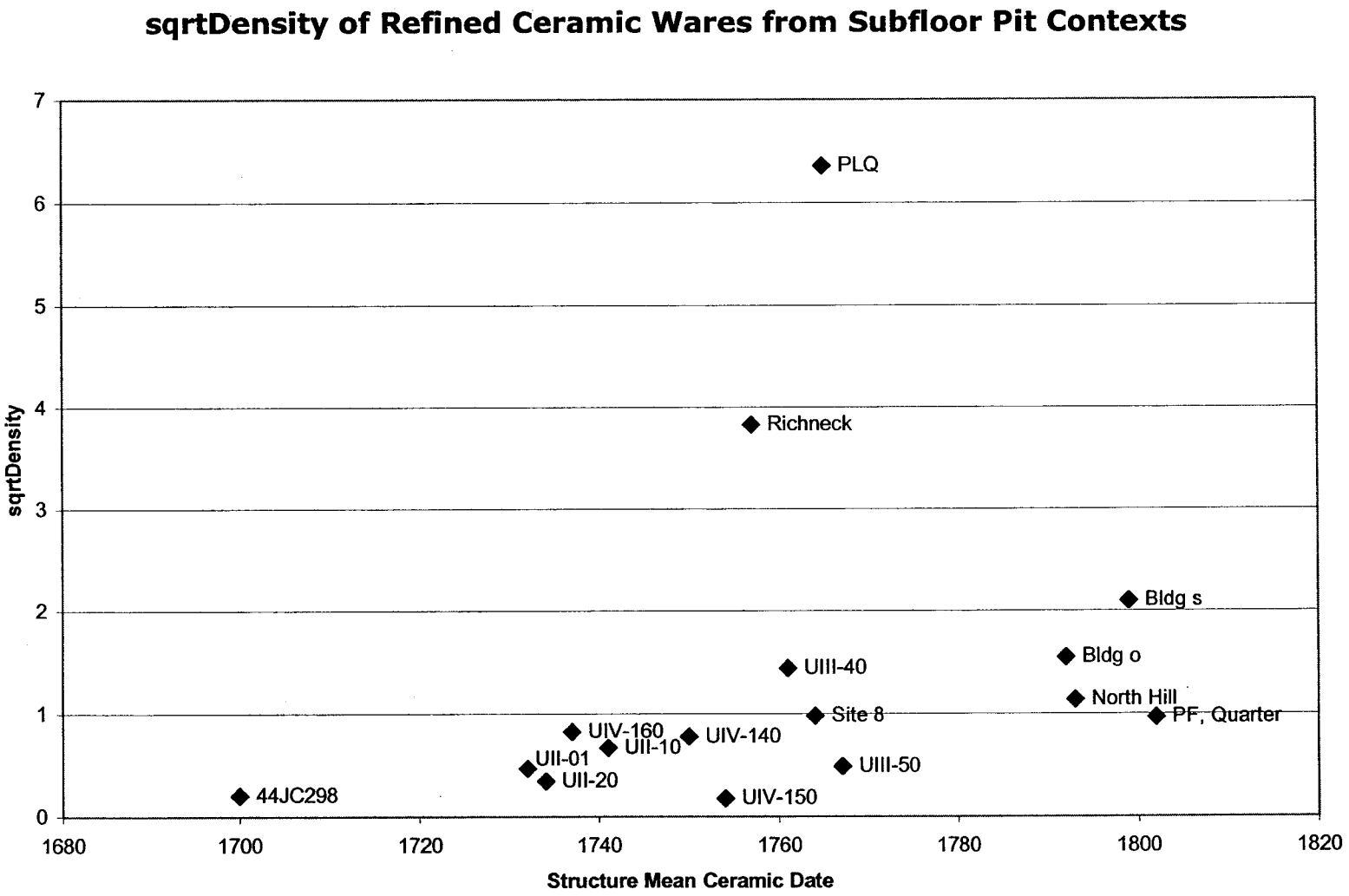

Figure 5. 2: Square root densities of Refined Ceramic Wares from Subfloor pit Contexts.

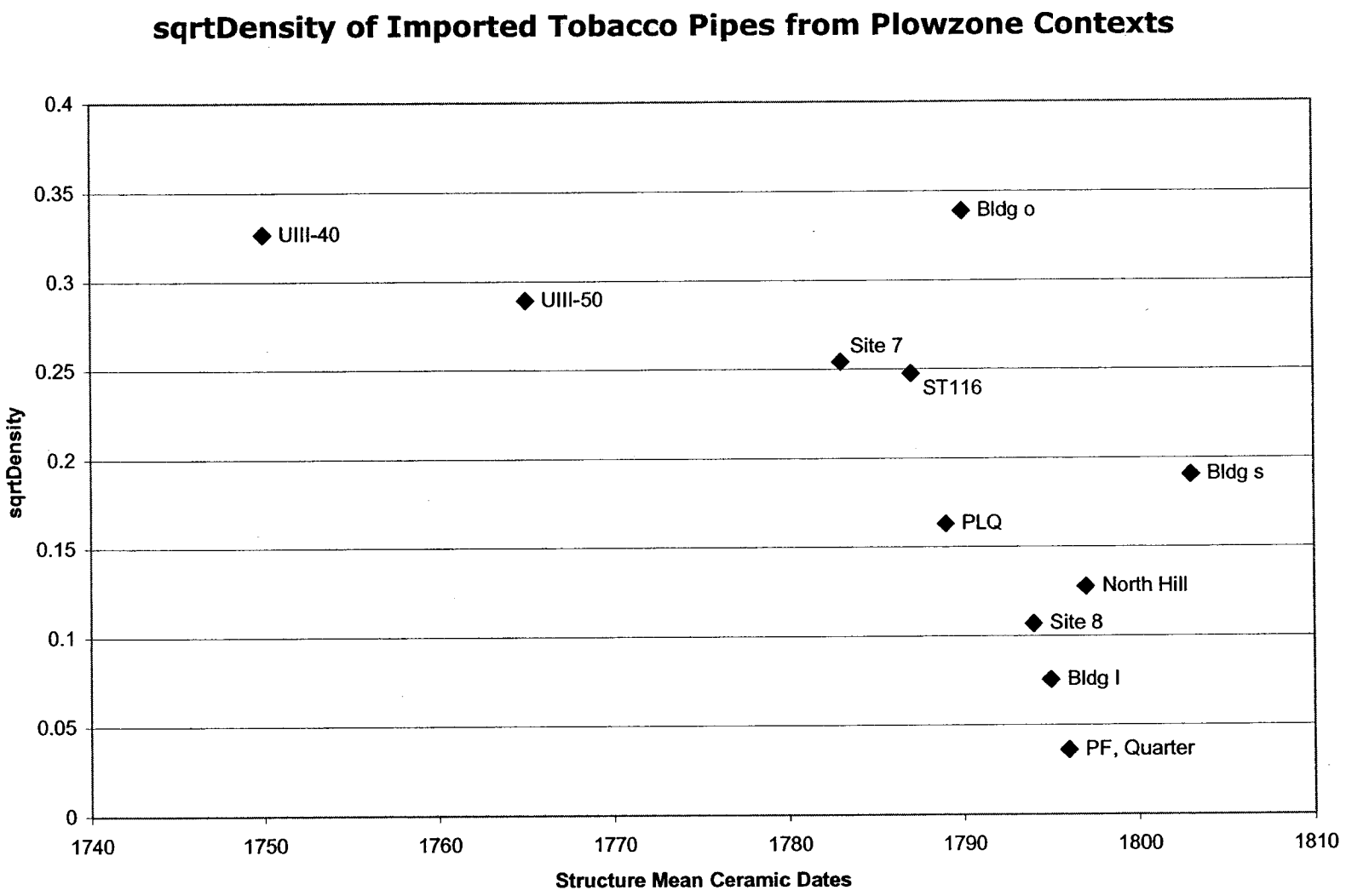

Figure 5. 3: Square root densities of Imported Tobacco Pipes from Plowzone Contexts.

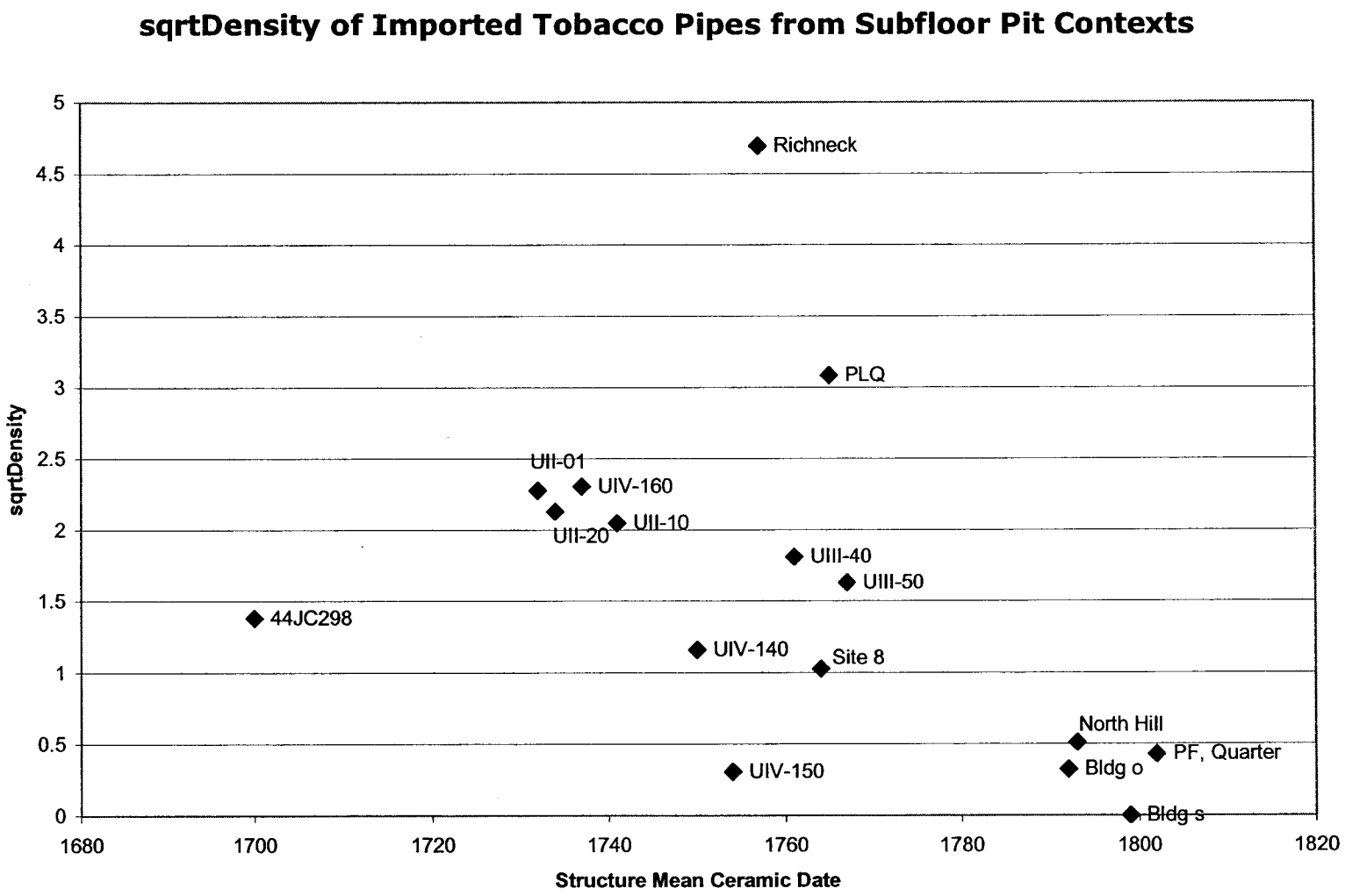

Figure 5. 4: Square root densities of Imported Tobacco Pipes from Subfloor pit Contexts.

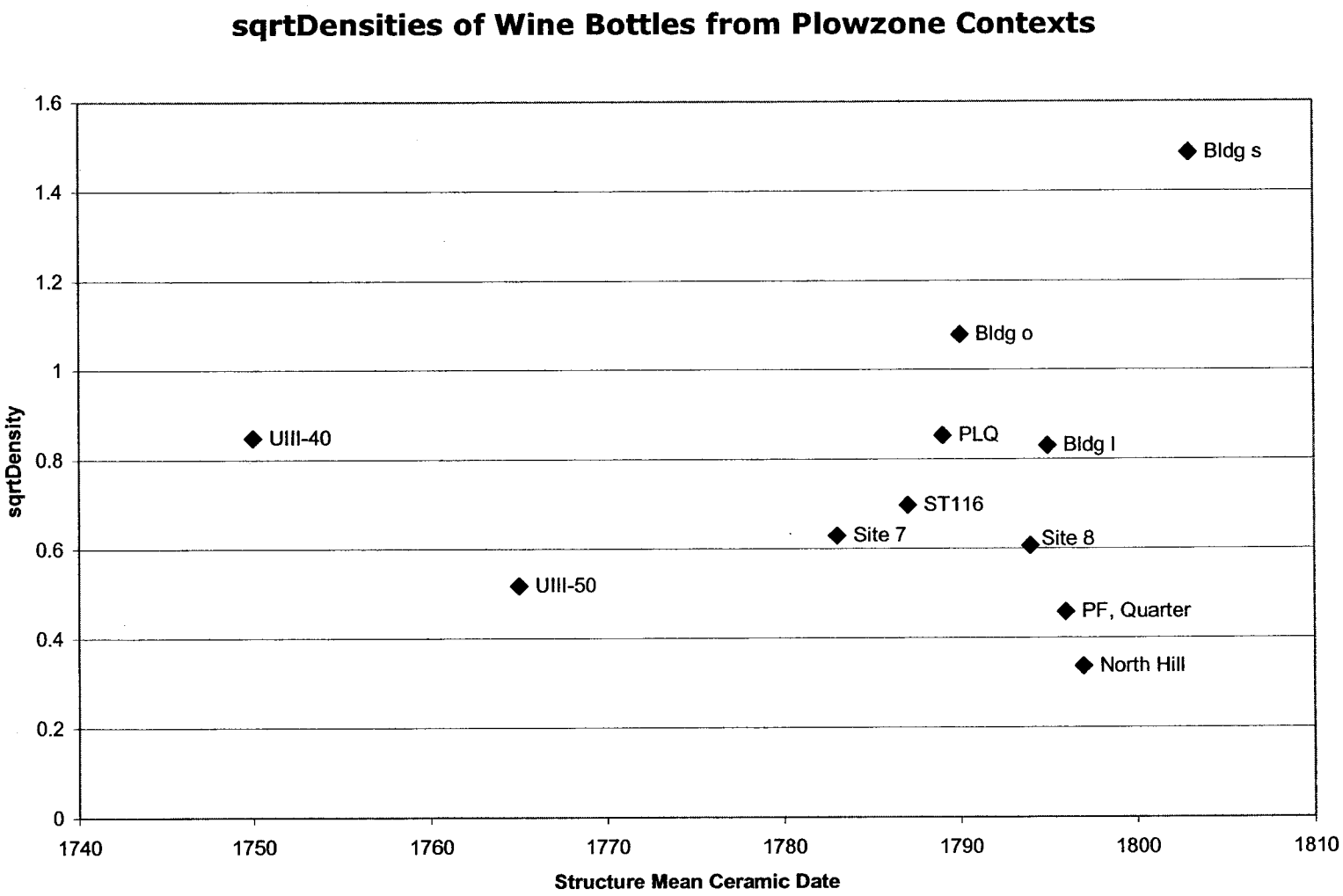

Figure 5. 5: Square root densities of Wine Bottle from Plowzone Contexts.

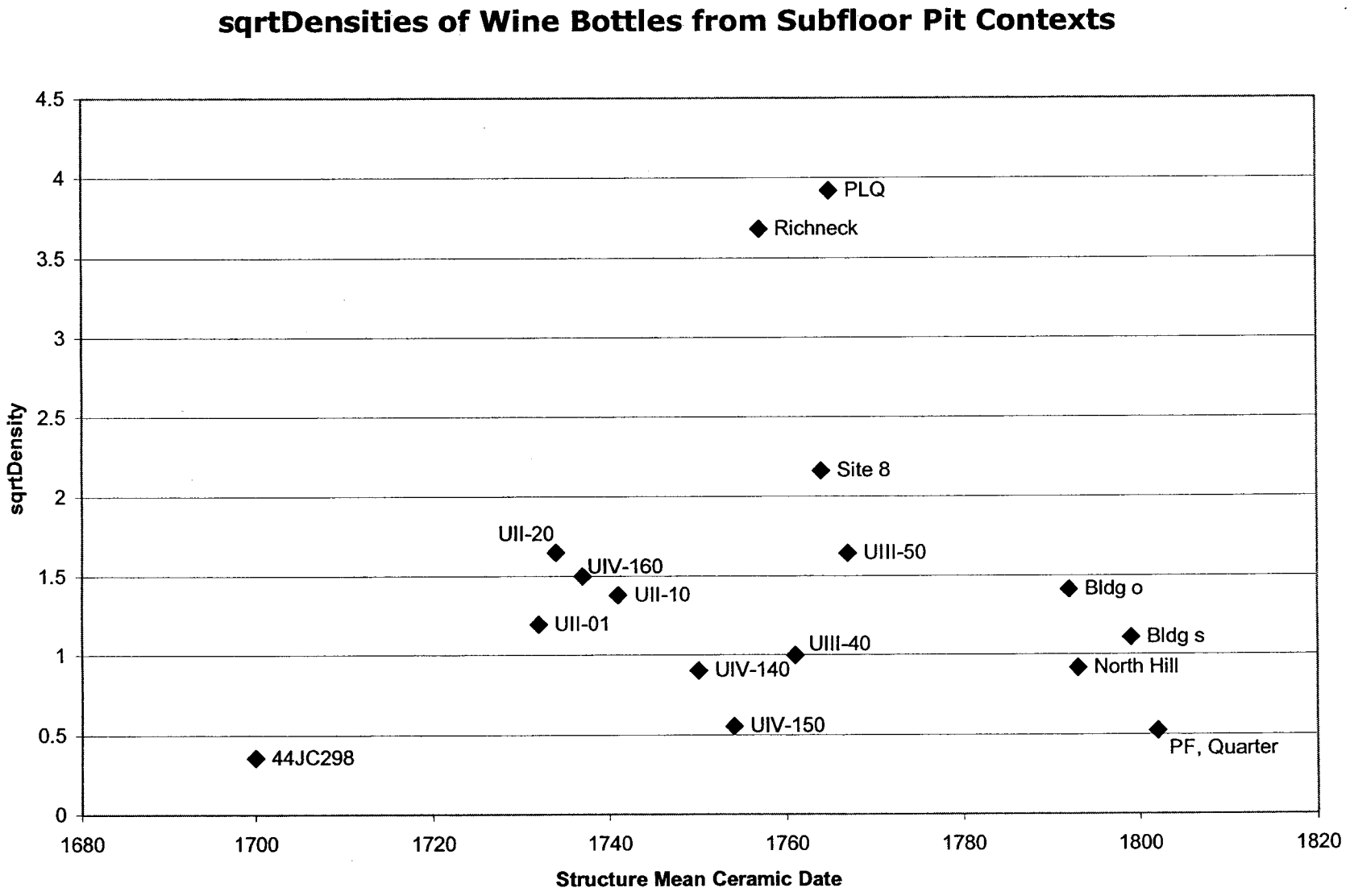

Figure 5. 6: Square root densities of Wine Bottle from Subfloor pit Contexts.

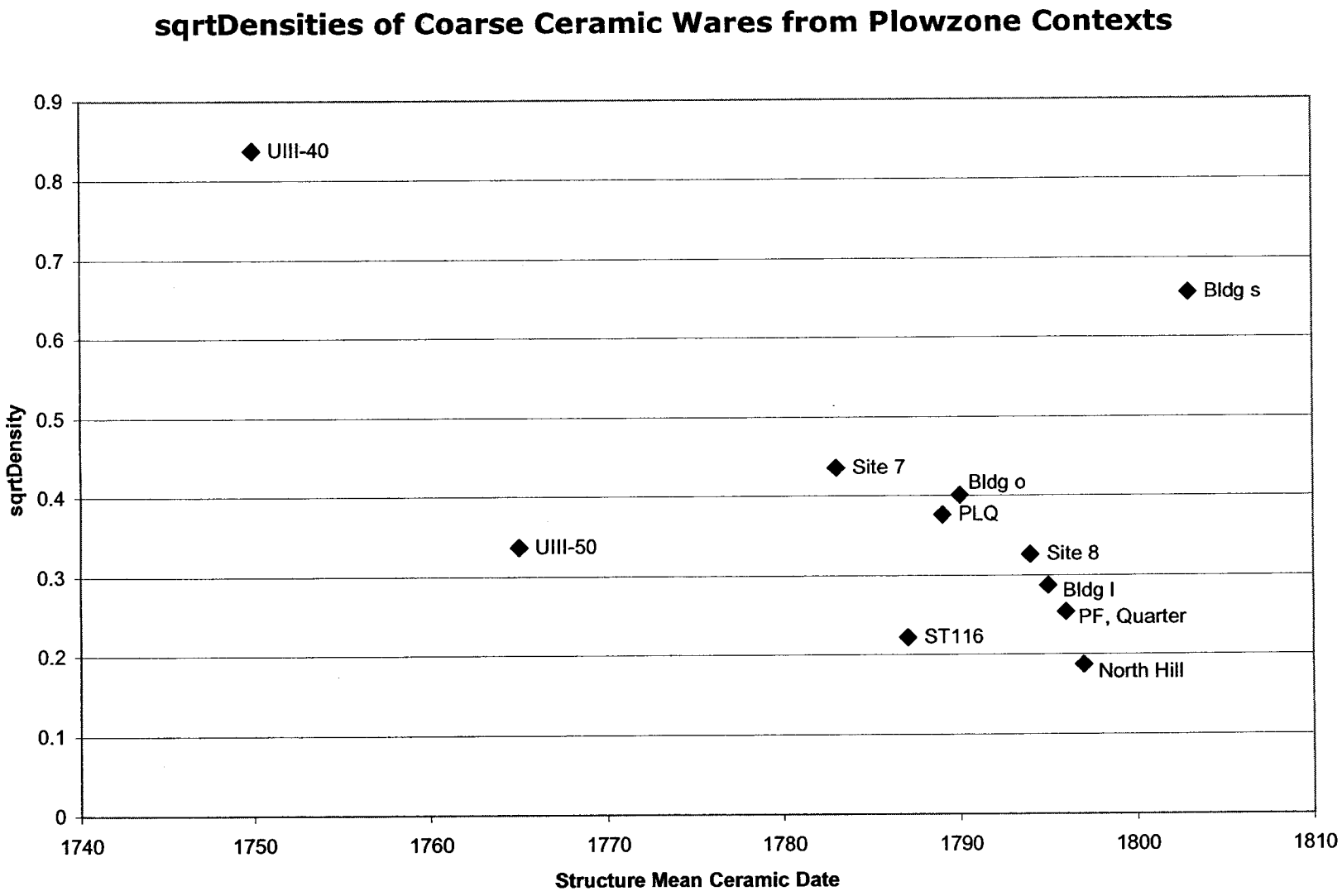

Figure 5. 7: Square root densities of Coarse Ceramic wares from Plowzone Contexts.

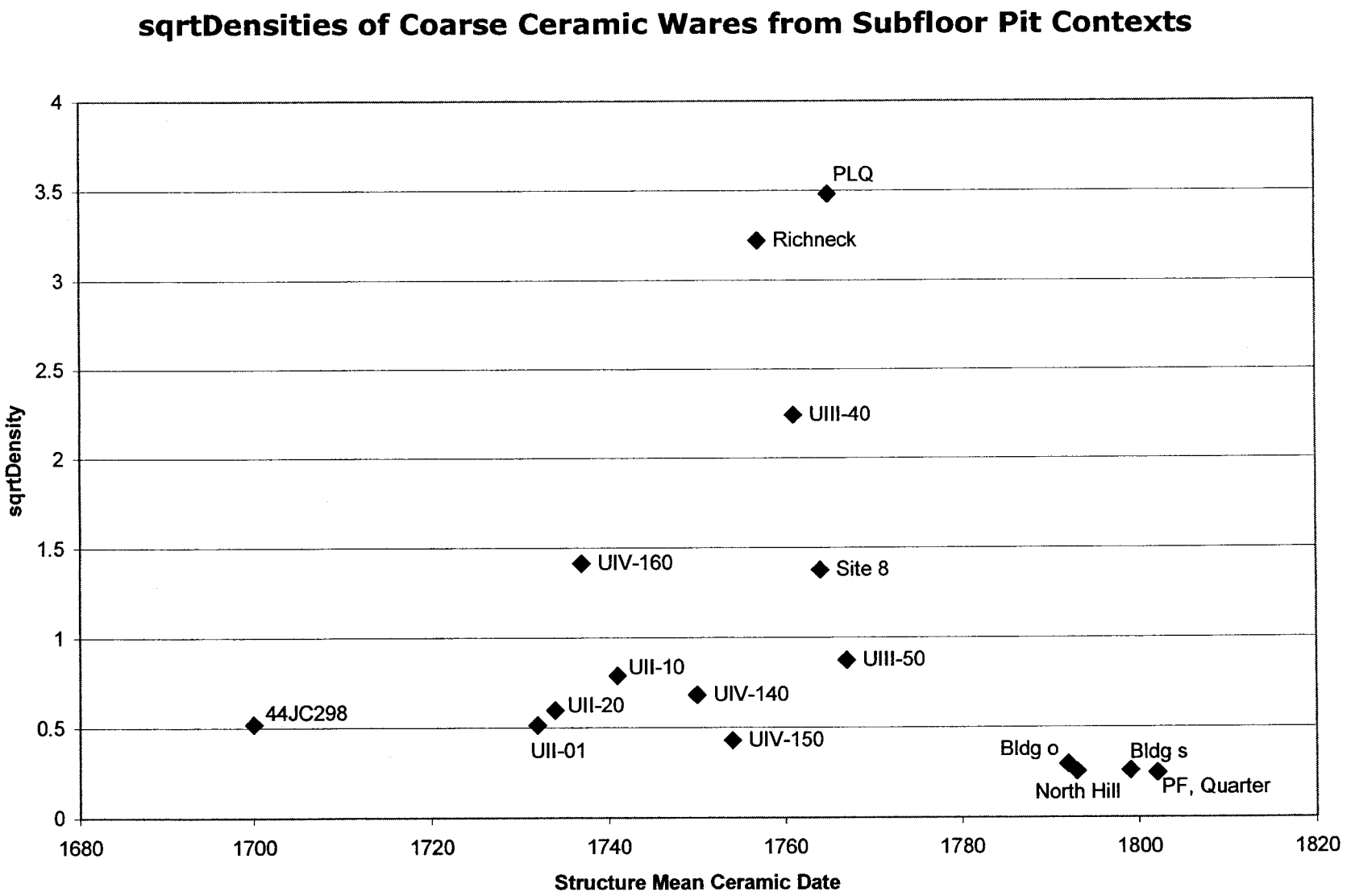

Figure 5. 8: Square root densities of Coarse Ceramic wares from Plowzone Contexts.

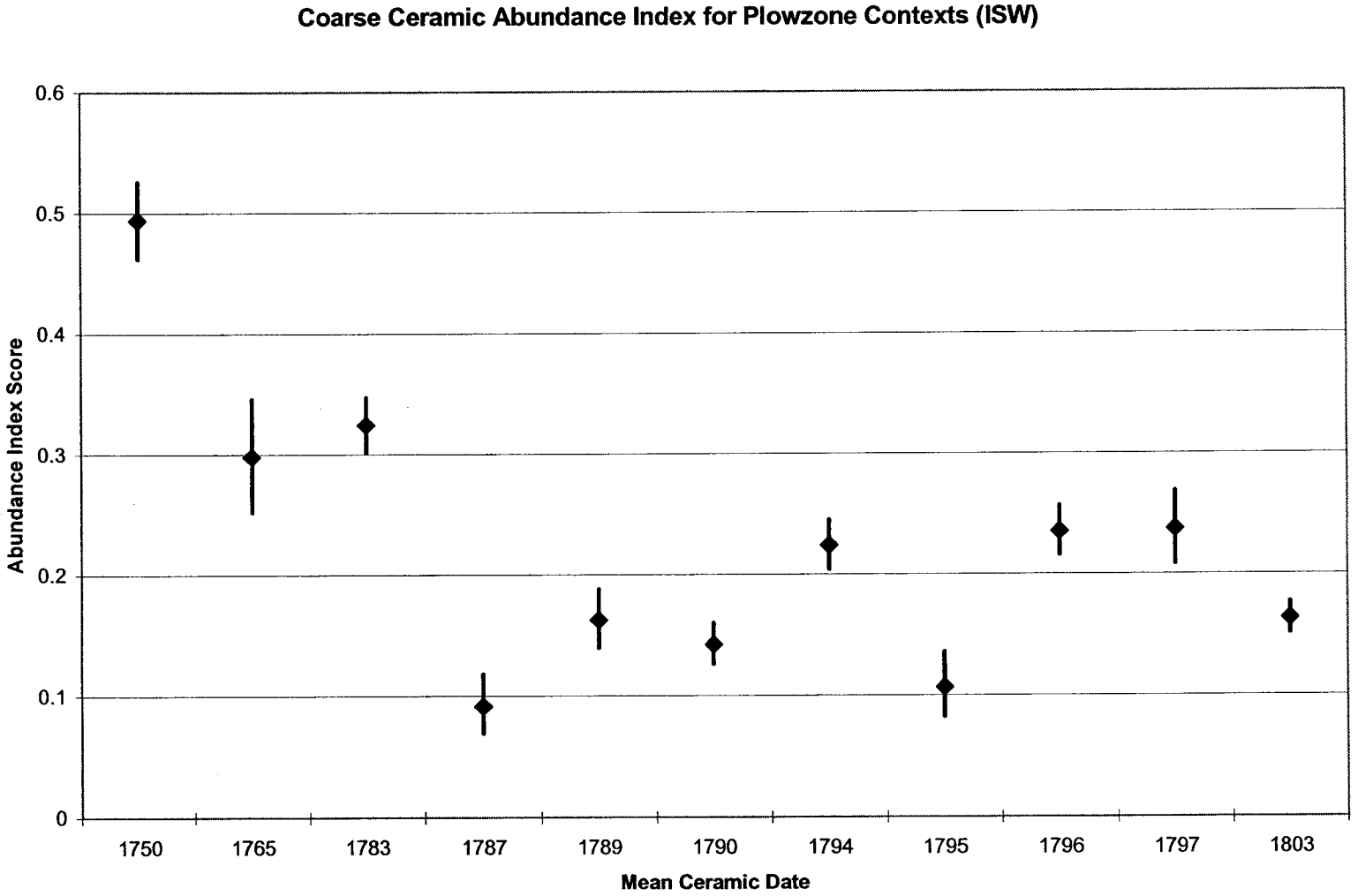

Figure 5. 9: Wine Bottle Index for Coarse Ceramic Wares from plowzone contexts with 95% binomial confidence limits.

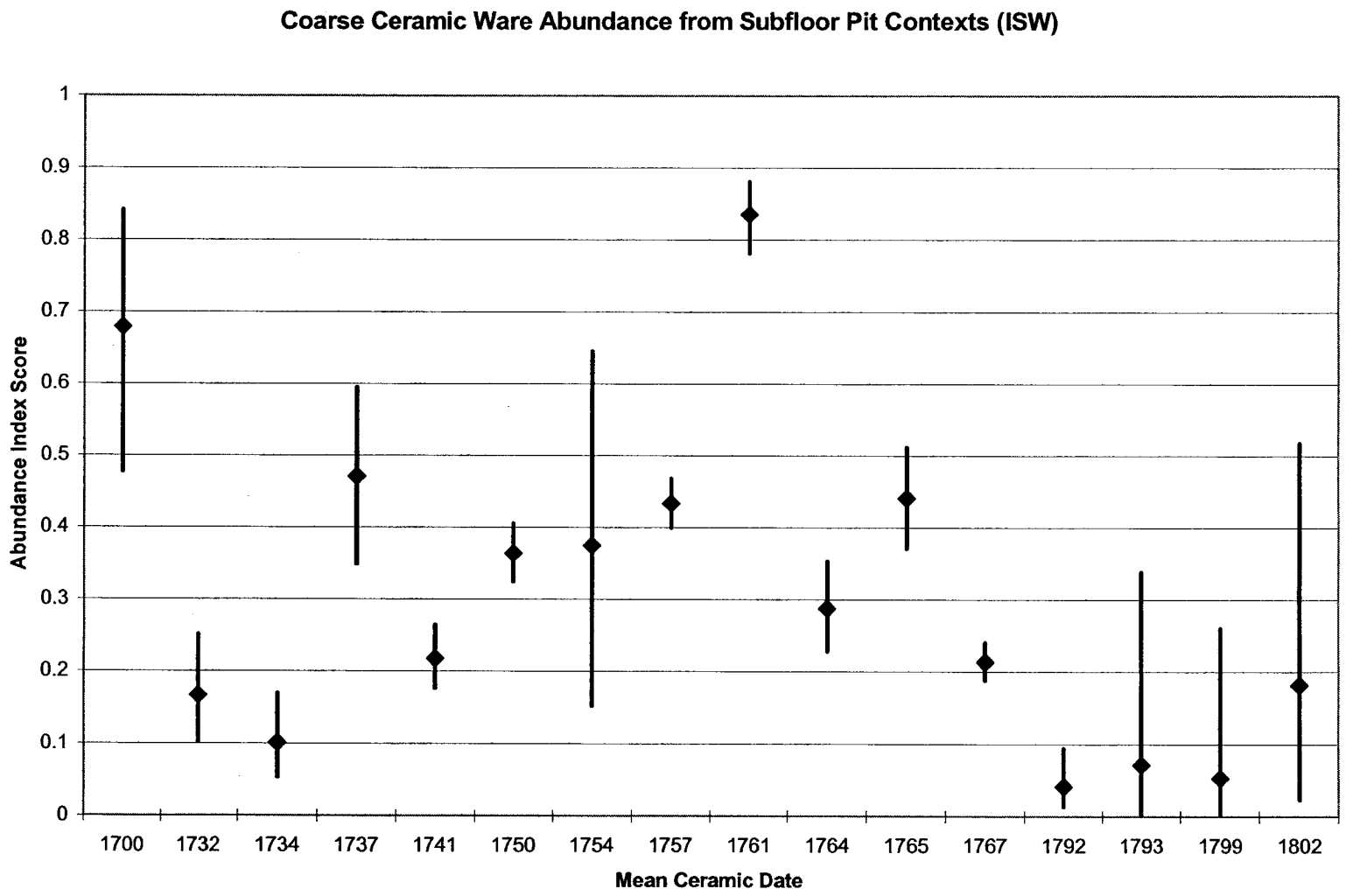

Figure 5. 10: Wine Bottle Index for Coarse Ceramic Wares from subfloor pit contexts with 95% binomial confidence limits.

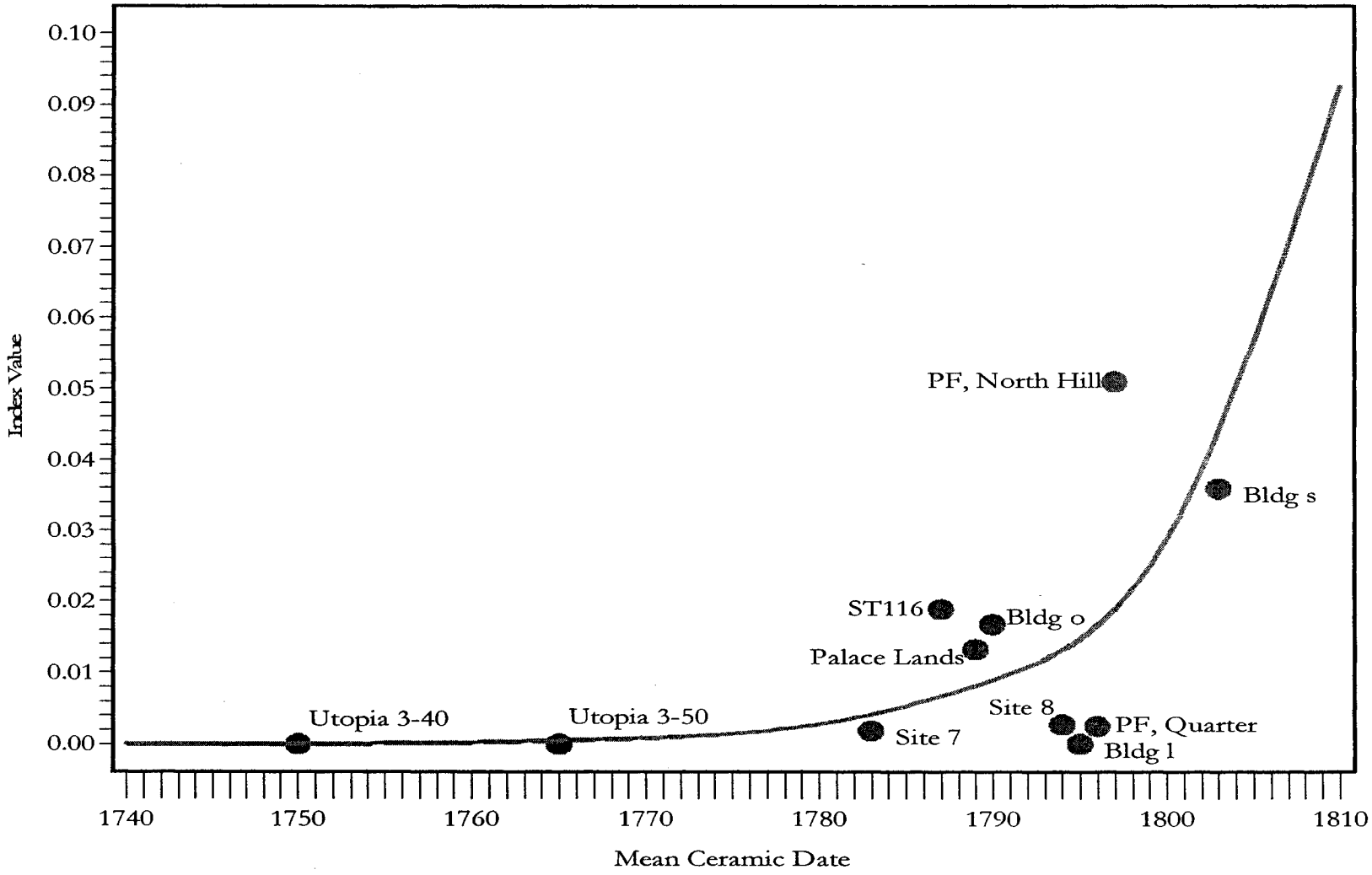

Figure 5. 11: Coarseware Index for Buckles from Plowzone Contexts.

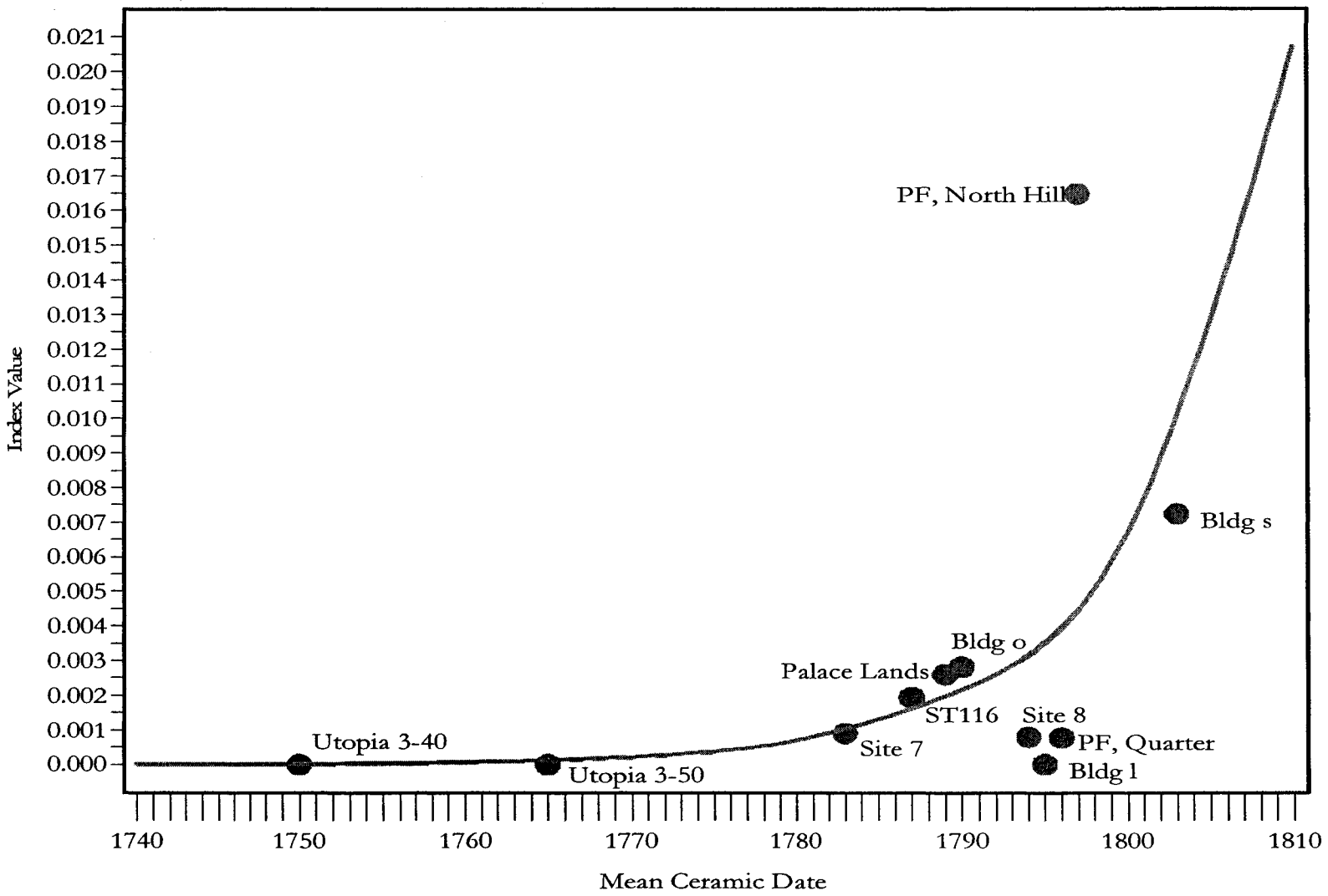

Figure 5. 12: Wine Bottle Index for Buckles from Plowzone Contexts.

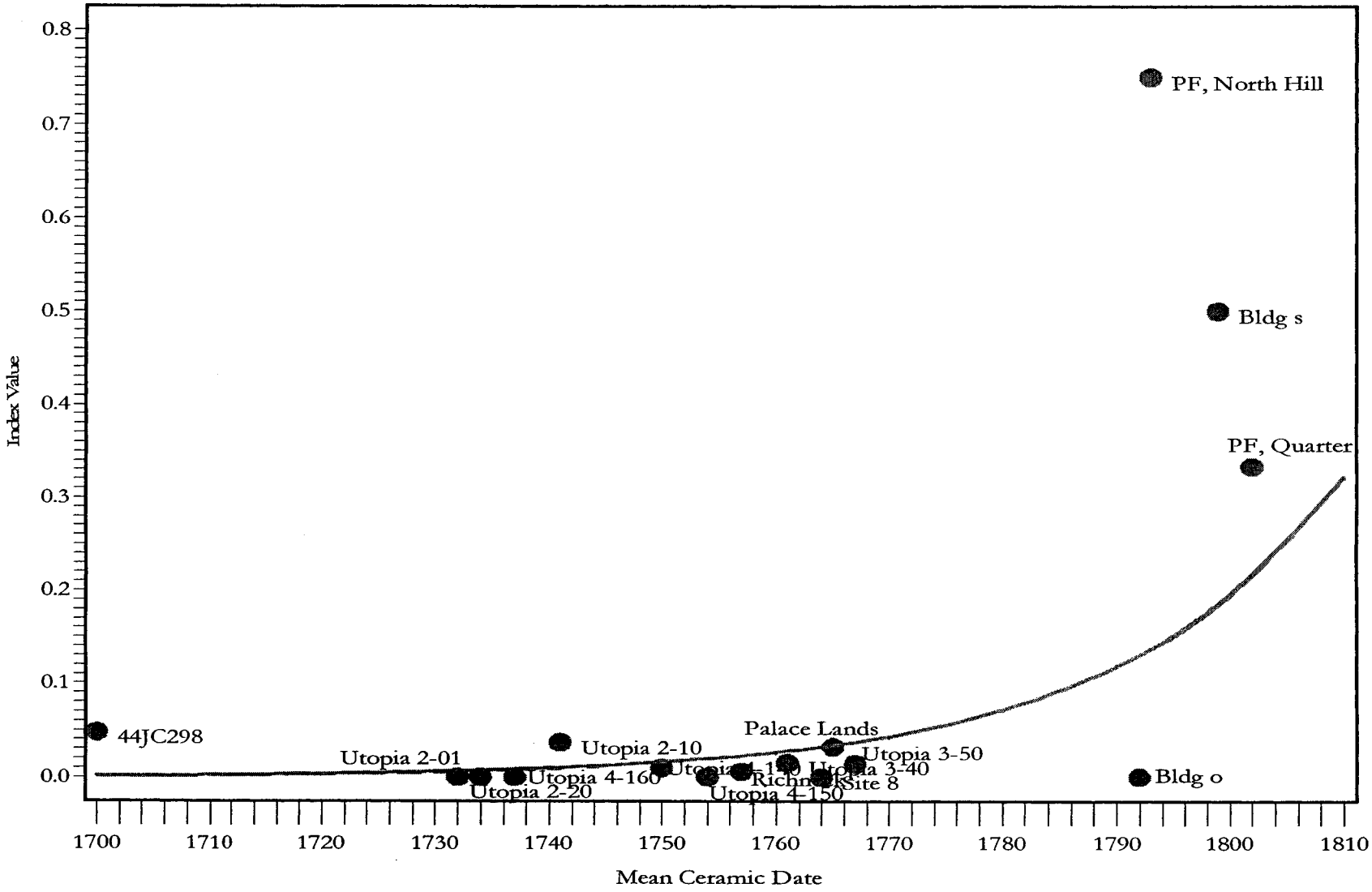

Figure 5. 13: Coarseware Index for Buckles from Subfloor Pit Contexts.

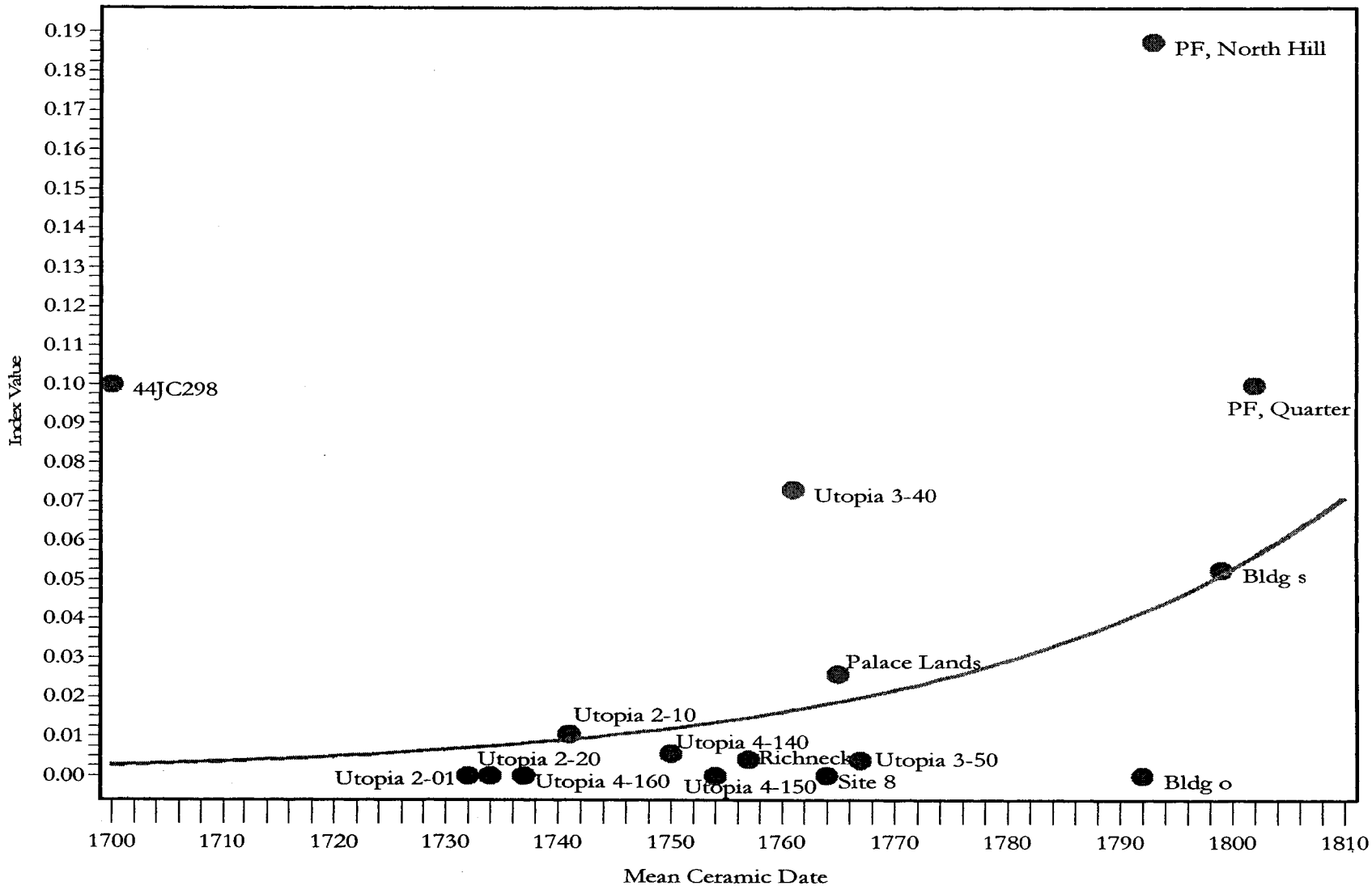

Figure 5. 14: Wine Bottle Index for Buckles from Subfloor Pit Contexts.

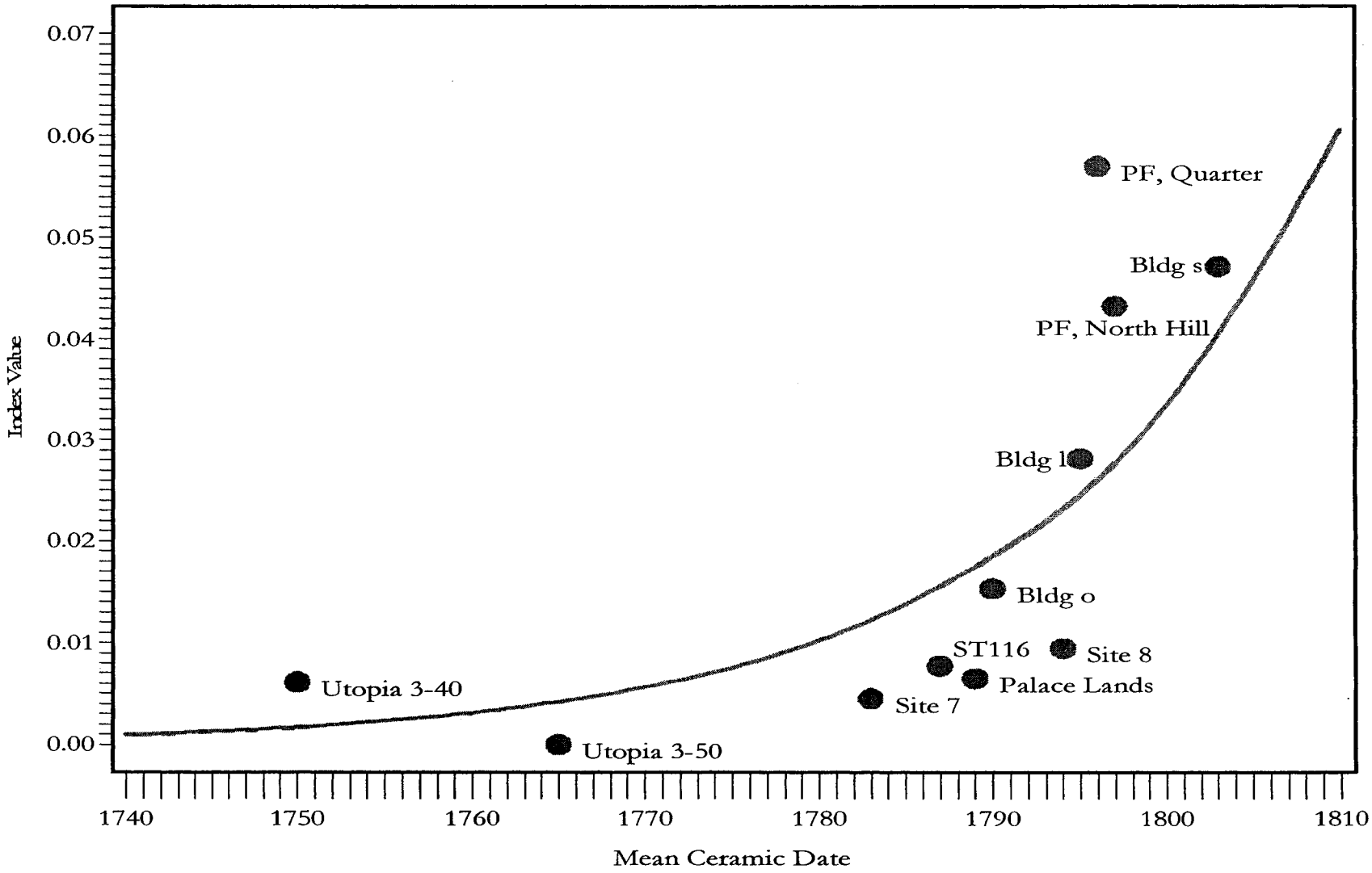

Figure 5. 15: Wine Bottle Index for Buttons from Plowzone Contexts.

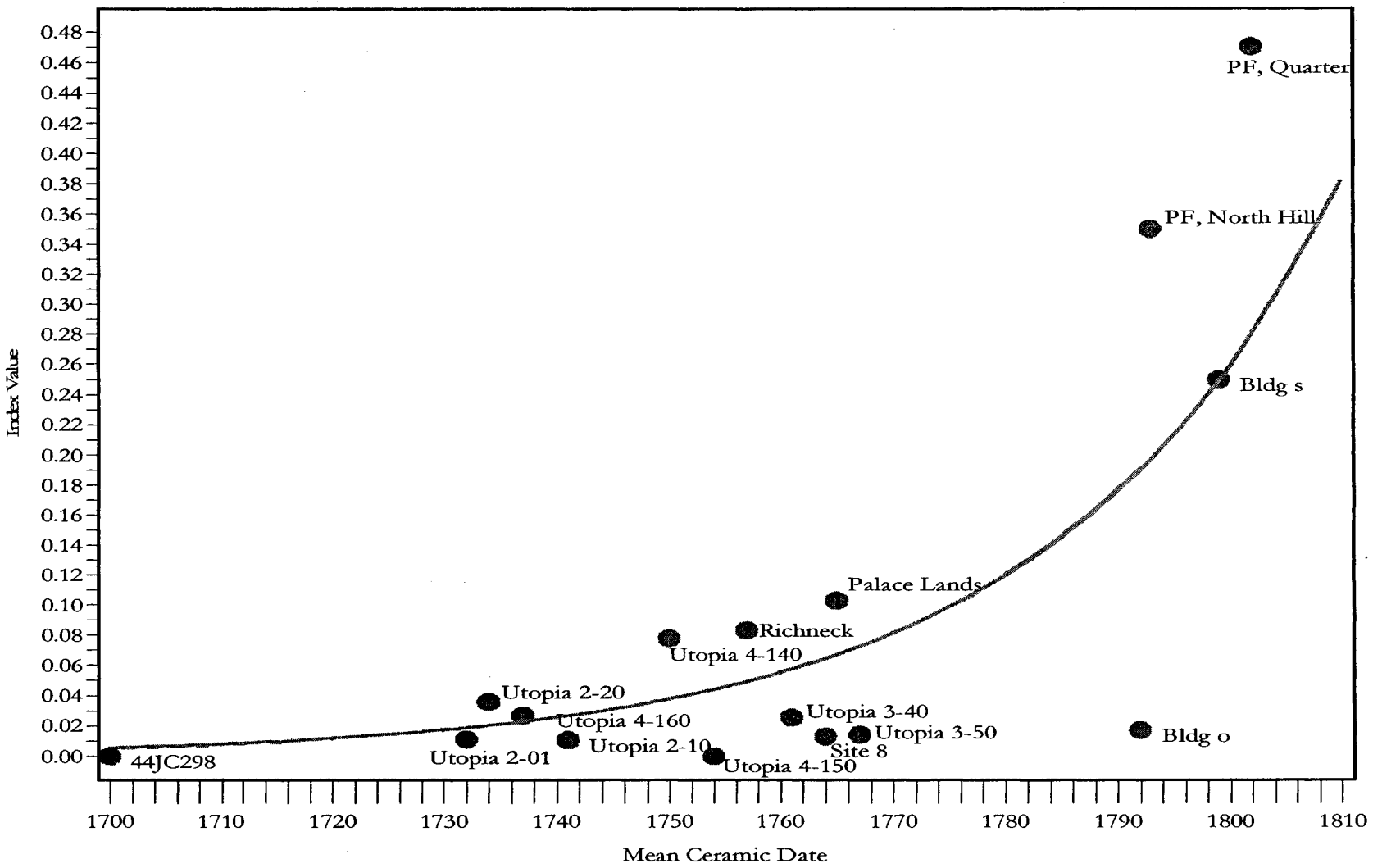

Figure 5. 16: Wine Bottle Index for Buttons from Subfloor Pits Contexts.

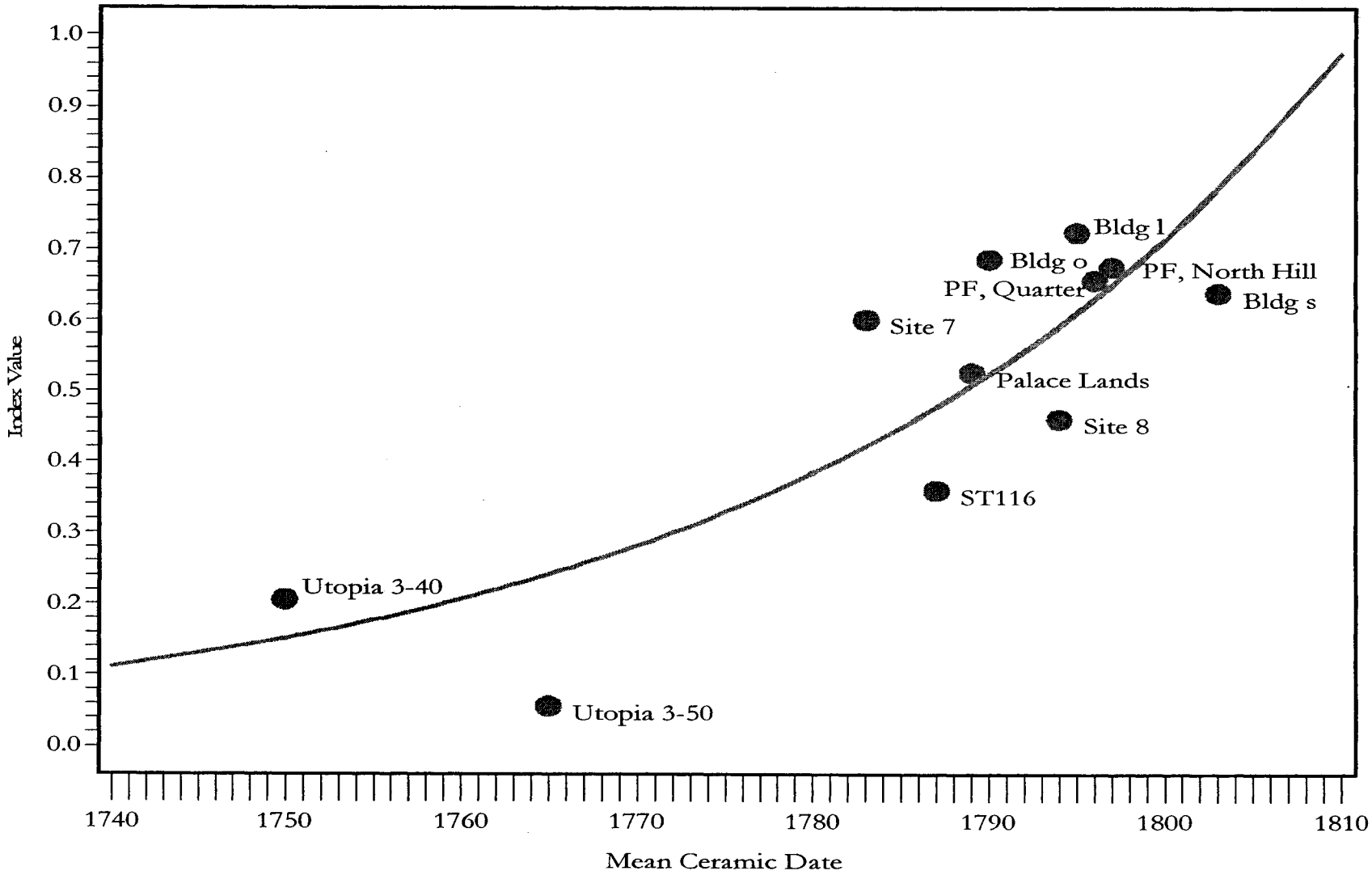

Figure 5. 17: Wine Bottle Index for Refined Ceramics from Plowzone Contexts.

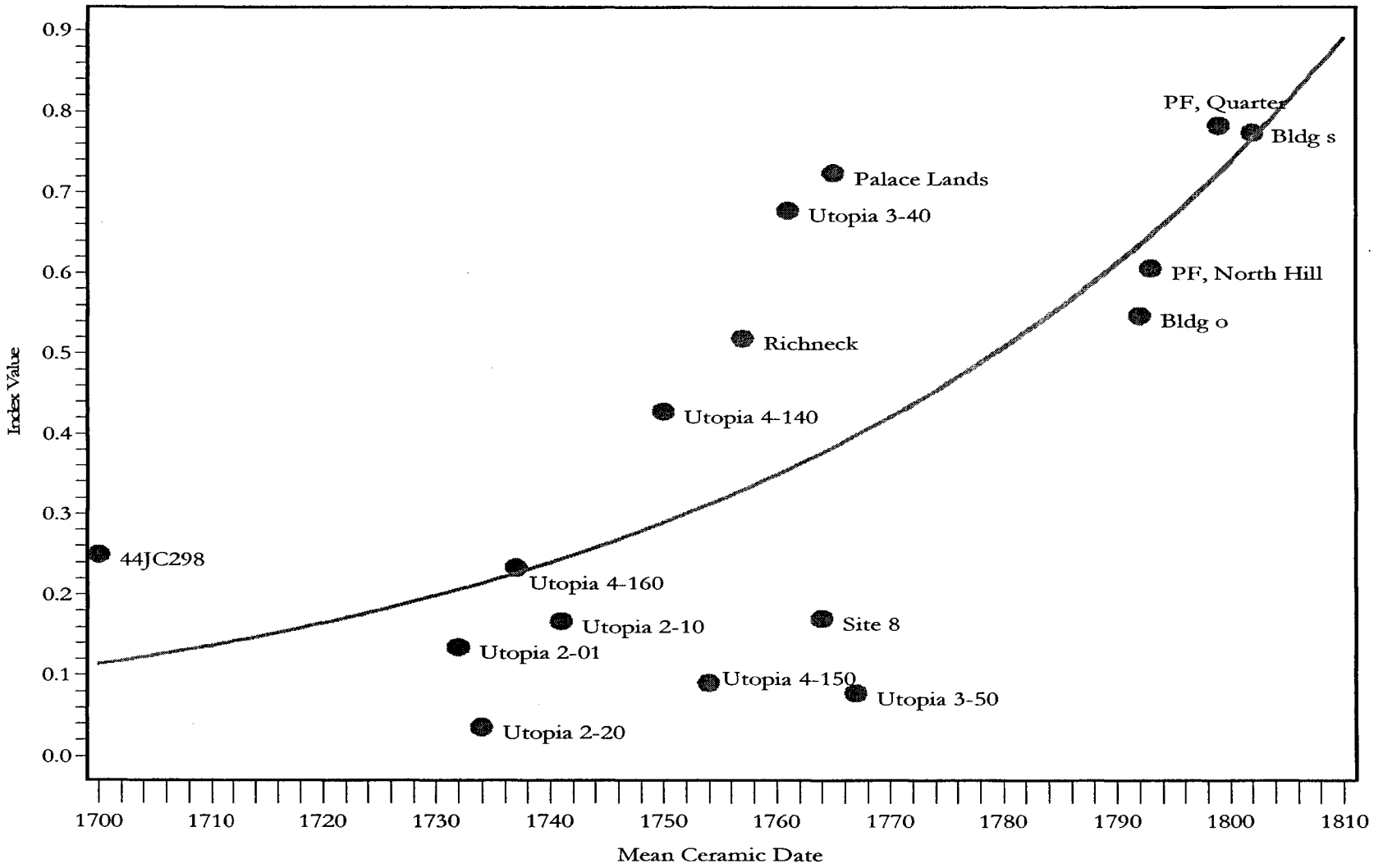

Figure 5. 18: Wine Bottle Index for Refined Ceramics from Subfloor Pit Contexts.

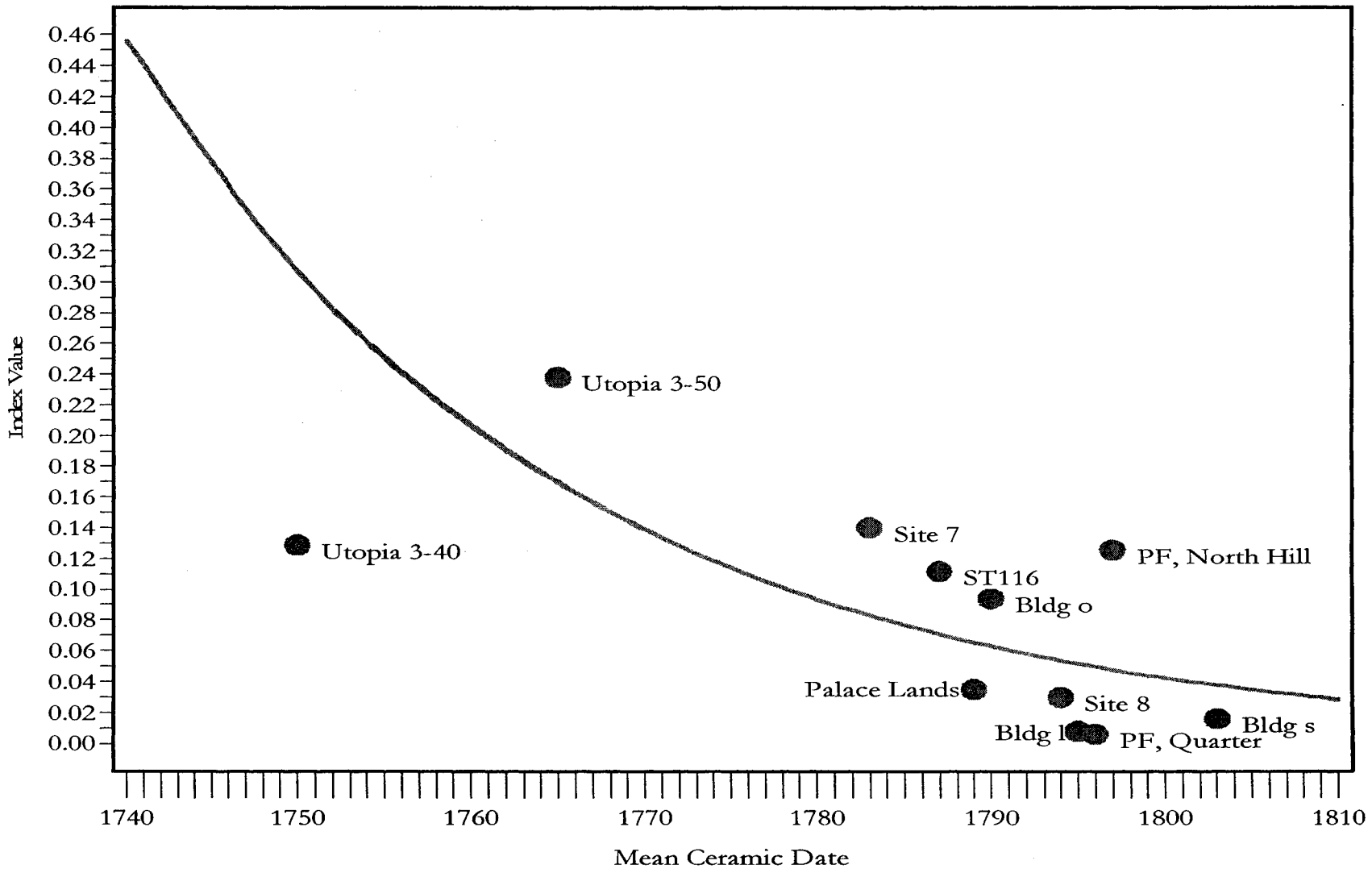

Figure 5. 19: Wine Bottle Index for Imported Tobacco Pipes from Plowzone Contexts.

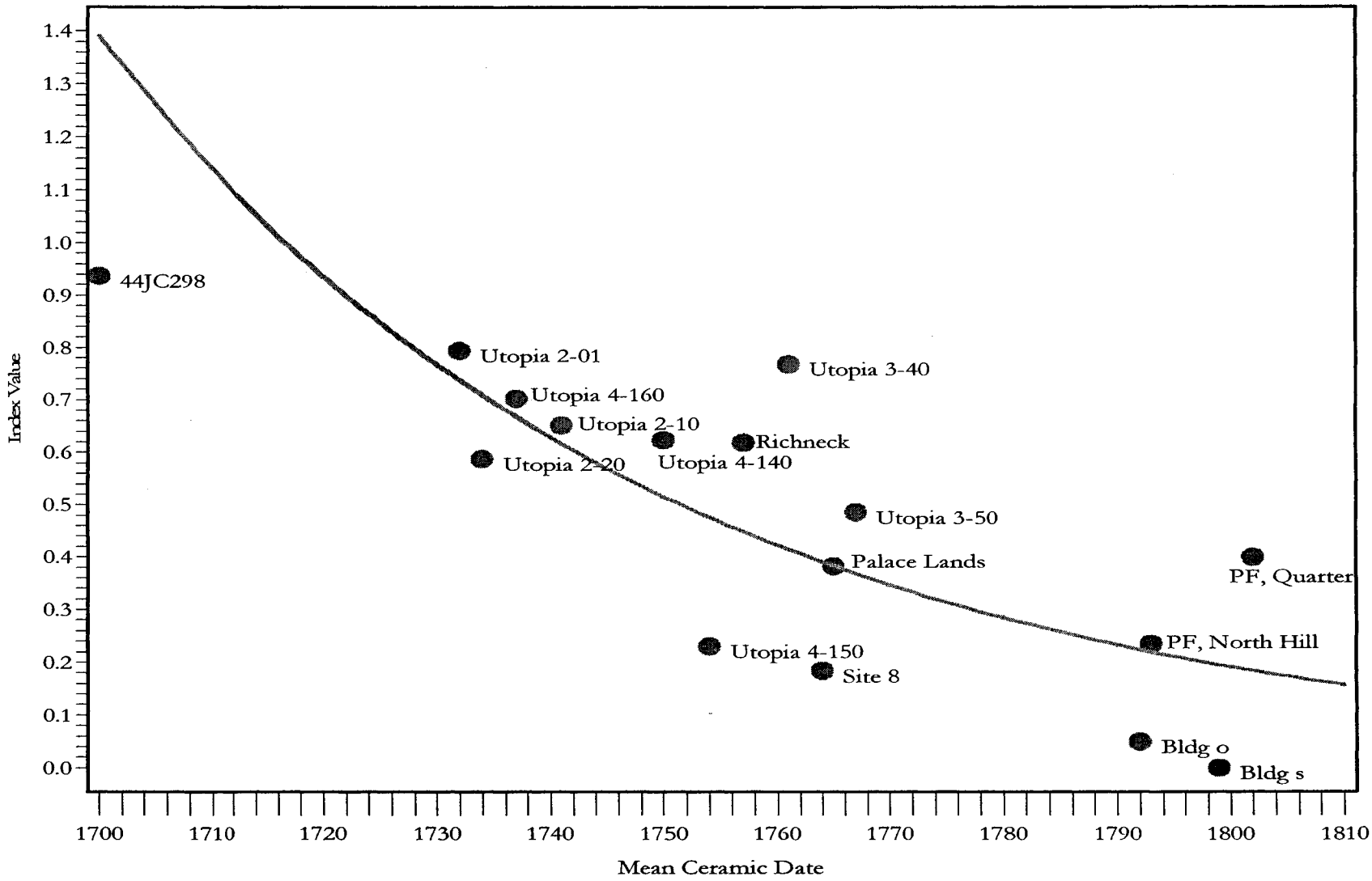

Figure 5. 20: Wine Bottle Index for Imported Tobacco Pipes from Subfloor Pit Contexts.

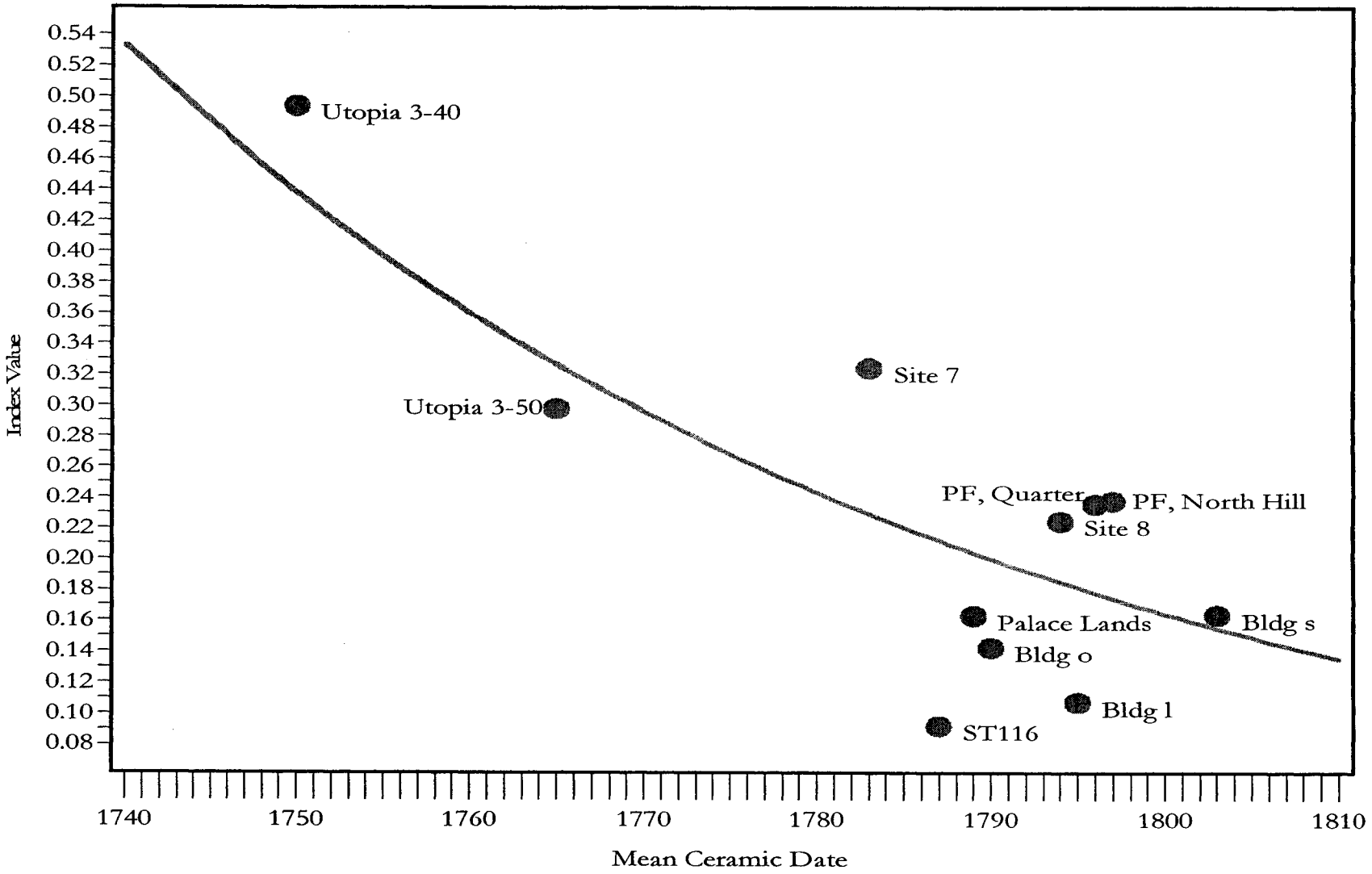

Figure 5. 21: Wine Bottle Index for Coarse Ceramic Wares from Plowzone Contexts.

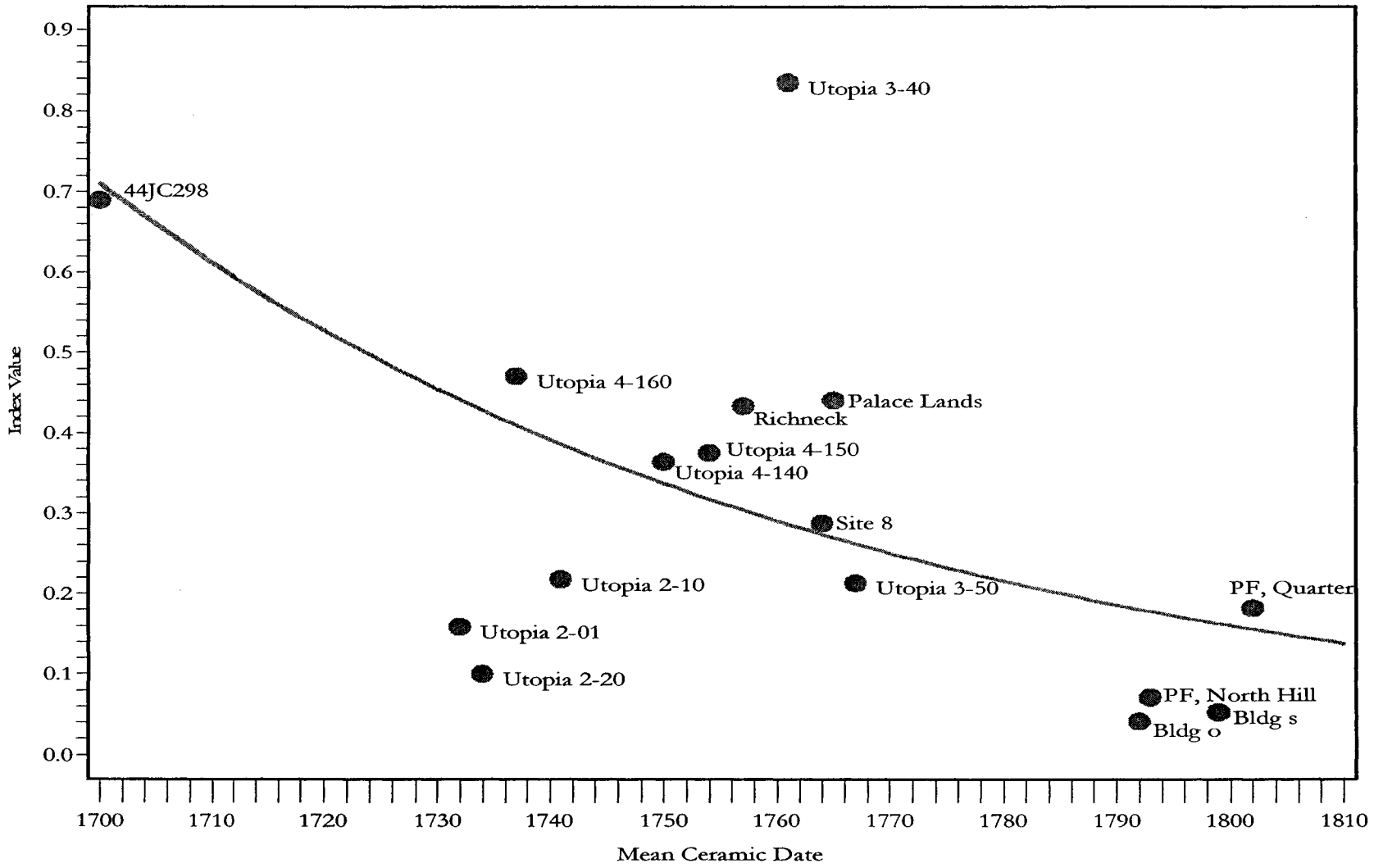

Figure 5. 22: Wine Bottle Index for Coarse Ceramic Wares from Subfloor Pit Contexts.

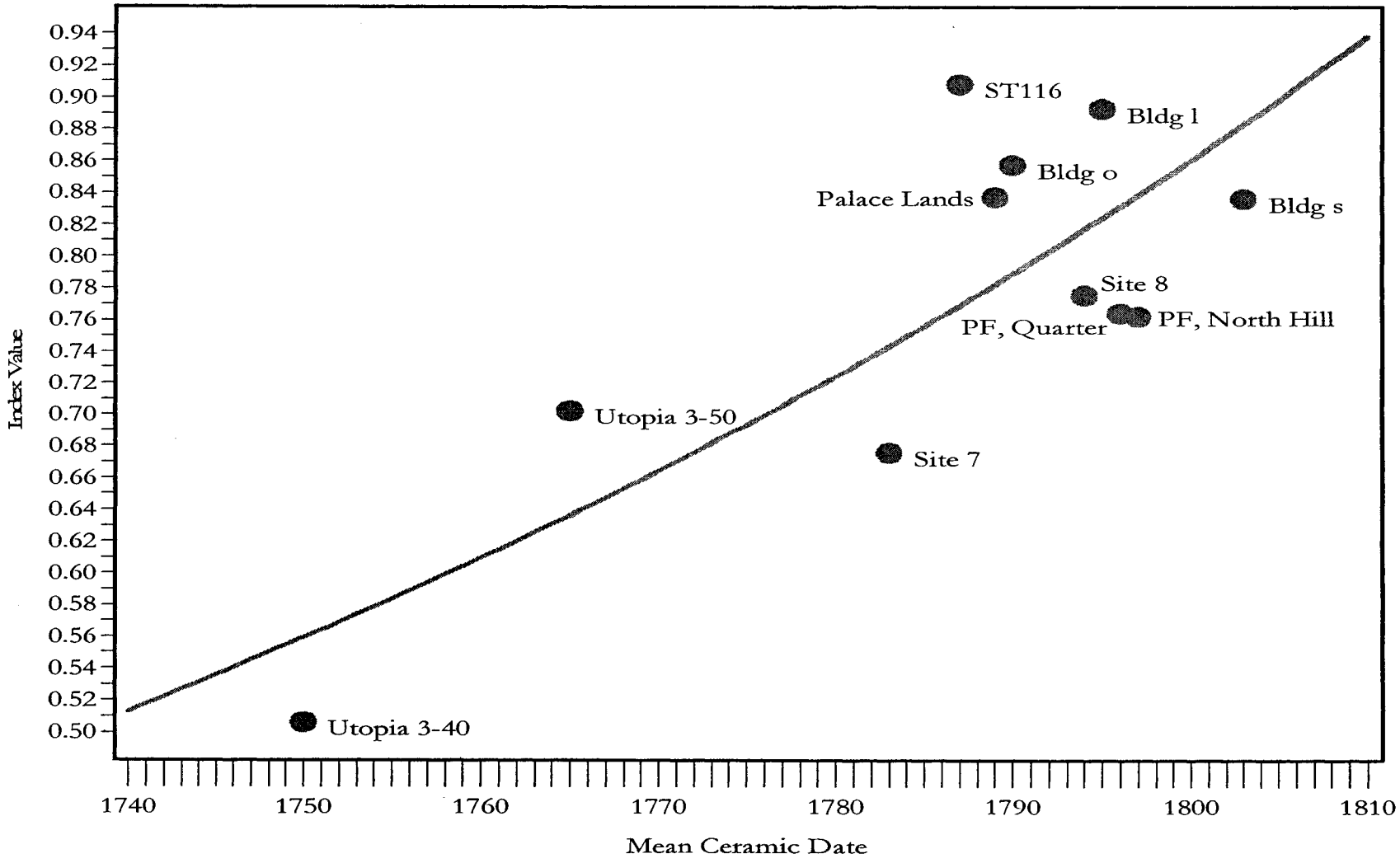

Figure 5. 23: Coarseware Index for Wine Bottles from Plowzone Contexts.

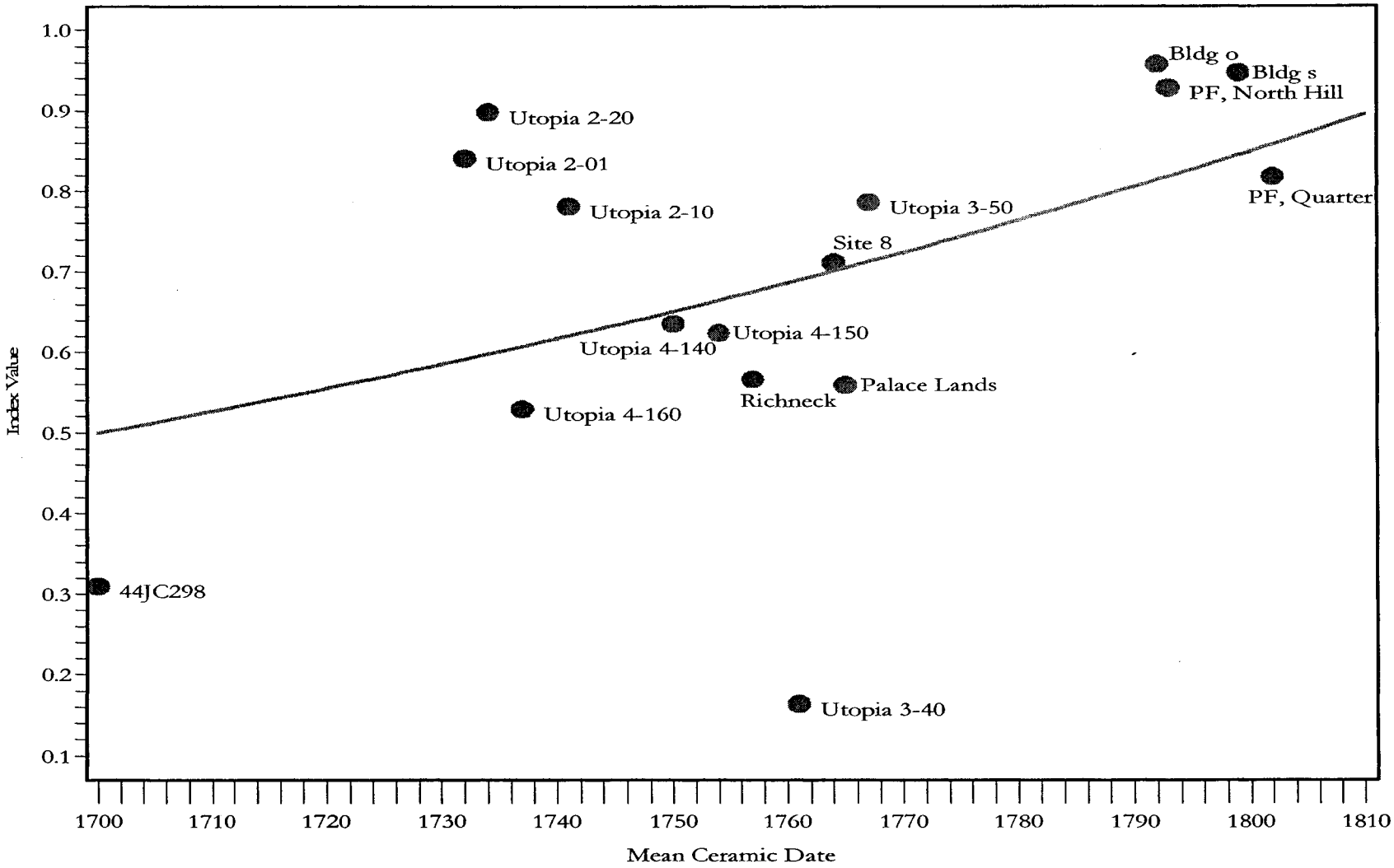

Figure 5. 24: Coarseware Index for Wine Bottles from Subfloor Pit Contexts.

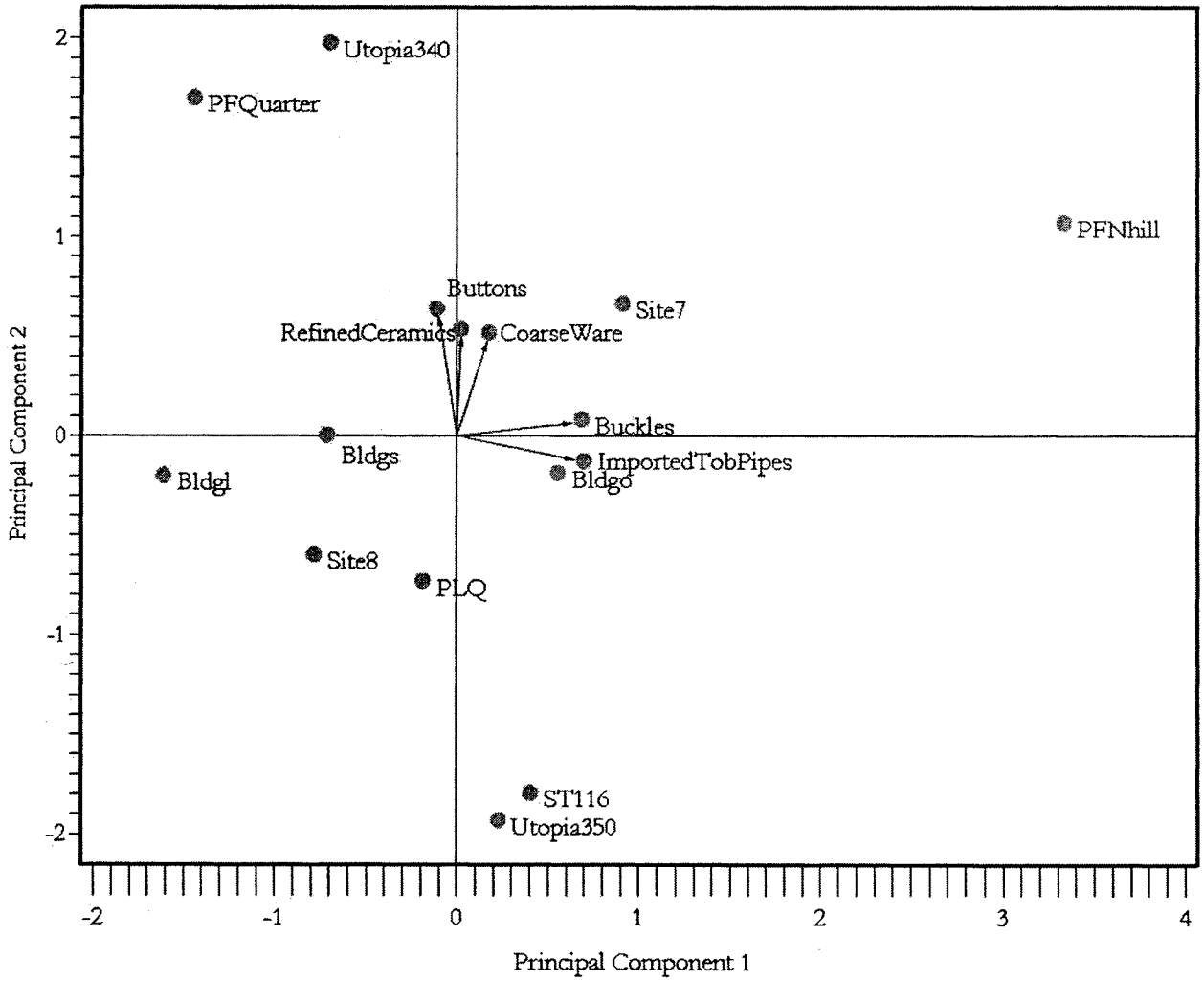

Figure 5. 25: Principal Component Analysis for Artifact Residuals from Wine Bottle Index for Plowzone Contexts.

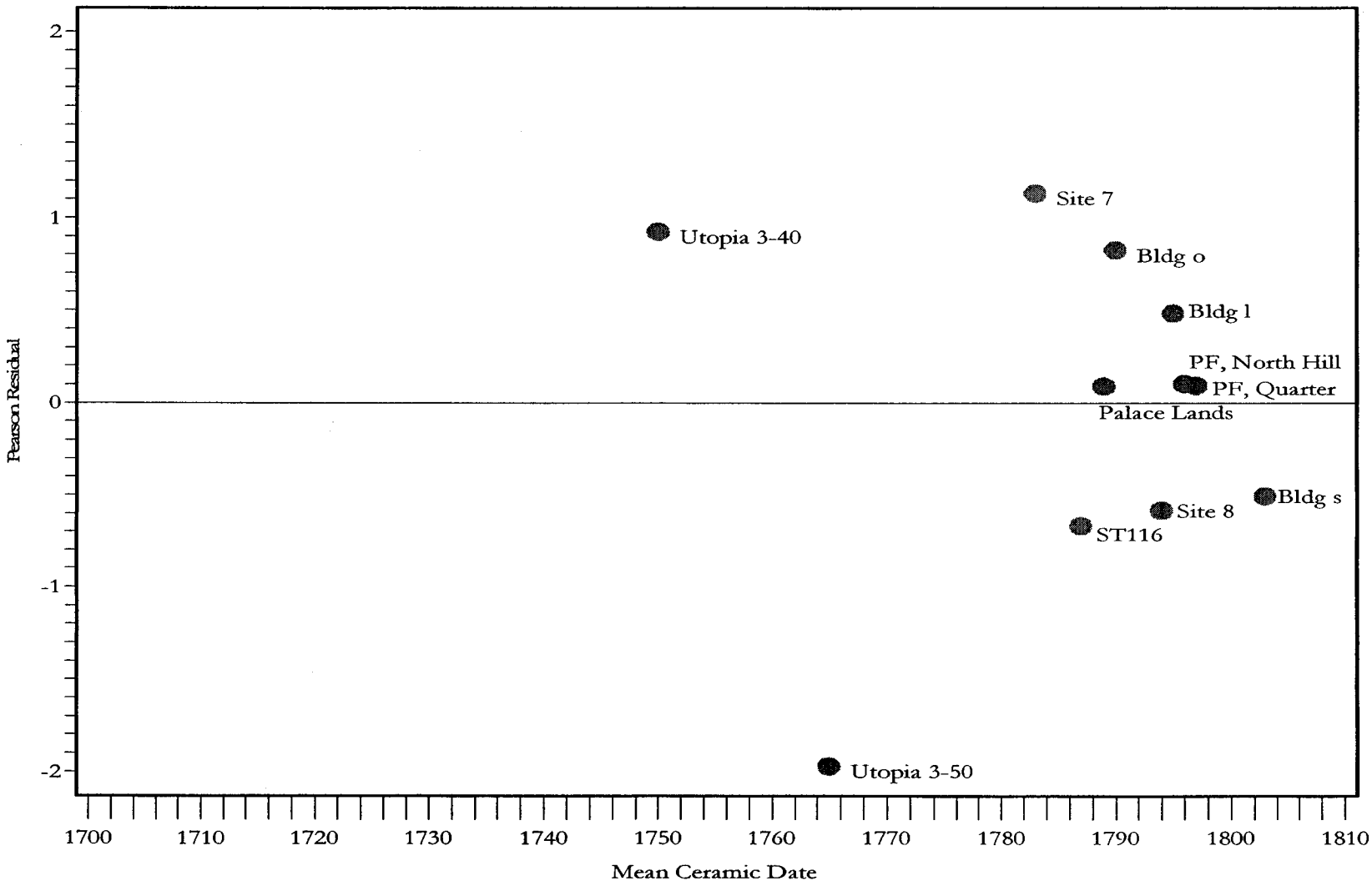

Figure 5. 26: Pearson Residual Plot for Negative Binomial regression use the Wine Bottle Index for Refined ceramics for Plowzone Contexts where X=MCD and Y=AI.

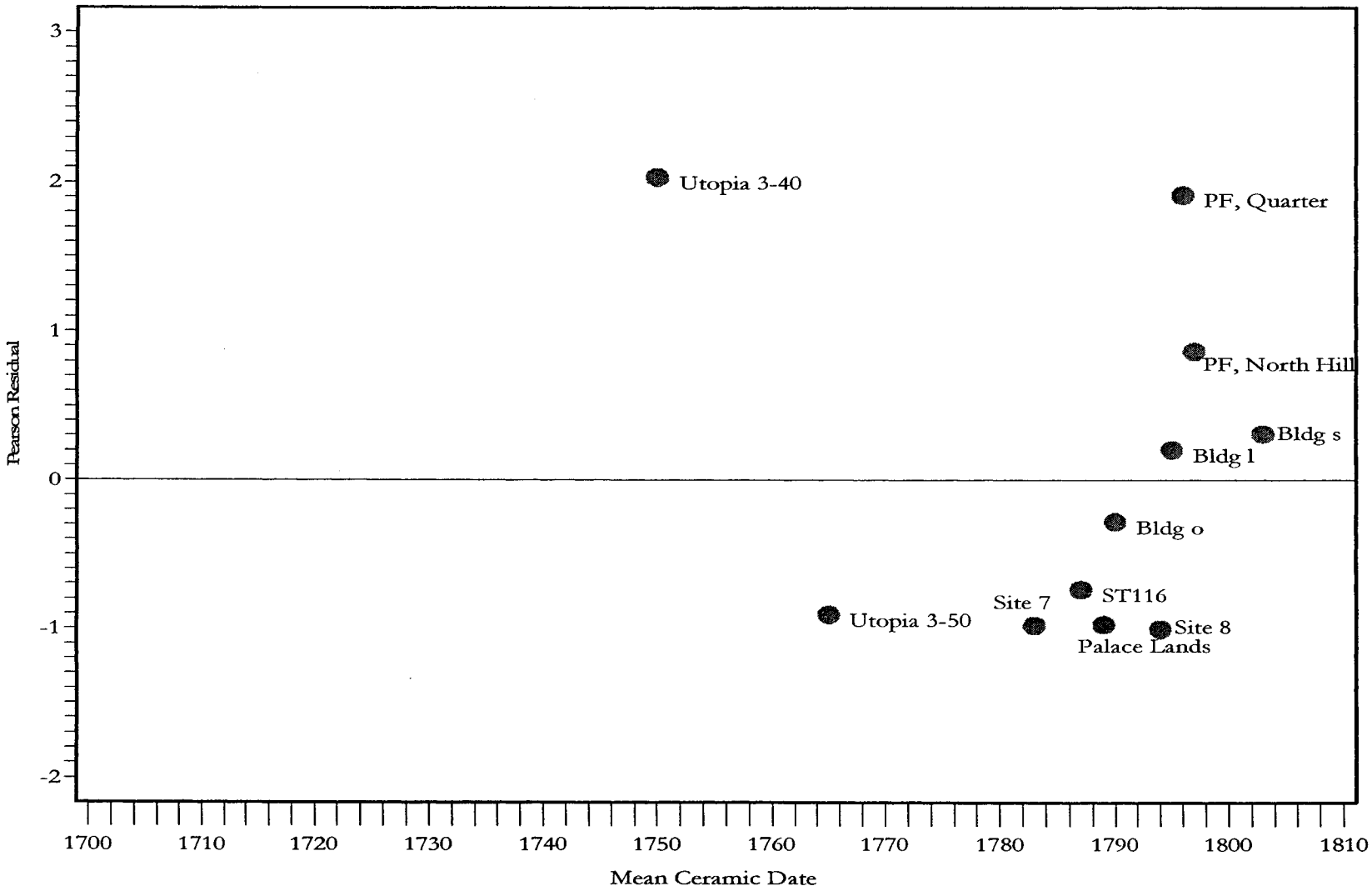

Figure 5.27: Pearson Residual Plot for Negative Binomial regression use the Wine Bottle Index for Buttons for Plowzone Contexts where X=MCD and Y=AI.

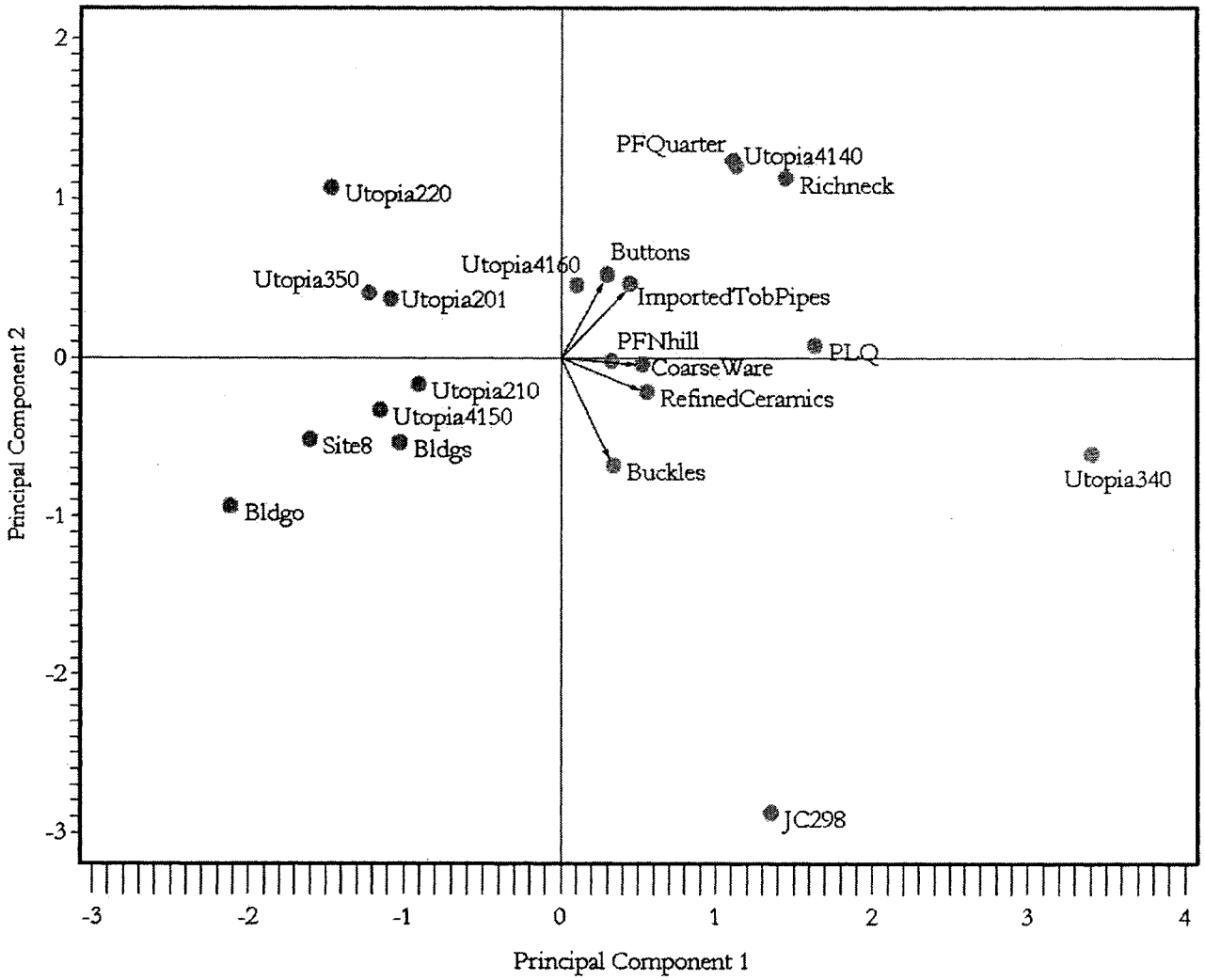

Figure 5.28: Principal Component Analysis for Artifact Residuals from Wine Bottle Index for Subfloor Pit Contexts.

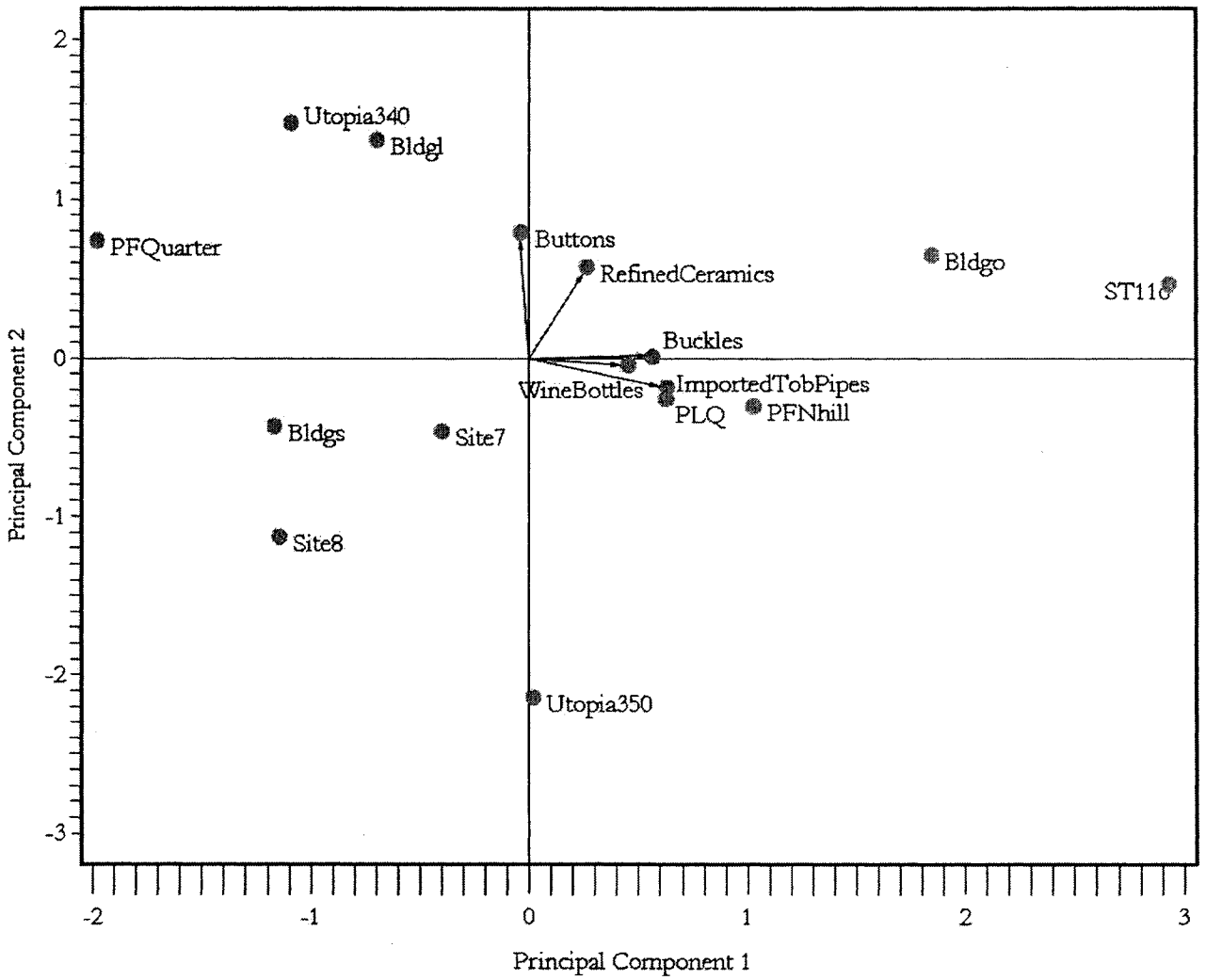

Figure 5.29: Principal Component Analysis for Artifact Residuals from Coarseware Index for Plowzone Contexts.

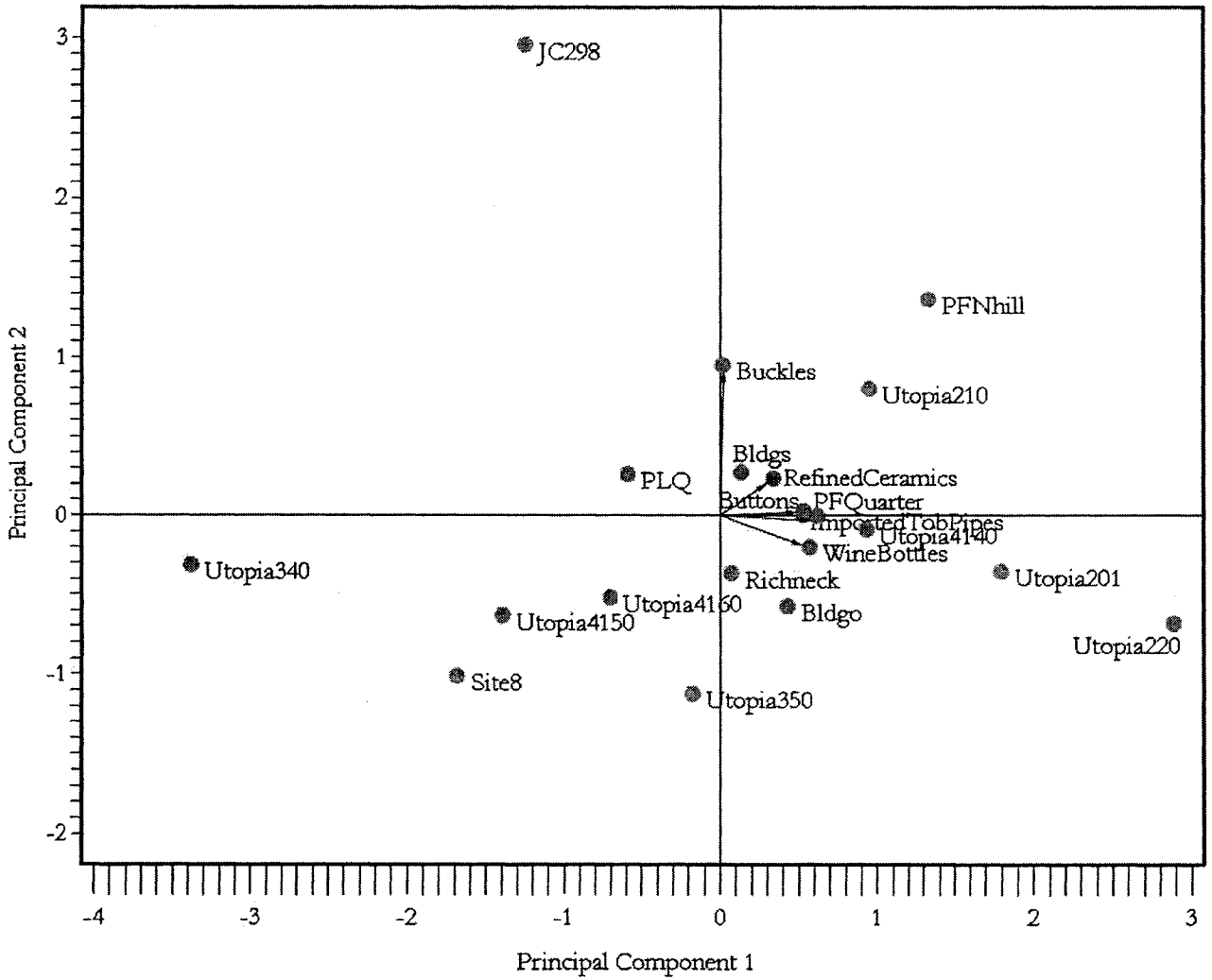

Figure 5.30: Principal Component Analysis for Artifact Residuals from Coarseware Index for Subfloor Pit Contexts.

Chapter 6: Refining our understanding of slave households: individual signaling strategies among and within plantations

Buttons are some of the most evocative, and understudied, archaeological artifacts (for exceptions see Heath 1999, Hinks 1988, and White 2002). Patterns in button consumption demonstrate that enslaved men and women responded to changing clothing fashions. I suggest that those responses in turn reveal a range of signaling strategies used by slaves throughout the Chesapeake region, and can provide clues to household organization. Buttons found on eighteenth-century sites are one of the few artifacts that give us access to the world of male fashion, allowing us to see what men wore for a variety of activities, from work to socializing. As portable, easily displayed items whose form and cost were finely tuned to shifting fashions, buttons were ideal signaling media for enslaved men.[14] Dwellings with high use and discard rates of fashionable buttons may have been lived in primarily by young, unattached men whose desire for high-quality mates or social allies spurred expenditures on costly and displayable goods. High discard rates may also point to kin-groups in which the adult males had mobility and whose fashionable displays helped smooth economic transactions, created social ties with other slaves or free blacks in the area, or solidified other types of collective action, such as religious meetings or rebellions. Finally, it is possible that the consumption of fashionable buttons points to men in established relationships who developed mating strategies that extended beyond their wife or partner (Harpending et al. 1987).

The second half of this chapter looks at the consumption of fashionable, costly, and relatively non-portable refined ceramics. Porcelain and refined earthenware tea and

[14] As noted in Chapter 3, buttons were use primarily on male garments during the eighteenth and early-nineteenth centuries, and are largely absent from female garments of the period.

tablewares were expensive and unnecessary items compared to inexpensive or free alternatives made from coarse earthenware, out-moded refined wares, pewter and even wood (Martin 1994). Yet, fine ceramic wares are found in great abundance on some Chesapeake slave quarter sites and their presence is often explained as the result of hand-me-downs or theft. However, the variety of specialized forms, the sheer quantity of refined ceramic wares found on these sites, and documents showing that slaves purchased dishes, indicate that slaves used several methods to acquire ceramics (Heath1999a:51, 2004b:29).

The preparation and presentation of food has been the domain of women historically, including among slave populations (Franklin 1997, 2001a). African women's cooking styles and techniques adapted quickly to North American foods and restricted rations. Many women were forced to change how they prepared food if they were sold to different owners, who may have provided less food of unusual types, or moved to new regions that restricted or expanded options for growing vegetables. Colonoware is one ceramic type that was arguably adopted by slaves for cooking one-pot meals reminiscent of African stews (Ferguson 1992; Steen 1999).

Imported ceramics, with their highly specialized forms and quickly changing decorative styles, were clearly attractive to slaves as well as the general public. Refined imported ceramics dominate the slave quarter assemblages and the diversity of forms and ware-types indicate that not all were provisioned. Store account books from Bedford and Campbell Counties in Virginia indicate that slaves purchased ceramics (Heath 1999:51). Archaeological data from the Elizabeth Hemings site, a female headed household, sheds light on the types of ceramics slaves may have chosen. Monticello archaeologists

conducted a comparative study of refined ceramics from the Elizabeth Hemings site and the Stewart-Watkins site, both located at Monticello. Elizabeth Hemings was the matriarch of a large and influential enslaved family at Monticello. Her children and grandchildren, as well as their spouses, all held prominent positions in Jefferson's household or workshops (Stanton 2000). The Stewart-Watkins site was lived in by the family of a white carpenter, Elisha Stewart, during the period Hemings lived in her dwelling. Ceramic analysis revealed that Hemings acquired many more costly Chinese porcelain and painted pearlware tablewares than the Stewart family, which consumed higher style teawares and had inexpensive, well-used plates. Although Elizabeth Hemings did have refined teawares, an emphasis was placed on dining rituals that used expensive tablewares while Stewart used outmoded tablewares and invested in expensive teawares (Neiman et al. 2000:51-52).

As seen in the case of Elizabeth Hemings, if enslaved women had some control over the ceramics they used, high discard rates of costly ware-types and vessel forms may have been a signal of female economic strength or position within the plantation. A site that had high ceramic and low button consumption may be indicative of kin-based households with strong female members. This chapter explores how patterns in button and refined ceramic consumption can reveal individual signaling strategies while providing clues to household composition. It is this intersection of male and female signaling strategies on individual sites that may provide the fullest picture of household dynamics on eighteenth-century plantations.

Fashioning Young Men: Button Consumption in the Chesapeake

Buttons were central elements of male attire throughout the eighteenth century. They were attached to jackets, overcoats, vests, and shirts for both functional and decorative purposes. Many elite garments were conspicuously adorned with costly buttons that had no matching utilitarian button hole; they served instead as decorative accents on pockets or sleeves. Buttons were manufactured in a wide range of materials and styles, which gave men many aesthetic and financial options when adorning their clothing. The attributes that distinguished popular contemporary fashions from locally-made utilitarian buttons are often still measurable on archaeologically-recovered buttons. Diagnostic attributes such as metal color and size provide important information about the cost and visibility associated with each type of button.

The following analyses will look at attributes of metal buttons found at the 19 structures in this study. Prior to the nineteenth century, the majority of metal, glass, and shell buttons used in America were imported (Hinks 1988; Hume 1969). Although porcelain and glass buttons are found on a number of sites used in this study, these buttons tend to date to the mid-nineteenth century and are more often associated with ready-made clothing and women's attire (Hinks 1988). Although several decorative glass buttons and cufflinks have been excavated from these sites, their small sample size is statistically useless for this study. A substantial number of buttons in the eighteenth century were made from thread or embroidered cloth that was wrapped around small copper alloy rings or bone discs (Baumgarten 2002; Hinks 1988; White 2002). Although some cloth buttons were elaborately constructed using costly materials such as silk and

silver or gold thread,[15] the majority of cloth buttons were less expensive than metal ones (Hinks 1988:72). The ephemeral qualities of cloth buttons make them difficult to identify with certainty since only fragments of thin metal rings, shanks, or bone survive in the archaeological record.

Evidence for bone button manufacture at Monticello and other historic period sites indicate that bone, and most likely wood, buttons were produced in the colonies. Wood and bone buttons were frequently included on provisioned clothing and it is unlikely that they were used by enslaved men as costly signals. Wood and bone, as well as glass, porcelain, and shell buttons are excluded from the following analyses. Metal buttons were, on average, the most costly button available in the eighteenth century, although cost varied depending on material and style. These analyses look at the use and discard rates of buttons that retained four important measurable attributes: material, color, size, and completeness. These attributes provide information about the choices and signaling power of slaves living at each structure.

Button Material, Metal Color, and Size

The majority of eighteenth-century metal buttons were made of pewter, tombac, and copper alloy. These are terms used by DAACS to describe the material from which a button was made and it should be noted that other archaeologists may use different terms to describe the same materials. Pewter was commonly used by all economic levels throughout the seventeenth and early eighteenth centuries (Hinks 1988; White 2002).

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[15] Mount Vernon's House for Families and the Fairfield Quarter, two slave quarter sites in DAACS that were not used in this study, have remnants of buttons that were constructed with silver embroidery thread.

Copper alloy buttons were introduced in the early eighteenth century. They quickly became popular but were prohibitively expensive for most people until the end of the century. A silvery or "white" appearance on a button remained the most popular button fashion until the last few decades of the eighteenth century. Methods for silver plating over copper were introduced in the 1740s and patents for tinning copper objects were given in the 1760s (Hinks 1988:62-63). Tombac, a white metal alloy made from zinc and copper, had a naturally silvery appearance and was also developed in the early 1760s (Hinks 1988:61). Throughout the eighteenth century button manufacturers spent much time and effort transforming copper alloy buttons that naturally had a warm, yellow appearance into cool silvery-looking buttons as demanded by the fashions of the day.

By the late eighteenth century, however, fashions had shifted in favor of large yellow-colored buttons. Copper alloy and, in rare cases, pewter and tombac buttons were polished to a shine or covered in gilt to produce shiny, yellow buttons. The popularity of these yellow metal buttons lasted through the mid-nineteenth century but the height of their novelty and expense was during the last quarter of the eighteenth and first decades of the nineteenth centuries. As a result, by the late eighteenth century pewter buttons were primarily used by those of low economic status (White 2002:247). Acquisition and display of yellow buttons in the last quarter of the eighteenth century would have signaled both financial resources and knowledge of current fashions.

Runaway advertisements placed in newspapers throughout the northeast and south often describe in great detail the physical characteristics and dress of runaways. These advertisements indicate that slaves wore, and took with them, a wide array of clothing, from "a new high crowned hat, maker's name in the crown Jacob Hollingshead, of

Philadelphia" (Newman 2003:98) and a "gray suit, with blue cloth cap" (Foster 1997:202) to "a wallet full of clothes of sundry kinds" (Newman 2003:100). Heath's research on clothing and adornment items draws on hundreds of runaway advertisements, many of which indicate the color and size of buttons worn by slaves when they ran away. Heath notes that owners most often described the color of the buttons as white or yellow. As the case of Phil, a 32-year-old runaway from Philadelphia, demonstrates, even slaves with ill-fitting and visibly unfashionable clothing sought fashionable buttons. Phil was described in a runaway advertisement from May 1793 as wearing "a purple twilled home-made coat, very large for him, fulled and dyed in the family, and is spotted by dyeing, with large yellow gilt buttons..." (Newman 2003:99).

As this advertisement indicates, button size is another measurable attribute that provides important clues to the types of garments worn by slaves. While clothing historians can read runaway advertisements that indicate the type of garment to which the buttons described were attached, measuring the size of a button is the main way for archaeologists to understand the types of garments that may have been worn at a particular site. Clothing historians have identified a number of button size categories that correspond to specific pieces of clothing. Coats, frocks, and greatcoats were adorned with the largest and most visible buttons that generally measured between 18 and 35 mm in diameter. Buttons used on waistcoats/vests, jackets and breeches measured between 14.5 mm and 19.5 mm. Sleeve buttons measured between 13 and 17 mm and are therefore difficult to distinguish from those used on waistcoats and breeches (Hinks 1988; White 2002:251, 266). Common materials such as bone and wood were most often used

on breeches, therefore providing some ability to distinguish archaeologically between buttons used on waistcoats from those on breeches (White 2001:266).

Outer garments such as coats and frocks were ideal for the prominent display of fashionable buttons. Since they were larger and generally more decorative, coat buttons cost nearly twice as much as waistcoat or vest buttons (Hinks 1988:36). The most costly and fashionable eighteenth-century coats and frocks were adorned with decorative, non-functional buttons located on pockets, sleeves, and jacket tails (Baumgarten 2002). For slaves, a waistcoat or vest may have been considered a superfluous everyday garment, especially in hot weather. Vest or waistcoat buttons cost less but wearing a waistcoat required enough buttons to close it properly and, if worn alone, all of the buttons would have been on prominent display. Two molded black glass buttons from *Building s*, one displaying the Hounds of St. Hubert, patron saint of hunting, and another with pheasants and roses, are a fancy set of late eighteenth-to-early-nineteenth-century buttons whose size (17 mm) suggests that they were made to be worn on a vest or waistcoat.

In the following analysis I divide the metal button assemblages into a number of groups based on button size and metal color. Since plating, tinning, and gilt frequently do not survive in the archaeological record, metal button color could not simply be identified by these decorative processes. In this analysis, all tombac and pewter buttons with identifiable silver or tin plating, or with no visible plating, are considered "white" metal buttons. All copper alloy buttons with identifiable gilding or gold plating, or with no visible plating, were categorized as "yellow" metal buttons. Any copper alloy buttons with identifiable tin or silver plating were placed in the "white" button category. All

tombac and pewter buttons with identifiable gilt or gold plating were placed in the "yellow" button category.

Metal buttons were also broken into two size groups, large and small. Complete and incomplete buttons whose diameters were equal to or greater than 18.00 mm were categorized as large buttons. Small buttons are defined in this study as *complete* metal buttons whose diameters were less than 18.00 mm. Only complete buttons were used in this size category since it cannot be known with certainty that an incomplete button is definitely smaller than 18.00 mm.

Button Completeness

Whether a button was broken or complete when deposited into the archaeological record is the final button attribute considered in my analysis. Heath's work at the Poplar Forest Quarter site suggests that the discard of buttons not only demonstrates the types of buttons people used but also the degree to which residents were wasteful in their pursuit of fashion. Her analysis at the Quarter site indicates that complete white buttons were being discarded at much greater rates than complete yellow ones. This suggests that residents there were purposefully discarding usable but unfashionable white buttons, opting to spend money on new, more fashionable yellow ones. The DAACS cataloging system records whether a button is broken and complete and these data will be used to see if there are similar patterns of discard at the sites used in this study.

The Analyses

The results of the button analysis in Chapter 5 indicated that the consumption of buttons spiked in the last half of the eighteenth century. In this section I use the categories outlined above to measure more precisely how male slaves were consuming and displaying buttons. Using the Wine Bottle Index described in Chapter 5, I first calculated abundance index scores for the following categories of buttons from each site: 1. all white metal buttons, 2. all yellow metal buttons, 3. all large buttons, regardless of metal color, 4. all small buttons, regardless of metal color, 5. all large white buttons, 6. all small white buttons, 7. all large yellow buttons, and 8. all small yellow buttons. These abundance indexes were then used with the negative binomial models described in the previous chapter. Finally, I used logistic regression, which is discussed in greater detail below, to predict the likelihood of finding complete white buttons instead of complete yellow buttons at any given site.

I first discuss the GLIM results and how the use and discard of each category of button was impacted by the six signaling variables. I then focus specifically on the abundance of each button category at individual sites, exploring consumption differences and trends within sites. Please note that the Pearson residuals for the following six models fell between 2 and -2 indicating that there were no significant outliers.

Signaling Trends with Buttons

Model 1: Mean Ceramic Dates

Time had a significant positive relationship with the use and discard of all categories of buttons in both plowzone and subfloor pit assemblages (Appendix 9). The

frequency with which slaves acquired all types of metal buttons increased throughout the eighteenth century, with the most dramatic increase occurring during the last 50 years. Figures in Appendix 10 plot the abundance index scores with the predicted abundance index scores generated for each button group using this bivariate model. Below I will use the Pearson residuals from this model with Principal Component Analysis to analyze the relationships between individual sites.

Model 2: Agricultural Diversification and Time

The effects of agricultural diversification on button consumption are uncertain but, allowing moderate *p-values*, these models suggest that agricultural diversification may have had some impact on the discard of most categories of buttons (Appendix 11). It is clear from the plowzone assemblages that slaves living on diversified plantations were more likely to use and discard all yellow metal buttons and large yellow metal buttons than those living on non-diversified sites. As we have seen, by the late eighteenth century yellow buttons were the most costly types of buttons. Large yellow buttons were ideal for adornment and costly displays as they were highly visible on exterior garments and were almost twice as expensive as smaller yellow metal buttons. This significant association between fashionable yellow metal buttons and agricultural diversification has an important correlation with the signaling model. Diversification brought with it increased mobility for enslaved men, offering them more contact with individuals outside of their home plantation. A slave could have signaled his ability to circumvent the bounds of slavery by participating in the market economy. This crucial ability to move

outside the rules established by whites may have been best expressed through the possession and display of items that were attractive, costly, and difficult to obtain.

Diversification may have also had positive influences on the consumption of white metal buttons from subfloor pits and on all large and all small metal buttons regardless of color; however, the *p-values* for the assemblages' estimates fall between .13 to .42. As was suggested in Chapter 5, the negative binomial results for all models may become less ambiguous once I have access to data from earlier undiversified sites.

There are no significant relationships between agricultural diversification and the consumption of most categories of white metal buttons. In this multivariate model that includes both the MCD and agricultural diversification variables, time remains a strong positive influence for nearly all categories of buttons.

Model 3: Proximity to Main House and Time

An enslaved person's proximity to the main house had no significant relationships with the discard rates of any category of buttons from both plowzone and subfloor pit assemblages (Appendix 12). As we have seen, it is accepted that most slaves who worked either in the mansion or had specialized skills that required their presence near mansion dependencies lived within close proximity to the mansion. It has also often been argued that such slaves received special gifts, treatment, and stylish hand-me-down clothing. However, these results indicate that among these 19 households, slaves living near mansions were not any more likely to have costly and fashionable buttons than those living in distant farm quarters. This does not mean that male slaves living near a mansion did not receive uniforms or cast-off jackets. It does, however, point to the acquisitive and

fashion-conscious behavior of men living far from mansions. Perhaps even more importantly, it suggests that men did not wear European fashions simply because they were provided by an owner. This pattern, in addition to data from store accounts, confirms that men sought European buttons for use on their clothing and were willing to pay the cost necessary to obtain some elements of the most current fashion.

The negative binomial model that used the Main House and MCD variables indicates that time remained a strong positive influence on the use and discard of all categories of buttons.

Model 4: Proximity to Urban Center and Time

While being close to an urban center doesn't appear to have much impact on the consumption of all white buttons and all yellow metal buttons, when they are divided into categories by size, an exciting pattern emerges. Living near an urban center has a strong, positive relationship with the use and discard of large yellow metal buttons (p=.07) and a more moderate positive association with the consumption of large white metal buttons (p=.17) (Appendix 13). A similarly moderate positive relationship exists for all large metal buttons regardless of color.

These relationships are confirmations of my expectations that highly visible, costly, and portable goods would be consumed near towns or cities. Slaves living on sites near urban centers chose to wear fashionable, large, and expensive buttons, most likely because they had easier access to large, diverse audiences that offered greater rewards for successful communication of one's skills and personality. Male slaves visiting or working in a city on a regular basis would have been aware of what the most

fashionable people were wearing and what stores were offering as the current style. They would have also known what was stylish, and competitive, within their peer group. Men wishing to display their knowledge of, and ability to maintain, current fashions would have needed to invest greater amount of money in clothing accoutrements as the competitive nature of their interaction sphere increased. This interaction sphere certainly included male and female slaves. Class may have also been a factor in whom slaves chose to engage with, with poor or middling whites comprising a group to whom signals were also directed.

There are no significant relationships between a structure's proximity to an urban center and the discard of small metal buttons. Time had a significant positive influence on all categories of button consumption when proximity to urban center was held constant.

Model 5: Presence of Owner and Time

The presence of an owner had a significant negative impact on the ability of slaves to consume almost every category of button (Appendix 14). There were significant negative relationships ($p < .09$) between the use and discard of all white and yellow metal buttons and all small and large metal buttons regardless of color when an owner was living on the property. This may be the result of exceptionally high discard rates of buttons in the subfloor pits at Poplar Forest Quarter and North Hill where Jefferson was not present on a regular basis. It may be the case the slaves at Poplar Forest were able to consume buttons in such large quantities due to the lack of tight oversight and the benefits received from having Jefferson as an absentee owner.

The models for large yellow buttons and small white buttons could not be estimated using the maximum likelihood method due to the many zeros in these datasets. Time remained a significant positive influence on the consumption of most categories of buttons when the effect of owner presence was held constant.

Model 6: Thomas Jefferson, owner and Time

The results for this model were highly variable. For plowzone and subfloor pit assemblages, a slave's ability to use and discard white and yellow buttons regardless of size had no significant relationship with Jefferson ownership (Appendix 15). A possible positive relationship between Jefferson ownership and the discard of white metal buttons and all large metal buttons can be seen for plowzone assemblages, although clearly not all slaves living at Monticello sites chose to, or were able to, consume in a consistently competitive manner as can be seen when looking at changes in button abundance at *Building o* (see Appendix 8).

Note that with a number of these plowzone models, time did not have a significant relationship with button abundance when the effect of Jefferson ownership was held constant. The models for large white buttons and small yellow buttons from plowzone contexts could not be estimated using the maximum likelihood method due to the many zeros in these datasets.

Uncovering Signaling Trends in the Regional Consumption of Buttons

As was the case in Chapter 5, the greatest single influence on the use and discard of all categories of buttons was time. These models demonstrate that slaves consumed

buttons in much greater quantities on sites occupied during the last quarter of the eighteenth century than they did during the preceding seventy-five years. The regression analyses also indicate that slaves living on agriculturally diversified plantations located near urban centers were much more likely to consume all types of yellow metal buttons as well as large yellow metal buttons than slaves living on monoculture plantations located further away from towns. It is likely that, in the future, the availability of data from additional sites whose occupations are spread evenly across the eighteenth century will contribute to more significant results.

Enslaved men who had the ability and incentive to invest in costly displays were clearly choosing the most costly, visible, and decorative items, in this case large buttons and large yellow buttons used on coats and frocks. They lived on diversified plantations whose work schedules likely offered the opportunity to acquire non-agricultural skills as well as some degree of mobility. The organization of work may have also provided time to earn money or produce items that could be sold or traded. Proximity to urban centers, such as Williamsburg, offered an ever-changing social and economic landscape. Large, unfamiliar audiences were most affected by signaling displays and offered more opportunities, and more options, for selecting mates, social allies, and economic partners. As diversification brought mobility and urbanization ushered in increased opportunities and payoffs for signaling, male slaves responded by acquiring portable, highly visible and fashionable costly items for use in the increasingly large and diverse social and economic milieu of the late eighteenth century.

Patterns among Sites: Principal Component Analysis for Button Residuals

What do variations in button consumption among sites tell us about household signaling strategies? The signaling model provides explanations for regional and temporal variations in conspicuous consumption. Although these models can't include unknowable independent variables such as the number, age, and gender of the people living in a structure, attributes that certainly influenced artifact abundance, signaling theory as a whole can help us make sense of individual and household behavioral strategies in ways that previously we have been unable to do. As in Chapter 5 I use Principal Component Analysis of the residuals from the bivariate temporal models as the primary method for understanding the similarities and differences in button consumption among dwellings

In the plowzone models, the first principal component accounted for 66.1 percent of variation in the data while the second principal component accounted for 17.3 percent of variation. The fact that principal components one and two account for 83 percent of the total variation within the data when removing the influence of time suggests that most of the patterning can be seen in two dimensions. Eigenvectors indicate that all white buttons, all small white buttons, and all large white buttons are closely correlated (Figure 6.1). All yellow buttons, small yellow buttons, large yellow buttons, and all large buttons are related. All small buttons also appear to be related to this second group. It should be noted that some of the correlations in the following analyses are artificial due to the manner in which the data were coded. Of the eight button categories, only four, large yellow, small yellow, large white, and small white are truly independent. The other four categories, all yellow, all white, all large, and all small, contain button data that also

contribute to the previous four categories. It is therefore expected that correlations should be seen between categories such as all yellow, large yellow, and all large buttons and small white, large white, and all white buttons (see Figure 6.1 for examples). Correlations between the four independent groups remain true.

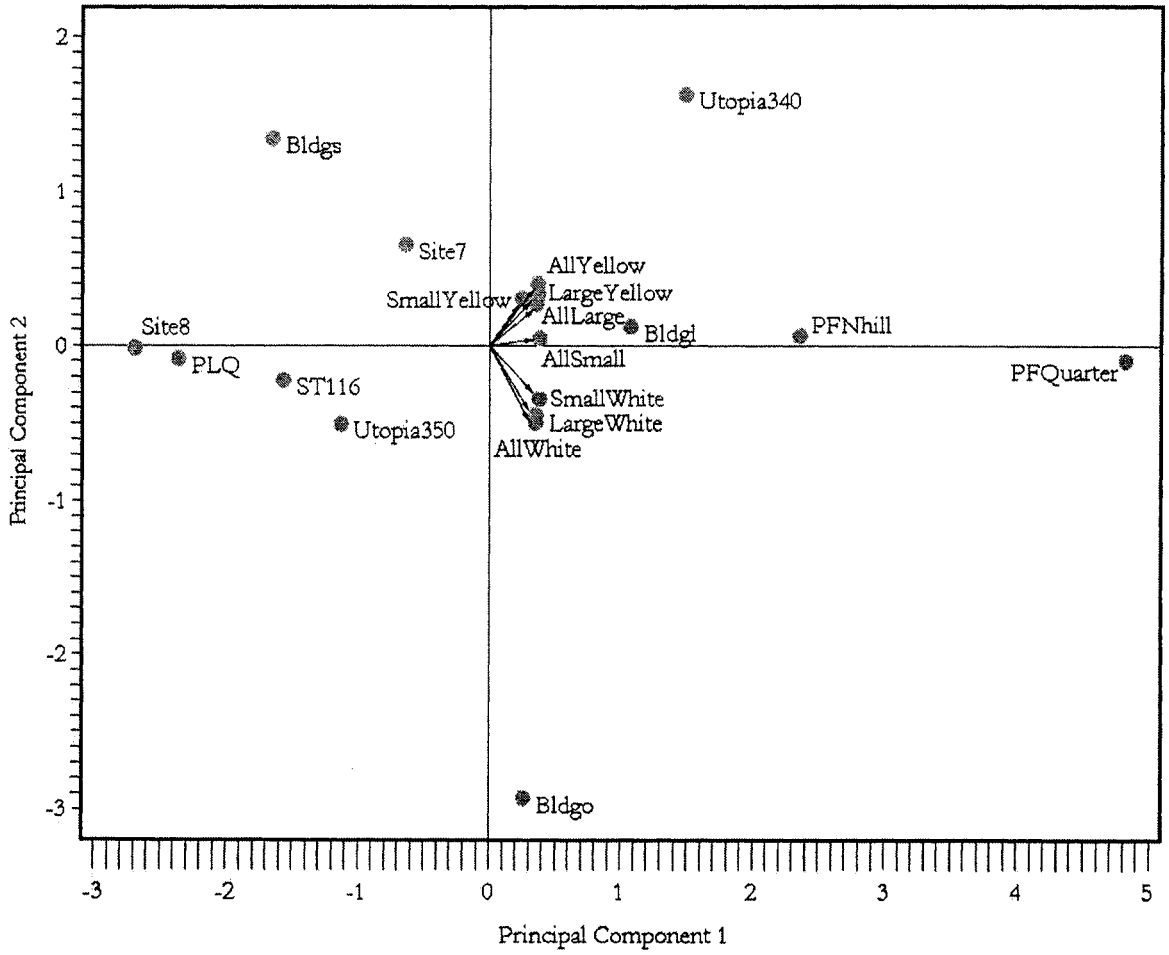


Figure 6. 1: Principal Component Analysis for Artifact Residuals from Wine Bottle Index for Button Categories from plowzone contexts where x=MCD and Y=AI.

PCA is particularly useful as it summarizes variability seen in the artifact patterning once time has been removed. In reducing the dimensionality in a dataset, PCA allows us to see clearly relationships among the data. This plowzone PCA demonstrates that Utopia 3-Structure 50, *Building s*, ST116, the Palace Lands Quarter and Site 8 all used and discarded fewer buttons then expected. Poplar Forest Quarter and North Hill

sites consumed many more buttons than accounted for by the temporal model. Utopia 3-40 also stands out for its greater than expected consumption of yellow metal buttons. *Building l* had slightly greater discard of buttons, most likely large yellow buttons, than can be expected from the bivariate temporal model. *Building o* residents consumed greater than expected quantities of white metal buttons.

The PCA for buttons from subfloor pits provides additional patterns. Here axis one accounts for 73.4 percent of the variation in the dataset and axis two accounts for 11.5 percent of the variation. Poplar Forest North Hill and the Palace Lands Quarter are high positive outliers along axis one, having many more large white and large metal buttons that anticipated by the model (Figure 6.2). Richneck, the Poplar Forest Quarter site, and Utopia 2-Structure 220 have higher than expected discard rates of small buttons and small white buttons. Utopia 4-Structure 140's positive outlier status appears to be influenced by greater numbers of large yellow and all yellow buttons than anticipated by the model. Sites that are negatively correlated with button consumption include Utopia 2-01, Utopia 2-10, Utopia 3-40, Utopia 3-50, Site 8 and *Building o*.

Shifting Fashions within Sites

Moving beyond regional signaling trends, a close look at index residuals within a single site raises a number of interesting questions about how individual signaling strategies can reveal clues to household composition. Here I focus on methods that reveal how slaves living at individual structures responded to changing button fashions and what those responses might tell us about signaling strength at, and composition of, each dwelling. As we've just seen, slaves living at the Poplar Forest Quarter and North Hill

sites used and discarded buttons at exceptionally high rates into both subfloor pit and plowzone contexts. The plowzone analysis indicates that men were consuming large quantities of all button categories (Figure 6.1). The subfloor pit analysis suggests that

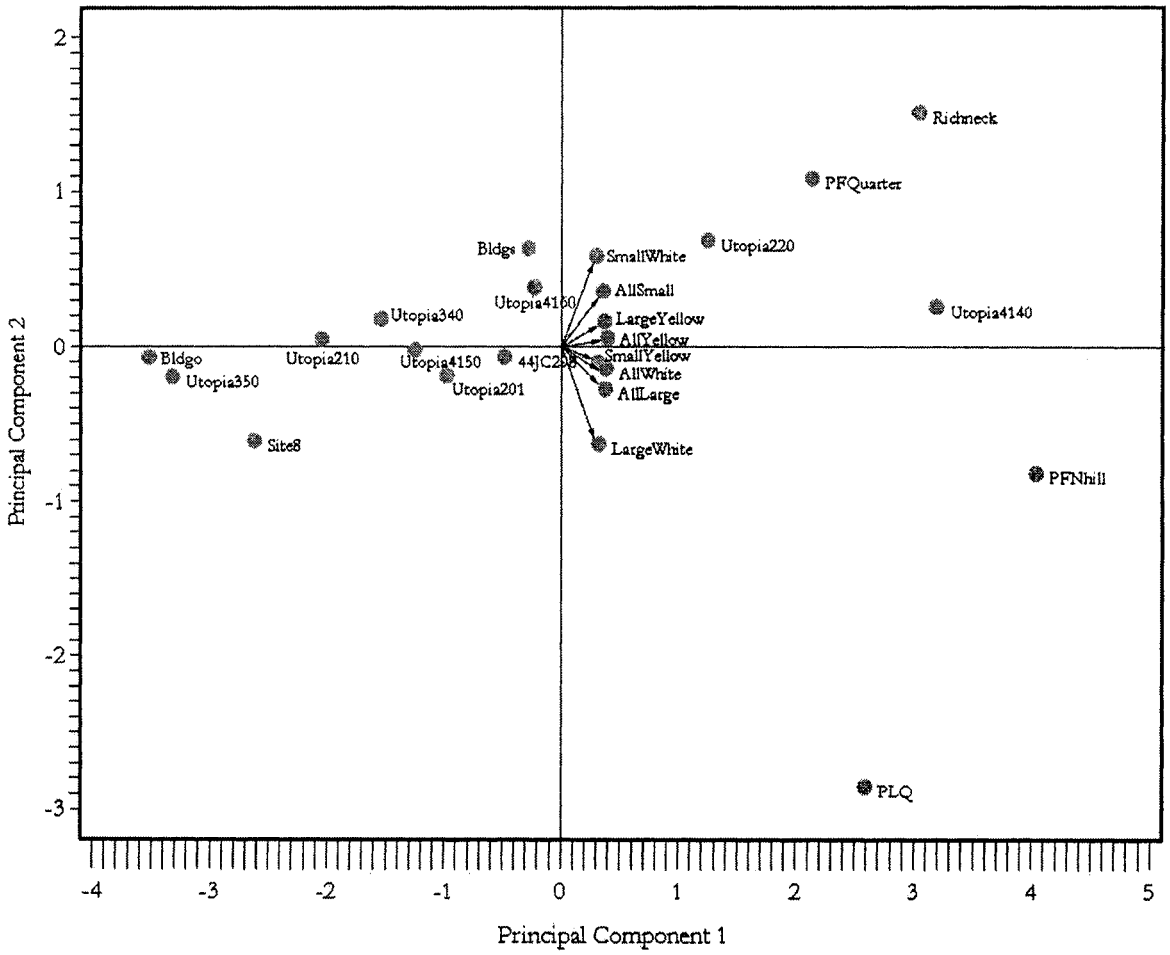


Figure 6. 2: Principal Component Analysis for Artifact Residuals from Wine Bottle Index for Button Categories from subfloor pit contexts where x=MCD and Y=AI.

men at the Quarter site discarded greater quantities of small white buttons, all types of small buttons, and possibly large yellow buttons (Figure 6.2). The North Hill residents instead appear to be investing in greater quantities of large buttons, small yellow buttons, and large and small white buttons. Looking at the abundance indexes from subfloor pits, Quarter site residents used and discarded more large yellow buttons than North Hill

residents while North Hill residents discarded more large white buttons than Quarter site residents. Quarter site residents discarded greater quantities of both large yellow and large white buttons than North Hill residents into plowzone.

Button use and discard at the North Hill and Poplar Forest sites suggest two different approaches to signaling displays through clothing. Although the mean ceramic date for the North Hill site is 1797, the earliest fill layer of the pit has a mean ceramic date of 1784 (TPQ90 =1762) and the whole pit has a mean ceramic date of 1791. It is most likely that the pit was out of use by the mid-1780s (DAACS 2005; Heath pers. communication). Although the North Hill and Quarter sites have nearly contemporary mean ceramic dates, the early abandonment date for the subfloor pit at North Hill may account for the greater abundance of large white buttons than large yellow buttons. Although large yellow buttons had declined in cost from what they had been in the last quarter of the eighteenth century, they were still more costly than white buttons in the early nineteenth century. The almost equal abundance of large white buttons and small yellow buttons in the subfloor pit compared to the less abundant small white buttons and large yellow buttons suggest that North Hill residents may have been investing primarily in small yellow-metal buttons to adorn garments such as waistcoats, vests, breeches, and shirts. In the hot climate of central Virginia, such a strategy may well have been the optimal one since for almost eight months of the year these garments would have provided suitable warmth and coverage. The large white buttons used on overcoats and jackets were not yet completely unfashionable and, during the winter months, they would have still displayed a slave's ability to procure large metal buttons different from the bone or wood buttons that accompanied provisioned clothing.

The three subfloor pits at the Quarter site were abandoned in the late 1790s and early 1800s and were most likely open and used for 10 to 15 years after the closure of the North Hill pit. By the early nineteenth century, white buttons were relatively unfashionable, worn mainly by the very poor society-wide (Hinks 1988). Yellow metal buttons, while still costly, were more readily available in stores and markets. Both the plowzone and subfloor pit analyses indicate that men at the Quarter site acquired and discarded more large yellow buttons than large white metal buttons and it is likely that these yellow buttons were prominently displayed on frocks or coats.

Barbara Heath argues that patterns of button discard at the Quarter site not only demonstrate the types of buttons people used but the degree to which residents were wastefulness in their pursuit of fashion. Her analysis at the Quarter site suggests that complete white buttons were being discarded at much greater rates than complete yellow buttons, which indicates that residents were purposefully discarding usable but unfashionable white buttons and opting to spend some of their money on new, more fashionable yellow metal buttons (1999). Is it possible to see similar patterns of discard at the sites used in this study?

Heath arrived at her conclusions by comparing the percentages of complete and broken white buttons to the percentages of complete and broken yellow buttons. Here I use a logistic regression model to predict the probability that a button on a site is complete or not based on whether it is a white or yellow button. I briefly introduced logistic regression in Chapter 5, where we learned that it is an effective tool for describing the relationship between dichotomous, or binary, variables and a group of independent "predictor" variables (Menard 2002; Pampel 2000). It powerfully predicts

the overall effect of independent variables, in this case button color, on the abundance of a given artifact class, here the number of complete and incomplete buttons. Logistic regression works by converting an artifact index value into an odds ratio (p/1-p) and then log transforming that ratio.[16]

Logistic regression produces coefficients that can be interpreted as "the change in the dependent variable, logit (Y), associated with a one-unit change in the independent variable" (Menard 2002:1). Keeping in mind that the dependent variables are the log-transformed odds ratio of abundance index scores, the coefficient allows me to predict the log odds of an artifact being a numerator class (Artifact Class 1) relative to being a denominator class (Artifact Class 2). Since I want to predict the probability of a complete button being white or yellow, in this analysis Artifact Class 1 will consist of either complete white buttons or complete yellow buttons. Artifact Class 2 will be either incomplete white buttons or incomplete yellow buttons. Two abundance indexes for each site were calculated, one for complete white buttons relative to incomplete white buttons and another for complete yellow buttons relative to incomplete yellow buttons. These abundance equations look like: $\sum$CompleteWhiteButtons/($\sum$CompleteWhiteButtons) + ($\sum$IncompleteWhiteButtons) and $\sum$CompleteYellowButtons/($\sum$CompleteYellowButtons) + ($\sum$IncompleteYellowButtons).

The logistic regression coefficient can be moved off the log scale by exponentiating the coefficient. This exponentiated coefficient, known as Exp[b], is the effect of the independent variable on the "odds ratios," the probability of an event divided by the probability of a nonevent. If we take the index scores for complete versus

[16] The mathematical details of logistic regression will not be discussed here but see Menard 2002 and Pampel 2000 for a full explanation of logistic regression.

incomplete buttons at the Poplar Forest Quarter site, the resulting Exp[b] tells us the odds a button in that assemblage will be a complete button if it is white as opposed to yellow. For example, an Exb[b] of 1.88 means there is an 88 percent chance that a complete button in the Quarter assemblage will be white colored as opposed to being yellow colored. In Chapter 5 I was unable to use logistic regression with the abundance index scores due to extra-binomial variation in the samples. Logistic regression works, however, with these button data. For these sites, the largest chi-square likelihood ratio was four. I compared the following logistic regression results against goodness-of-fit chi-square tests and received the same results. I am presenting the logistic regression results here as they are more powerful predictors of association.

Due to concerns about small sample sizes, I used count data for complete and broken buttons from all contexts associated with every structure; therefore the results for each model are not divided into plowzone and subfloor pit assemblages. For most sites the logistic regression model was either not valid due to small sample sizes or the results of the model were not significant. However, statistically significant results were received for both Poplar Forest sites (Table 6.1). The logistic regression results support Heath's conclusions about the discard of complete white buttons at the Quarter site. A button at the Quarter site is 88 percent more likely to be complete when it is made from white metal than when it is made from yellow metal (p= .08). The opposite is true for North Hill where any given button is 68 percent less likely to be a complete white button as opposed to a complete yellow button (p=.04).

The results for Site 8, while more moderate, are also worth noting. With a *p-value* of .15, Site 8's odds ratio estimate of .16 suggests that a button at Site 8 is 84 percent less likely to be a complete when it is white than when it is yellow.

Table 6. 1: Odds ratio estimates and their confidence intervals for complete white buttons relative to complete yellow from all contexts at a single site.

Sites	Odds Ratio Estimate	95% Wald Confidence Interval	*p*
Poplar Forest Quarter, Button Completeness, White vs. Yellow	1.882	0.912-3.880	0.086
Poplar Forest North Hill Button Completeness, White vs. Yellow	0.317	0.101-0.994	0.048
Site 8, Button Completeness, White vs. Yellow	0.16	0.013-1.984	0.153
Models for all other sites are either invalid or not significant			

These results indicate that Poplar Forest Quarter residents were discarding usable white metal buttons in favor of yellow metal buttons. The sheer abundance of metal buttons at the Quarter site, and the obvious attention paid to the acquisition of the most fashionable buttons, may be a compelling clue to what male signaling strategies look like archaeologically. On the other hand, people living at the North Hill site and Site 8 were instead wearing white metal buttons until they broke. The North Hill site may have been occupied by the single family that was living at the plantation prior to Jefferson's ownership and his subsequent arrangement of his labor force. The complete yellow buttons deposited at North Hill and Site 8 in usable condition may well have been lost through regular wear and use. Data presented in the following section and Chapter 7 sheds further suggest more specific household dynamics.

I then tested the probability that highly visible complete *large* white buttons were being discarded in favor of complete *large* yellow buttons. Here I received even fewer statistically significant results (Table 6.2). For the Poplar Forest Quarter site, there was a possible 93 percent chance that a complete large button would be white metal than yellow metal (p= .21). At North Hill, a complete large button had a 76 percent chance of being a white button as opposed to a yellow button (p=.12).

Table 6. 2: Odds Ratio Estimates and their confidence intervals for complete white large buttons relative to complete large yellow from all contexts at a single site.

Sites	Odds Ratio Estimate	95% Wald Confidence Interval	*p*
Poplar Forest Quarter, **Large** Button Completeness, White vs. Yellow	1.927	0.678-5.479	0.218
Poplar Forest North Hill, **Large** Button Completeness, White vs. Yellow	0.233	0.036-1.513	0.127
Models for all other sites are either invalid or not significant			

The data from Poplar Forest are compelling. Men living at the Quarter site were choosing to discard usable white metal buttons, both large and small, and were replacing them with more fashionable and costly yellow metal buttons. These men were knowledgeable about current fashions and they had the financial means and mobility to acquire them. What incentives did these men have to invest their labor, money and time, in this case the 12-mile, round-trip walk to New London and 14 mile round trip walk to Lynchburg, in the purchase of fashionable buttons when usable metal buttons were available? The act of purchasing fashionable buttons was certainly a personal statement of aesthetics and choice that challenged the notion of property being able to own property (White and White 1998). However, we know from Heath's store account research that

Poplar Forest slaves purchased a wide range of goods from other types of adornment items to tools and ceramics that were most likely used to maintain their household. As we'll see in the following chapter, sex ratios at Poplar Forest during the period the Quarter site was occupied suggest that a stylish appearance, epitomized in the display of high quality buttons on a suit of clothing, may have benefited young men in their social and economic activities on and off the plantation.

Women's choices: Refined ceramic consumption

The introduction of refined ceramic wares in the mid-eighteenth century accompanied a host of new social rules related to the consumption of food and drink. Although intended for the most elite, the rituals and ceramic accoutrements surrounding the taking of tea quickly filtered to the middling and even lower classes (Martin 1994; Roth 1988). The widespread acceptance of new dining etiquette emphasized the appropriateness of individual place settings and drinking glasses. An explosion in the range of vessel forms used in daily dining supported these social changes, with trenchers, large plates, and mugs being replaced by dinner plates, small plates, dished plates, bowls, teacups, teabowls, saucers, and serving pieces (B. Carson 1990; Martin 1994). Ceramic manufacturers offered these forms in a range of refined ware-types that were regularly improved upon, thereby constantly providing the market with novel ware-types, forms, and decorative patterns (McKendrick et al. 1982).

As discussed in Chapter 5, the use and discard of refined ceramic wares on slave sites increased dramatically during the second half of the eighteenth century and we know from Chapter 3 that refined ceramic prices did not fall dramatically until the early

nineteenth century. How did slaves acquire these costly wares? Each slave owner had their own rules that dictated what items were given to slaves although generally most provisioned items were restricted to food and textiles. Jefferson provided his slaves with food and clothing and every woman received a bed and iron pot when she married a man living on the same plantation (Heath 1999a:13; Stanton 2000). Whether ceramics were provided to slaves living on the other Chesapeake plantations in this study is unknown. It is clear, however, that providing slaves with refined ceramics during the eighteenth century would have been the most costly option for any owner. Inexpensive coarse earthenware and durable stoneware vessels used for food preparation and storage were readily available. Storage containers could also be made from gourds or wood with little effort and money. Plates and mugs were also available in pewter which, although initially quite costly, was less expensive than refined ceramics when amortized over a lifetime (Martin 1988; Neiman et al. 2000).

It is probable that many of the refined ceramic wares found at slave sites were acquired through the efforts of the slaves themselves. While buttons were portable and visible, the use and display of refined ceramics were restricted primarily to a person's house. The act of purchasing ceramics in a store or market may have been the only costly signal visible to individuals outside of a slave's home plantation. However, the relatively open nature of slave housing would have insured that refined ceramics served as signals to slaves living on the same plantation who were not household members. This next section looks at the consumption of refined ceramics, with a specific focus on the discard of teawares and tablewares made from refined ware-types. Although the teaware category included some of the most unnecessary ceramic forms (Table 6.3) made of the

costliest ware-types, Martin (1994) has demonstrated that it was financially easier to purchase a few pieces of teaware in the most expensive ware-types, such as Chinese porcelain, than to purchase plates and other tablewares in that same ware. People who could not afford whole place settings in porcelain could often afford a few teabowls in the same ware-type. The acquisition of teawares was not essential, however, and any expenditure on teawares was ultimately unnecessary to the daily functioning of a household. In addition, teawares used in the context of tea drinking also required the acquisition of tea and sugar, costly components needed to properly complete the ritual. It would be unexpected to see the use and discard of large numbers of teawares at structures where individuals and households who could not bear any additional financial burden.

The first challenge in analyzing teawares is identifying if individual sherds had once been part of a teaware or tableware vessel (see Table 6.3 for list of teaware and tableware forms used in DAACS). Assigning a specific vessel form, such as teacup, teapot, and saucer,

Table 6. 3: Tea and Tableware Forms used in DAACS

Teaware Forms	Tableware Forms
Coffeepot	Bowl
Cup	Box
Pitcher/Ewer	Mug/Can
Saucer	Plate
Teabowl	Platter
Teacup	Serving Dish, misc.
Teapot	Tureen
Unid: Teaware	Unid: Tableware
	Vegetable Dish

to a small sherd can be nearly impossible. Ceramic and glass data from DAACS demonstrates that the average sherd from plowzone contexts is around 5 mm smaller than

a sherd found in feature contexts (Table 6.4). The DAACS cataloging system enables a cataloger to assign a sherd to a Vessel Category (Hollow, Flat, or Unidentifiable)

Table 6. 4: Average sherd size for ceramic and glass from plowzone and feature contexts in DAACS

	Plowzone Contexts	Feature Contexts
Average Ceramic Sherd Size in mm	21.8	27.6
Average Glass Sherd Size in mm	28.2	31.4

and a vessel form (Bowl, Plate, Saucer, Teabowl, etc.). If a cataloger can't assign a sherd to a specific vessel form but believes a more general vessel function, such as teaware, tableware, or utilitarian ware can be identified, that sherd's vessel form may be cataloged as "Unid:Teaware", "Unid:Tableware", or "Unid:Utilitarian".[17] A sherd can also have the vessel form of "Unidentifiable". Approximately 47 percent of the ceramic sherds currently in DAACS have "Unidentifiable" vessel forms.[18] Over half of these sherds are 15 mm or smaller.

Sixty-four percent of sherds with "Unidentifiable" vessel forms are also missing glaze on one or more sides, which means that these sherds have no body thickness measurement associated with them. As a result, only 36 percent of the sherds that have an "Unidentifiable" vessel form have an associated sherd thickness measurement. However, the majority of the sherds with an identifiable vessel form, either a specific form such as "Teapot" or a more general form designation such as "Unid:Teaware," have a corresponding sherd thickness. I used logistic regression on sherd thickness data from

[17] Please see http://www.daacs.org/aboutDatabase/structure.html for complete list of database fields and authority terms available for use.

[18] It should be noted that many cataloging systems do not attempt to assign vessel forms until the sherd has gone through the cross-mending process, at which time the sherd is then assigned to a vessel form. However, DAACS analysis does not include cross-mending (see www.daacs.org for further explanation).

sherds with identifiable vessel forms to predict the probability that a sherd of a certain thickness was either a teaware or a tableware form.

Using logistic regression, a log sherd thickness value can be calculated that is the optimum cutoff between tablewares and teawares, such that any "Unidentifiable" sherd with a thickness below that log sherd thickness is more likely to be a teaware category. Logistic regression was used to determine the log sherd thickness value that best represents that dividing point between teawares and tables for the total of all refined ceramic wares, as well as for the following individual ware types: delft, white salt glaze, creamware, pearlware, and Chinese porcelain (Table 6.5). Any "Unidentifiable" sherd with a thickness above the predicted log sherd thickness is more likely to be in the tableware category.

Table 6. 5: Predicted log sherd thickness in millimeters of vessel forms by ware type where α=.05 in all cases.

Ware Type	Teaware	Tableware
All refined ceramic ware types	<= .945	> .945
White Salt Glaze	<= .98	> .98
Delft	<= .85	> .85
Chinese Porcelain	<= .84	> .84
Creamware	<= .95	> .95
Pearlware	<= .98	> .98

Using these results, I assigned each unidentifiable sherd to either the "Unid: Teaware" or "Unid:Tableware" vessel form category. I was able to assign over 4000 sherds with previously unidentifiable vessel forms to either a teaware or tableware category, thereby greatly increasing the sample size for each structure. These data were combined with data from sherds with identifiable vessel forms to create the dataset used in the following Wine Bottle Indexes for teawares and tablewares. The indexes measure

the discard of all refined ceramic tablewares and teawares, as well as the discard of five individual ware types mentioned above, relative to the discard of wine bottle glass. As with other analyses in this study, indexes were calculated for assemblages from both plowzone and subfloor pits. The index scores and signaling variables are then used in the six negative binomial models employed in previous analyses. I first discuss the broad temporal and regional signaling trends seen in the data. I then use Principal Component Analysis to address the similarities and differences in the use and discard of specific refined ceramic wares among sites.

Refined ceramic consumption and fit with signaling variables

Model 1: Mean Ceramic Dates

As expected, time was a significant positive factor in the use and discard of teawares and tablewares made in all refined ware types. When broken down by individual ware-types, it becomes clear that the progression of time also had a positive influence on the use and discard of Chinese porcelain, creamware and pearlware teawares and tablewares from both plowzone and subfloor pit contexts. There is no significant temporal relationship with the use and discard of Delft or white salt glaze vessels (Appendix 16.1, 16.2; Appendix 17). This is most likely due to the rise and fall in the popularity of delft and white salt glaze during the mid-eighteenth century. A model using the quadratic mean ceramic date (Y=Abundance Index Scores, X_1=MCD and X_2=MCD*MCD) for delftware and white salt glaze confirms that consumption does decrease dramatically after 1780 (Appendix 17). Delftware and white salt glaze vessels were early refined ceramics that, while whetting the appetite for novel ceramic forms and

decorations, were quickly replaced by more stylish and innovative refined earthenwares such as creamware and pearlware.

A slave's consumption of creamware and pearlware tea and tablewares had a more intensive and significant positive relationship with time than enjoyed by Chinese porcelain. Although Chinese porcelain was *the* luxury ware-type for both tea and tablewares during the last half of the eighteenth century perhaps both its expense and decorative conservatism contributed to its more even-paced consumption. Ann Smart Martin has argued that, as more of the Chesapeake population began drinking tea, the quality of teawares used to consume the tea became more important than the tea or the ritual itself (Martin 1994:181-182). Using store accounts, Martin demonstrated that sales of Chinese porcelain plates were slow in less urban regions of the Chesapeake in the 1770s due to the extreme cost of setting a table in porcelain. Sales of Chinese porcelain teawares were more fast-paced, however, in part due to the fact that porcelain teawares were often offered in a range of prices. Variation in prices enabled poor to middling consumers to purchase a teapot or a few teabowls without having to commit financially to entire place settings.

The regression estimates for creamwares, pearlwares, and Chinese porcelains suggest that the patterns Martin uncovered in store accounts are seen archaeologically at slave quarter sites in the Chesapeake. The Chinese porcelain teaware regression coefficients and *p-values* are slightly lower than the tableware coefficients, perhaps suggesting that the consumption of Chinese teaware has a stronger positive relationship with time than the porcelain tablewares. The opposite is true for pearlware and creamware, which had higher tableware coefficients and lower *p-values* than teawares of

the same ware types. In the future more samples may help to clarify this pattern but for now it is possible to suggest that consumption trends seen in the store accounts of rural Virginians are also reflected in the use and discard of these ware types on slave sites in the greater Chesapeake.

Model 2: Agricultural Diversification and Time

The relationship between the index scores, time and agricultural diversification varied considerably depending on whether ceramics came from plowzone or subfloor pit contexts. For plowzone assemblages, agricultural diversification had no significant influence on the consumption of most ware-types and forms. Creamware tablewares were negatively influenced by agricultural diversification and, allowing moderate *p-values*, creamware teawares may have also been negatively influenced by diversification. Time was a strong positive influence on the discard of Chinese porcelain, creamware, and pearlware teawares and tablewares from plowzone contexts (Appendix 18.1-18.2).

The use and discard of both delft and white salt glaze tea and tablewares in subfloor pit assemblages are positively influenced by agricultural diversification. There is also a strong positive relationship between diversification, time and all refined teawares and Chinese porcelain teawares found in subfloor pits. Here again a correlation can be seen with Martin's data on ceramic consumption which indicate that delft and white salt glaze consumption increased until the 1770s when creamware was introduced. Slaves living on early diversified sites, such as Utopia 4-140, Utopia 4-160 and Palace Lands Quarter, may well have parlayed some of their earnings into delft and white salt glaze tea and tablewares. Note too that the discard rates of delft and white salt glaze at

Utopia 3-Structure 40 are exceptionally high compared to other early sites, especially its direct neighbor Utopia 3-Structure 50.

Model 3: Proximity to Main House and Time

A slave's proximity to the main house had no impact on the discard rates of delft and white salt glaze tea and tablewares from both plowzone and subfloor pit assemblages (Appendix 19.1, 19.2). In this model, time was also not a factor in the consumption of these ware-types. Living close to the main house did have significant positive influences on slave consumption of all refined teawares from plowzone contexts regardless of ware type (Appendix 19.1; p=.006). The abundance of Chinese porcelain teawares in the plowzone was strongly influenced by proximity to the main house while the consumption of creamware teawares (Appendix 19.1; p=.10) and pearlware teawares (Appendix 19.1; p=.17) had more moderate positive relationships with proximity. For subfloor pits, only the discard of creamware teawares had a moderate positive relationship (Appendix 19.1; p=.15) with the main house. The other subfloor pit teaware assemblages had no significant relationship with proximity to the main house. Living near the main house had a less significant impact on the consumption of refined tablewares. There were no significant relationships between subfloor pit tableware assemblages and a slave's location on the plantation. Only the consumption of Chinese porcelain tablewares from plowzone contexts was positively influenced by location (Appendix 19.2; p=.09).

The use and discard of buttons, even expensive and fashionable yellow buttons that might have adorned provisioned uniforms or hand-me-down clothing, had no significant relationship with proximity to the main house. Expensive clothing buckles

also had no significant relationship with the main house (Appendix 5). The fact that different types of costly goods have different relationships with proximity to the main house suggests that access to certain goods may have been determined more by household composition -- and the signaling strategies of individual slaves comprising a household -- than by a household's location within a plantation. Although the overall regional pattern is that costly button consumption is not linked to proximity to a main house, the discard rate of fashionable buttons were quite high at *Building l* located near main houses. *Building l* was likely inhabited by young men at some point during the 1790s. Since the overall trend tells us that a slave's consumption of buttons was not influenced by their proximity to a mansion, this exception may be telling us that high levels of button consumption are indicative of households comprised predominantly of socially and economically competitive young men as supported by the fact that documents tell us buttons were used predominantly on male clothing.

The significant positive relationships between refined teawares, Chinese porcelain tablewares and a structure's proximity to the mansion may indicate that different kinds of households dominated areas around the main house. Many of the skilled positions within a mansion or its surrounding dependencies were allotted to women. Seamstresses, cooks, house maids, nursemaids, and laundresses often had considerable access to their owner and his family. At Monticello, almost every female member of the Hemings family had prominent roles running and maintaining Jefferson's household (Stanton 2000). Skilled women whose work was valued or trusted by their owner may have put them in the position to receive ceramics not given to other slaves. It is also possible that their work provided them with some discretionary income that they then invested in ceramics for

their families. The strong positive relationship with these costly ceramics may well indicate that the items in many of the households surrounding a mansion were the result of women's labor and may point to female-headed households or to households in which women had long-term relationships with skilled males. I explore these possible household arrangements more thoroughly in Chapter 7.

Model 4: Proximity to Urban Center and Time

As discussed in Chapter 5, the relationship between time, a structure's proximity to an urban center, and refined ceramic abundance could only be measured for subfloor pit assemblages. The abundance of creamware teawares was positively and significantly influenced by a slave's proximity to an urban center (Appendix 20.1, 20.2). All refined teawares, regardless of ware type, have a moderate positive relationship with being near a cosmopolitan area (Appendix 20.1, p=.14). Use and discard of Chinese porcelain teawares was positively impacted by the progression of time but had no significant relationship with distance from an urban center. Time and proximity to an urban center had no significant relationship with the use and discard of delft or white salt glaze teawares.

The use and discard of creamware and pearlware tablewares had significant positive relationships with both time and proximity to large towns or cities (Appendix 20.2). More moderate positive relationships also occurred between urban proximity and delft and white salt glaze tablewares. Time was not a significant factor in the abundance of these two ware types. As with teawares, Chinese porcelain tablewares had a positive relationship with time but no significant relationship with distance from an urban center.

Model 5: Presence of Owner and Time

Subfloor pit assemblages could only be used to test the relationship between the abundance index scores, time and owner presence. The abundance of all teawares, whether grouped together or separated by ware types, had no significant positive or negative relationship with the presence of an owner. In addition, all refined teawares, Chinese porcelain teawares, and creamware teawares were the only categories with significant positive relationships with time (Appendix 21.1, 21.2). In addition, only pearlware tablewares had a moderate positive relationship with owner presence (Appendix 21.2). Only all refined tablewares as a group and creamware and pearlware tablewares had a significant positive relationship with time. The fit of the Chinese porcelain model was questionable, and therefore the results were disregarded.

I illustrated above that all categories of buttons had significant negative relationships with owner presence, meaning that they were more likely to be acquired and displayed when owners were absent. I suggested earlier that a slave's ability to consume costly goods may have increased with an owner's absence as there may have been less control on the plantation. If this were the case, we would expect to see the consumption of ceramics also increase when an owner did not live near or on the plantation. If the consumption of ceramics is not linked to an owner's absence but the consumption of buttons is, it may highlight the ability of some men to be more mobile with regularity. Mobility offered a range of rewards, especially for those who could distinguish themselves in the more competitive environments off the plantation.

Model 6: Thomas Jefferson, owner, and Time

This model produced different results for plowzone and subfloor pit contexts. For plowzone assemblages, only pearlware teawares were positively affected by Jefferson ownership (Appendix 22.1). However, the consumption of all types of refined tablewares, as well as specifically the use and discard of creamware and pearlware tablewares, were positively correlated with Jefferson ownership. The use and discard of Chinese porcelain, delft and white salt glaze teawares and tablewares had no significant relationship with Jefferson.

Being owned by Thomas Jefferson negatively impacted the amount of refined ceramics discarded in subfloor pits (Appendix 22.2). The discard rates of all refined teawares as a whole, and creamware and Chinese porcelain teawares, were negatively impacted by Jefferson ownership. The consumption of delft and white salt glaze tablewares were also negatively influenced by Jefferson ownership. This last relationship may be a factor of time, since region-wide consumption of these ware-types was in steep decline by the time that Jefferson owned sites in this study were occupied.

Plowzone assemblages, on the other hand, produced a number of positive relationships with Jefferson ownership. Note that a similar pattern was true for many of the button analyses, where discard in plowzone was positively correlated with Jefferson and discard into subfloor pits had either no or a negative relationship with Jefferson. This may be related to abandonment processes at Monticello, where occupation zones developed around a house during throughout its lifetime. When these houses were abandoned, and subfloor pits filled in, residents may have taken most of their items with them. This seems likely for the Mulberry Row sites, with the exception of Chinese

porcelain which remained in high quantities in the subfloor pits from *Building o* and *Building s*. At Mulberry Row sites, the relatively clean subfloor pit fill may reflect the popularity of creamware and pearlware, ceramic wares that slaves may have chosen to keep. The presence of whole Chinese porcelain plates in the subfloor pit fill of *Building o* may reflect a household's decision, when forced to abandon their house, to leave heavy porcelain behind, opting to perhaps remove the more fashionable and lighter weight pearlwares and creamwares.

Patterns among Sites: Principal Component Analysis of Tea and Tableware Residuals

Principal component analysis once again helps us understand the similarities and differences in the consumption of costly refined ceramics among these structures. This PCA uses the Pearson residuals from the bivariate temporal regression models (where x=MCD and y=AI). In the plowzone model, the first principal component accounted for 48.4 percent of the variation in the data while the second principal component accounted for 31.7 percent of variation. Eigenvectors indicate that the consumption of white salt glaze tea and tablewares and delft tea and tablewares are related. This is a temporal relationship since these are the earliest refined ware types with manufacturing spans solidly in the mid-eighteenth century. The remaining ware types group together near axis one but they vary slightly along axis two, with all tablewares, all teawares, and all creamware tablewares clustering together. Pearlware teawares and tablewares and all Chinese porcelains cluster just below zero on axis two (Figure 6.3).

Building o's and *Building l*'s strong positive positions along axis one indicate that the plowzone around these buildings have larger than expected quantities of Chinese

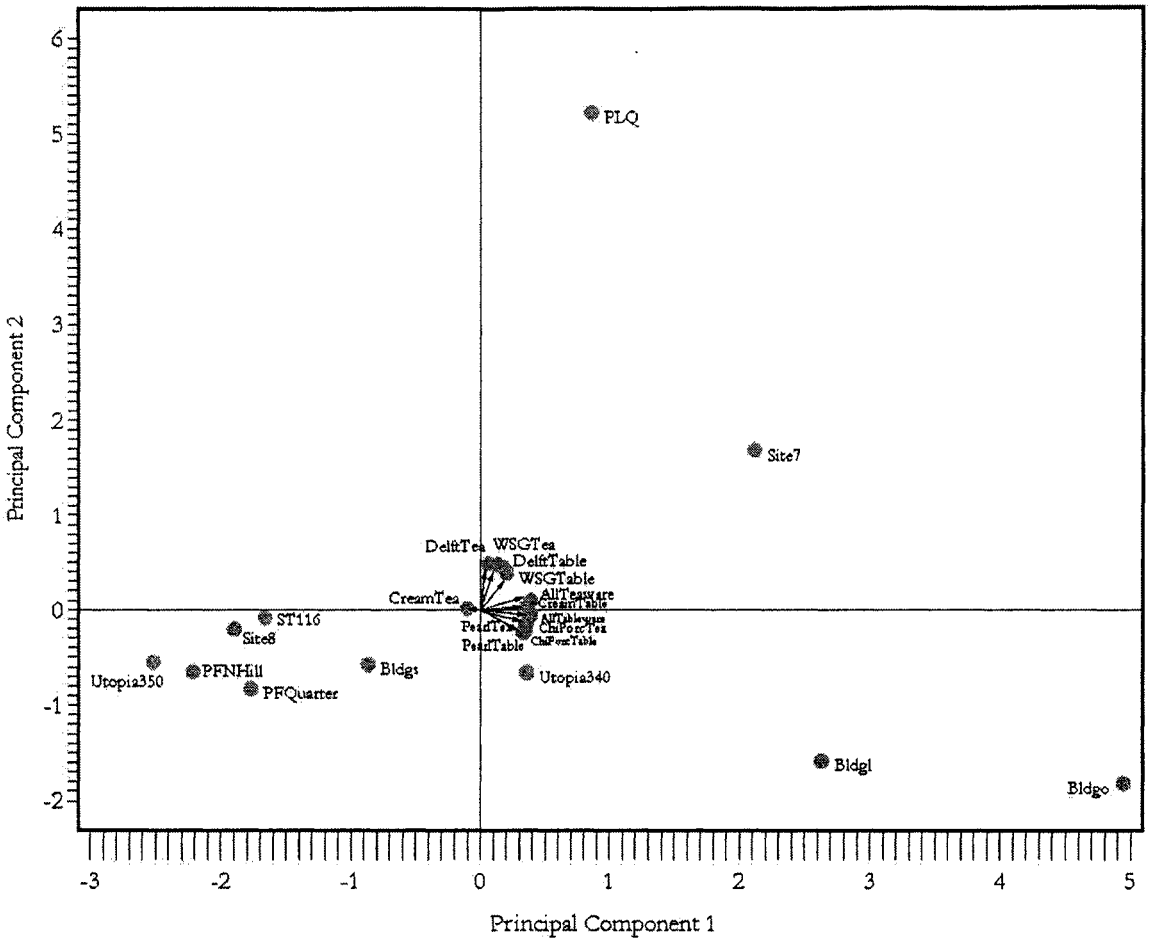


Figure 6. 3: Principal component analysis for artifact residuals from the Wine Bottle Index for tea and tablewares from plowzone contexts where x=MCD and Y=AI.

porcelain. Unexpectedly high discard of white salt glaze and delft tablewares, and the relative lack of creamware teawares, contribute to the high positive positions of Palace Land's and Site 7 along axis two.

The Poplar Forest Sites, ST116, Utopia 3-50, Site 8 and Building s all consistently under-consumed refined ceramics of all ware-types and forms. Once again there is a clear opposition between Utopia 3-40 and Utopia 3-50, two contemporary sites with strikingly different consumption strategies. All analyses in this study show that these two

contemporary sites, separated by little over 100 feet, are radically different in regards to their consumption of buttons and refined ceramics. Chapter 7 provides a closer look at this opposition and suggests that residents at Utopia 3-40 may have been members of an overseer's family.

The negative positions of the Poplar Forest sites on axis one are also striking. People living at these sites were exceptional consumers of flashy, fashionable buttons and yet they used and discarded much fewer refined ceramics than the model anticipates. If we accept that buttons are predominantly related to male activities, this may be evidence that individual or household signaling strategies at Poplar Forest focused on men's mobility and their ability to make connections outside of the plantation. Labor and its resulting financial resources may have been invested in dressing men in a manner that eased their way into the world outside of Poplar Forest, thereby making them more competitive in both economic and social interactions.

Principal component analysis using residuals for the subfloor pit models brings more complexity to these relationships when the influence of consumption at the Utopia sites is introduced (Figure 6.4). In this analysis, the majority of variation in the subfloor pit datasets is captured by three axes instead of two. Principal component one accounts for 47.2 percent of the variation, principal component two accounts for 14.3 percent and principal component three accounts for 12.6 percent. People living at the Palace Lands Quarter, Utopia 3-40, and Richneck had white salt glaze and delft tea and tablewares in quantities that exceeded the expectations of the model (Figure 6.4). Utopia 4-140 stands out for its high discard of Chinese porcelain tea and tablewares while *Building s* contained many more pearlware teawares than expected.

The patterns for Utopia 3 and Poplar Forest sites seen in this subfloor pit biplot are identical to those seen in the plowzone biplot. Once again, the Poplar Forest sites consumed less pearlware and Chinese porcelain tea and tablewares than anticipated by the model. Utopia 3-40 and Utopia 3-50 are on opposite sides of the biplot indicating that the consumption of refined ceramics at these sites was quite different. These compelling patterns will be further explored in Chapter 7.

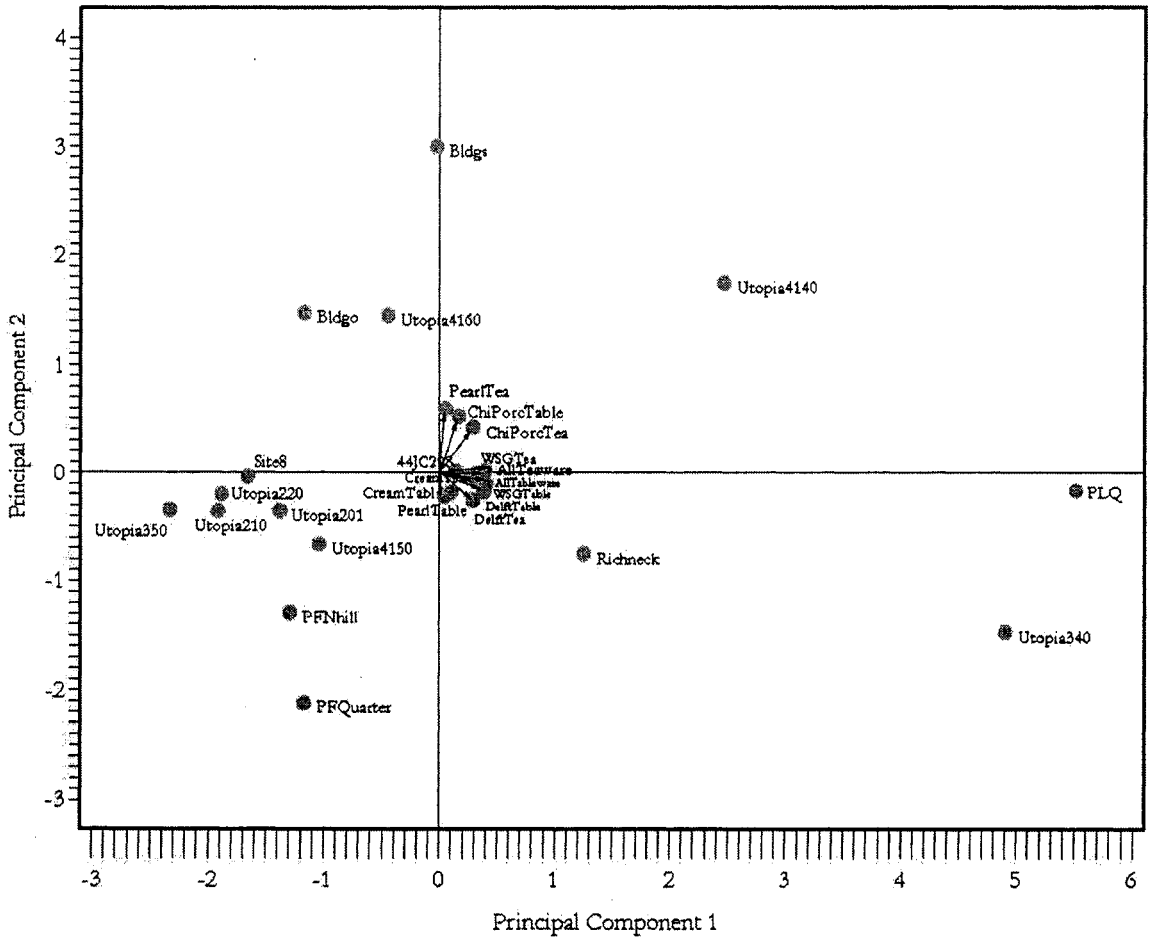


Figure 6. 4: Principal component analysis for artifact residuals from the Wine Bottle Index for tea and tablewares from subfloor pit contexts where x=MCD and Y=AI.

Conclusions

The fine-grained investigation of metal button and refined ceramic consumption has demonstrated that slaves throughout the eighteenth-century Chesapeake were participating actively in costly signaling and social advertising. Men and women increased their consumption of these costly goods at rates that exceeded falling prices associated with changing styles and fashions. Male slaves living on agriculturally diversified sites as well as near urban centers found ways to acquire large yellow and white metal buttons. They most likely attached these buttons to jackets and frock coats, such as the "dark coloured jacket with vellum button holes" that Tom took with him when he ran away from his owner in Georgia (White and White 1998:14). The increased use and discard rates of small yellow buttons suggest that even if some slaves, such as those at the North Hill site, did not invest as heavily in large, highly visible metal buttons, they were still investing in fashionably-colored metal buttons that may have adorned garments such as the "fine Cloth Pompadour waistcoat" that was taken by Baccchus, an Augusta County, Virginia runaway (White and White 1998:12).

The significant associations between the consumption of fashionable and highly visible metal buttons and signaling model variables such as agricultural diversification and proximity to urban center provide provocative evidence for male signaling strategies within certain households. Diversification offered some slaves more time to earn money and gave many male slaves mobility outside of their home farm quarter. Proximity to urban centers not only inspired signaling through the promise of large and diverse audiences that provided gave higher payoffs to fashionable and costly displays, but it also gave slaves access to the material and cultural tools necessary to succeed in their costly

displays. High use and discard rates of these buttons, as well as evidence for the wasteful turn-over of usable but unfashionable buttons, indicate that men who were able to sustain the costs of fashion did so because there were compelling rewards for this expenditure. Drawing on the work of Heath (2004a) and de Vries (1993) and well as recent research on male signaling strategies (McGuire and Hildebrant 2005), it is likely that men who acquired these buttons were either single, young men able to reap the social benefits of successful displays or established skilled slaves in relationships with skilled women, which allowed a kin-based household to bear the costs of button acquisition while benefiting economically from productive signaling.

Artifact patterns at these 19 structures also indicate that slaves consumed refined ceramics in ways similar to rural Virginians (Martin 1994). Some women and men chose expensive ware-types in teaware forms, which gave them the ability to display the most current fashions without spending the almost certainly prohibitive amount necessary to set an entire table with dining vessels. Akin to the disposal of usable but unfashionable white metal buttons, these households pursued costly teawares when much less costly tablewares were available. Households located near main houses were particularly likely to consume costly teawares, suggesting that skilled women working in the main house or its dependencies had more control over the economic choices made by their families.

The following chapter takes these analyses one step further by investigating the correlations between the consumption of buttons and refined ceramics when time is held constant. Specific consumption strategies as well as previously unidentified household contexts become clear when these different costly signaling displays are compared.

Chapter 7: Consumption and gendered display among slaves in the eighteenth-century Chesapeake

As the eighteenth century progressed, slaves in the Chesapeake consumed increasingly greater quantities of goods that were not only costly and difficult to procure but that were also likely not part of regular provisions distributed by an owner. Across the region, slaves were aware of changing material fashions and found ways to possess clothing buckles, stylish metal buttons, and expensive refined tea and tablewares. Increasing discard rates of these artifact-types translates to increased acquisition costs through time and indicates that slaves were investing more physical and financial resources in the acquisition of non-essential goods for themselves and their household.

The increase in the use and discard of items ideally suited to social advertising fits with the expectations of the signaling model proposed in Chapter 3. A number of key historical variables converged in the late eighteenth century as population growth stimulated the expansion of urban centers. Economic vagaries forced many farmers and plantation owners to diversify their agricultural operations. These changes expanded the economic and social opportunities for all people including slaves. Diversification gave some slaves mobility and occupational skills that increased their chances of visiting or working in cosmopolitan areas. Increased access to markets and greater quantities of goods made even the least competitive person a viable consumer. As populations grew, the benefits received from successful costly signaling increased, which in turn spurred further investment in expensive and fashionable goods as a way to maintain the signal. Many men and women were able to bear the growing costs of maintaining meaningful

and reliable signals; others, perhaps due to age, childrearing, or other social and environmental factors, were not.

Patterns in the abundance index scores and principal component analyses for metal button and refined ceramic categories suggest that certain households, while contributing to the broader regional and temporal consumption trends, had clearly different signaling strategies. When possible, individual slaves chose costly and fashionable goods to express their personal aesthetics, their knowledge of popular fashions, and to communicate in specific ways with other individuals. A slave's ability and motivation to signal with costly goods was in part influenced by the historical, temporal and spatial variables in the signaling model. Signaling strategies were also influenced by age, gender, marital status and household living arrangements, elements of an enslaved person's life that are nearly impossible to measure. Implicit in these immeasurable variables are the various experiences of a kin-based household, from its initial formation and the birth of children to the strains of long-term relationships and the effects of aging. Slave households were also exposed to the tremendous uncontrollable strength of an owner, who could instantly shatter its balance through the forcible removal of individual members. All of these possible events in a household's life cycle should have some visible impact on the manner in which artifacts pattern across sites.

Beyond the regional consumption trends, principal component analysis provides a close look at signaling strategies among sites which suggest that certain types of households consumed costly goods in relatively predictable ways. Principal component analysis that includes the Pearson residuals for both costly buttons and refined ceramics reveal household-specific variables that cannot be detected using the regional signaling

model. The biplots presented below provide evidence for four different signaling modes among the 19 structures in this study.[19] Data from both plowzone and subfloor pit assemblages present nearly the same striking patterns: the consumption of metal buttons is not correlated with the consumption of refined ceramics. These results indicate that slaves who consumed large quantities of metal buttons tended not to invest in refined ceramics while slaves that acquired refined ceramics tended not to acquire metal buttons. As slaves made personal decisions about which costly goods to purchase or in other ways acquire, they had distinctly different, yet perhaps predictable, motivations for doing so. Significantly, the biplots indicate that the acquisition of costly goods was not the result of random, unknowable variables but was instead shaped by specific historical and environmental factors. The remainder of this chapter presents the four consumption groups and demonstrates how signaling theory can illuminate the factors that contributed to a household's inclusion in a specific consumption group. It concludes by discussing future research goals for the comparative exploration of slavery in general and consumption-driven signaling systems in particular throughout the greater Chesapeake region.

Plowzone Principal Component Analysis for Refined Ceramics and Buttons

The principal component analysis for plowzone included the Pearson residuals for all button and refined ceramic categories except for the residuals for creamware teawares, which were removed because they were exceptionally small (between -0.000003831 and -0.000001510). The residuals for delft and white salt glaze tablewares were derived from

[19] These biplots were generated using principal component analysis on Pearson residuals from the refined ceramic and button negative binomial regression models (where x=MCD and y=AI).

the quadratic temporal model used in Chapter 6 where x_1=mcd x_2=mcd*mcd and y=AI. The majority of the variation in these plowzone data was accounted for by three principal components: the first principal component accounted for 35.7 percent of variation, the second principal component 33.2 percent and the third principal component 12.7 percent of the variation in the data. It is first important to note how the scaled eigenvectors or coefficients for each artifact category are arrayed on the biplot (Figure 7.1). The coefficients for early refined ceramics, represented by delft and white salt glaze tea and table wares, cluster together while the later, more costly refined ceramics, which include creamware, pearlware, and Chinese porcelain tea and table wares, form a second group. The coefficients for all categories of buttons form a third group. Each cluster represents a group of goods whose consumption is positively correlated. The fact that the use and discard of buttons and later refined ceramics have no correlation suggests that slaves who invested in one type of costly item tended not to invest in the other. Here we see that slaves either invested in costly metal buttons or expensive refined ceramics but rarely did they invest in both. This is an extraordinary result with most sites falling cleanly into one consumption category or the other.

The coefficients from the plowzone assemblages form four general groups that give us clues to the consumption strategies at work at each site when time is held constant. The first consumption group is comprised of the Poplar Forest sites, whose residents clearly consumed many more buttons than anticipated by the temporal model. Slaves at Poplar Forest also consumed far fewer refined ceramics than expected by the temporal model, as seen in their Pearson residuals and as represented by the eigenvectors (Appendix 23). Residents at Utopia 3-Structure 40 did not consume as many delft and

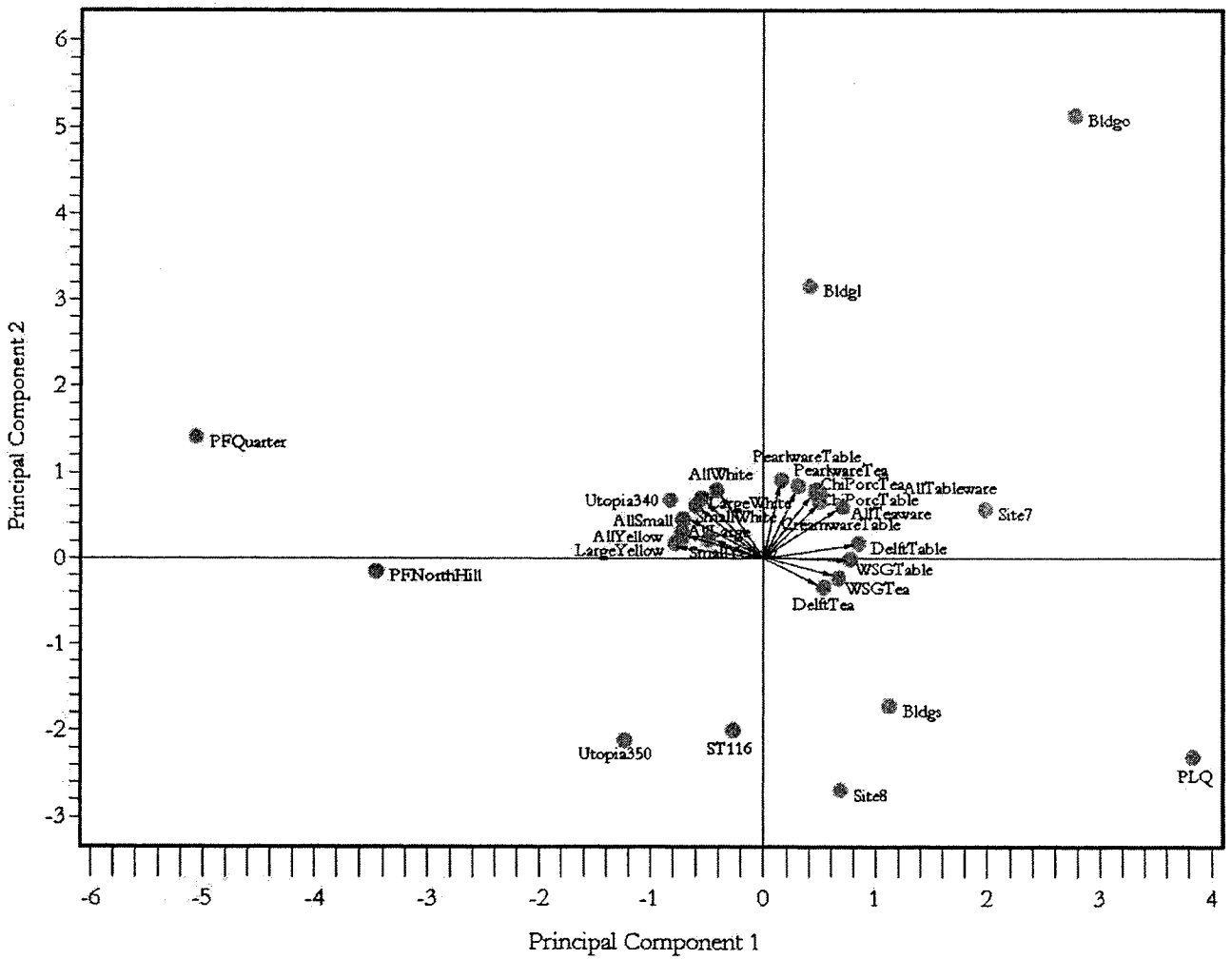


Figure 7. 1: Principal Component Analysis for Artifact Residuals from Wine Bottle Index for all Button and all Refined Ceramic Categories from plowzone contexts where x=MCD and Y=AI.

white salt glaze vessels as expected for its mean ceramic date and its high discard of metal buttons aligned it with the Poplar Forest sites.

Slaves living in structures in the second consumption group manifest in the plowzone data are distinguished by their consumption of costly refined wares. *Building o* is distinct from other sites based on its residents' preference for pearlware and Chinese porcelain forms. Site 7's position on the biplot is determined by the combination of relatively high consumption of all teaware forms and creamware tablewares. Both of these sites are distant from those sites that consumed large quantities of buttons.

Although it might be argued that *Building l* falls into consumption group two, a look at its associated Pearson residuals indicates that its placement on the biplot is the result of high levels of refined ceramic consumption as well as fairly high button consumption. *Building l*'s assemblage is characterized by 16 positive Pearson residuals out of a possible 19. Site 7 and *Building o* are tied for second, each having 11 positive residuals out of a possible 19. *Building l* thus falls into is own signaling category distinguished by the consumption of both buttons and refined ceramics beyond the expectations of the temporal model.

The fourth and final consumption group is comprised of households whose consumption of both buttons and refined ceramics fall well below the expectations of the temporal model. Residents at Utopia 3-Structure 50, ST116, Site 8, and, surprisingly, *Building s* did not consume refined ceramics or buttons to the degree expected by the temporal model. *Building s*'s position on the biplot is surprising since it appeared to have relatively high abundance index scores for buttons and refined ceramics. However, when

time is removed from the model, the principal component analysis indicates that *Building s* residents were, in fact, not consuming either costly item at an extraordinary rate.

Subfloor Pit Principal Component Analysis for Refined Ceramics and Buttons

The principal component analysis for subfloor pits included creamware teawares and used the linear temporal model for delft and white salt glaze tablewares. The first principal component made up 40.5 percent of the variation in the data while the second principal component made up 21 percent of the variation. The subfloor pit principal component biplot demonstrates that the scaled eigenvectors or coefficients for the artifact categories cluster into two different groups instead of three, with the button eigenvectors forming one group and the refined ceramic eigenvectors forming a second (Figure 7.2). The lack of correlation between metal buttons and refined ceramics along axis two is once again exciting confirmation of two very different consumption strategies at work at these sites.

The four basic signaling groups represented in the plowzone biplot are also present in the subfloor pit principal component analysis. Group one, again distinguished by the consumption of all categories of buttons, includes both Poplar Forest sites and the Richneck quarter. It could be argued that Utopia 2-Strucure 20 is on the outskirts of this group, with it very low refined ceramic consumption and solid positive residuals for all categories of yellow metal buttons and button size (Appendix 24). The use and discard of buttons at these four sites exceeds the expectations of the temporal model.

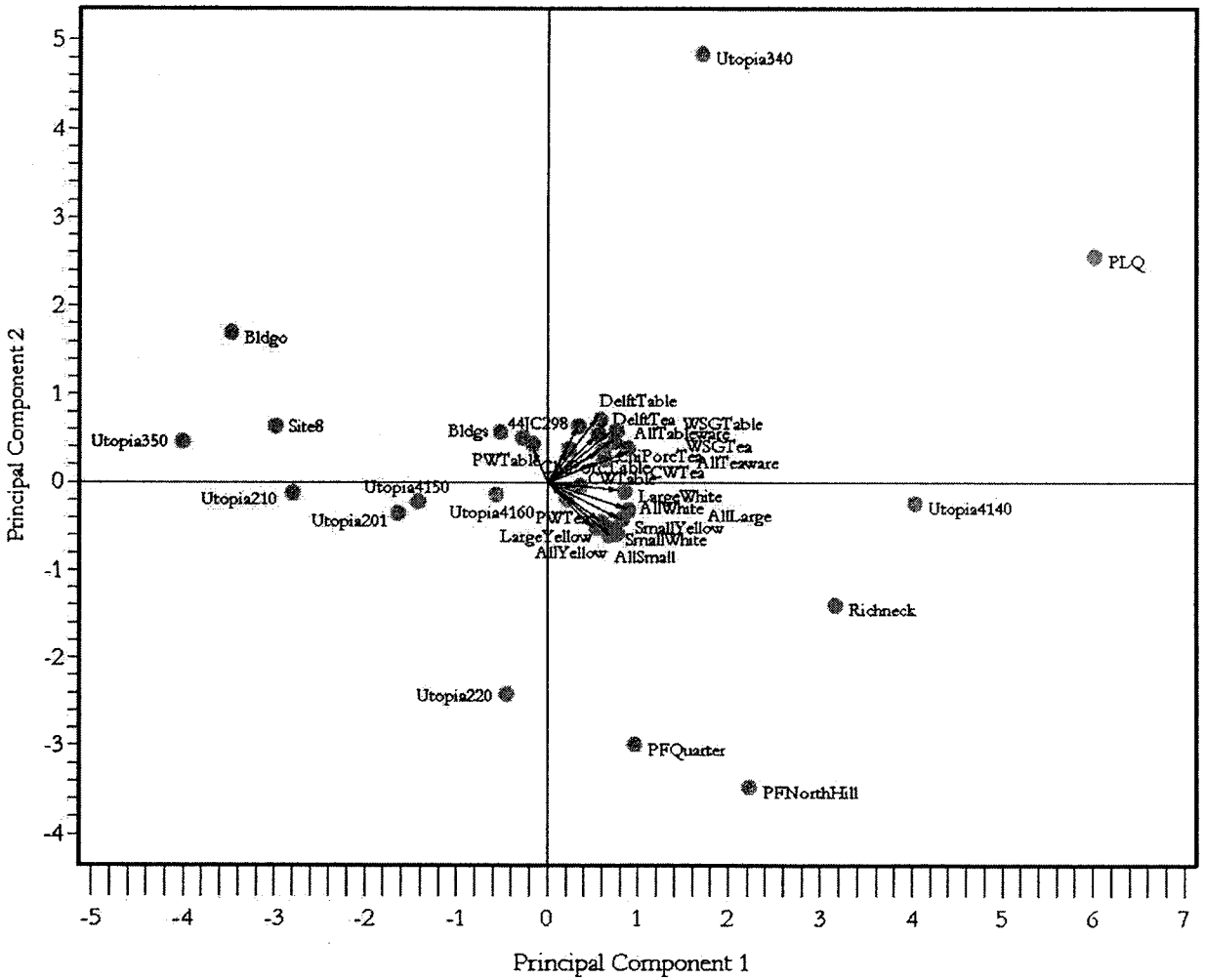


Figure 7. 2: Principal Component Analysis for Artifact Residuals from Wine Bottle Index for all Button and all Refined Ceramic Categories from subfloor pit contexts where x=MCD and Y=AI.

In this analysis, Utopia 3-Structure 40 was the only site in consumption group two. Its residents consumed greater than expected amounts of delft and white salt glaze tea and tablewares as well as all tea and tablewares regardless of ware type. Unlike the plowzone analysis, *Building o* is absent from this group, its residuals from the subfloor pit models placing it in group four.

Like *Building l* in the plowzone biplot, residents of the Palace Lands Quarter and Utopia 4-Structure 140 are distinguished by their exceptional use and discard of both refined ceramics and buttons. Structure 140 is distinguished by positive residuals for all categories of metal buttons as well as positive residuals for Chinese porcelain and white salt glaze tea and table wares, delft tablewares and all tea and table wares regardless of ware types. Button use and discard for Structure 140 is particularly high and contributes to its position directly between the button and refined ceramic eigenvector clusters. Slaves living at Palace Lands were strong consumers of almost all categories of buttons except small white metal buttons, and they also acquired all refined ceramic wares and forms except for pearlware. This site had 16 positive residuals out of a possible 20.

Consumption group four was once again made up of those households whose consumption of refined ceramics and buttons fell below expectations when time was held constant. Utopia 4-Structure 150 and Structure 160, Utopia 2-Structure 01, Structure 10, and Structure 20, Site 8, Utopia 3-Structure 50, 44JC298, *Building s* and *Building o* had negative residuals for both buttons and refined ceramics. *Building o*'s slightly positive placement along axis two appears to be influenced by the high positive residuals for Chinese porcelain and pearlware. Taphonomic processes involved in filling pits needs to be considered when interpreting these data, especially when radically different results are

seen for plowzone assemblages, as is the case for *Building o*. The subfloor pit residuals for Utopia 3-50, *Building s*, and Site 8 also fell into the same pattern observed in the plowzone principal component analysis.

These compelling consumption patterns are the result of the choices made by both individuals and households. I suggest that each group provides clues to specific household arrangements that have not been identified previously in documents or the archaeological record. What prompted slaves to pursue the acquisition of costly goods in these specific ways? Signaling theory provides some persuasive explanations for the motivations and mechanisms behind the composition of each group.

Consumption Group 1: Signaling with buttons

Investment in male signaling through clothing displays may have been selected in several household contexts. Heavy investment in buttons and lack of investment in refined ceramics may point to dwellings that were occupied primarily by adolescent boys or young adult men. Documents indicate that sex ratios at the Richneck quarter in the late 1760s favored men (Franklin 2004a). The architecture at Richneck, distinguished by multiple subfloor pits opened and filled at different points throughout the life of the building, suggests that individuals or small groups of slaves came and went with some regularity. Men at Richneck lived about 1.5 miles from the center of Williamsburg, where markets, stores, and large, relatively unknown audiences provided numerous opportunities to make friends, meet potential mates, and to enter into economic relationships. Fashionable clothing, adorned by buttons, indicated that the wearer had the skills to acquire goods not provisioned by their owners. Jackets and vests with matched

sets of buttons or large bright buttons may have set their wearer apart from others or served as a way to identify compatible people. Beyond their use for adornment and self-presentation off the plantation, buttons may have established, or reinforced, a person's position within non kin-based, uncooperative households.

Residents at the Poplar Forest Quarter and North Hill sites consumed more metal buttons than any other household in this study. Although we don't know who lived in these houses, there is evidence that about 15 unmarried men and 19 unmarried women between the ages of 15 and 25 lived at Poplar Forest during the early 1790s and 1800s (Heath Slave Database 2005). In light of this uneven sex-ratio, young men at Poplar Forest may have used buttons as part of a signaling system that appealed to women living both on and off the plantation. In 1823, well after the abandonment of the North Hill site and possibly around the time that the Quarter site was abandoned, four men between the ages of 19 and 29 were convicted of attacking an overseer at Poplar Forest (Heath 1999a). These men were sold to New Orleans but their collective action raises the possibility that signals which communicated independence and a willingness to take physical and emotional risks were crucial means for organizing different types of collective action. As we saw in Chapter 2, unrelated slaves also came together with some regularity to runaway and rebel (Johnson 1981). Costly and highly visible items such as buttons may have communicated a slave's ingenuity, ability, and motivation to circumvent an owner's or overseer's direct control, attributes that may have been valued when seeking partners for resistance and rebellion.

Some women also lived at Richneck and it is likely that women also inhabited one or both of the Poplar Forest quarters. At Richneck, these women and their families may

have lived in one half of the duplex while the other half was occupied by mobile, unattached men. In the future, finer grained analysis will be conducted to see if buttons and refined ceramic consumption can be refined for each duplex half. Even though women most likely lived in these quarters, slaves there invested significantly in buttons used on male garments as opposed to refined ceramics. This strategy may well indicate that the success of men within and outside of these quartering areas provided all residents with benefits that made allocating resources to men the optimum strategy.

It may be that sites that fall into the all-button consumption group were primarily inhabited by young or unattached men. If this is the case, we may be seeing evidence for the persistence of all male households throughout the eighteenth century. To date, most archaeological and historical research has focused on what is perceived as a relatively straightforward shift from single-sex or co-residential barracks to established kin-based households. Little attention has been paid to the possibility that, despite dramatic changes in the nature of slavery, specific household contexts persisted as a result of their utility. To date, identification and discussion of dwellings that housed the ever-changing populations of young unmarried men or men who had marriages or partnerships off their home plantation has received little attention. Similarly, buildings that housed groups of mothers and their children who had been separated from their husbands would not be unexpected. Identifying sites that are distinguished by their consumption of buttons to the near exclusion of refined ceramics may help archaeologists better understand the distribution and form of these household contexts.

Consumption Group 2: Signaling with refined ceramics

Unlike the first consumption group, residents at Utopia 3-Structure 40, Site 7, and *Building o*'s acquired refined ceramics in such large quantities that these structures are very different from those quarters that consumed primarily metal buttons. Residents at Utopia 3-Structure 40 used and discarded white salt glaze and delft tea and table wares and invested in Chinese porcelain tea and table forms. Although Structure 40 fits best with this signaling group, it also had high positive residuals for all large, all yellow, and all large yellow metal buttons from plowzone contexts. Those living at Structure 40 had access to expensive yellow buttons as well as fancy Chinese porcelain tea and tablewares at a time when these items would have been the most costly. In all of the principal component analyses in previous chapters, Structure 40 is in direct opposition to Structure 50, which contains very few artifacts in relationship to wine bottle glass. Structure 40 is also very different from every other Utopia dwellings. Clearly, people living in Structure 40 had a significantly different consumption agenda when compared to other consumers living with the Utopia quarters. In his dissertation Garrett Fesler suggested Structure 40 was occupied by a female-headed household of related people (Fesler 2004a:394). His assumption is that families should appear more prosperous in the archaeological record as a result of the competitive pooling of resources. Heath (2004a), on the other hand, has shown the inability of kin-based households with children to participate in the cash economy within Monticello, suggesting that kin-based households with children may not have had the ability to acquire goods outside an owner's provisions. Signaling theory also contradicts Fesler's suggestion by arguing that costly display is based on the strategic needs of the individuals in that household. A co-residential household may, in

fact, have more costly goods since it is made up of unattached people who may have had more time, money, and energy to invest in their clothing and appearance than individuals with children for whom to care. Unattached people may have more incentive to use costly goods in signaling systems and could receive bigger payoffs for successful signaling in the form of economic and social connections. Individuals working together as a household could also be very successful in their acquisition and display of costly goods, as we'll see in the following section. However, it should not always be assumed that high rates of consumption are signs of kin-based households.

Although the presence of three large subfloor pits, as opposed to many more pits constructed during different occupational phases does point to a more stable household, Structure 40 is significantly different from every other slave quarter at Utopia. I suggest that Structure 40, so strikingly different from Structure 50 and other Utopia quarters, was occupied by the families of either a white overseer or an enslaved driver. The existence of three large pits, each of which cut the others, indicates that there was turnover in the occupants of the building. However, the fact that only one pit was used at a time suggests that a cooperative household lived in the building. The size of the structure is large for a single family and may have served to distinguish architecturally an overseer or driver from those living in neighboring buildings. Unlike structures at Utopia 2 and Utopia 4, which are clustered within 20 to 40 feet of each other, Structure 40 and Structure 50 are separated by nearly 100 feet. When these architectural features are combined with the artifact data, it becomes clear that this building is an outlier on the Utopia landscape.

The subfloor pit assemblage from Structure 40 demonstrates that it was the only Utopia household that consumed refined ceramics at a higher than expected rate. These data, when combined with the positive correlation of Structure 40's plowzone assemblage with buttons, point to a household with very different signaling strategies than other Utopia households. The architecture and artifact assemblages at Structure 40 may suggest that an overseer or driver and his family lived in this building. Although frequently poor, overseers also rarely stayed in one job for more than a year or two. Living near Williamsburg, an overseer would have had ample opportunities to meet potential future employers. Displaying costly and fashionable yellow buttons may have been one way to indicate reliability, to demonstrate that one didn't spend all disposable income on drink or tobacco. Overseers with wives may have allowed them to furnish their house with some pieces of Chinese porcelain. It is probable that white women living within 1.5 miles of Williamsburg had more opportunities to receive visitors and it is feasible that the women living at Utopia 3-40 occasionally had visitors that warranted the use and display of expensive teawares.

Building o residents used and discarded the largest quantities of creamware, pearlware, and porcelain. Similar to Utopia 3-40, this structure also had positive residuals for the consumption of all white buttons, although these residuals were not high enough to push this site into the third consumption group. Residents at *Building o* had access to refined ceramics in greater quantities than other residents along Mulberry Row. High refined ceramic consumption and low metal button consumption may indicate an established household with no or few young males. This household may have been headed by women or included men who had no need for signaling through clothing.

Since the *Building o* site most likely had two architecturally distinct occupations, the discard rates of white buttons may also be from an earlier male occupation that was short-lived enough to not change *Building o*'s position on the combined biplot.

Consumption Group 3: Signaling strategies with buttons and refined ceramics

Three sites in this study are characterized by higher than expected consumption of both metal buttons and refined ceramics. The residents of *Building l*, the Palace Lands Quarter, and Utopia 4-Structure 140 possessed a number of unique attributes that may have been essential to their ability to acquire both types of costly goods. The Palace Lands Quarter is the only site located on the outskirts of a city, having been located about .8 miles from the center of Williamsburg. The presence of a single large subfloor pit (MCD=1761, TPQp90=1762) suggests that a single family, or otherwise socially and economically cooperative group of people, lived at the quarter (for more on subfloor pits and household formation see Neiman 1997, 2005; Fesler 2004a, 2004b, and Galle 2003). Here we see high levels of metal button consumption, which may have been worn by the men in the household who had frequent opportunities to move throughout Williamsburg. The Pearson residuals indicate that slaves who were living at the Palace Lands Quarter discarded greater quantities of delft and white salt glaze tablewares while also investing more heavily in creamware and Chinese porcelain teawares relative to wine bottle glass. As more popular refined wares, such as creamware and Chinese porcelain came on the market, were introduced residents at Palace Lands acquired tea forms in these costly ware-types. As Martin (1994) has pointed out, although the expense of setting a table with these wares was prohibitive for most, acquiring them in tea forms allowed for

entertaining and social display on a smaller scale. Women living at Palace Lands acquired the most expensive refined teawares, items that were for costly social advertising to other individuals in a relatively populated area. Palace Lands may be representative of a more urbane household, comprised of men and women, who took advantage of signaling opportunities both inside and outside of their dwelling.

Building l at Monticello provides an alternative example of how a household that consumed high quantities of both metal buttons and ceramics may have been organized. We can be fairly certain that, throughout much of its occupation, *Building l* was the site of both industrial and domestic activities. At one point, *Building l* was occupied by adolescent boys who worked in the neighboring nailery. Removed from slave households located across Jefferson's plantations to Mulberry Row in the early 1790s, these young men found themselves forced to live and work with other, perhaps unfamiliar, boys. At an age when they were becoming socially active, the young men may have used extra money they earned in the nailery to acquire fancy metal buttons that were then worn at social gatherings both on and off the plantation.

Building l is also distinguished by high residuals for pearlware and Chinese porcelain tea and tablewares. Residents at this building acquired some of the most expensive ceramics. Exploratory research conducted on decorative styles on porcelain found at quarters along Mulberry Row suggests that while one or two decorative patterns are predominant in most Mulberry Row houses, Chinese porcelain at *Building l* was decorated in a variety of styles. This suggests that residents at *Building l* acquired their ceramics in a rather piecemeal fashion, either through personal acquisition or through provisioning. If these ceramics belonged to the young men living for a time at *Building l*,

it may be that the ceramic assemblage was the result of different families sending some pieces of their own collection with their sons when they were moved to Mulberry Row. It is also possible that the combination of high button and high refined ceramics consumption points to two different household occupations. Seriating *Building 1* proved difficult due to the several different excavation seasons conducted at the site by different principal investigators (Scholnick et al. 2001). These biplots may be showing us that *Building 1* was occupied by two different households, a co-residential household of boys who were responsible for the high button consumption and an earlier household, possibly a kin group with strong female members that focused any additional income on the consumption of high-style ceramics.

Utopia 4-Structure 140 was the third quarter distinguished by its high consumption of both buttons and refined ceramics. Slaves living in this duplex were not only consistently strong consumers of all types of buttons but they were also the biggest consumers of refined tea and tablewares at Utopia 4. Structure 140 is second only to Utopia 3-Structure 40 in its consumption of white salt glaze teawares. Residents also used and discarded large quantities of Chinese porcelain teawares, although Structure 160 had slightly higher discard rates of Chinese porcelain tablewares. Each unit in this duplex was smaller than all other dwelling units at Utopia and Fesler concluded from these architectural data that kin-based households occupied both halves of the building. Fesler also suggested that no more than three pits were open in a unit at any one time (Fesler 2004a:413-414). DAACS phasing of the pits suggests a more ambiguous dating sequence and future research will focus on analyzing consumption at this structure by unit, as opposed to the entire structure. Although he uses a different analytical approach

than I do here, Fesler believes that the western unit of Structure 140 has artifacts predominantly related to men. If one saw greater consumption of buttons in the western unit and greater consumption of refined ceramics in the eastern, one might argue that these households were based not on kin but on gender groups.

Sites that fall into this third consumption group may represent a handful of household types. Houses with high discard rates of both types of costly goods located near cities or large towns and those that have only a small number of pits in use at any given time may point to economically and socially successful households. These households may have included men and women with high skill levels. Following Heath's model (2004a), they may also represent kin-based houses with no or few children. The three households in this current study are located within a day's walk to the main house and were located on agriculturally diversified plantations. A careful analysis of occupation phases at each site might also reveal different occupations within the same structure, where high button discard might be attributable to a predominantly male household while high refined ceramic discard may point to a kin-based household that included successful female members.

Consumption Group 4: Least competitive signalers

Slaves at a number of sites had much less access to both costly buttons and refined ceramics than anticipated by the temporal model. These sites include Utopia 2-Structure 1 and Structure 10, Utopia 4-Structure 150 and Structure 160, Utopia 3-Structure 50, Site 8, ST116, *Building s* for both plowzone and subfloor pit assemblages and *Building o*, only for subfloor pit assemblages. Of this group, Structure 50

consistently has one of the strongest negative correlations with the consumption of buttons and refined ceramics. Slaves at this site discarded these items at much lower rates than any other structure in the entire Utopia quartering area. In his dissertation Garrett Fesler proposed that a group of unrelated "co-residents" lived in Structure 50 (Fesler 2004a:394). He argued that kin-related households should have overall better material conditions due to the ability to pool resources. Signaling theory, however, suggests that kin-based and co-residential households might leave a different archaeological signature. If Structure 50 was occupied by a group of unrelated residents, signaling theory would lead us to expect more social competition within that building. As possibly demonstrated by the Richneck and the Poplar Forest sites, it is likely that unrelated individuals interested in attracting available mates and allies at Utopia and in the Williamsburg area would have discarded greater quantities of costly goods. The construction of multiple subfloor pits in Structure 50, many of which cut each other, suggests that people moved in and out of the building. Such movements may have spurred competition for prime sleeping and storage spaces (Neiman 2005). I suggest that this pattern of movement and costly signaling is demonstrated in the principal component analysis for the other Utopia sites that Fesler has categorized as co-residential; Utopia 2-Structure 10, Utopia 2-Structure 01, and Utopia 4- Structure 140 all have architectural evidence for frequent population movements as well as the competitive signaling with greater discard rates of buckles, buttons, and refined ceramics than Utopia 3- Structure 50.

What do the low consumption rates but high incidences of subfloor pitting episodes suggest about Structure 50? First, it may simply be a building that housed

slaves who were frequently rotated through Bray's many quartering sites. It may be that these people were relatively unsuccessful at establishing cooperative personal relationship with others. Second, this dwelling may have been inhabited by a number of families with small children. Small families with just one or two children may not have been given their own housing units and may have been forced to share space with other young families. Fesler indicates that Utopia III was occupied during a period of relative instability for slaves that stemmed from decisions the Bray family made about where slaves should live. A 1745 dowry and ledgers kept by the Brays suggest that families were split, and mothers may have been kept with children (Fesler 2004a:120-129). The archaeological and historical data, when combined with Heath's demonstration that households at Monticello with young children were unable to participate in the cash economy on the plantation, may indicate that Structure 50 was inhabited by couples or single mothers with young children. The 1745 dowry suggests at least one elderly woman was enslaved by the Brays (Fesler 2004a:126). The building may have been inhabited by young families with no additional resources as well as older men and women who spent more time at the quarter looking after children and tending gardens than in the fields.

Finally, the inclusion of *Building s* in this consumption group is intriguing and raises questions about its inhabitants. Although the *Building s* assemblage did not lack fashionable and costly goods, slaves living there were not competitive or conspicuous consumers of these items. The artifact indexes for *Building s*, as seen in the abundance indexes plotted by time presented in Chapters 5 and 6, indicates fairly high discard for all classes of artifacts at *Building s*. When regression is used to hold time constant, however,

it becomes clear that slaves living at *Building s* consumed fewer costly goods than many other slaves in the region. This is a surprising result since it is likely that at least one Hemings family member lived in *Building s*, very possibly Sally Hemings (Stanton 1996). The relative lack of metal buttons, along with the presence of an almost intact French delft (faience) drug jar, which has long been a suggested link to Sally Heming's trip to Paris, may well point to a female-headed household that had few men living in it. If Sally Hemings occupied the structure in the mid 1790s, she would have been recently returned from France. Her first male child who survived to adulthood, Beverly, was born in 1798. Madison and Eston were born in 1805 and 1808 respectively. These boys, who were almost without a doubt fathered by Thomas Jefferson (Neiman 2000; Stanton 2000), would have been too young to wear masculine garments with metal buttons.

During the 1790s and early 1800s, prior to her probable move to a room in the south dependency at Monticello, Sally Hemings may well have dined in the house, the main kitchen, with her mother Elizabeth Hemings, or with neighboring relatives. Elizabeth Hemings appears to have been moved closer to Mulberry Row in time for the birth of Sally Hemings' first child, perhaps suggesting that she was charged with caring for her grandchildren in her old age. The abundance of Chinese porcelain tablewares in Elizabeth Heming's house, and the relative lack of refined wares in general at *Building s*, also contribute to the possibility that Sally, if she lived at *Building s*, may have occasionally dined with her mother. The lack of large quantities of buttons and refined ceramics may well reflect a household with few men whose members spent much of their time with other family members. Testing this hypothesis will require that this analysis

includes sites that we know were headed by women, such as the dwelling that Elizabeth Hemings lived in during her old age.

New Directions for Comparative Research on Slavery in the Chesapeake

While I hope that this study has uncovered a number of useful analytical methods and brought new understanding to the nuances of changing household contexts, many questions remain unanswered and warrant further research. This study raises at least four new directions for future research. Both methodological and theoretical in nature, these themes pursue the promises inherent in broad regional and temporal comparisons that are grounded in the minute details of the archaeological record.

The importance of plowzone: considering the impact of taphonomic processes on data analysis

It is well understood that the taphonomic processes that create plowzone deposits are very different from those that create subfloor pit deposits. How and whether the differences affect data analysis has not been thoroughly explored until now. As the first large-scale comparative study of assemblages from plowzone and subfloor pit deposits, it became quickly apparent that plowzone and subfloor pit assemblages were rarely comparable. More importantly, I discovered that the 11 plowzone assemblages were statistically better behaved than the 16 subfloor pit assemblages, and that plowzone data produced more stable, reliable results across all of the analyses.

This study highlights the need for conscientious and thorough sampling of plowzone before its mechanical removal. Many slave quarter excavations are conducted by cultural resources management firms prior to real estate or transportation

developments. The majority of these projects remove plowzone without testing it, thus enabling the companies to quickly identify features cut into subsoil that are thought to contain the most important archaeological data: large, intact artifacts. However, plowzone deposits provide analytically powerful data that are less influenced by the effects of one-time, possibly post-abandonment filling episodes.

This is not to conclude that digging and analyzing subfloor pit deposits is futile. Rather, archaeologists need to carefully consider how these features are filled, and what the fill may tell us about the last inhabitants of the building as well as the process of pit abandonment. On plantations that have many buildings, especially slave quarters located near each other, one must always consider that the sediment used to fill a pit may have been taken from yards, trash dumps, or unoccupied areas far from the house. The result is that excavated pit fill may have little or no relationship with the activities of the building's residents.

When the contents of a pit are compared to surrounding plowzone or occupation layers, the fill can provide clues to the final choices of that building's inhabitants. However, one must have data from plowzone to be able to see the similarities and differences in the contents of the two deposit types. For example, a large quantity of refined wares and buttons were excavated from the occupational layers surrounding the subfloor pits at *Building o* and *Building s* along Mulberry Row. When compared to these deposits, the subfloor pits in both buildings contain a surprising lack of buttons and refined ceramics sherds. Here we might conclude that some relatively clean sediment was brought from other areas along Mulberry Row to fill the pits after they were abandoned. The lack of relatively whole artifacts also suggests that the final residents of

these structures, or that another person responsible for the buildings after abandonment, removed all items from the pits prior to abandonment and destruction of the quarters.

Five almost complete Chinese porcelain plates found at the bottom of *Building o*'s subfloor pit (F06) present an anomaly. The abandonment of these Chinese porcelain plates in the pit, when few other pits along Mulberry Row contain whole vessels[20], perhaps indicates that *Building o*'s last inhabitants were able to take more popular and less heavy creamware and pearlware vessels. It might also be that the Chinese porcelain plates represent items that had been given to them, rather than items they purchased for themselves. Although these are speculations, the comparison between subfloor pit and surrounding occupation or plowzone deposits is essential to understanding the biases of each dataset.

The need for temporal and spatial diversity

This study has also revealed the analytical need for samples from sites that date to the first half of the eighteenth century. As the largest comparative study of slave quarters throughout Virginia, it is remarkable to see that even data from 19 structures still leave many questions unanswered. As was seen, a number of the regression models had moderate *p-values* that may become significant when data from earlier undiversified sites are available. Until then, we'll only be able to make preliminary statements about the impact of diversification on consumption and signaling strategies. There is also a need for data from sites that were located either in or near urban centers as well as from sites

[20] No other subfloor pits from sites along Mulberry Row that have been analyzed by DAACS contains a similar cache of complete or almost complete vessels. Pits at *Buildings s* and *t* contain fragments of teawares that mend together but these sherds do not indicate that whole, usable vessels were abandoned by the residents.

located at least a day's walk away from an urban center. In the case of this study, only the Palace Lands Quarter and Richneck are located on the outskirts of a city and only ST116 is located over 10 miles away from a large town. Only when data are available from sites located less than one mile or greater than 10 miles away from an urban center will we be able to understand the impact that distance from competitive audiences and urban fashions had on consumption.

Detailed artifact attribute recordation and analysis

A third line of future research requires more detailed analysis of the estimates of discard rates of artifacts with specific attributes. In Chapter 6, logistic regression proved useful in predicting the probability that households would discard usable but unfashionable buttons in favor of more expensive but current fashions. Future research will include using logistic regression to predict the likelihood of having different sized buttons. When combined with the analysis of specific artifact attributes by phase, it may be possible to understand changing investments in different types of garments. Looking for matching buttons can also help in understanding if buttons were acquired gradually or one at a time.

Detailed stylistic element analysis of decorative patterns on refined tea and tablewares are another important avenue of future research. Preliminary research using the DAACS Stylistic Element Initiative,[21] has demonstrated marked variation among band patterns painted on Chinese porcelain sherds found at five Mulberry Row slave quarters. At *Building o*, trellis bands dominated the assemblage of decorated Chinese

[21] See http://www.daacs.org/aboutDatabase/stylisticElements.html for more information on the DAACS Stylistic Element System.

porcelain sherds with plain bands, geometric bands, and spearhead bands also enjoying popularity. Although trellis and plain bands were found at *Building l,* they made up a much smaller percentage of the Chinese porcelain band patterns. More significantly, correspondence analysis indicated that band elements found on Chinese porcelain at *Building l* are significantly different from Chinese porcelain bands at *Building o*, particularly during the later phases of occupation at each site. The divergence in the sites' decorated porcelain band assemblages results from the presence of three over-glazed band styles at *Building l*, two of which are not present at *Building o* and the third overgraze band design only accounts for two percent of the band patterns at the same building (Galle and Neiman 2003).

The promise of recording these attributes will, with any luck, influence archaeologists beginning their own artifact analysis. When it comes to analysis, the artifact attributes that seem time consuming or superfluous to record in the end may provide the most compelling clues to how slaves responded to changing social and economic conditions in the Chesapeake.

Understanding within-site cycles in signaling and consumption

The regional and local patterns seen in the preceding analyses demonstrate that that there are at least four different signaling strategies visible in the archaeological record. The four consumption groups are significant since they suggest that the presence of costly goods isn't just the result of the whims of an individual or family. Rather, goods, especially fashionable and costly goods, were important means for establishing

one's place in a society where the acquisition of non-provisioned items was dangerous, difficult, and not available to everyone.

Having identified these signaling groups, this study presents, and leaves unanswered, a series of questions about signaling and consumption within single sites. How did changes in the age and gender of household members affect the use and discard of costly goods? How might the combination of architectural data and artifact patterns allow us to see single-sex, co-residential households versus kin-based households? Do sudden shifts in signaling types result from the departure of one household and the arrival of another within the same structure? Or do shifts in consumption strategies indicate the birth of children, a life event that requires changes in household production and resource allocation? Do these same signal shifts represent the departure of certain household members, such as adolescent or young adult males?

The key to answering these questions lies in the fine-grained analysis of consumption patterns within sites by phase. For example, the abundance indexes and principal component analysis tell us that *Building o* consumed fairly substantial quantities of white metal buttons but few yellow metal buttons. It also indicates that *Building o* residents acquired and discarded a lot of Chinese porcelain. When *Building o* is analyzed as a whole, it falls in the "all-ceramics" signaling group. However, we might very well see different patterns when analyzed by phase, with each occupation phase falling into a different signaling group. Are these consumption trends a function of time and are we seeing a single, early household of very competitive signalers investing in popular white metal buttons and expensive Chinese porcelain tea and tablewares? Or do these artifact groups represent two different households that lived in separate structures built on top of

each other, the earlier of which housed men who had incentives to invest in costly buttons used for active signaling while the later household concentrated on costly ceramics. Analysis by phase will be essential to addressing these questions. Success in sorting out how signaling shifts can provide clues to the types of household changes also lie in the fourth line of research, detailed artifact attribute analysis conducted both within and among sites.

Conclusions

Until recently, the majority of the archaeological literature on the material culture of slavery has remained steadfastly focused on two explanations for artifact patterning on slave sites: the acquisition and use of goods by slaves as a form of resistance and the manner in which provisioned goods from an owner indicates status differences within an enslaved community. At the beginning of this study I asked how archaeologists might develop a more nuanced understanding of the communicative, competitive and cooperative aspects of slave consumption while remaining engaged with the motivations of individual agents and the structuring aspects of their lives such as gender, age, and class. In seeking to answer this question, I have found signaling theory a useful tool for revealing previously unidentified regional and temporal consumption trends among slaves in the greater Chesapeake region of Virginia. These trends point to a number of contextual variables that influenced an enslaved person's ability to acquire costly goods and they suggest that slaves engaged with the communicative aspects of material culture in order to enter into competitive and cooperative relationships on and off their home plantation.

The consumption of costly imported goods by slaves in the Chesapeake, such as buckles, metal buttons, and refined ceramics, spiked during the last half of the eighteenth century. The temporal trends revealed in previous chapters demonstrate that the increase in consumption outpaced falling prices, indicating that enslaved people sought goods that were financially costly. Acquiring such items would have incurred substantial physical costs as well. The risks involved in acquiring goods such as metal buttons and refined ceramics made them desirable for effective social advertising. The multiple regression models in Chapters 5 and 6 suggest an alternative to arguments regarding domestic or favored slaves who may have received expensive imported goods as a function of their position within their owner's household. Although these relationships undoubtedly existed, at the 19 structures used in this study, there was no significant relationship between a slave dwelling's proximity to the main house and the consumption of most costly artifact types. Further substantiating this evidence is the fact that many of the households living on plantations not owned by Thomas Jefferson or not situated within one-third mile of the main house had more metal buttons and refined ceramics than anticipated by the regression models. Enslaved men living near the main house were not any more likely to have costly buttons than those living in distant farm quarters. This suggests that men were actively pursuing fashionable clothing, and were not only wearing what had been handed down or given by owners. Factors other than preferential treatment by an owner, living or working near a mansion, or having a specialized occupation contributed to a person's ability to acquire costly, non-provisioned goods.

The relationship of costly goods to regional contextual variables, such as agricultural diversification and the growth of urban centers, indicates that a slave's ability

to consume costly goods appears to have been linked closely to the increasingly competitive social and economic environment within the Chesapeake region. As the eighteenth century progressed, many enslaved people seized the newly available opportunities to acquire skills or to work at task-based positions that provided mobility and cash. My results suggest that as slaves tested their ability to move outside the plantation, those that were successful found themselves in expansive and unknown social and economic territories. According to the signaling model I have employed, exposure to new people combined with growing access to novel, costly and attractive goods resulted in the increased consumption of items, such as portable and fashionable metal buttons, that best displayed a person's qualities and abilities.

Expressions of these trends can be seen in the metal button data. The use and discard of costly large yellow buttons was significantly positively correlated with agriculturally diversified sites located close to an urban center. The consumption of large white metal buttons was also positively correlated with proximity to an urban center. These large buttons, suited for prominent display on frock coats, were ideal vehicles for the successful communication of a person's skills, fiscal acumen, and individuality. Male slaves visiting or working in a city on a regular basis would have known what was stylish and competitive among their peer group. At the Poplar Forest Quarter site we have compelling data for male signaling that indicates men displayed their knowledge of, and ability to maintain, current fashions through the discard of usable but unfashionable white metal buttons in favor of the much more costly but up-to-date yellow metal buttons.

Finally, it is important to consider that signaling displays were not only focused on other slaves, but that they were also likely calibrated to engage with poor or middling

whites. Such class-based signaling is perhaps seen in the pattern of refined tea and tableware consumption at the sites in this study, which indicates that enslaved women and men discarded refined ceramics in ways very similar to rural white Virginians (Martin 1994). Households acquired teawares in much more costly ware-types and opted for tablewares in fashionable but not exceptionally expensive wares.

In addition to helping us rethink the manner in which goods were both acquired and used by slaves, these data reveal another previously unidentified aspect of slave life: sex-based, and possibly age-based, housing that persisted into the nineteenth century. Single-sex barracks have been identified primarily with the first half of the eighteenth-century, prior to the emergence of demographic stability and natural increase within the Chesapeake slave population. Several scholars have demonstrated convincingly that large, barracks-style housing disappeared by the third quarter of the eighteenth century and this disappearance has long been associated with a perceived shift to kin-based, cooperative housing units. Due in large part to the documentary record, it has been assumed that this shift to kin-based housing encompassed unmarried or unpartnered members, effectively doing away with households of unrelated individuals. This study suggests a more complex picture by pinpointing the probable existence of households consisting of unrelated individuals at different stages in their lives. The Principal Component Analyses presented in this chapter indicate that enslaved households in the Chesapeake adopted, or were forced into, one of four signaling groups. The biplots demonstrate that the households that consumed more than expected metal buttons were not correlated with households that consumed more refined ceramics than anticipated by

the model. These sites were also not correlated with sites that consumed fewer buttons and refined ceramics than anticipated by the model, or with the sites that consumed far more buttons and refined ceramics than expected.

The substantial distances between sites that consumed large quantities of metal buttons and those that consumed substantial amounts of refined ceramics indicate the existence of two different household-types that each chose a different signaling strategy. Households with inordinate amounts of metal buttons may represent dwellings comprised of males who were either unmarried or married to women on other plantations. Unattached young male slaves, or men with marriages abroad, might well have focused their energies, and any income, on the acquisition of buttons and the stylish clothes to which they were attached. In doing so, these men displayed their skills and their personalities through their dress, and their ability to maintain costly and fashionable signals or statements through time would have served them well in social relationships and economic ventures.

Households with large quantities of refined ceramics and those that were able to consume similar amounts of both buttons and refined ceramics may well point to kin-based households anchored by men and women who worked extraordinarily hard to establish a foot-hold in a culture and economic system that sought to exclude them in multiple ways. These households may have included few to no children, thereby enabling their members to translate their labor more easily into imported consumables. On the other hand, households that consumed fewer than expected buttons and refined ceramics may represent households of individuals who were unable to participate in the market economy. This group might include households with many children. Quarters

such as Utopia 3-Structure 50 may represent groups of small families, such as mothers and their children, who had been separated from their husbands and who may have been forced to share space with other small kin-groups.

Membership in these consumption groups was most likely fluid, as an individual's association with these groups was most likely based on a number of attributes, such as sex, age, physical and mental skills, as well as the disposition of a slave's owner and the type of plantation on which they worked. An individual's desire and ability to participate in the market economy certainly changed as children were born, as people aged, and as spouses or children died or were sold. Here archaeological data have provided the opportunity to explore and understand these shifting states in a way previously unavailable to scholars. Documents have been unable to provide concrete insight into slave households and, while demographics suggest the substantial formation of slave families by the late eighteenth century, the persistent presence of housing based on age, sex, martial status, or number of children is not only a reasonable but also a likely solution on plantations with sizeable slave populations.

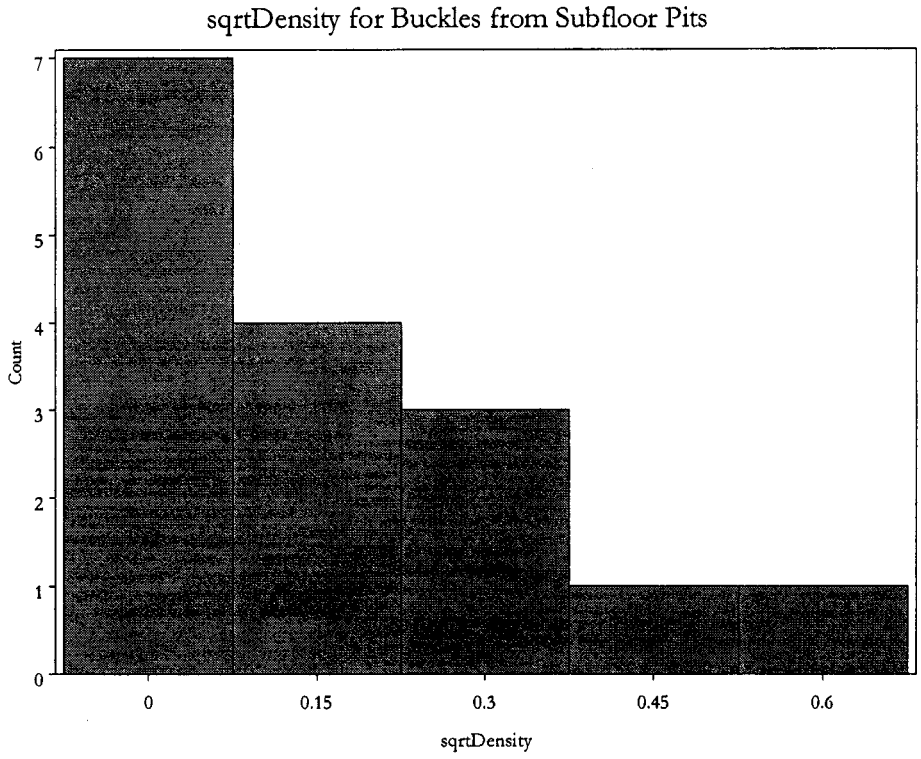
Drawings and paintings of slaves dancing and celebrating (Figure 7.3), embedded with clues to dress, music, and African cultural retentions, have long been testaments to the survival and flourishing of humanity in the face of slavery. The archaeological record allows us to read such images with a fresh eye: here men dressed in well-cut waistcoats exhibit not only their knowledge of fashion but also their ability to acquire the stylish, non-provisioned buttons required to complete the garment. The attire, hairstyles, and jewelry of the dancing women and men suggest that they are not simply celebrating.

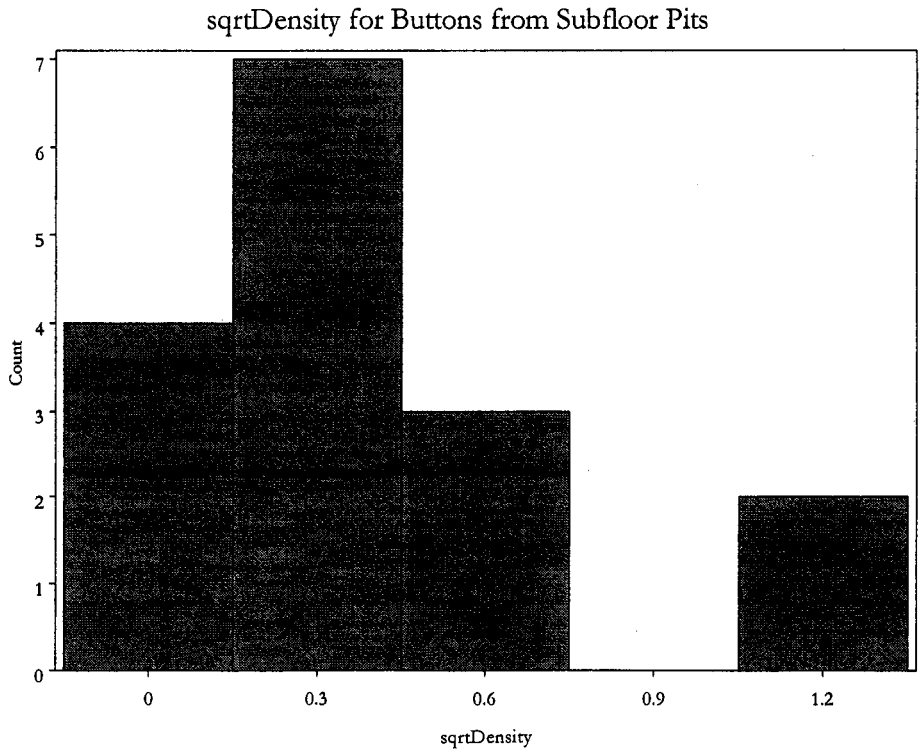
Figure 7. 3: 1853, Lynchburg, Virginia. Lewis Miller, Sketchbook of Landscapes in the State of Virginia, 1853-1867, in Abby Aldrich Rockefeller Folk Art Museum, Williamsburg, Virginia (The Atlantic Slave Trade and Slave Life in the Americas, J. Handler and M. Tuite, http://hitchcock.itc.virginia.edu/Slavery/)

They are sending clear signals about their personal status vis-a-vis marriage and children as well as information about their position within the local and regional structure of slavery. While we cannot read these signals as clearly as those represented in this image once could, it is through the melding of explanatory theoretical models and data-rich comparative archaeological analyses that the presence of such women and men, and their fluid personal states, can be better understood.

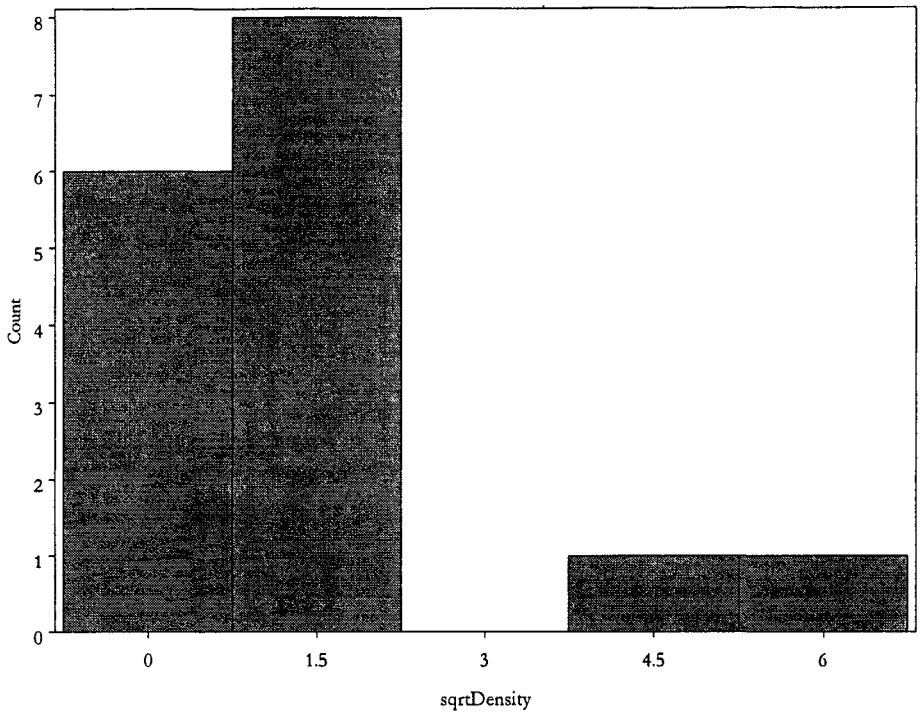
Appendices

Appendix 1: Square root density histograms for each artifact category.

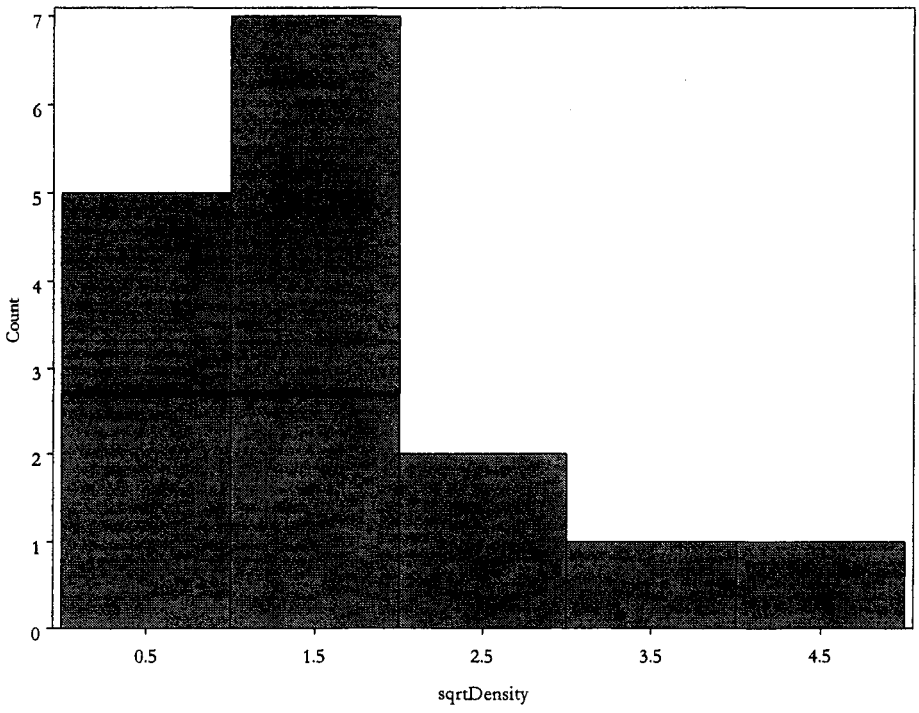




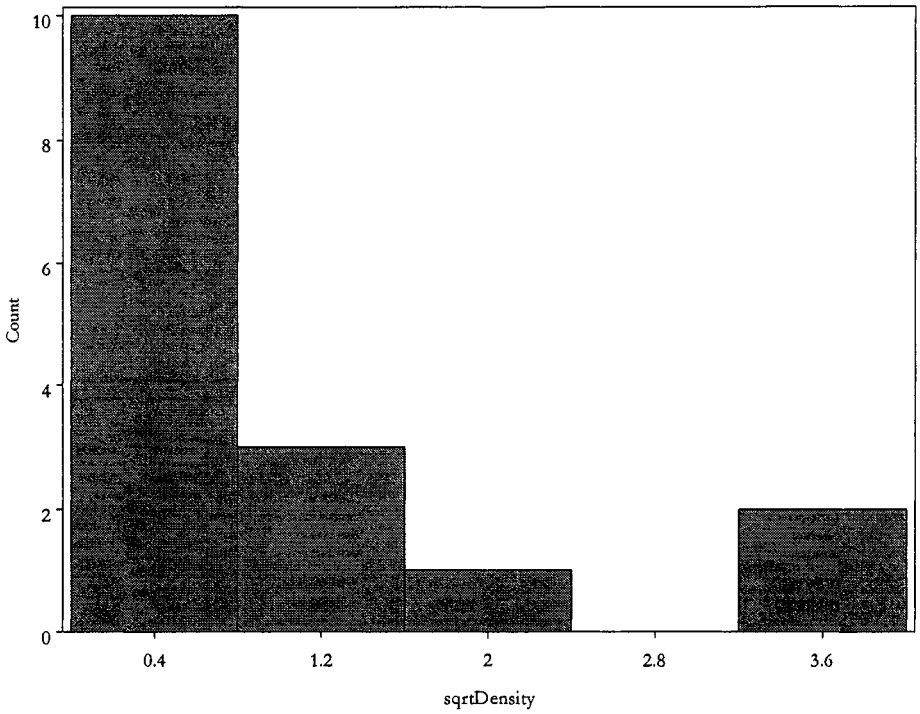
sqrtDensity for Refined Wares from Subfloor Pits



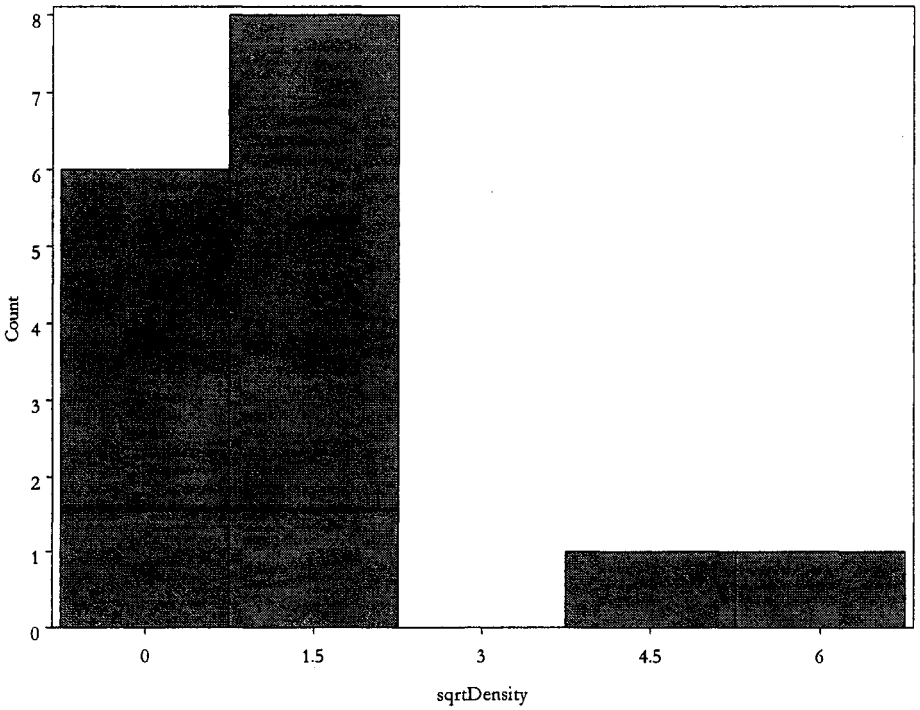
sqrtDensity for Imported Tobacco Pipes from Subfloor Pits

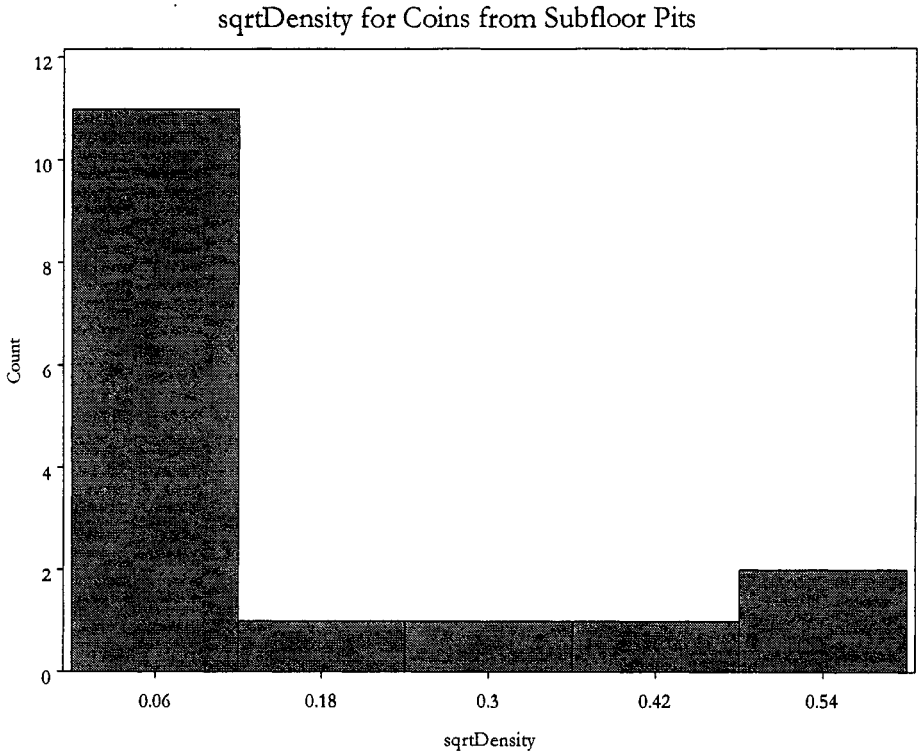


sqrtDensity for Coarsewares from Subfloor Pits

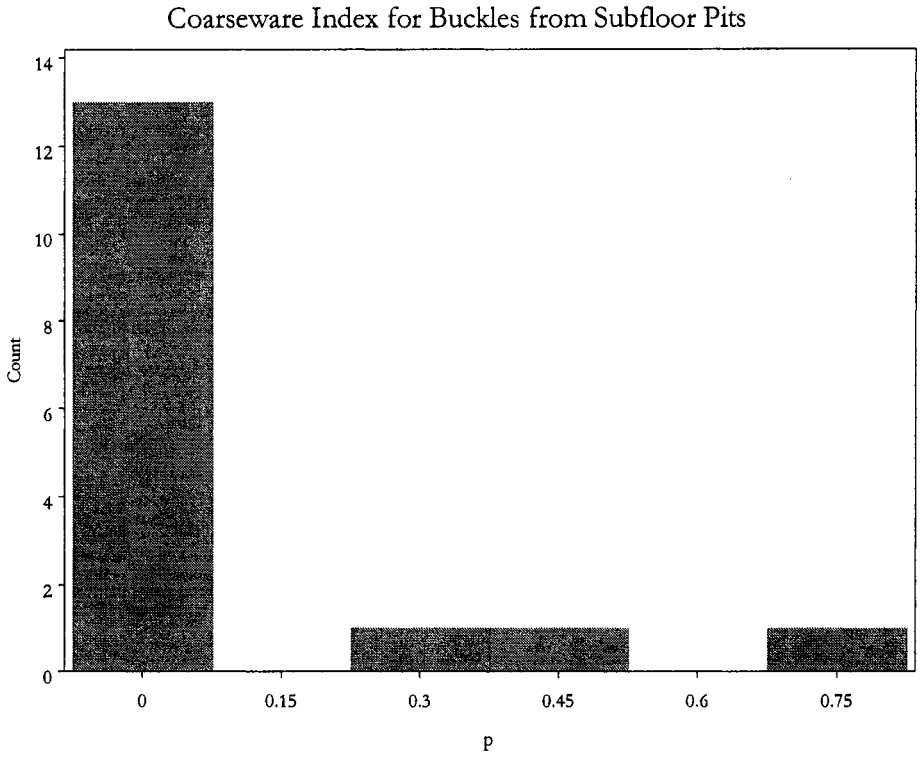


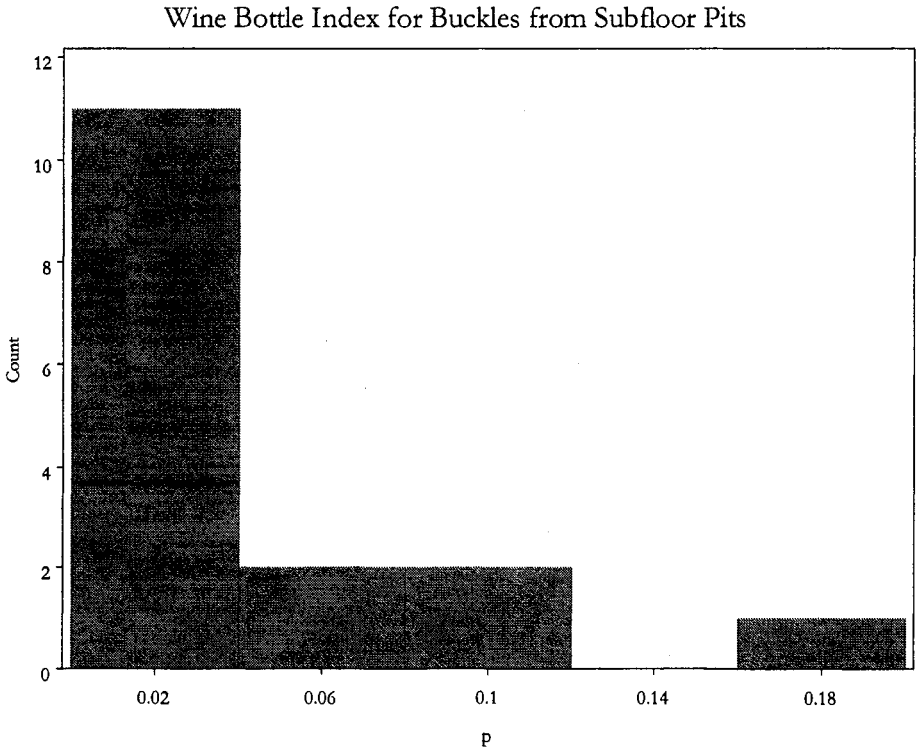
sqrtDensity for Refined Wares from Subfloor Pits



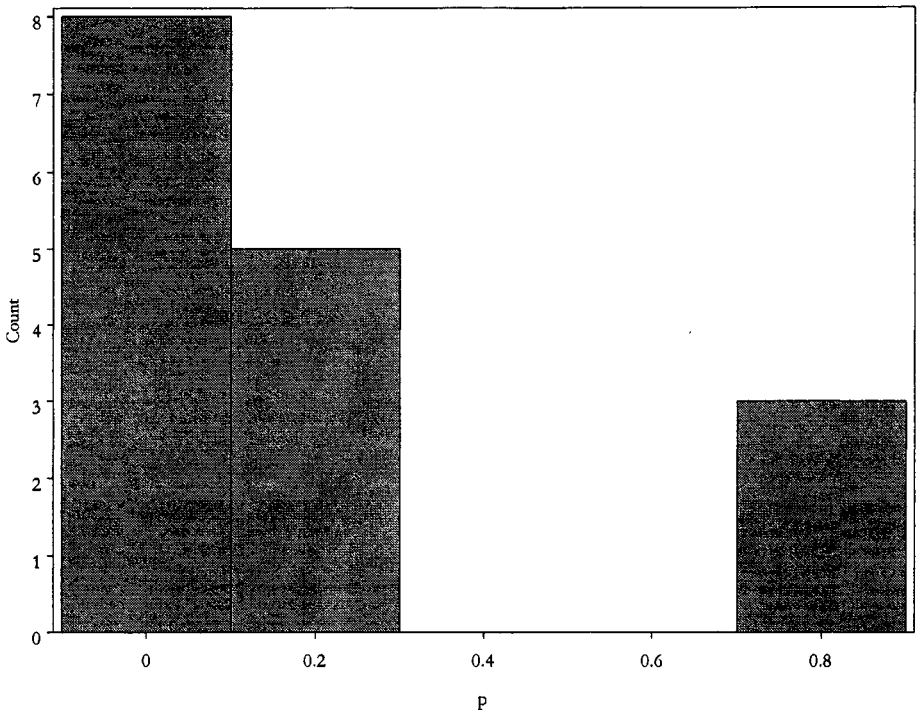

sqrtDensity for Coins from Subfloor Pits
Count
12
10
8
6
4
2
0
0.06
0.18
0.3
0.42
0.54
sqrtDensity

Appendix 2: Abundance Index histograms for each artifact category from subfloor pit contexts (plowzone histograms were not created due to small sample size).

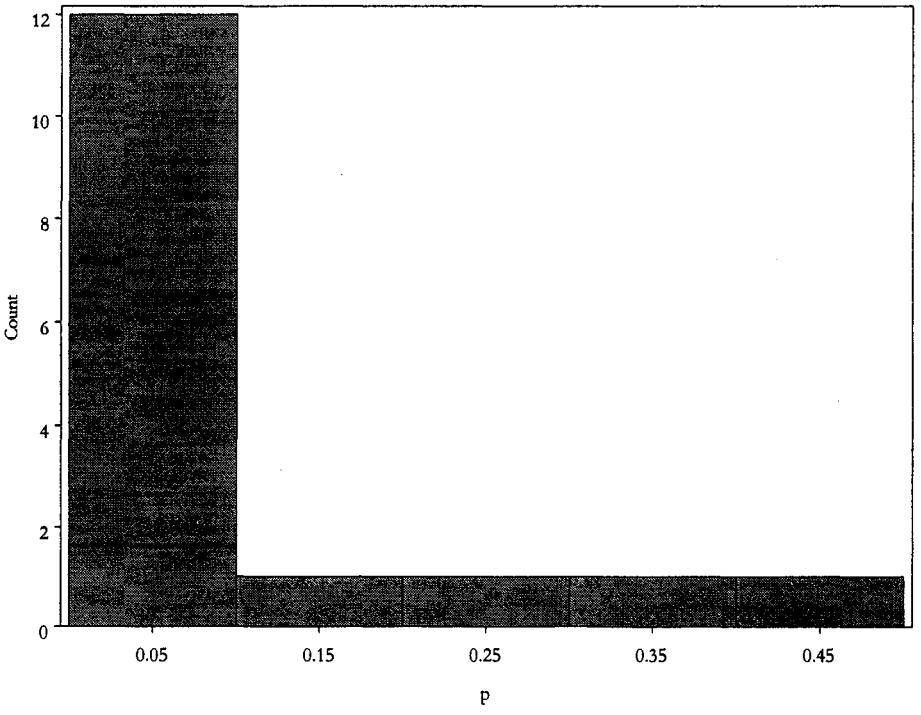




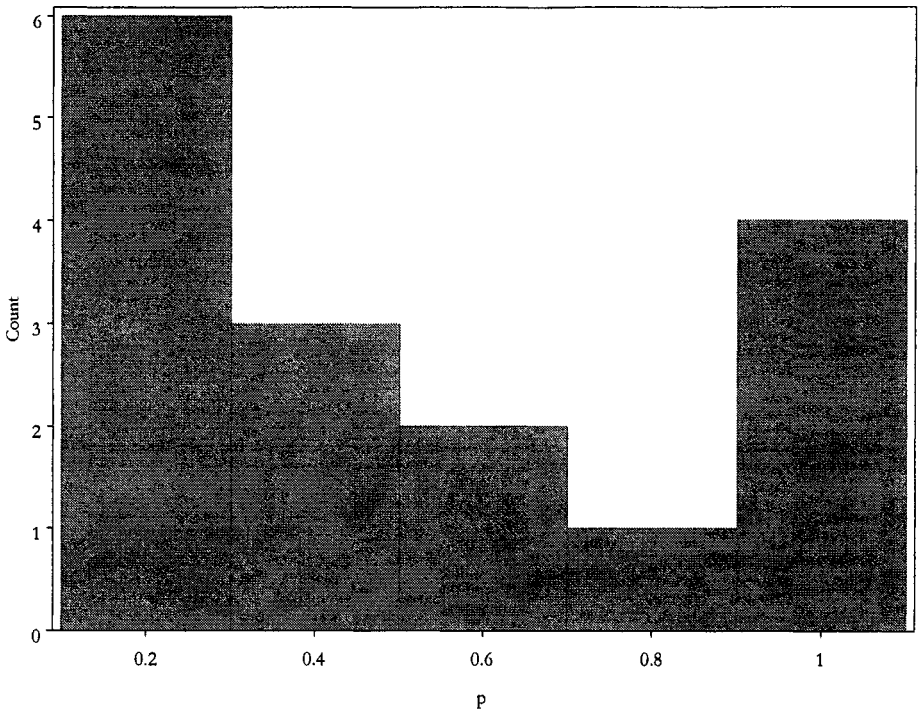
Coarseware Index for Buttons from Subfloor Pits



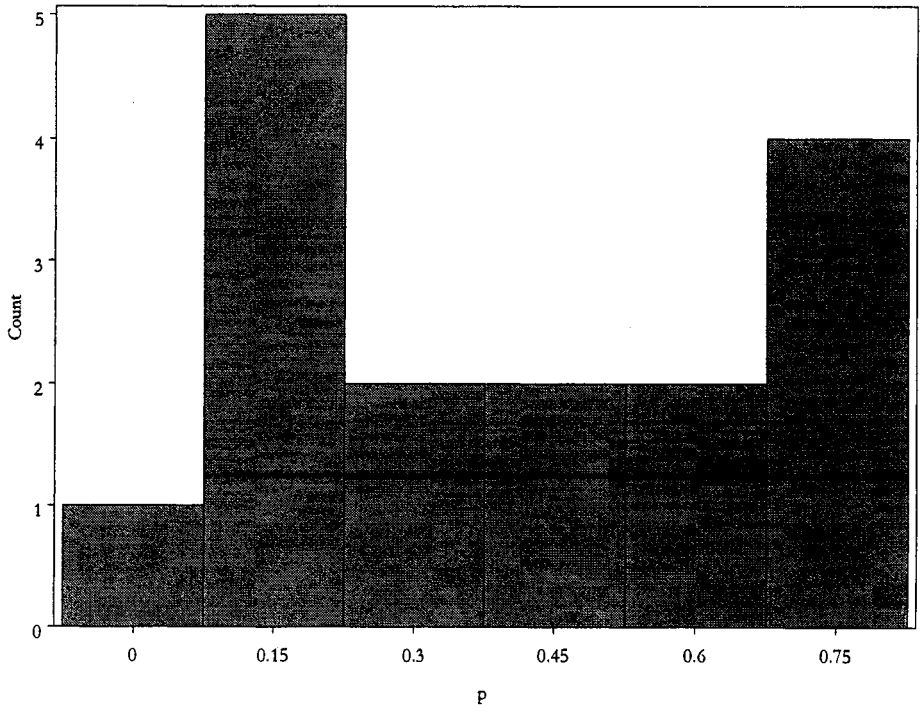
Wine Bottle Index for Buttons from Subfloor Pits



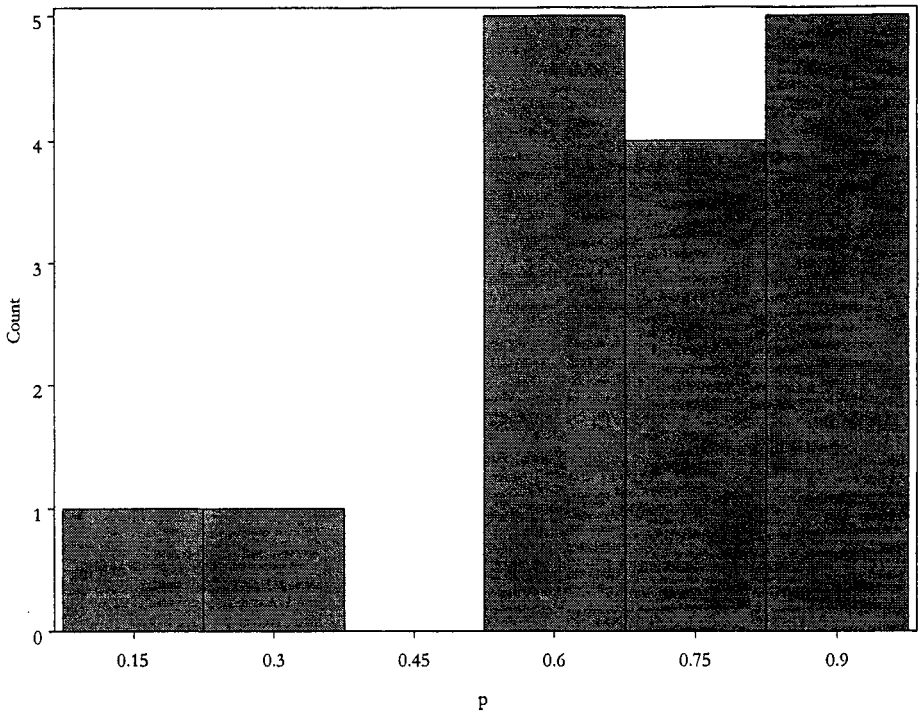
Coarseware Index for Refined Ceramics from Subfloor Pits



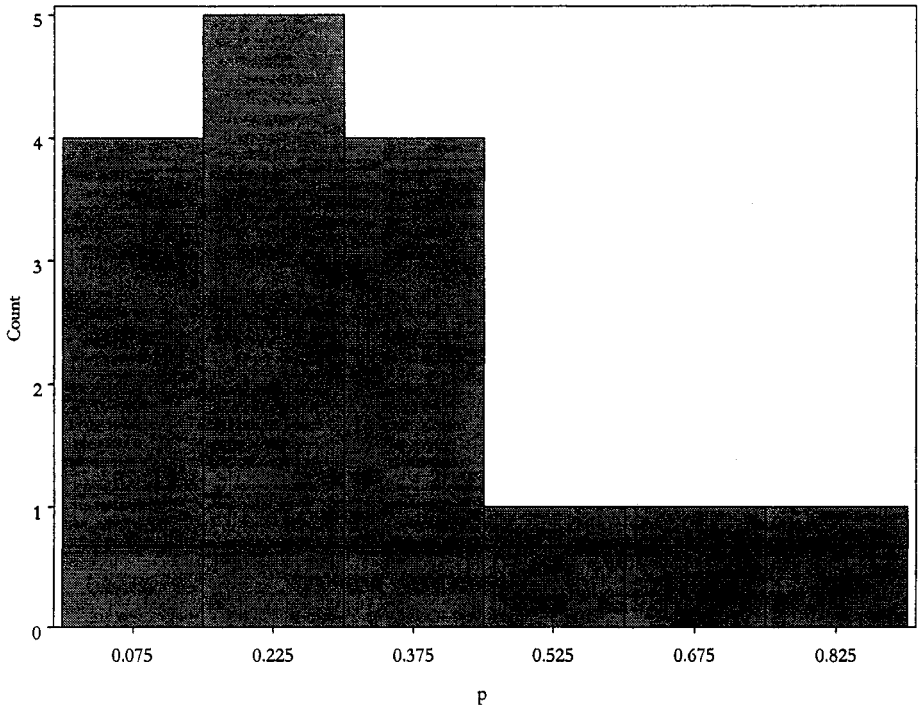
Wine Bottle Index for Refined Ceramics from Subfloor Pits



Coarseware Index for Wine Bottles from Subfloor Pits



Wine Bottle Index for Coarsewares from Subfloor Pits



Appendix 3: Summary Statistics for Abundance Indexes.

Abundance Index	Mean	STD	N
Wine Bottle Index for Buckles, plowzone	0.003	0.0049	11
Wine Bottle Index for Buckles, subfloor pits	0.0352	0.0543	16
Coarseware Index for Buckles, plowzone	0.0129	0.0169	11
Coarseware Index for Buckles, subfloor pits	0.1923	0.2218	16
Wine Bottle Index for Buttons, plowzone	0.0204	0.02	11
Wine Bottle Index for Buttons, subfloor pits	0.0931	0.1402	16
Coarseware Index for Buttons, plowzone	0.084	0.0765	11
Coarseware Index for Buttons, subfloor pits	0.2273	0.3173	16
Wine Bottle Index for Refined Ceramics, plowzone	0.5082	0.2178	11
Wine Bottle Index for Refined Ceramics subfloor pits	0.3893	0.271	16
Coarseware Index for Refined Ceramics, plowzone	0.5082	0.2178	11
Coarseware Index for Refined Ceramics, subfloor pits	0.518	0.3116	16
Wine Bottle Index for Imported Tobacco Pipes, plowzone	0.085	0.0729	11
Wine Bottle Index for Imported Tobacco Pipes, subfloor pits	0.4784	0.2785	16
Coarseware Index for Imported Tobacco Pipes, plowzone	0.2257	0.174	11
Coarseware Index for Imported Tobacco Pipes, subfloor pits	0.6358	0.2653	16
Coarseware Index for Wine Bottles, plowzone	0.7744	0.1156	11
Coarseware Index for Wine Bottles, subfloor pits	0.6917	0.2267	16
Wine Bottle Index for Coarsewares, plowzone	0.2256	0.1156	11
Wine Bottle Index for Coarsewares, subfloor pits	0.3883	0.2267	16

Appendix 4: Negative binomial regression estimates for time and agricultural diversification where Y=Abundance Index Scores, X1=MCD and X2=Agricultural Diversification

Negative binomial regression estimates for time and agricultural diversification where Y=Abundance Index Scores, X_1=MCD and X_2=Agricultural Diversification.				
		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	*p*
Wine Bottle Index for Buckles				
MCD, plowzone	0.1328	0.0233	0.2423	0.0175
Diversified, plowzone	-0.9578	-2.2541	0.3385	0.1476
MCD, subfloor pits	0.0297	-0.0055	0.0649	0.0977
Diversified, subfloor pits	-0.0977	-1.7398	1.5443	0.9071
Coarseware Index for Buckles				
MCD, plowzone	0.128	0.0212	0.2348	0.0188
Diversified, plowzone	-0.5752	-1.9559	0.8055	0.4142
MCD, subfloor pits	0.0511	0.0211	0.0811	0.0008
Diversified, subfloor pits	-1.2554	-2.3896	-0.1211	0.0301
Wine Bottle Index for Buttons				
MCD, plowzone	0.0611	0.0248	0.0973	0.001
Diversified, plowzone	0.4013	-0.3646	1.1672	0.3045
MCD, subfloor pits	0.0366	0.0172	0.056	0.0002
Diversified, subfloor pits	0.597	-0.3741	1.5682	0.2282
Coarseware Index for Buttons				
MCD, plowzone	0.0835	0.0525	0.1144	<.0001
Diversified, plowzone	0.543	-0.111	1.197	0.1037
MCD, subfloor pits	0.041	0.0218	0.0603	<.0001
Diversified, subfloor pits	-0.4311	-1.4545	0.5923	0.409
Wine Bottle Index for Refined Ceramics				
MCD, plowzone	0.0297	0.0154	0.0439	<.0001
Diversified, plowzone	-0.2182	-0.6621	0.2257	0.3354

MCD, subfloor pits	0.0181	0.0062	0.03	0.0028
Diversified, subfloor pits	0.5659	-0.017	1.1488	0.0571
Coarseware Index for Refined Ceramics				
MCD, plowzone	0.0338	0.0239	0.0437	<.0001
Diversified, plowzone	-0.107	-0.3845	0.1706	0.4501
MCD, subfloor pits	0.0171	0.0093	0.0249	<.0001
Diversified, subfloor pits	-0.0629	-0.451	0.3251	0.7506
Wine Bottle Index for Imported Tobacco Pipes				
MCD, plowzone	-0.0555	-0.0886	-0.0224	0.001
Diversified, plowzone	-1.0434	-1.9297	-0.1572	0.021
MCD, subfloor pits	-0.0254	-0.0343	-0.0165	<.0001
Diversified, subfloor pits	0.5782	0.1979	0.9584	0.0029
Coarseware Index for Imported Tobacco Pipes				
MCD, plowzone	-0.0228	-0.062	0.0165	0.2554
Diversified, plowzone	-0.5104	-1.4789	0.458	0.3016
MCD, subfloor pits	-0.0065	-0.014	0.001	0.0889
Diversified, subfloor pits	-0.1065	-0.4218	0.2087	0.5077
Wine Bottle Index for Coarse Ceramics				
MCD, plowzone	-0.0219	-0.0338	-0.0101	0.0003
Diversified, plowzone	-0.2515	-0.6394	0.1365	0.204
MCD, subfloor pits	-0.0207	-0.0328	-0.0087	0.0007
Diversified, subfloor pits	0.9933	0.4474	1.5393	0.0004
Coarseware Index for Wine Bottles				
MCD, plowzone	0.0091	0.0053	0.0128	<.0001
Diversified, plowzone	0.0507	-0.0578	0.1591	0.3599
MCD, subfloor pits	0.0071	-0.0002	0.0143	0.0564
Diversified, subfloor pits	-0.358	-0.7082	-0.0078	0.0451

Appendix 5: Negative binomial regression estimates for time and proximity to main house where Y=Abundance Index Scores, X1=MCD and X2=Proximity to Main House.

Negative binomial regression estimates for time and proximity to main house where Y=Abundance Index Scores, X_1=MCD and X_2=Proximity to Main House.				
		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	*p*
Wine Bottle Index for Buckles				
MCD, plowzone	0.115	0.0171	0.2129	0.0213
Proximity to Main House, plowzone	-0.7122	-2.0028	0.5784	0.2794
MCD, subfloor pits	0.0318	-0.0081	0.0718	0.1184
Proximity to Main House, subfloor pits	-0.2311	-2.1884	1.7261	0.817
Coarseware Index for Buckles				
MCD, plowzone	0.1169	0.0195	0.2143	0.0186
Proximity to Main House, plowzone	-0.0765	-1.4419	1.2889	0.9125
MCD, subfloor pits	0.0476	0.008	0.0873	0.0185
Proximity to Main House, subfloor pits	0.2278	-1.6026	2.0582	0.8073
Wine Bottle Index for Buttons				
MCD, plowzone	0.0557	0.0155	0.0959	0.0066
Proximity to Main House, plowzone	0.2125	-0.6853	1.1103	0.6427
MCD, subfloor pits	0.0375	0.0116	0.0634	0.0045
Proximity to Main House, subfloor pits	0.0765	-1.2408	1.3937	0.9094
Coarseware Index for Buttons				
MCD, plowzone	0.0736	0.0389	0.1082	<.0001
Proximity to Main House, plowzone	0.7266	0.0799	1.3732	0.0277
MCD, subfloor pits	0.0376	0.0122	0.0629	0.0037
Proximity to Main House, subfloor pits	0.1945	-1.1729	1.5618	0.7804
Wine Bottle Index for Refined Ceramics				
MCD, plowzone	0.03	0.0129	0.0471	0.0006
Proximity to Main House, plowzone	0.0627	-0.4463	0.5718	0.8092

MCD, subfloor pits	0.0133	-0.0032	0.0298	0.1139
Proximity to Main House, subfloor pits	0.4559	-0.4197	1.3316	0.3075
Coarseware Index for Refined Ceramics				
MCD, plowzone	0.032	0.0212	0.0428	<.0001
Proximity to Main House, plowzone	0.1452	-0.1497	0.4401	0.3346
MCD, subfloor pits	0.0113	0.0015	0.0211	0.0239
Proximity to Main House, subfloor pits	0.4135	-0.084	0.9109	0.1033
Wine Bottle Index for Imported Tobacco Pipes				
MCD, plowzone	-0.0301	-0.0701	0.0099	0.1406
Proximity to Main House, plowzone	-0.6945	-1.6632	0.2742	0.1599
MCD, subfloor pits	-0.0153	-0.0265	-0.0041	0.0075
Proximity to Main House, subfloor pits	-0.5221	-1.1886	0.1444	0.1247
Coarseware Index for Imported Tobacco Pipes				
MCD, plowzone	-0.0147	-0.0563	0.0269	0.4882
Proximity to Main House, plowzone	-0.0194	-1.0036	0.9647	0.9691
MCD, subfloor pits	-0.0067	-0.0139	0.0005	0.068
Proximity to Main House, subfloor pits	-0.1718	-0.6704	0.3269	0.4995
Wine Bottle Index for Coarse Ceramics				
MCD, plowzone	-0.012	-0.0239	-0.0001	0.0479
Proximity to Main House, plowzone	-0.4775	-0.8522	-0.1027	0.0125
MCD, subfloor pits	-0.0127	-0.0302	0.0048	0.1554
Proximity to Main House, subfloor pits	-0.2361	-1.1733	0.7011	0.6215
Coarseware Index for Wine Bottles				
MCD, plowzone	0.0068	0.0032	0.0104	0.0003
Proximity to Main House, plowzone	0.1111	0.0087	0.2135	0.0335
MCD, subfloor pits	0.0051	-0.0052	0.0154	0.3309
Proximity to Main House, subfloor pits	0.018	-0.5932	0.6292	0.954

Appendix 6: Negative binomial regression estimates for time and distance from major urban center where Y=Abundance Index Scores, X1=MCD and X2=Distance from Urban Center.

Negative binomial regression estimates for time and distance from major urban center where Y=Abundance Index Scores, X_1=MCD and X_2=Distance from Urban Center.				
		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	*p*
Wine Bottle Index for Buckles				
MCD, subfloor pits	0.0287	-0.0069	0.0643	0.1143
Distance to Urban Center, subfloor pits	-0.3388	-2.5191	1.8416	0.7607
Coarseware Index for Buckles				
MCD, subfloor pits	0.048	0.0145	0.0816	0.005
Distance to Urban Center, subfloor pits	-0.7771	-2.6673	1.1131	0.4204
Wine Bottle Index for Buttons				
MCD, subfloor pits	0.0396	0.0197	0.0596	<.0001
Distance to Urban Center, subfloor pits	0.5596	-0.9551	2.0743	0.469
Coarseware Index for Buttons				
MCD, subfloor pits	0.0395	0.0199	0.0592	<.0001
Distance to Urban Center, subfloor pits	-0.1937	-1.6938	1.3064	0.8002
Wine Bottle Index for Refined Ceramics				
MCD, subfloor pits	0.0196	0.0075	0.0318	0.0015
Distance to Urban Center, subfloor pits	0.7539	-0.2611	1.7689	0.1455
Coarseware Index for Refined Ceramics				
MCD, subfloor pits	0.0173	0.0102	0.0245	<.0001
Distance to Urban Center, subfloor pits	0.4504	-0.1116	1.0124	0.1162
Wine Bottle Index for Imported Tobacco Pipes				
MCD, subfloor pits	-0.0201	-0.0308	-0.0094	0.0002
Distance to Urban Center, subfloor pits	0.1646	-0.6921	1.0214	0.7064
Coarseware Index for Imported Tobacco Pipes				
MCD, subfloor pits	-0.0067	-0.0134	-0.0001	0.0482

Distance to Urban Center, subfloor pits	-0.2775	-0.762	0.207	0.2616
Wine Bottle Index for Coarse Ceramics				
MCD, subfloor pits	-0.0162	-0.0311	-0.0012	0.0341
Distance to Urban Center, subfloor pits	0.6474	-0.5143	1.8091	0.2747
Coarseware Index for Wine Bottles				
MCD, subfloor pits	0.0054	-0.0021	0.0129	0.1562
Distance to Urban Center, subfloor pits	-0.2535	-0.9086	0.4017	0.4483

Appendix 7: Negative binomial regression estimates for time and owner presence where Y=Abundance Index Scores, X1=MCD and X2=Owner Presence.

Negative binomial regression estimates for time and owner presence where Y=Abundance Index Scores, X_1=MCD and X_2=Owner Presence.				
		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	*p*
Wine Bottle Index for Buckles				
MCD, subfloor pits	0.0149	-0.0154	0.0452	0.3346
Owner Presence, subfloor pits	-1.8767	-3.6704	-0.083	0.0403
Coarseware Index for Buckles				
MCD, subfloor pits	0.033	0.0022	0.0638	0.0359
Owner Presence, subfloor pits	-1.7324	-3.4648	-0.0033	0.0496
Wine Bottle Index for Buttons				
MCD, subfloor pits	0.0292	0.0086	0.0497	0.0054
Owner Presence, subfloor pits	-0.9708	-2.0717	0.1302	0.084
Coarseware Index for Buttons				
MCD, subfloor pits	0.037	0.0167	0.0572	0.0003
Owner Presence, subfloor pits	-0.4385	-1.5687	0.6918	0.447
Wine Bottle Index for Refined Ceramics				
MCD, subfloor pits	0.018	0.005	0.031	0.0068
Owner Presence, subfloor pits	-0.3564	-1.1078	0.3949	0.3525
Coarseware Index for Refined Ceramics				
MCD, subfloor pits	0.0166	0.0089	0.0244	<.0001
Owner Presence, subfloor pits	-0.1014	-0.5401	0.3373	0.6506
Wine Bottle Index for Imported Tobacco Pipes				
MCD, subfloor pits	-0.0203	-0.0313	-0.0092	0.0003
Owner Presence, subfloor pits	-0.2265	-0.8296	0.3765	0.4616
Coarseware Index for Imported Tobacco Pipes				
MCD, subfloor pits	-0.0076	-0.0143	-0.0008	0.0294
Owner Presence, subfloor pits	-0.0664	-0.4331	0.3002	0.7226

Wine Bottle Index for Coarse Ceramics				
MCD, subfloor pits	-0.0147	-0.0304	0.001	0.066
Owner Presence, subfloor pits	-0.0728	-0.8854	0.7398	0.8606
Coarseware Index for Wine Bottles				
MCD, subfloor pits	0.0056	-0.0019	0.0132	0.143
Owner Presence, subfloor pits	0.1726	-0.3008	0.6459	0.4749

Appendix 8: Negative binomial regression estimates for time and Thomas Jefferson as owner where Y=Abundance Index Scores, X1=MCD and X2=Thomas Jefferson, owner.

Negative binomial regression estimates for time and Thomas Jefferson as owner where Y=Abundance Index Scores, X_1=MCD and X_2=Thomas Jefferson, owner.				
		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	p
Wine Bottle Index for Buckles				
MCD, plowzone	0.1248	-0.003	0.2527	0.0557
Thomas Jefferson, owner, plowzone	-0.3823	-2.3705	1.606	0.7063
MCD, subfloor pits	0.0197	-0.0547	0.094	0.6039
Thomas Jefferson, owner, subfloor pits	0.5359	-3.0598	4.1316	0.7702
Coarseware Index for Buckles				
MCD, plowzone	0.1415	0.0305	0.2526	0.0125
Thomas Jefferson, owner, plowzone	-0.9718	-2.9186	0.9751	0.3279
MCD, subfloor pits	0.0132	-0.0409	0.0674	0.6323
Thomas Jefferson, owner, subfloor pits	2.076	-0.7047	4.8568	0.1434
Wine Bottle Index for Buttons				
MCD, plowzone	0.0393	-0.0096	0.0883	0.1155
Thomas Jefferson, owner, plowzone	0.8674	-0.4421	2.1768	0.1942
MCD, subfloor pits	0.0547	0.0133	0.0961	0.0096
Thomas Jefferson, owner, subfloor pits	-0.9217	-2.9707	1.1272	0.3779
Coarseware Index for Buttons				
MCD, plowzone	0.0781	0.0334	0.1229	0.0006
Thomas Jefferson, owner, plowzone	0.1228	-1.1223	1.3679	0.8467
MCD, subfloor pits	0.0285	-0.0108	0.0678	0.1553
Thomas Jefferson, owner, subfloor pits	0.6712	-1.3656	2.708	0.5183
Wine Bottle Index for Refined Ceramics				
MCD, plowzone	0.0227	0.0052	0.0402	0.0109
Thomas Jefferson, owner, plowzone	0.4057	-0.1265	0.938	0.1351

MCD, subfloor pits	0.0293	0.007	0.0516	0.0099
Thomas Jefferson, owner, subfloor pits	-0.6557	-1.7702	0.4589	0.2489
Coarseware Index for Refined Ceramics				
MCD, plowzone	0.0349	0.0222	0.0476	<.0001
Thomas Jefferson, owner, plowzone	-0.0146	-0.3793	0.35	0.9373
MCD, subfloor pits	0.0185	0.0051	0.0319	0.0068
Thomas Jefferson, owner, subfloor pits	-0.0953	-0.7772	0.5866	0.7841
Wine Bottle Index for Imported Tobacco Pipes				
MCD, plowzone	-0.0408	-0.091	0.0095	0.1117
Thomas Jefferson, owner, plowzone	0.0569	-1.2487	1.3624	0.932
MCD, subfloor pits	-0.0094	-0.0144	-0.0043	0.0003
Thomas Jefferson, owner, subfloor pits	-1.203	-1.5823	-0.8236	<.0001
Coarseware Index for Imported Tobacco Pipes				
MCD, plowzone	-0.0012	-0.0482	0.0458	0.96
Thomas Jefferson, owner, plowzone	-0.5509	-1.7357	0.634	0.3622
MCD, subfloor pits	-0.0065	-0.0137	0.0008	0.081
Thomas Jefferson, owner, subfloor pits	-0.2075	-0.7267	0.3116	0.4334
Wine Bottle Index for Coarse Ceramics				
MCD, plowzone	-0.0328	-0.0473	-0.0184	<.0001
Thomas Jefferson, owner, plowzone	0.5839	0.1202	1.0477	0.0136
MCD, subfloor pits	-0.006	-0.0226	0.0105	0.474
Thomas Jefferson, owner, subfloor pits	-0.8345	-1.7288	0.0598	0.0674
Coarseware Index for Wine Bottles				
MCD, plowzone	0.0122	0.0081	0.0163	<.0001
Thomas Jefferson, owner, plowzone	-0.1547	-0.2776	-0.0318	0.0136
MCD, subfloor pits	0.0011	-0.0106	0.0129	0.849
Thomas Jefferson, owner, subfloor pits	0.2929	-0.3556	0.9414	0.376

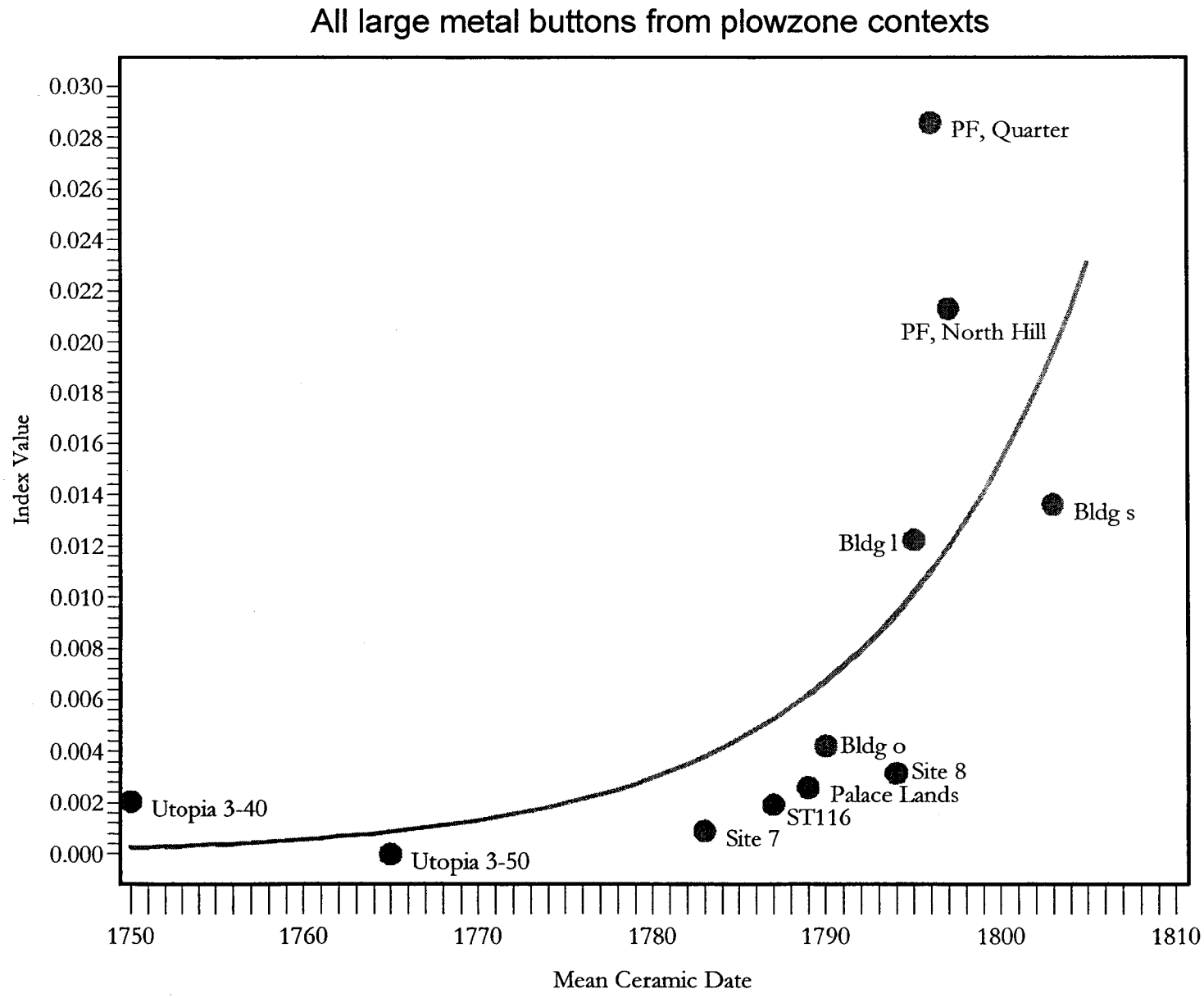
Appendix 9: Negative binomial regression estimates for all categories of buttons where Y=Abundance Index Scores, X1=MCD.

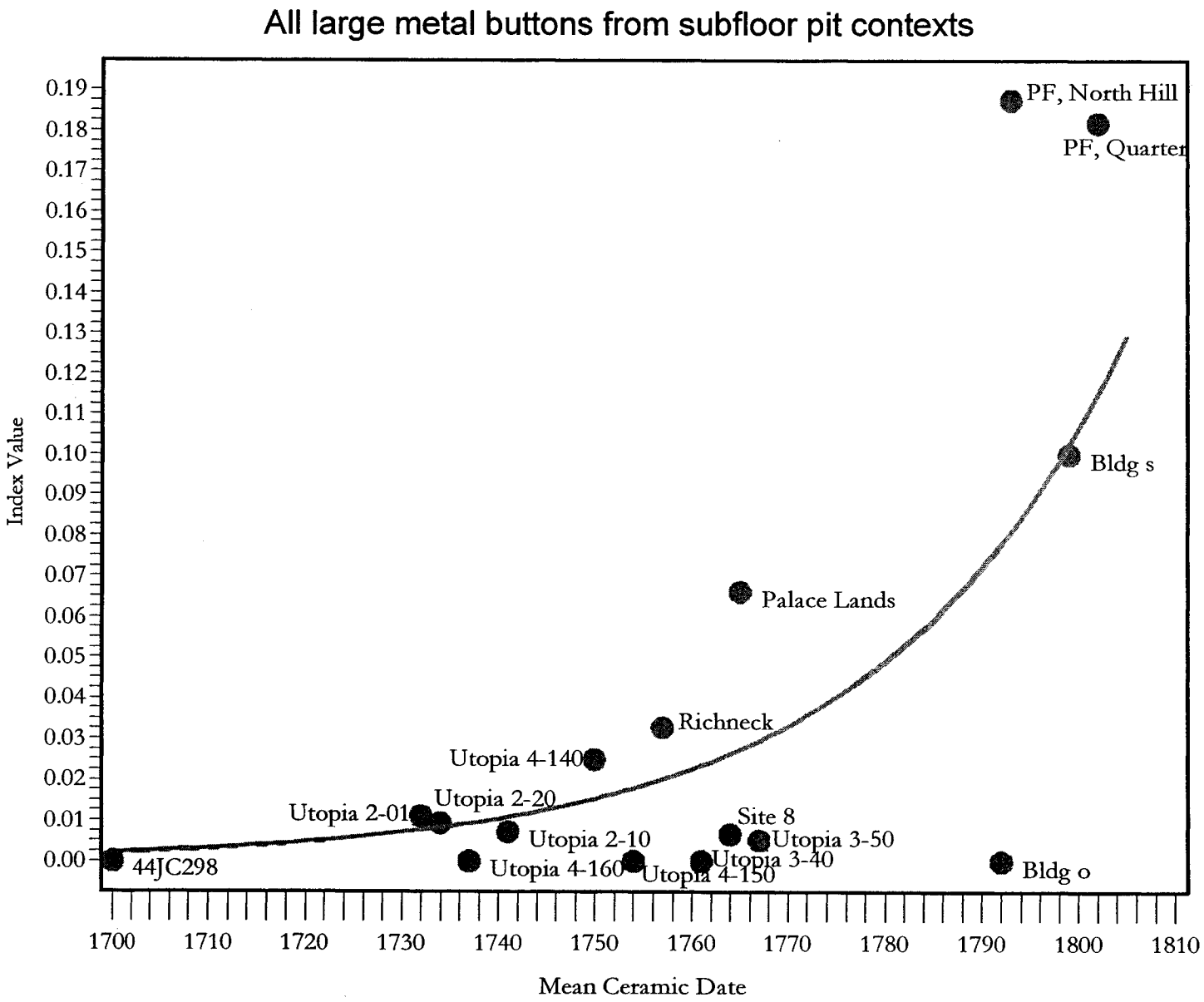
Negative binomial regression estimates for all categories of buttons where Y=Abundance Index Scores, X_1=MCD.

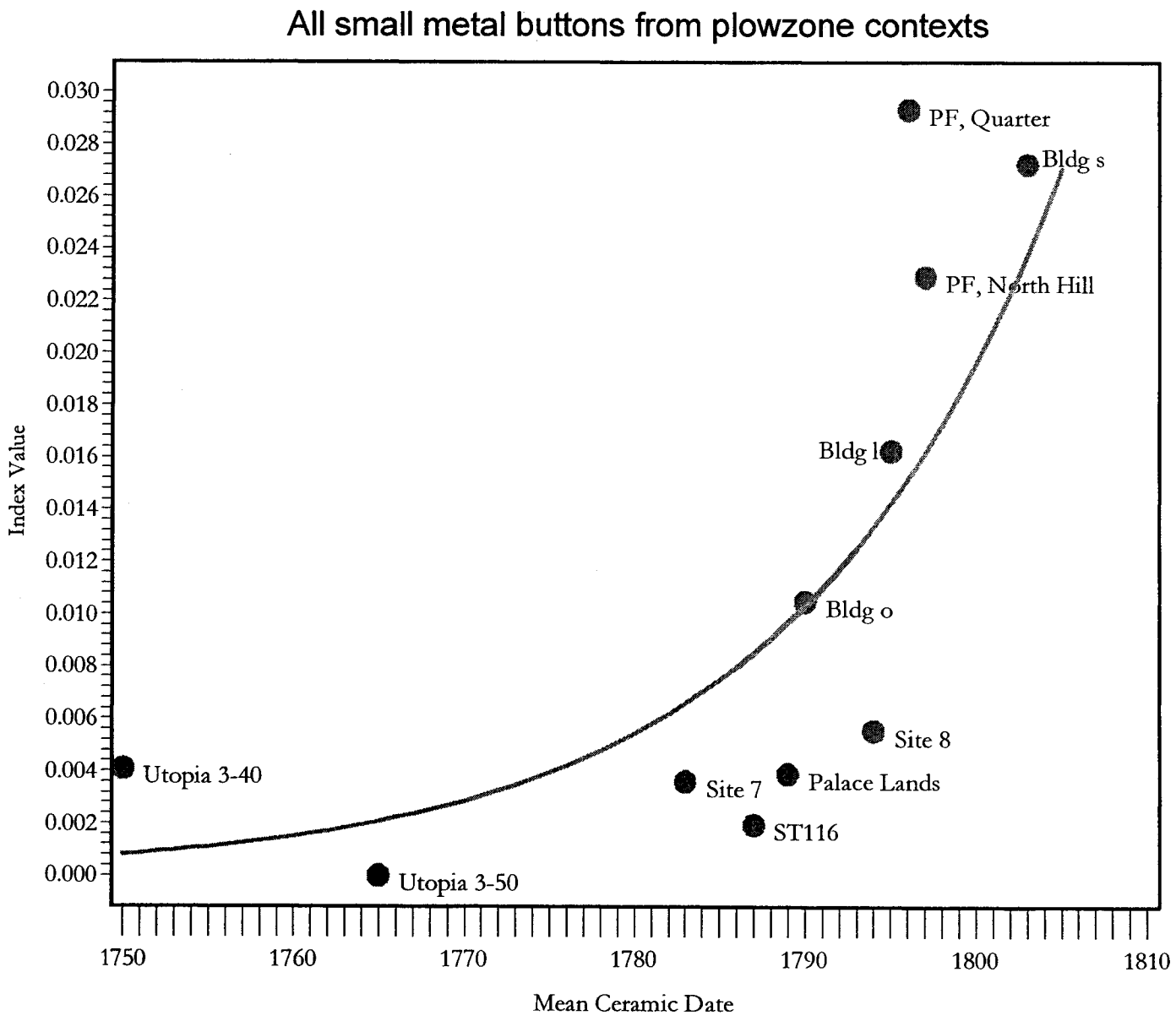
		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	p
Wine Bottle Index for White Metal Buttons				
MCD, plowzone	0.1194	0.0366	0.2022	0.0047
MCD, subfloor pits	0.0786	0.0485	0.1086	<.0001
Wine Bottle Index for Yellow Metal Buttons				
MCD, plowzone	0.0432	0.0059	0.0806	0.0232
MCD, subfloor pits	0.0205	-0.0035	0.0445	0.0944
Wine Bottle Index for all Metal Buttons >=18 mm				
MCD, plowzone	0.082	0.0083	0.1556	0.0291
MCD, subfloor pits	0.0388	0.0116	0.0659	0.0051
Wine Bottle Index for all Complete Metal Buttons < 18 mm				
MCD, plowzone	0.0641	0.0164	0.1118	0.0084
MCD, subfloor pits	0.0408	0.0183	0.0632	0.0004
Wine Bottle Index for all White Buttons >=18 mm				
MCD, plowzone	0.1728	0.0259	0.3196	0.0211
MCD, subfloor pits	0.0663	0.0217	0.1108	0.0036
Wine Bottle Index for all Yellow Metal Buttons >=18 mm				
MCD, plowzone	0.0499	-0.0133	0.1131	0.122
MCD, subfloor pits	0.0142	-0.0175	0.0458	0.3808
Wine Bottle Index for all Complete White Metal Buttons < 18 mm				
MCD, plowzone	0.0711	-0.0019	0.1442	0.0564
MCD, subfloor pits	0.0994	0.0611	0.1376	<.0001
Wine Bottle Index for all Complete				

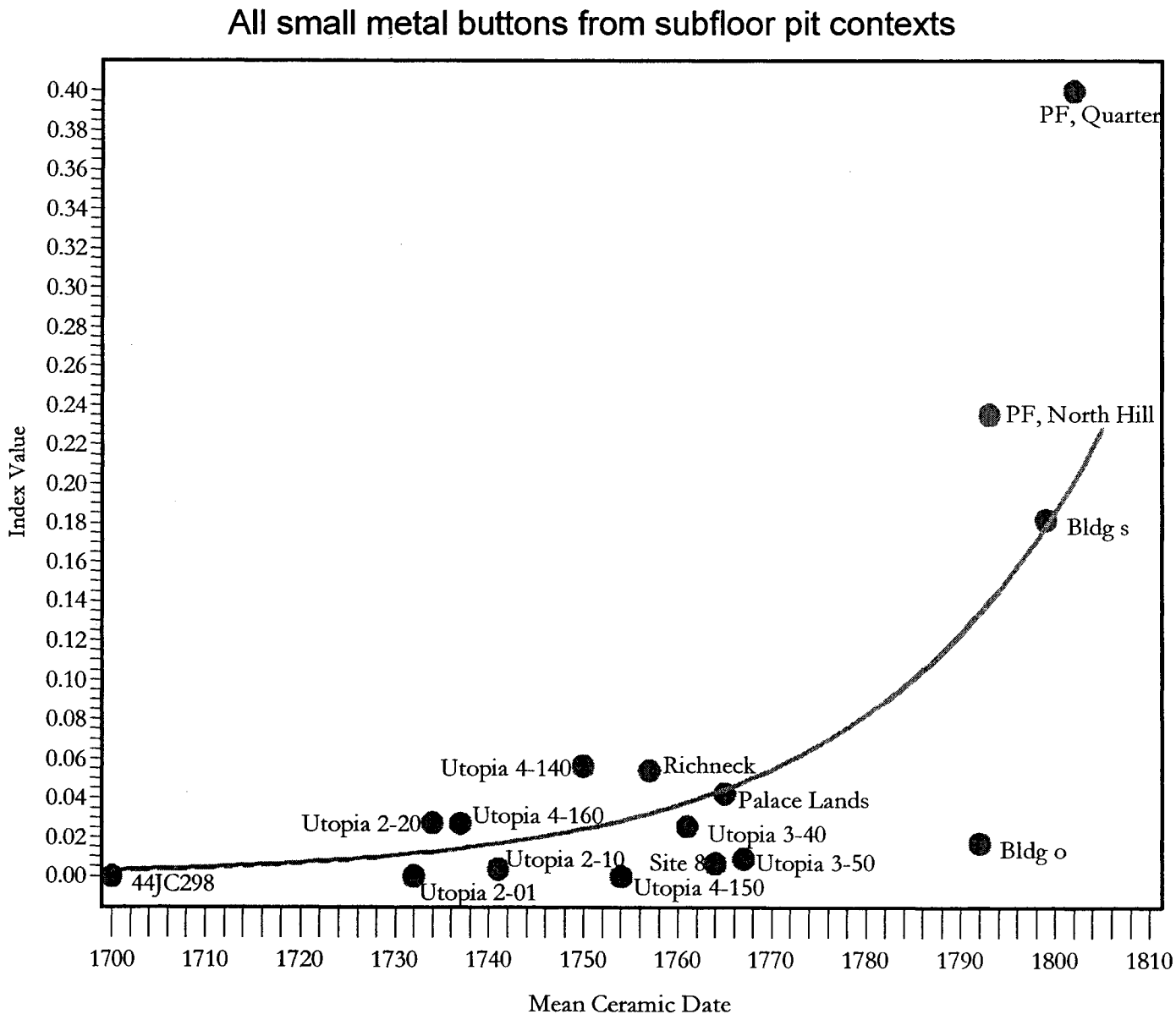
Yellow Metal Buttons < 18 mm				
MCD, plowzone	0.1184	0.0469	0.1898	0.0012
MCD, subfloor pits	0.0248	-0.0076	0.0572	0.1336

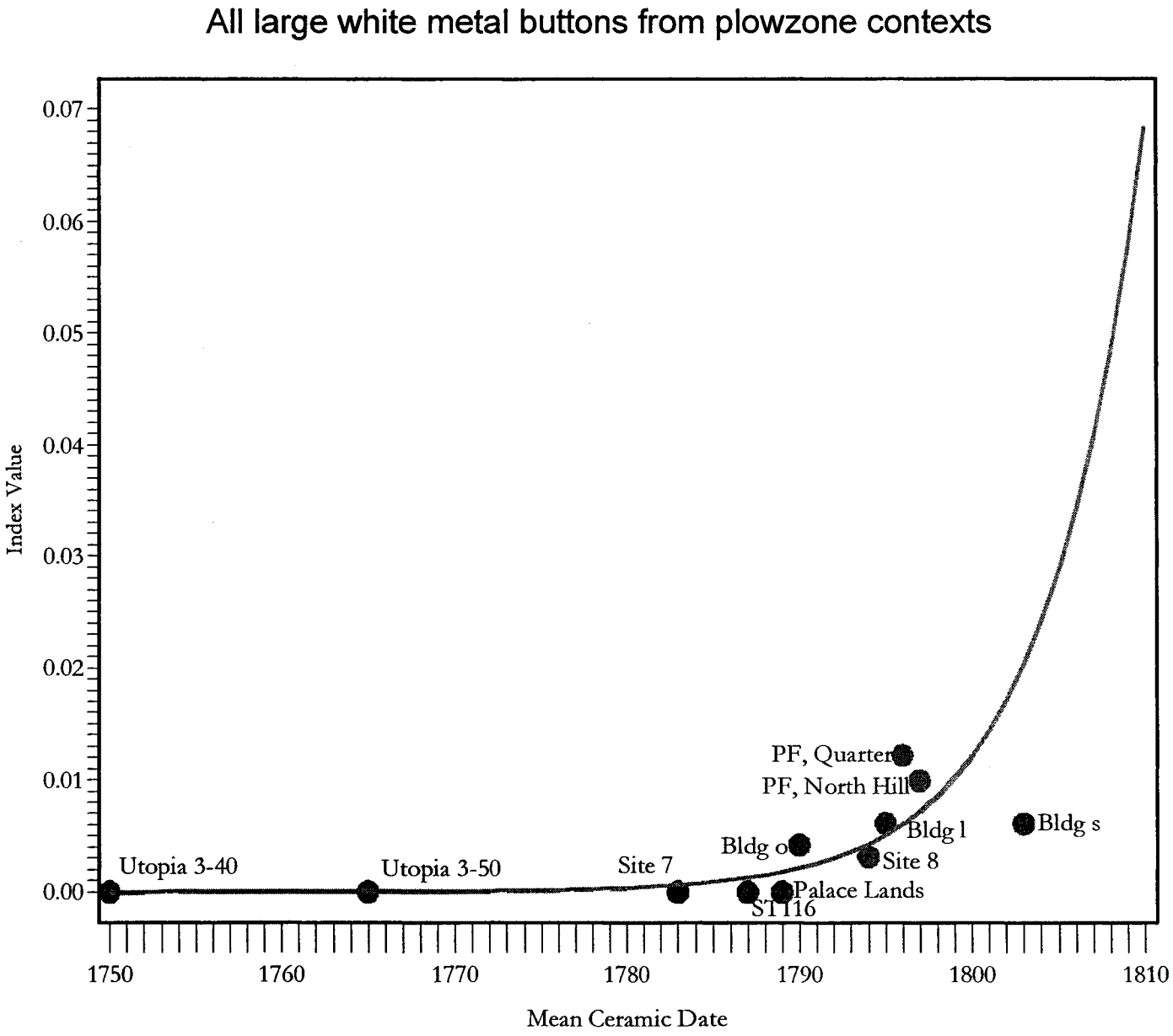
Appendix 10: Wine Bottle Index scores plotted against predicted abundance scores for all categories of buttons where Y=Abundance Index Scores, X1=MCD.

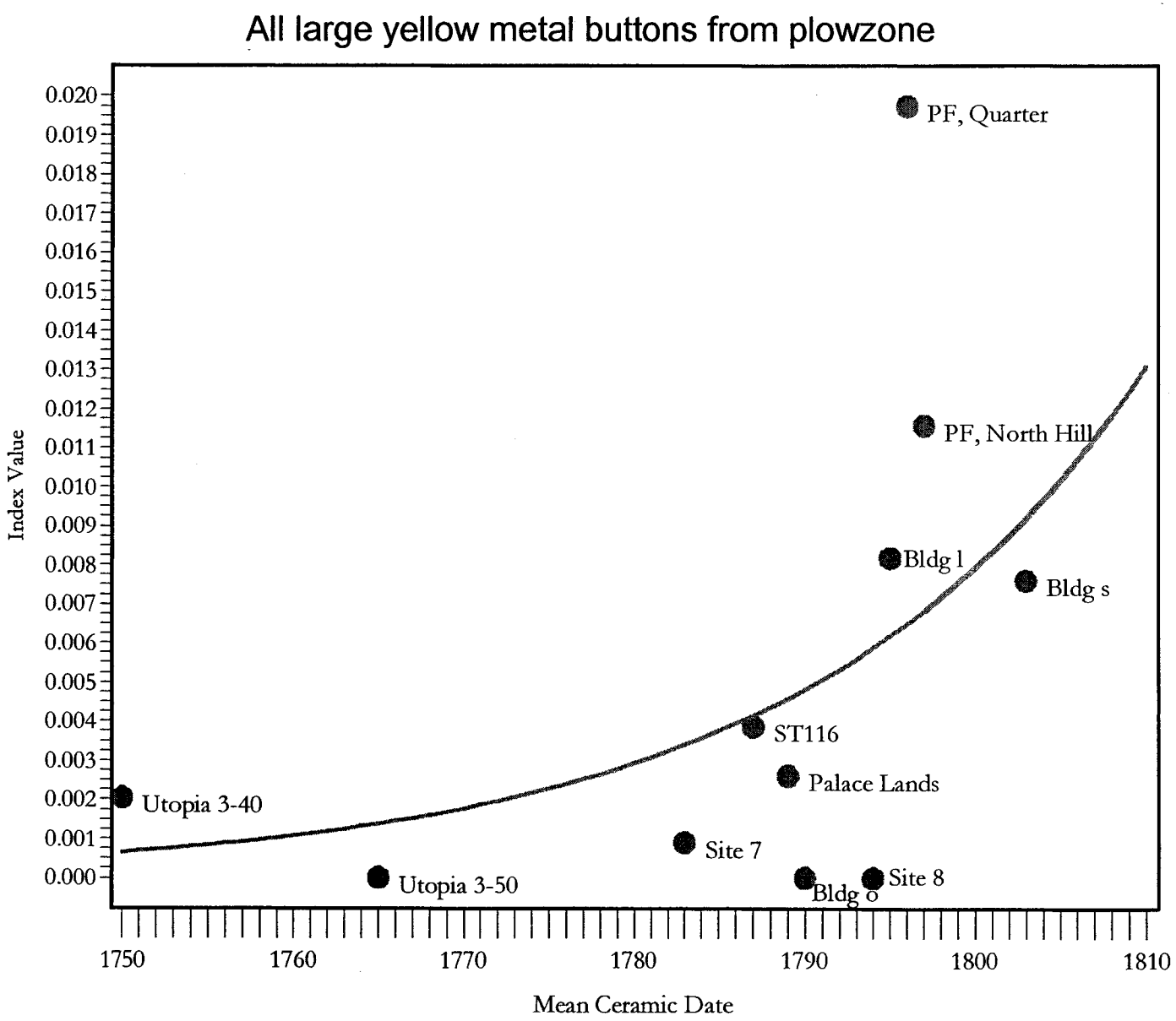



All large metal buttons from subfloor pit contexts
Index Value
0.19
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
PF, North Hill
PF, Quarter
Bldg s
Palace Lands
Richneck
Utopia 4-140
Utopia 2-20
Utopia 2-01
Site 8
Utopia 3-50
Utopia 2-10
Utopia 3-40
Utopia 4-160
Utopia 4-150
44JC298
Bldg o
1700
1710
1720
1730
1740
1750
1760
1770
1780
1790
1800
1810
Mean Ceramic Date

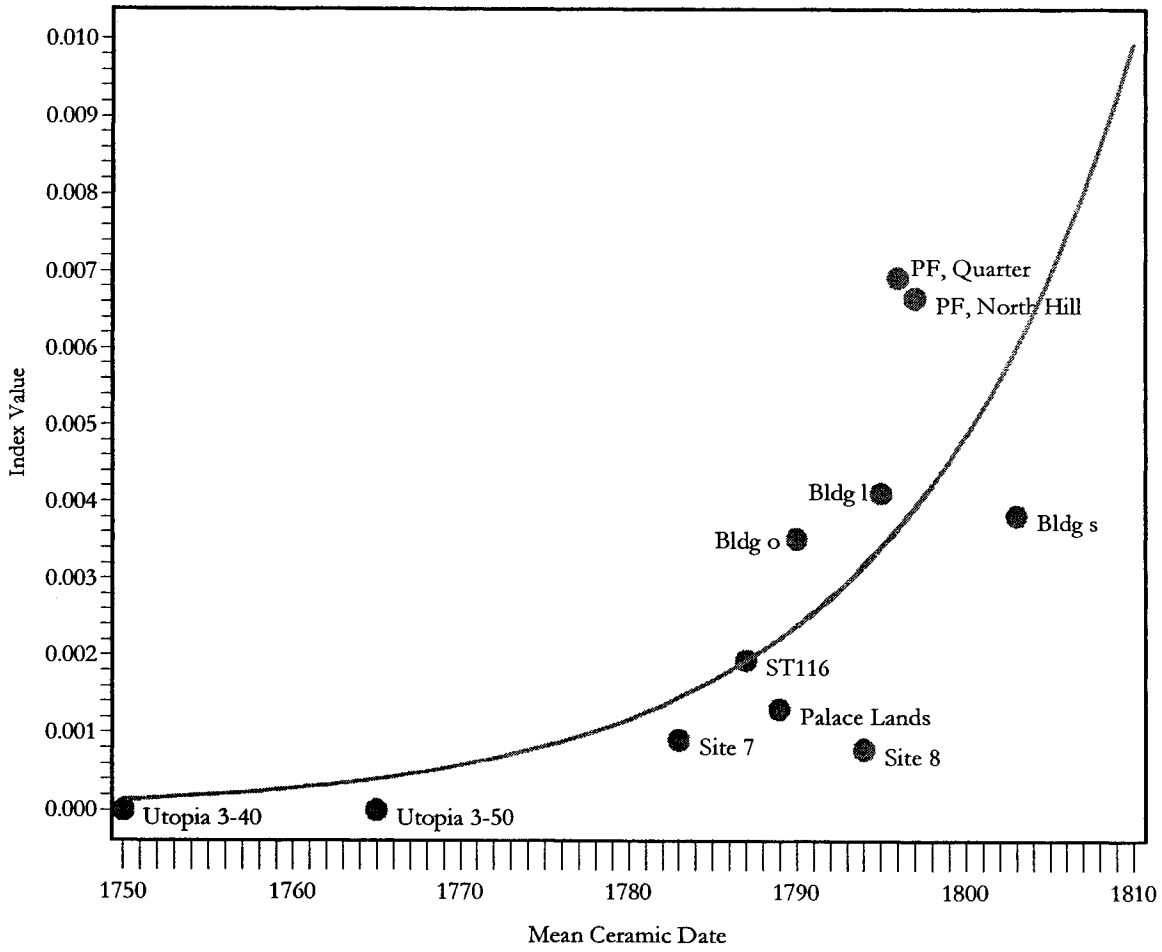

All small metal buttons from plowzone contexts
Index Value
0.030
0.028
0.026
0.024
0.022
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
PF, Quarter
Bldg s
PF, North Hill
Bldg l
Bldg o
Site 8
Utopia 3-40
Site 7
Palace Lands
ST116
Utopia 3-50
1750
1760
1770
1780
1790
1800
1810
Mean Ceramic Date


All small metal buttons from subfloor pit contexts
Index Value
0.40
0.38
0.36
0.34
0.32
0.30
0.28
0.26
0.24
0.22
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
PF, Quarter
PF, North Hill
Bldg s
Bldg o
Utopia 4-140
Richneck
Palace Lands
Utopia 2-20
Utopia 4-160
Utopia 3-40
Utopia 2-10
Site 8
Utopia 3-50
44JC298
Utopia 2-01
Utopia 4-150
1700
1710
1720
1730
1740
1750
1760
1770
1780
1790
1800
1810
Mean Ceramic Date

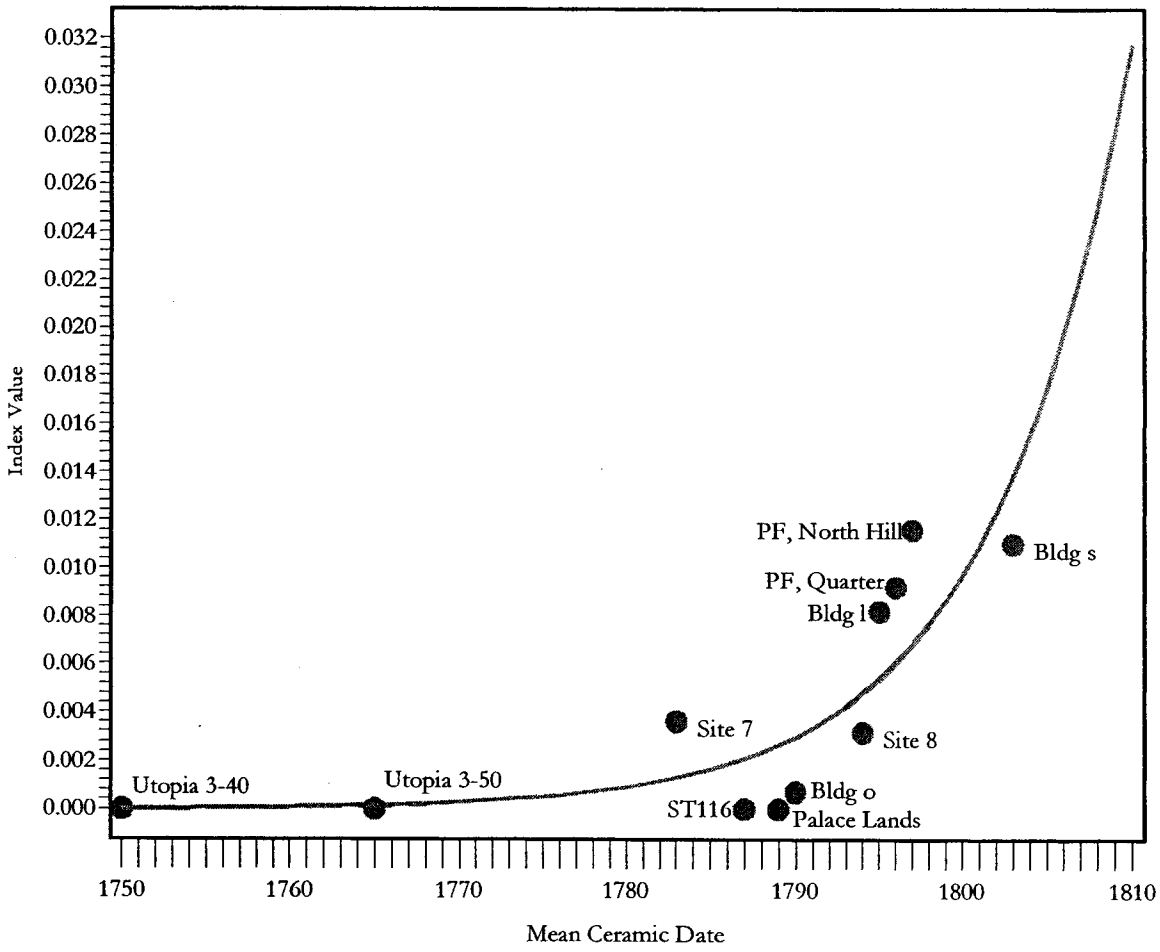

All large white metal buttons from plowzone contexts
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Index Value
Utopia 3-40
Utopia 3-50
Site 7
Bldg o
PF, Quarter
PF, North Hill
Bldg l
Site 8
Bldg s
Palace Lands
ST116
1750
1760
1770
1780
1790
1800
1810
Mean Ceramic Date


All large yellow metal buttons from plowzone
Index Value
0.020
0.019
0.018
0.017
0.016
0.015
0.014
0.013
0.012
0.011
0.010
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0.000
PF, Quarter
PF, North Hill
Bldg l
Bldg s
ST116
Palace Lands
Utopia 3-40
Site 7
Utopia 3-50
Bldg o
Site 8
1750
1760
1770
1780
1790
1800
1810
Mean Ceramic Date

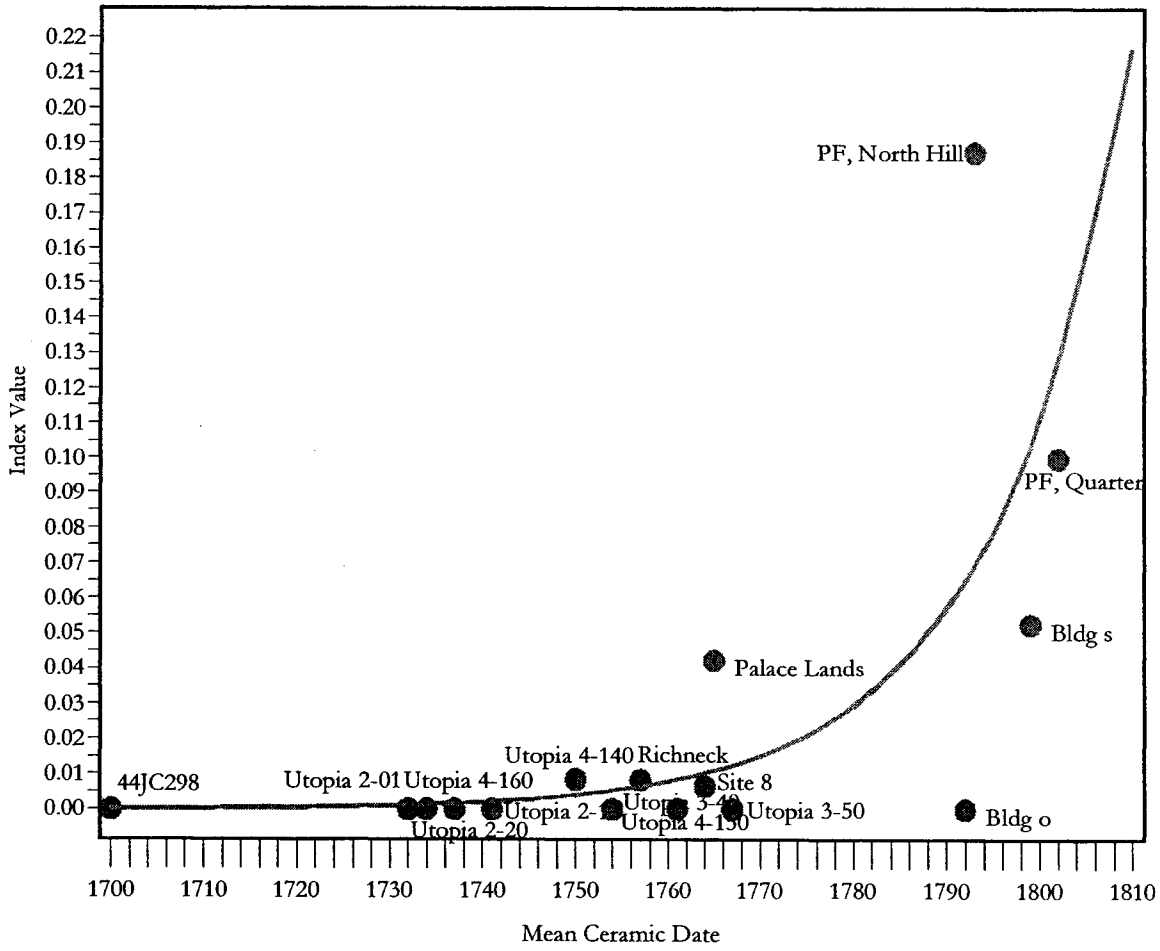
All small white metal buttons from plowzone

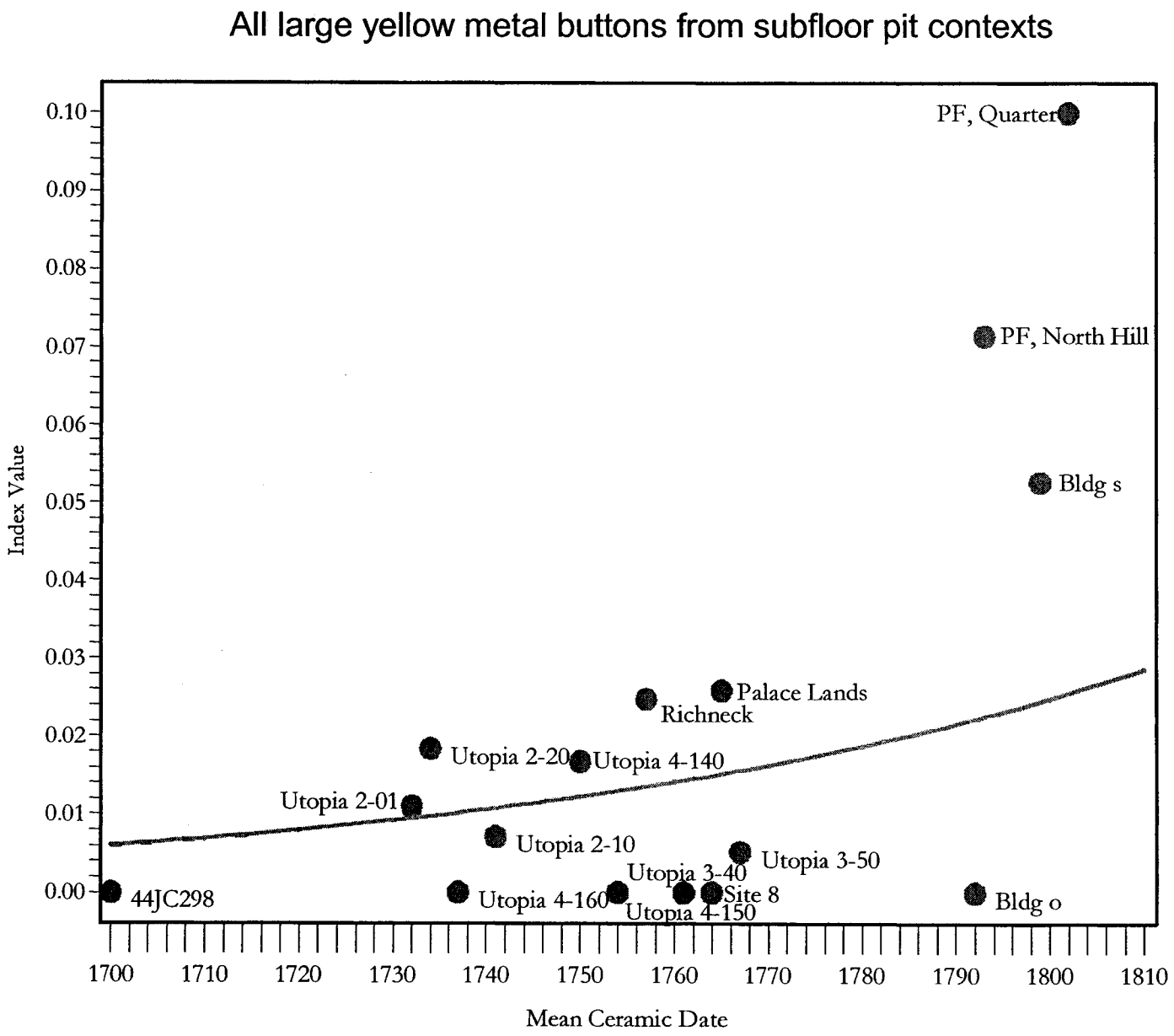


All small yellow metal buttons from plowzone contexts

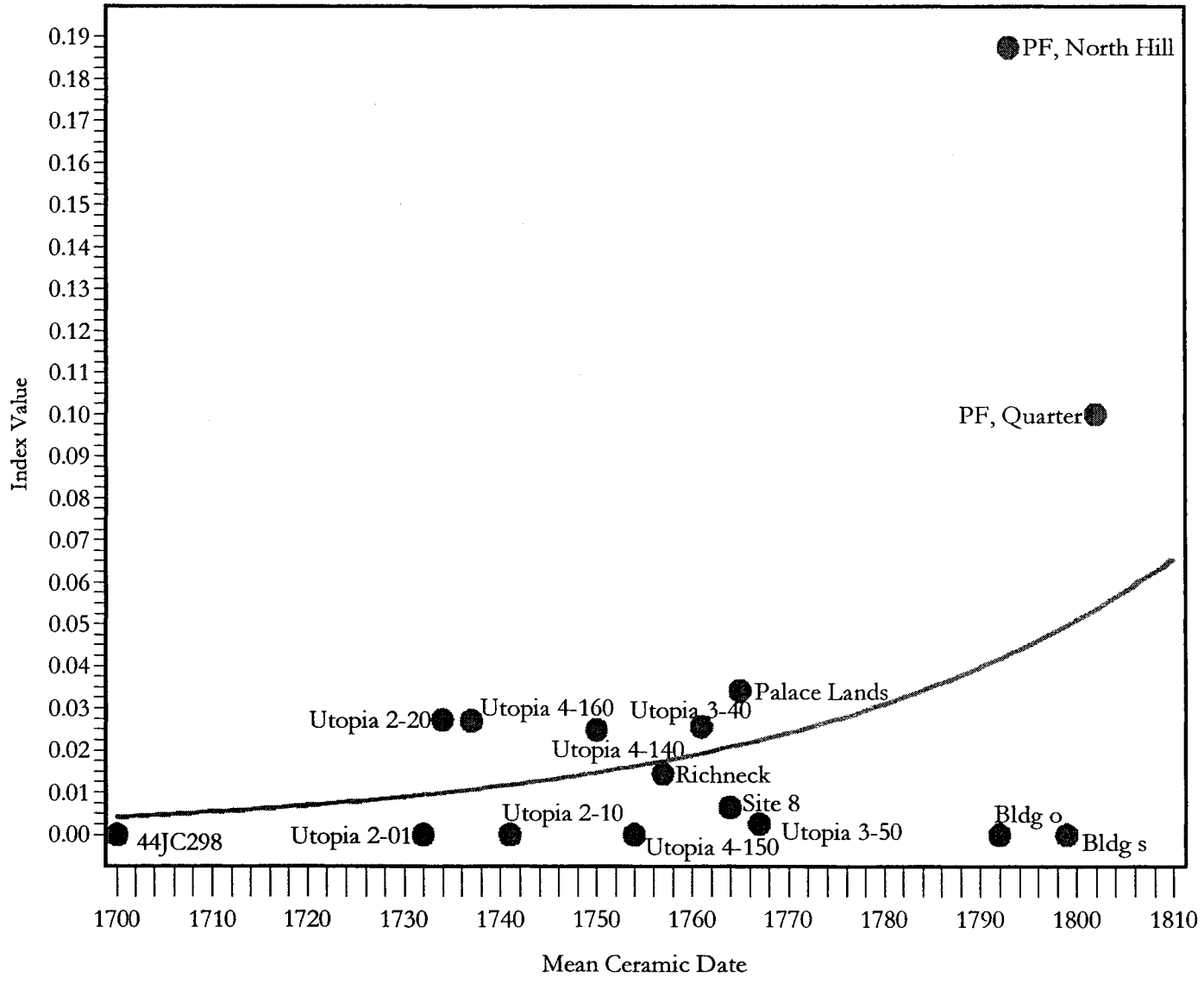


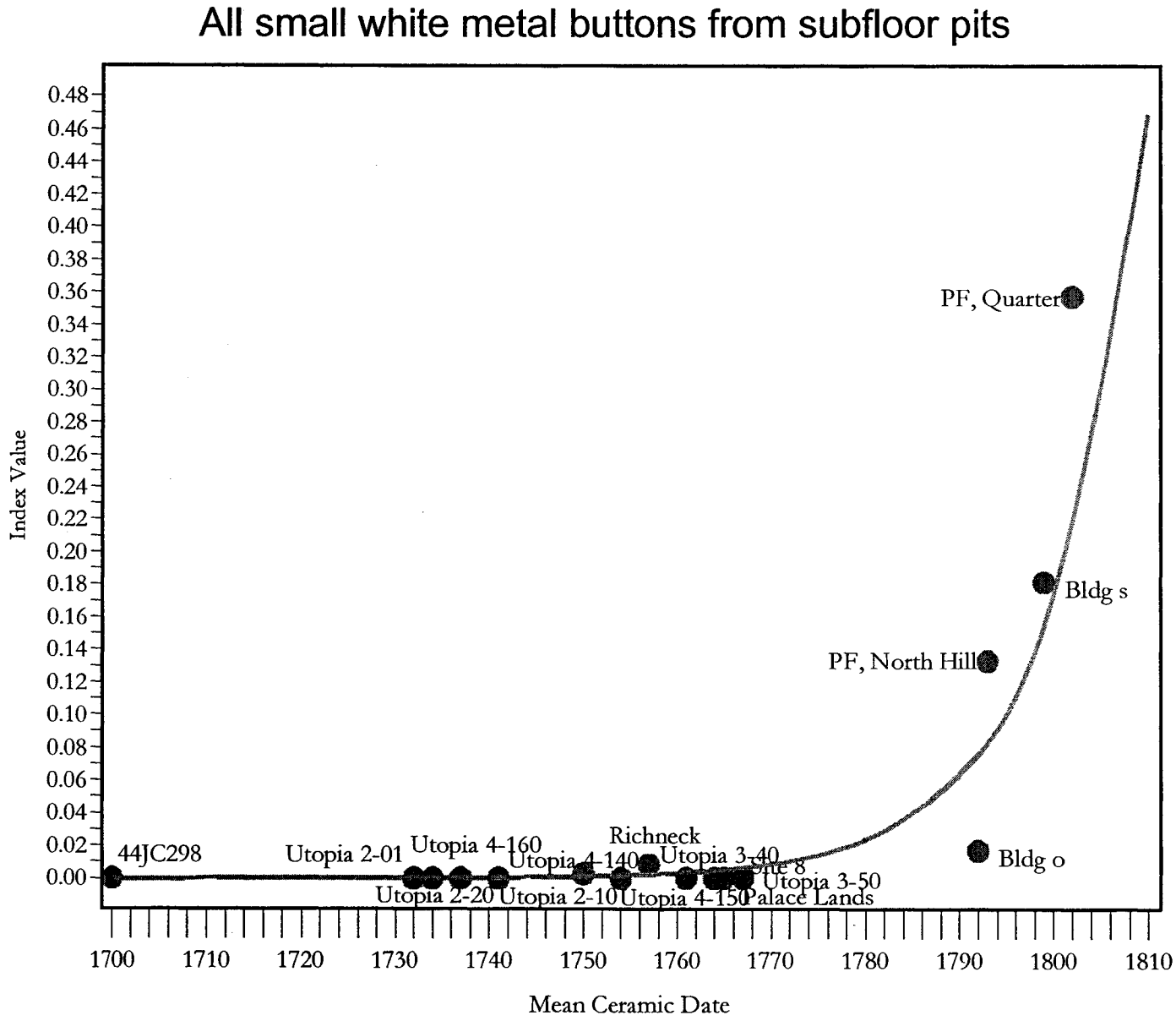
All large white metal buttons from subfloor pit contexts




All large yellow metal buttons from subfloor pit contexts
Index Value
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
PF, Quarter
PF, North Hill
Bldg s
Palace Lands
Richneck
Utopia 2-20
Utopia 4-140
Utopia 2-01
Utopia 2-10
Utopia 3-50
Utopia 3-40
Site 8
44JC298
Utopia 4-160
Utopia 4-150
Bldg o
1700
1710
1720
1730
1740
1750
1760
1770
1780
1790
1800
1810
Mean Ceramic Date

All small yellow metal buttons from subfloor pit contexts




All small white metal buttons from subfloor pits
Index Value
0.48
0.46
0.44
0.42
0.40
0.38
0.36
0.34
0.32
0.30
0.28
0.26
0.24
0.22
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
PF, Quarter
Bldg s
PF, North Hill
Bldg o
44JC298
Utopia 2-01
Utopia 4-160
Utopia 4-140
Richneck
Utopia 3-40
Site 8
Utopia 3-50
Utopia 2-20
Utopia 2-10
Utopia 4-150
Palace Lands
1700
1710
1720
1730
1740
1750
1760
1770
1780
1790
1800
1810
Mean Ceramic Date

Appendix 11: Negative binomial regression estimates for metal buttons where Y=Abundance Index Scores, X1=MCD, and X2=Agricultural Diversification.

\Negative binomial regression estimates for metal buttons where Y=Abundance Index Scores, X_1=MCD, and X2=Agricultural Diversification.				
		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	*p*
Wine Bottle Index for White Metal Buttons				
MCD, plowzone	0.1251	0.0358	0.2143	0.006
Diversified, plowzone	-0.1979	-1.105	0.7092	0.669
MCD, subfloor pits	0.081	0.0493	0.1127	<.0001
Diversified, subfloor pits	0.7744	-0.6328	2.1815	0.2808
Wine Bottle Index for Yellow Metal Buttons				
MCD, plowzone	0.0466	0.0109	0.0824	0.0106
Diversified, plowzone	0.6303	-0.2548	1.5154	0.1628
MCD, subfloor pits	0.0181	-0.0062	0.0424	0.144
Diversified, subfloor pits	0.4455	-0.6472	1.5381	0.4243
Wine Bottle Index for Metal Buttons >=18 mm				
MCD, plowzone	0.0821	0.0146	0.1496	0.0172
Diversified, plowzone	0.4627	-0.4891	1.4144	0.3407
MCD, subfloor pits	0.0366	0.0095	0.0636	0.0081
Diversified, subfloor pits	0.5214	-0.7417	1.7845	0.4185
Wine Bottle Index for Complete Metal Buttons < 18 mm				
MCD, plowzone	0.0636	0.0194	0.1077	0.0048
Diversified, plowzone	0.2883	-0.4129	0.9895	0.4203
MCD, subfloor pits	0.0388	0.0173	0.0602	0.0004
Diversified, subfloor pits	0.8426	-0.2548	1.9399	0.1323
Wine Bottle Index for White Buttons >=18 mm				
MCD, plowzone	0.1864	0.0252	0.3475	0.0235
Diversified, plowzone	-0.3343	-1.5518	0.8831	0.5904

MCD, subfloor pits	0.0691	0.0215	0.1168	0.0045
Diversified, subfloor pits	0.5806	-1.3547	2.5158	0.5565
Wine Bottle Index for Yellow Metal Buttons >=18 mm				
MCD, plowzone	0.0579	-0.0029	0.1187	0.0618
Diversified, plowzone	1.1579	-0.2223	2.5381	0.1001
MCD, subfloor pits	0.0082	-0.0243	0.0407	0.6217
Diversified, subfloor pits	0.6515	-0.4599	1.7628	0.2506
Wine Bottle Index for Complete White Metal Buttons < 18 mm				
MCD, plowzone	0.0701	-0.0077	0.1479	0.0774
Diversified, plowzone	0.0335	-0.8976	0.9646	0.9438
MCD, subfloor pits	0.1021	0.0633	0.1408	<.0001
Diversified, subfloor pits	0.9847	-0.8317	2.8012	0.288
Wine Bottle Index for Complete Yellow Metal Buttons < 18 mm				
MCD, plowzone	0.1255	0.0426	0.2085	0.003
Diversified, plowzone	-0.1905	-1.1805	0.7995	0.7061
MCD, subfloor pits	0.0245	-0.0079	0.0569	0.137
Diversified, subfloor pits	0.1598	-1.3231	1.6427	0.832

Appendix 12: Negative binomial regression estimates for all categories of buttons where Y=Abundance Index Scores, X1=MCD and X2=Proximity to Main House.

Negative binomial regression estimates for all categories of buttons where Y=Abundance Index Scores, X_1=MCD and X_2=Proximity to Main House.				
		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	p
Wine Bottle Index for White Metal Buttons				
MCD, plowzone	0.1151	0.0321	0.198	0.0065
Proximity to Main House, plowzone	0.3545	-0.5514	1.2604	0.4431
MCD, subfloor pits	0.0763	0.0399	0.1126	<.0001
Proximity to Main House, subfloor pits	0.0118	-1.575	1.5987	0.9883
Wine Bottle Index for Yellow Metal Buttons				
MCD, plowzone	0.0409	-0.0009	0.0828	0.0554
Proximity to Main House, plowzone	0.1343	-0.9727	1.2413	0.8121
MCD, subfloor pits	0.0236	-0.005	0.0523	0.1061
Proximity to Main House, subfloor pits	-0.295	-1.7397	1.1497	0.689
Wine Bottle Index for Metal Buttons >=18 mm				
MCD, plowzone	0.0805	0.005	0.1559	0.0367
Proximity to Main House, plowzone	0.1367	-0.9339	1.2073	0.8024
MCD, subfloor pits	0.0346	0.0015	0.0678	0.0404
Proximity to Main House, subfloor pits	0.3266	-1.1945	1.8478	0.6739
Wine Bottle Index for Complete Metal Buttons < 18 mm				
MCD, plowzone	0.0618	0.0119	0.1117	0.0151
Proximity to Main House, plowzone	0.1979	-0.603	0.9988	0.6281
MCD, subfloor pits	0.0428	0.0119	0.0737	0.0066
Proximity to Main House, subfloor pits	-0.1499	-1.7255	1.4258	0.8521
Wine Bottle Index for White				

Buttons >=18 mm				
MCD, plowzone	0.1733	0.0228	0.3237	0.024
Proximity to Main House, plowzone	0.1558	-1.0474	1.3591	0.7996
MCD, subfloor pits	0.0637	0.0161	0.1113	0.0087
Proximity to Main House, subfloor pits	0.2901	-1.6447	2.225	0.7688
Wine Bottle Index for Yellow Metal Buttons >=18 mm				
MCD, plowzone	0.0429	-0.0255	0.1113	0.2191
Proximity to Main House, plowzone	0.4524	-1.2167	2.1216	0.5952
MCD, subfloor pits	0.0072	-0.0337	0.0482	0.73
Proximity to Main House, subfloor pits	0.4291	-1.2302	2.0884	0.6123
Wine Bottle Index for Complete White Metal Buttons < 18 mm				
MCD, plowzone	0.0591	-0.0182	0.1364	0.134
Proximity to Main House, plowzone	0.42	-0.604	1.444	0.4214
MCD, subfloor pits	0.1125	0.0526	0.1723	0.0002
Proximity to Main House, subfloor pits	-0.7372	-3.2666	1.7922	0.5678
Wine Bottle Index for Complete Yellow Metal Buttons < 18 mm				
MCD, plowzone	0.133	0.0571	0.2088	0.0006
Proximity to Main House, plowzone	-0.5804	-1.546	0.3852	0.2388
MCD, subfloor pits	0.0294	-0.0073	0.0661	0.1168
Proximity to Main House, subfloor pits	-0.498	-2.3556	1.3595	0.5993

Appendix 13: Negative binomial regression estimates for all categories of buttons where Y=Abundance Index Scores, X1=MCD and X2=Distance from Urban Center.

Negative binomial regression estimates for all categories of buttons where Y=Abundance Index Scores, X_1=MCD and X_2=Distance from Urban Center.				
		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	*p*
Wine Bottle Index for White Metal Buttons				
MCD, subfloor pits	0.0834	0.0514	0.1155	<.0001
Distance to Urban Center, subfloor pits	1.2174	-0.8146	3.2494	0.2403
Wine Bottle Index for Yellow Metal Buttons				
MCD, subfloor pits	0.0205	-0.0035	0.0444	0.0939
Distance to Urban Center, subfloor pits	0.5035	-1.1068	2.1138	0.54
Wine Bottle Index for Metal Buttons >=18 mm				
MCD, subfloor pits	0.0399	0.0133	0.0665	0.0033
Distance to Urban Center, subfloor pits	1.0769	-0.5201	2.6739	0.1863
Wine Bottle Index for Complete Metal Buttons < 18 mm				
MCD, subfloor pits	0.0411	0.0184	0.0639	0.0004
Distance to Urban Center, subfloor pits	0.1493	-1.6035	1.9021	0.8674
Wine Bottle Index for White Buttons >=18 mm				
MCD, subfloor pits	0.0736	0.0299	0.1174	0.001
Distance to Urban Center, subfloor pits	1.5768	-0.7277	3.8812	0.1799
Wine Bottle Index for Yellow Metal Buttons >=18 mm				
MCD, subfloor pits	0.0034	-0.0319	0.0387	0.8487
Distance to Urban Center, subfloor pits	1.1638	-0.1335	2.4611	0.0787

Wine Bottle Index for Complete White Metal Buttons < 18 mm				
MCD, subfloor pits	0.1025	0.0547	0.1504	<.0001
Distance to Urban Center, subfloor pits	0.4011	-3.1014	3.9035	0.8224
Wine Bottle Index for Complete Yellow Metal Buttons < 18 mm				
MCD, subfloor pits	0.0249	-0.0076	0.0573	0.1329
Distance to Urban Center, subfloor pits	0.2093	-1.8322	2.2509	0.8407

Appendix 14: Negative binomial regression estimates for all categories of buttons where Y=Abundance Index Scores, X1=MCD and X2=Owner Presence.

Negative binomial regression estimates for all categories of buttons where Y=Abundance Index Scores, X_1=MCD and X_2=Owner Presence.				
		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	p
Wine Bottle Index for White Metal Buttons				
MCD, subfloor pits	0.0657	0.036	0.0954	<.0001
Owner Presence, subfloor pits	-1.1223	-2.4449	0.2004	0.0963
Wine Bottle Index for Yellow Metal Buttons				
MCD, subfloor pits	0.0082	-0.0141	0.0306	0.4707
Owner Presence, subfloor pits	-1.2226	-2.3877	-0.0574	0.0397
Wine Bottle Index for Metal Buttons >=18 mm				
MCD, subfloor pits	0.0284	0.0007	0.056	0.0441
Owner Presence, subfloor pits	-1.063	-2.4238	0.2978	0.1258
Wine Bottle Index for Complete Metal Buttons < 18 mm				
MCD, subfloor pits	0.0303	0.0075	0.0532	0.0092
Owner Presence, subfloor pits	-1.0877	-2.2946	0.1192	0.0773
Wine Bottle Index for White Buttons >=18 mm				
MCD, subfloor pits	0.0544	0.0048	0.1041	0.0316
Owner Presence, subfloor pits	-0.9211	-3.0908	1.2485	0.4053
Wine Bottle Index for Yellow Metal Buttons >=18 mm				
MCD, subfloor pits	Warning: Negative of Hessian not positive. Model does not fit.			
Owner Presence, subfloor pits				
Wine Bottle Index for Complete White Metal Buttons < 18 mm				
MCD, subfloor pits	Warning: Negative of Hessian not positive. Model does not fit.			
Owner Presence, subfloor pits				
Wine Bottle Index for Complete Yellow Metal Buttons < 18 mm				

MCD, subfloor pits	0.0096	-0.0234	0.0425	0.569
Owner Presence, subfloor pits	-1.4058	-3.205	0.3933	0.1257

Appendix 15: Negative binomial regression estimates for all categories of buttons where Y=Abundance Index Scores, X1=MCD and X2=Thomas Jefferson, owner.

Negative binomial regression estimates for all categories of buttons where Y=Abundance Index Scores, X_1=MCD and X_2=Thomas Jefferson, owner.				
		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	p
Wine Bottle Index for White Metal Buttons				
MCD, plowzone	0.0884	0.0063	0.1705	0.0348
Thomas Jefferson, owner, plowzone	1.087	-0.4087	2.5828	0.1543
MCD, subfloor pits	0.1019	0.0359	0.1679	0.0025
Thomas Jefferson, owner, subfloor pits	-1.2319	-4.001	1.5371	0.3832
Wine Bottle Index for Yellow Metal Buttons				
MCD, plowzone	0.021	-0.0311	0.0732	0.4293
Thomas Jefferson, owner, plowzone	1.0103	-0.5943	2.6149	0.2172
MCD, subfloor pits	0.0359	-0.0067	0.0785	0.099
Thomas Jefferson, owner, subfloor pits	-0.9633	-3.1022	1.1755	0.3774
Wine Bottle Index for Metal Buttons >=18 mm				
MCD, plowzone	0.0585	-0.0287	0.1458	0.1884
Thomas Jefferson, owner, plowzone	0.8659	-0.89	2.6217	0.3338
MCD, subfloor pits	0.0571	0.0077	0.1066	0.0235
Thomas Jefferson, owner, subfloor pits	-1.0417	-3.337	1.2536	0.3737
Wine Bottle Index for Complete Metal Buttons < 18 mm				
MCD, plowzone	0.0438	-0.0153	0.1029	0.1465
Thomas Jefferson, owner, plowzone	0.9965	-0.2802	2.2732	0.1261
MCD, subfloor pits	0.0567	0.008	0.1053	0.0224
Thomas Jefferson, owner, subfloor pits	-0.8828	-3.2684	1.5027	0.4683
Wine Bottle Index for White Buttons >=18 mm				
MCD, plowzone	Warning: Negative of Hessian not positive. Model does not fit.			
Thomas Jefferson, owner, plowzone				

MCD, subfloor pits	0.088	0.0081	0.1679	0.0309
Thomas Jefferson, owner, subfloor pits	-1.0698	-4.2667	2.1271	0.5119
Wine Bottle Index for Yellow Metal Buttons >=18 mm				
MCD, plowzone	0.0457	-0.0413	0.1326	0.3033
Thomas Jefferson, owner, plowzone	0.1695	-2.2379	2.577	0.8902
MCD, subfloor pits	0.0285	-0.0193	0.0764	0.2422
Thomas Jefferson, owner, subfloor pits	-0.9609	-3.081	1.1592	0.3744
Wine Bottle Index for Complete White Metal Buttons < 18 mm				
MCD, plowzone	0.0583	-0.0186	0.1351	0.1374
Thomas Jefferson, owner, plowzone	0.5229	-1.1459	2.1917	0.5392
MCD, subfloor pits	0.1184	0.0151	0.2216	0.0247
Thomas Jefferson, owner, subfloor pits	-0.8881	-5.3106	3.5344	0.6939
Wine Bottle Index for Complete Yellow Metal Buttons < 18 mm				
MCD, plowzone	Warning: Negative of Hessian not positive. Model does not fit.			
Thomas Jefferson, owner, plowzone				
MCD, subfloor pits	0.0285	-0.0288	0.0858	0.3303
Thomas Jefferson, owner, subfloor pits	-0.2214	-3.0409	2.5981	0.8777

Appendix 16: Negative binomial regression estimates for all categories of teawares where Y=Abundance Index Scores, X1=MCD.

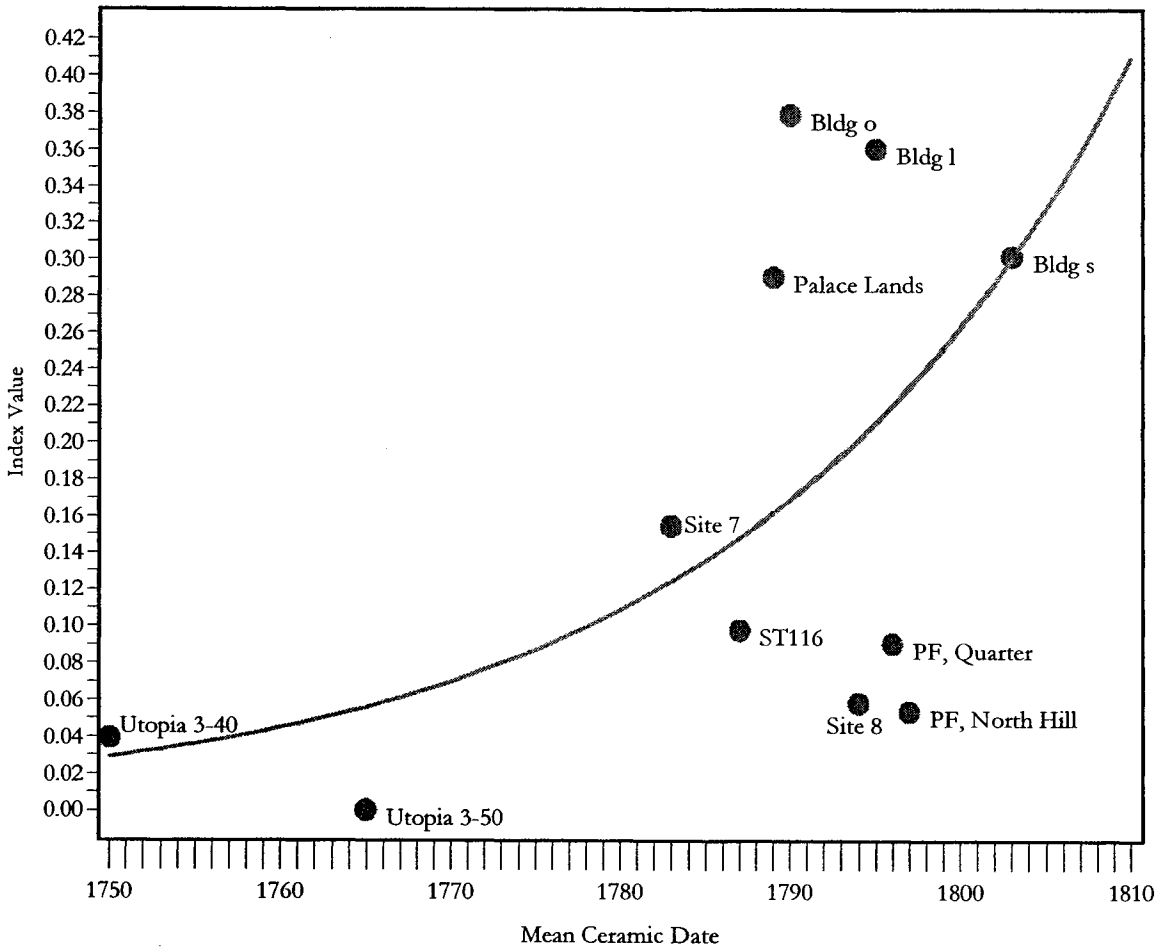
Table 16.1--Negative binomial regression estimates for all categories of teawares where Y=Abundance Index Scores, X_1=MCD.

		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	p
Wine Bottle Index for All Refined Teawares				
MCD, plowzone	0.0327	-0.0005	0.0659	0.0537
MCD, subfloor pits	0.0469	0.0167	0.0771	0.0023
Wine Bottle Index for Creamware Teaware				
MCD, plowzone	0.1059	0.0239	0.1878	0.0114
MCD, subfloor pits	0.0797	-0.019	0.1785	0.1135
Wine Bottle Index for Chinese Porcelain Teaware				
MCD, plowzone	0.0808	0.0193	0.1423	0.01
MCD, subfloor pits	0.0568	0.0225	0.0912	0.0012
Wine Bottle Index for Pearlware Teaware				
MCD, plowzone	0.1489	0.0559	0.2418	0.0017
MCD, subfloor pits	Warning: Negative of Hessian not positive. Model does not fit.			
Wine Bottle Index for White Salt Glaze Teaware				
MCD, plowzone	-0.0243	-0.1053	0.0567	0.5573
MCD, subfloor pits	-0.0099	-0.0843	0.0646	0.7946
Wine Bottle Index for Delft Teaware				
MCD, plowzone	0.0316	-0.2275	0.2907	0.811
MCD, subfloor pits	-0.0007	-0.0583	0.057	0.9817

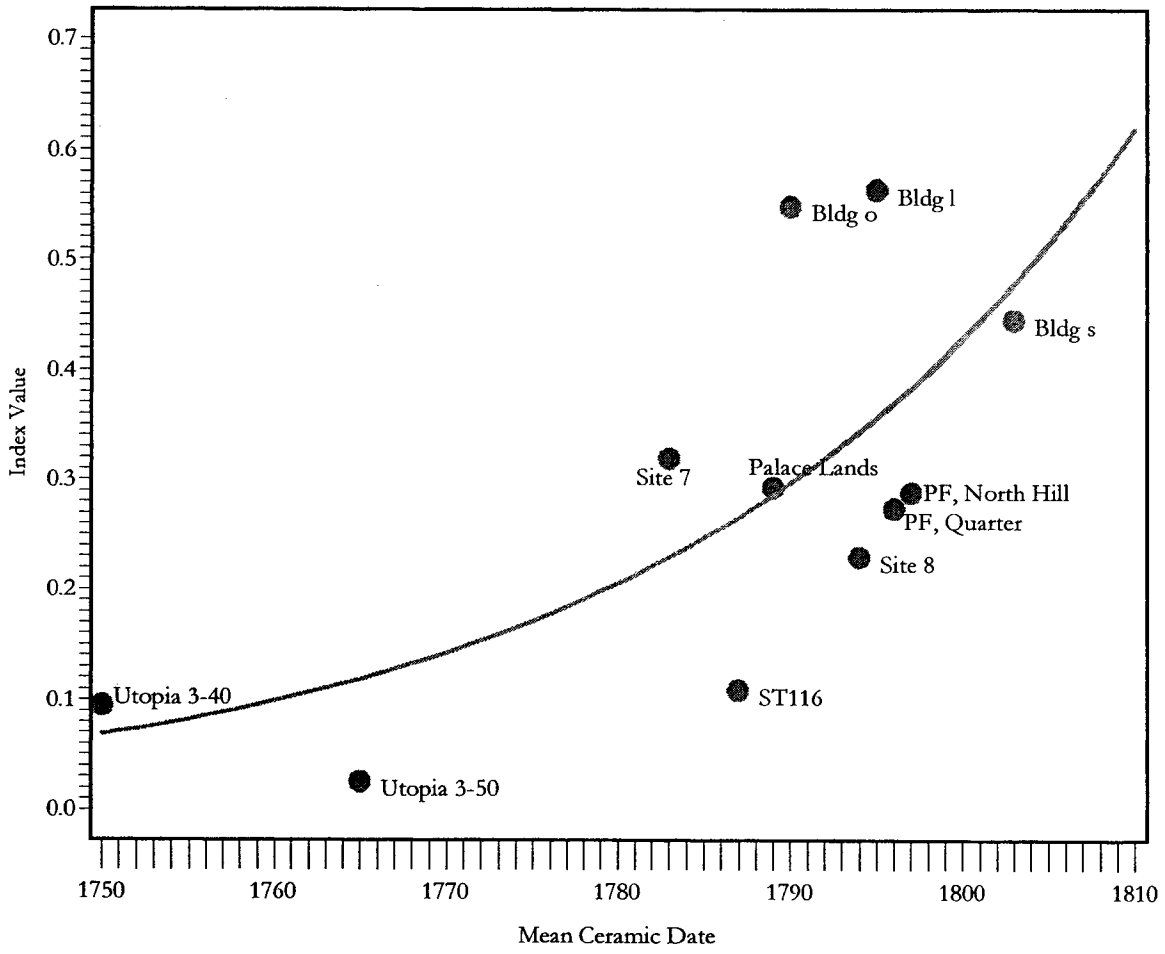
Table 16.2--Negative binomial regression estimates for all categories of tablewares where Y=Abundance Index Scores, X_1=MCD.				
		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	p
Wine Bottle Index for All Refined Tablewares				
MCD, plowzone	0.0367	0.0161	0.0572	0.0005
MCD, subfloor pits	0.0256	0.0053	0.0459	0.0136
Wine Bottle Index for Creamware Tableware				
MCD, plowzone	0.1196	0.0574	0.1818	0.0002
MCD, subfloor pits	0.0838	0.0446	0.1229	<.0001
Wine Bottle Index for Chinese Porcelain Tableware				
MCD, plowzone	0.0524	-0.0077	0.1126	0.0874
MCD, subfloor pits	0.0454	0.0016	0.0891	0.042
Wine Bottle Index for Pearlware Tableware				
MCD, plowzone	0.1658	0.0803	0.2513	0.0001
MCD, subfloor pits	0.2713	0.1245	0.4181	0.0003
Wine Bottle Index for White Salt Glaze Tableware				
MCD, plowzone	-0.0264	-0.1041	0.0514	0.5062
MCD, subfloor pits	0.0102	-0.092	0.1123	0.8454
Wine Bottle Index for Delft Tableware				
MCD, plowzone	-0.0444	-0.128	0.0392	0.2976
MCD, subfloor pits	-0.0137	-0.0522	0.0249	0.4874

Appendix 17: Wine Bottle Index scores plotted against predicted abundance scores for all refined ware types where Y=Abundance Index Scores, X1=MCD.

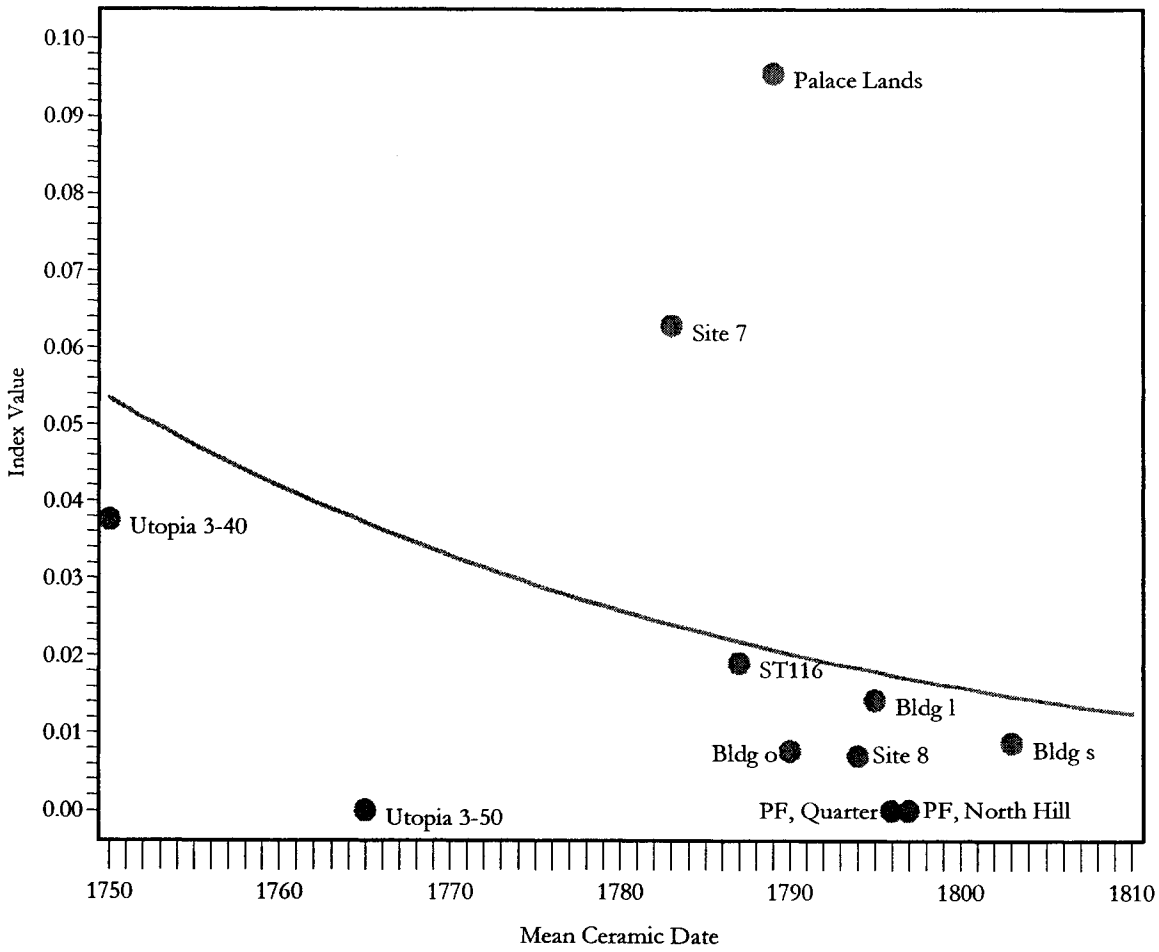
All refined ceramic teawares from plowzone where Y=Abundance Index Scores, X1=MCD



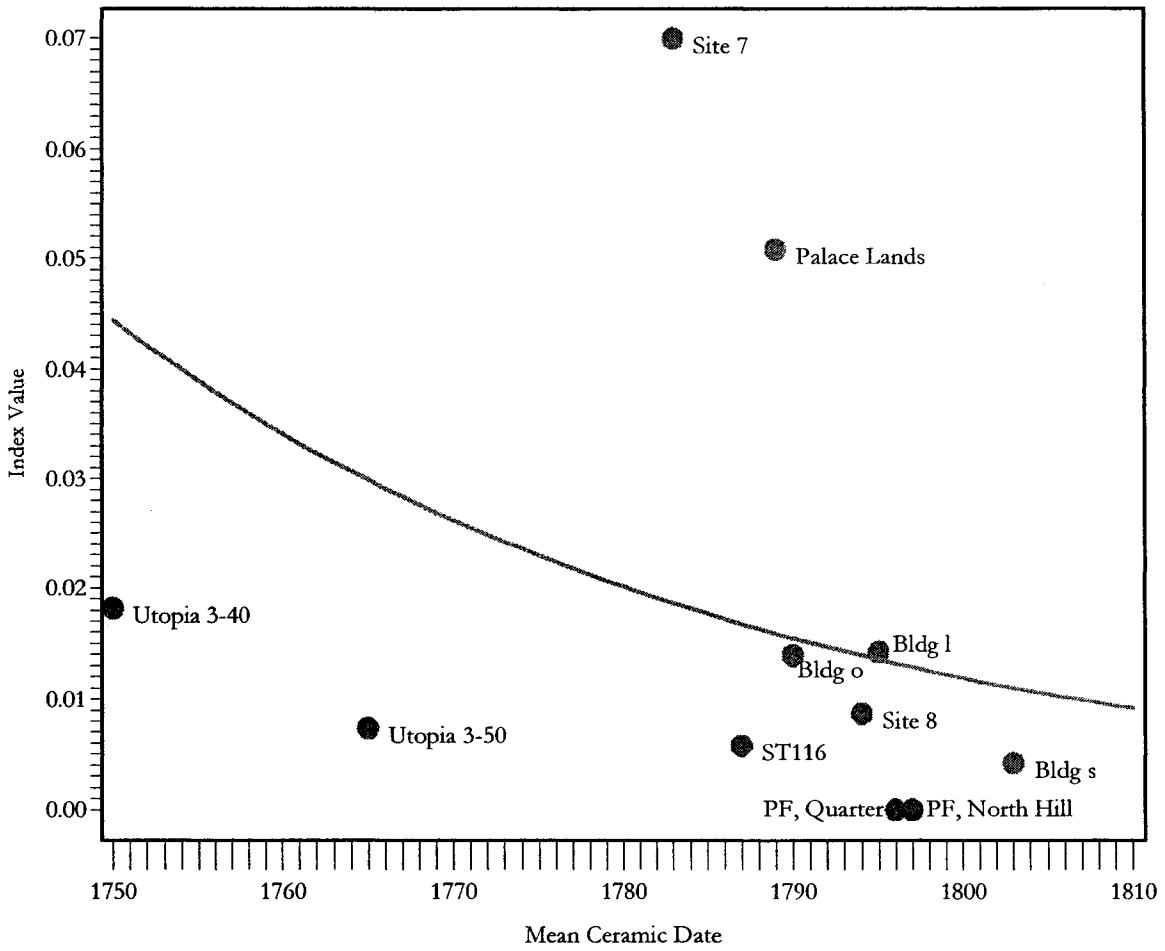
All refined ceramic tablewares from plowzone where Y=Abundance Index Scores, X1=MCD



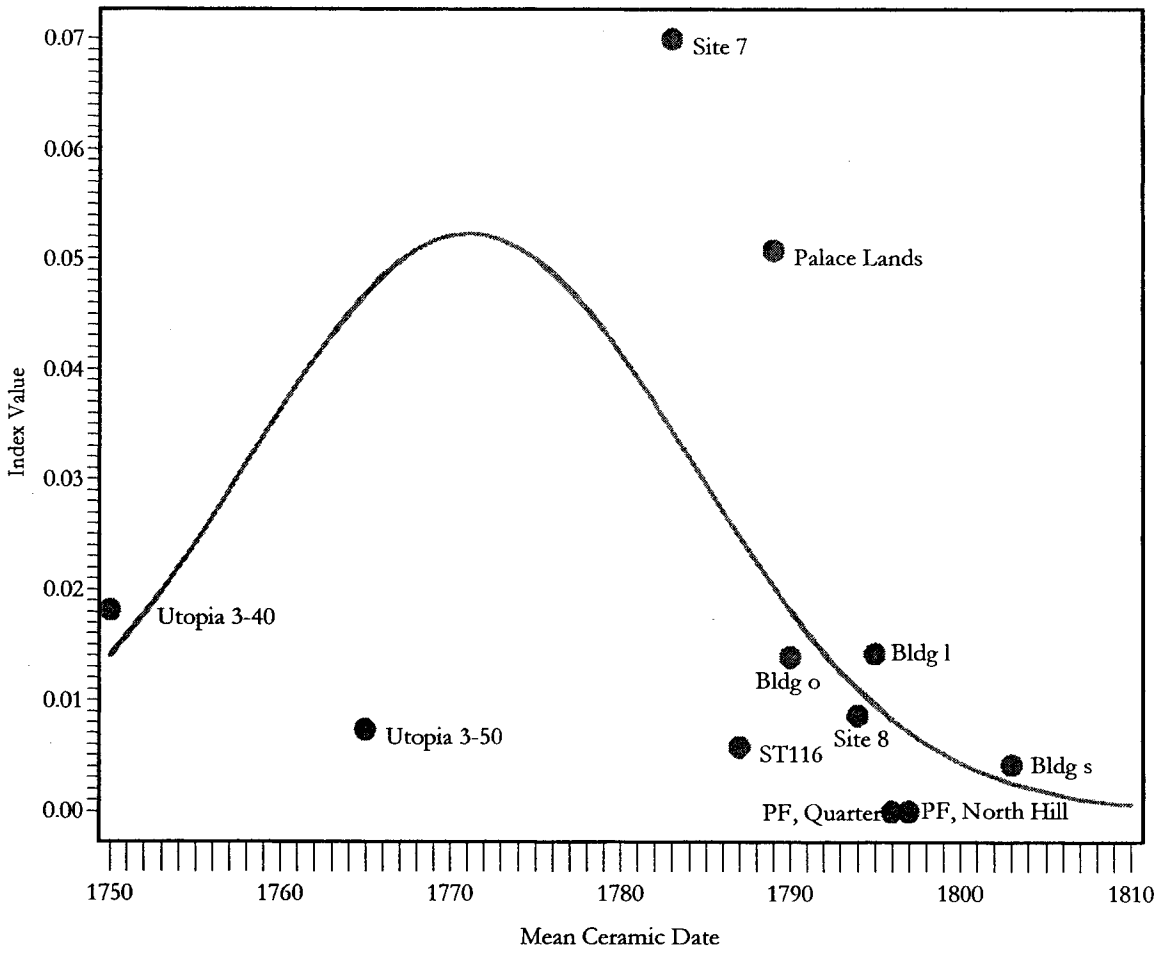
White salt glaze teawares from plowzone where Y=Abundance Index Scores, X1=MCD



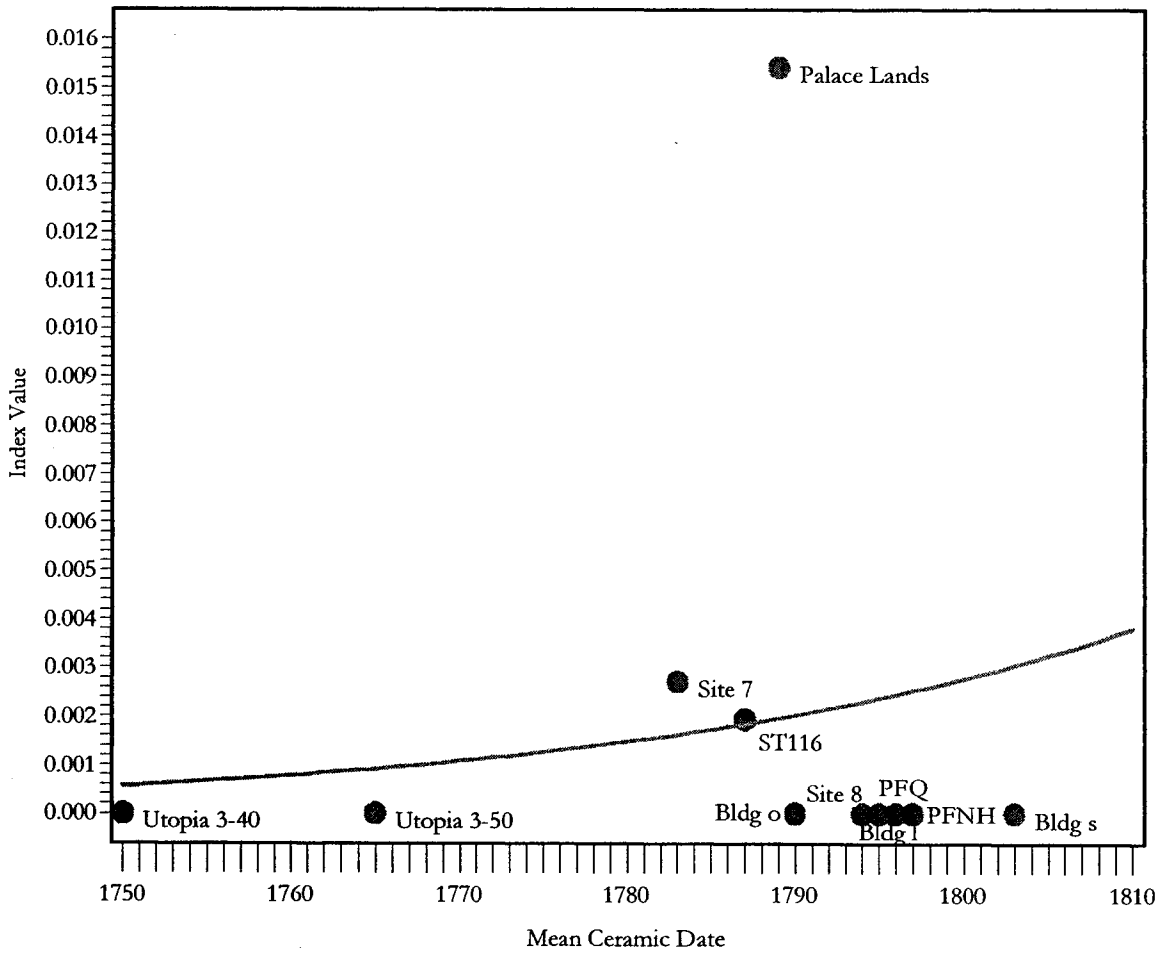
White salt glaze tablewares from plowzone where Y=Abundance Index Scores, X1=MCD



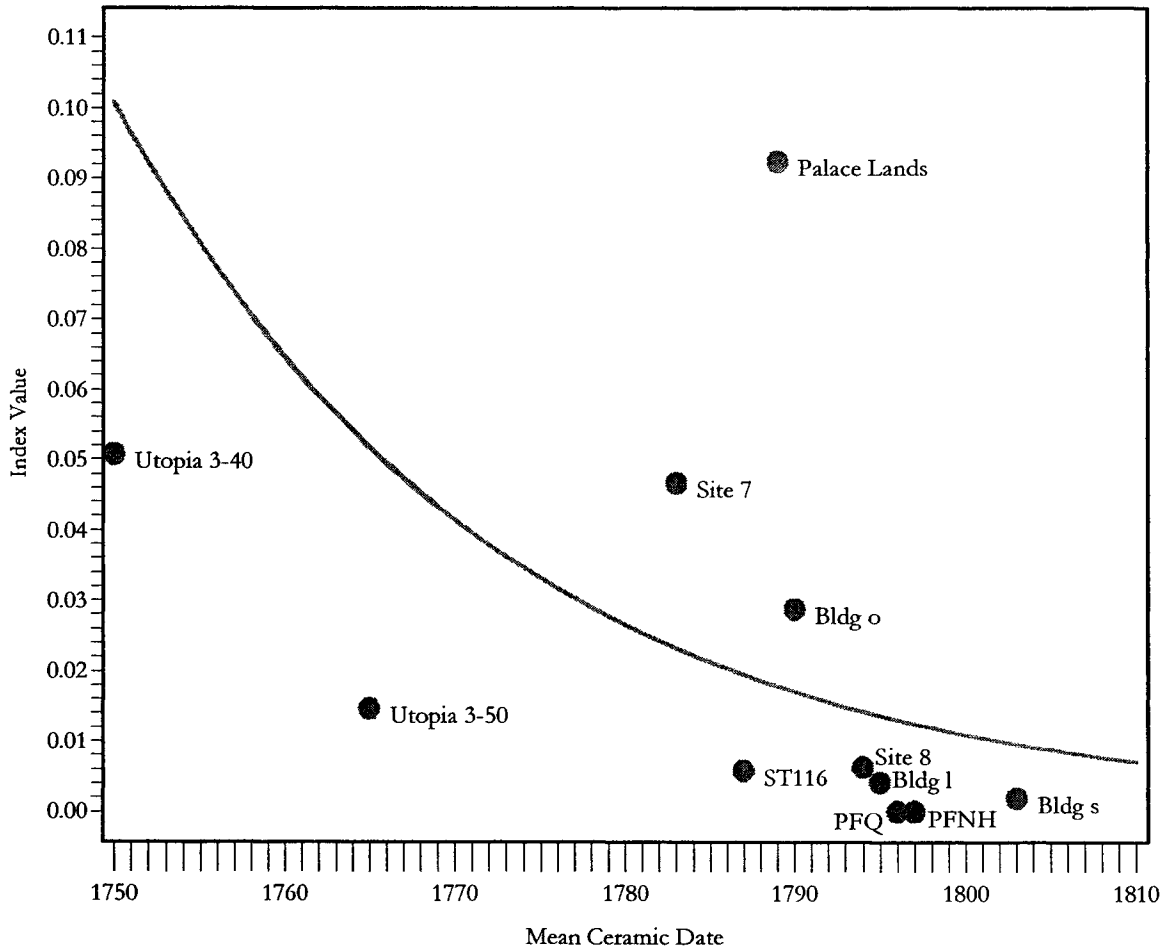
White salt glaze tablewares from plowzone where Y=Abundance Index Scores, X_1=MCD, and X_2=MCD*MCD



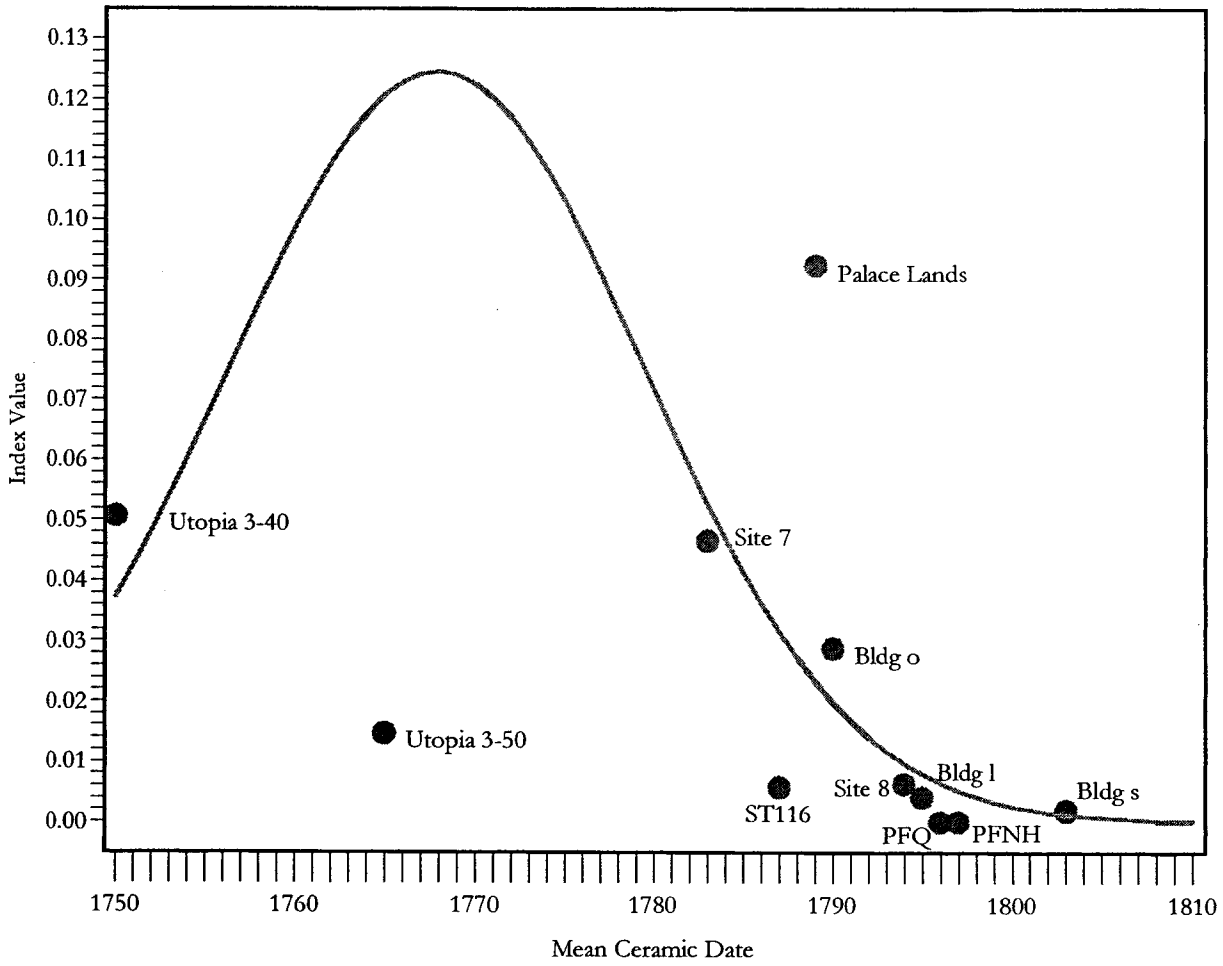
Delft teawares from plowzone where Y=Abundance Index Scores, X1=MCD



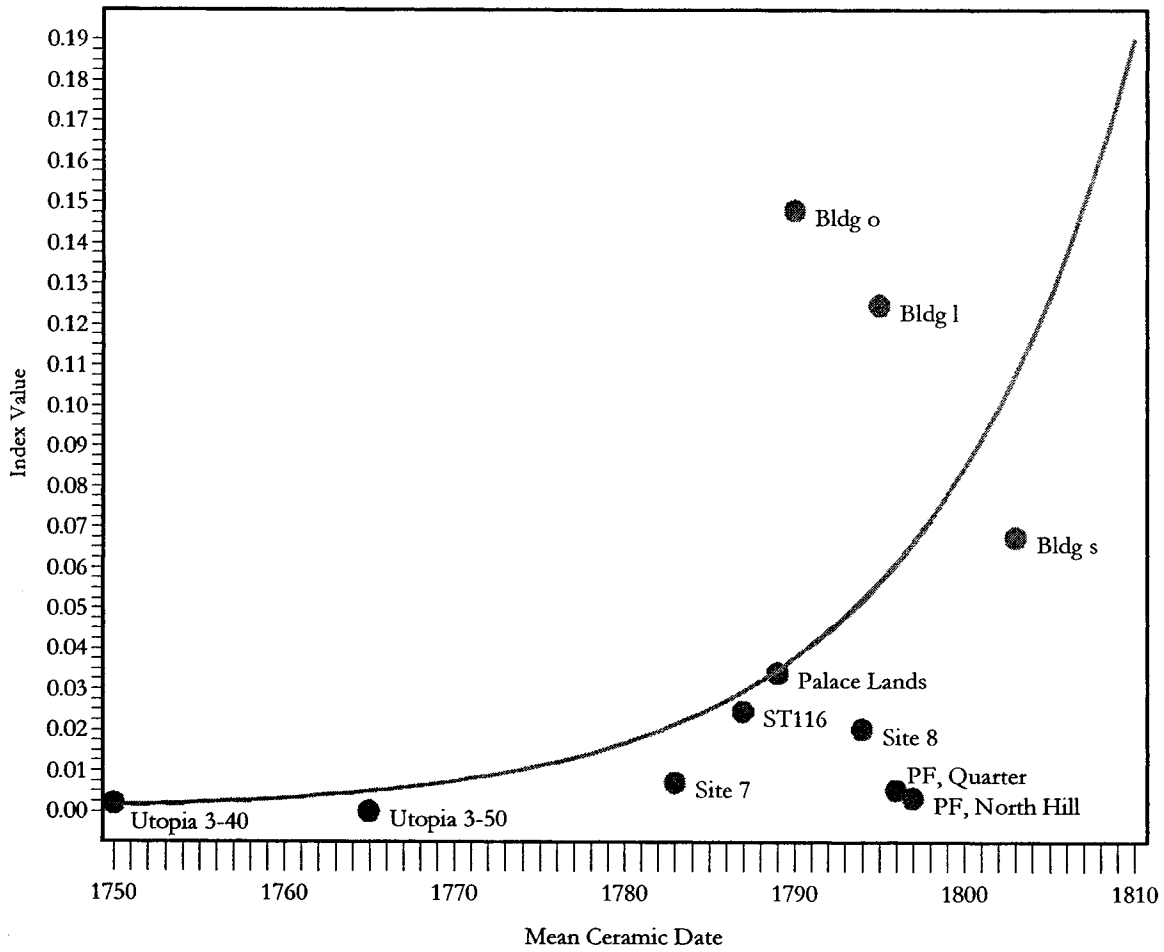
Delft tablewares from plowzone where Y=Abundance Index Scores and X_1=MCD



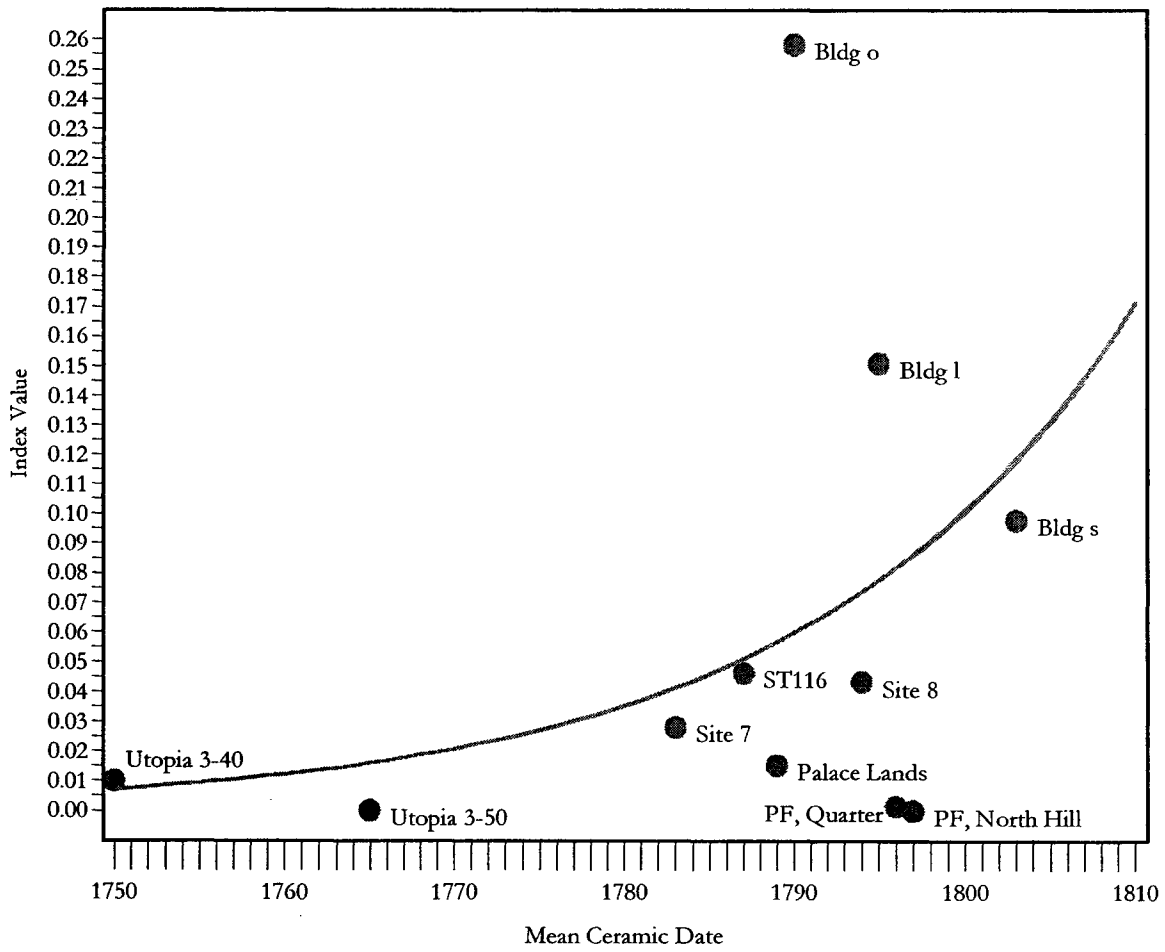
Delft tablewares from plowzone where Y=Abundance Index Scores, X_1=MCD, and X_2=MCD*MCD



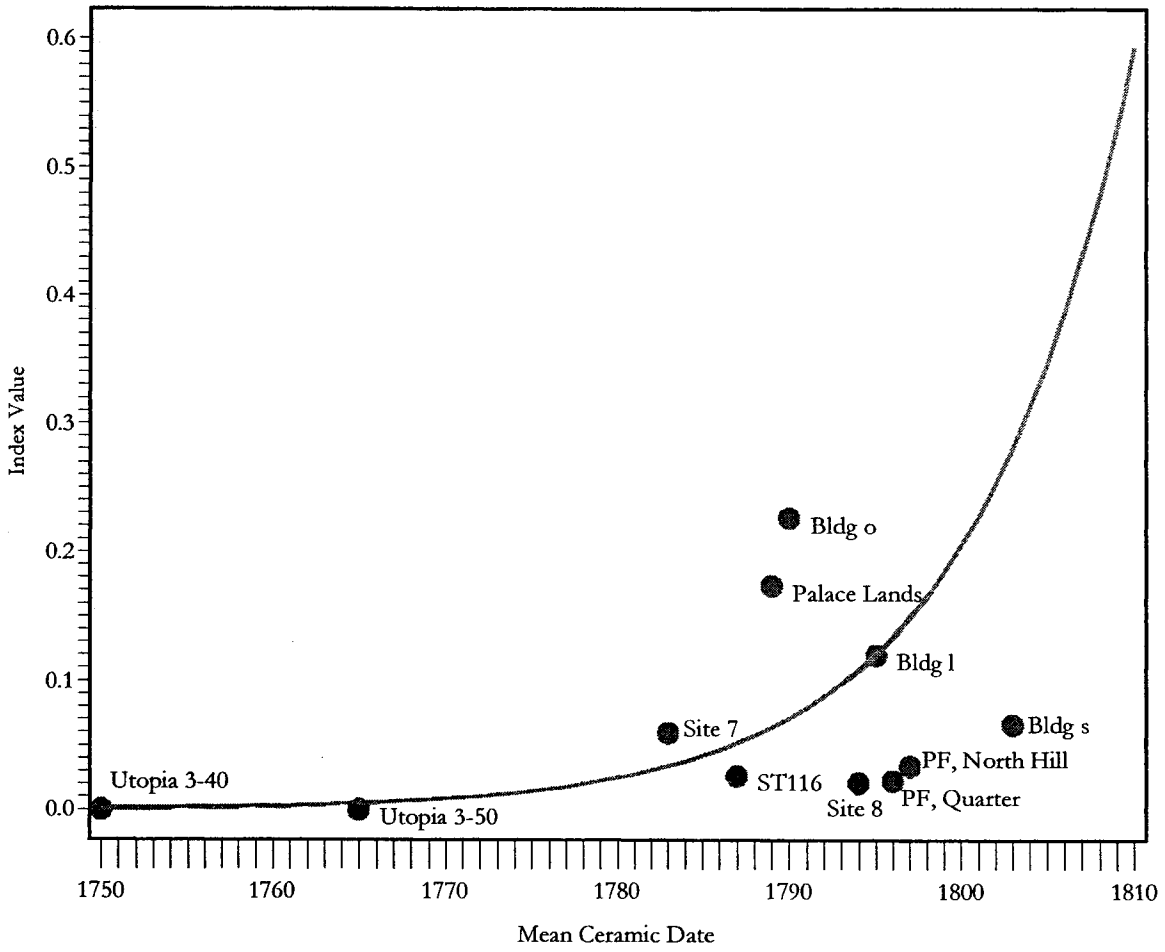
Chinese porcelain teawares from plowzone where Y=Abundance Index Scores, X1=MCD



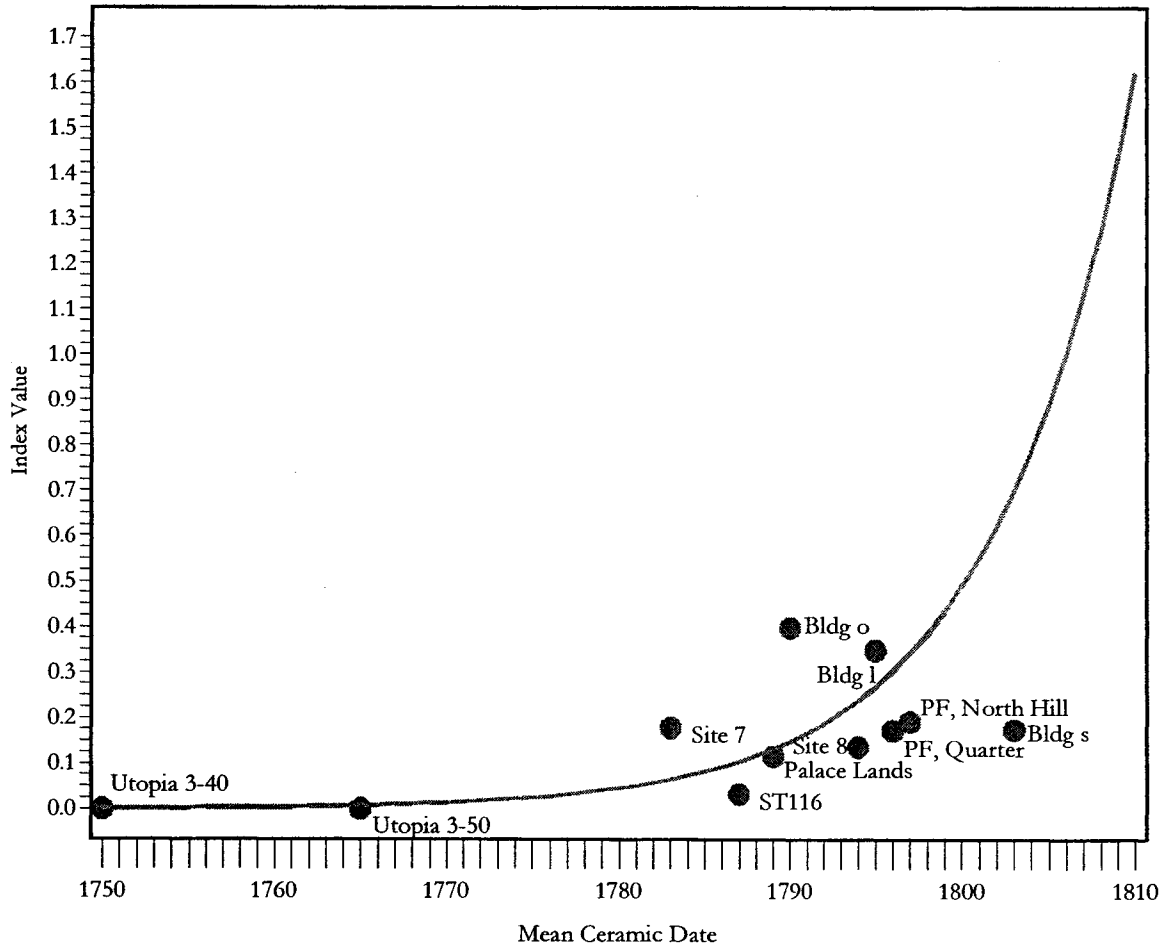
Chinese porcelain tablewares from plowzone where Y=Abundance Index Scores, X1=MCD



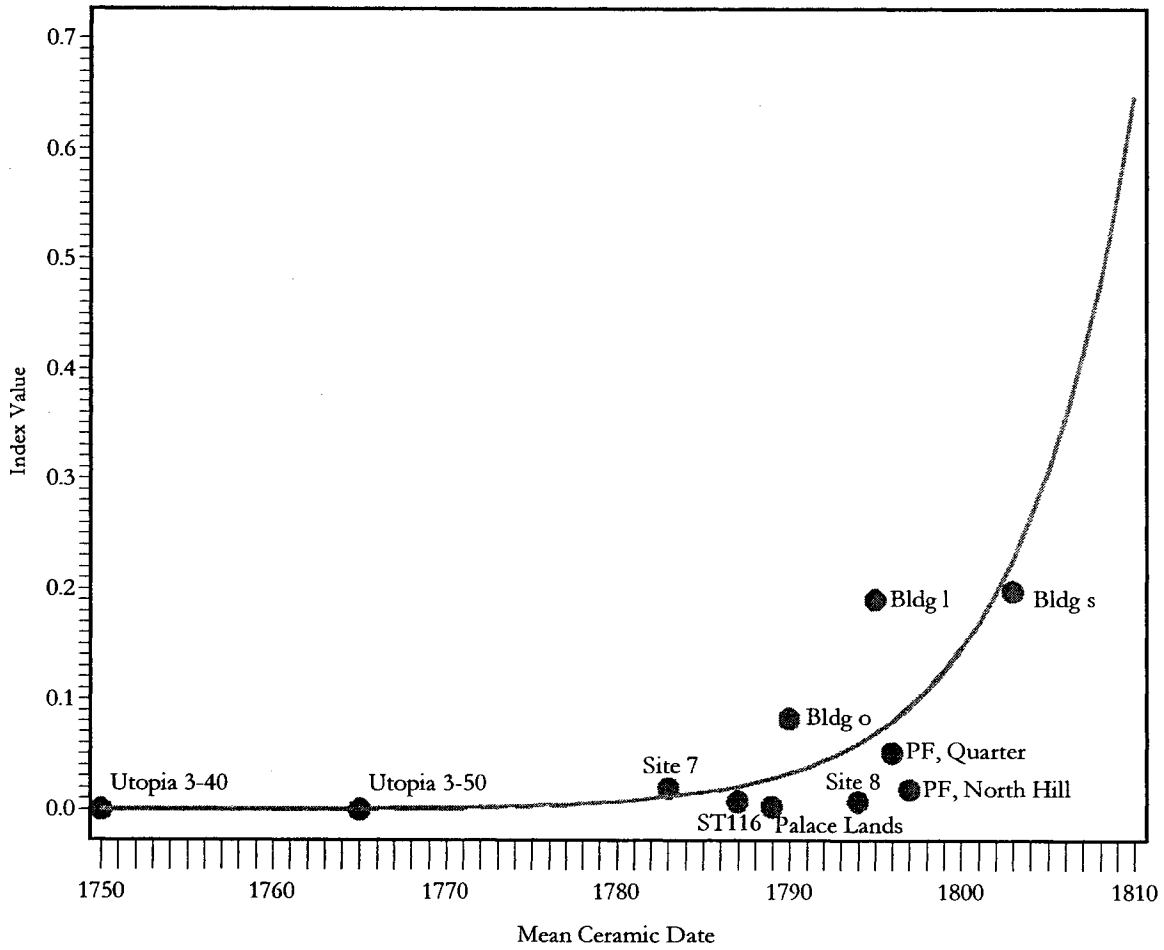
Creamware teawares from plowzone where Y=Abundance Index Scores, X1=MCD



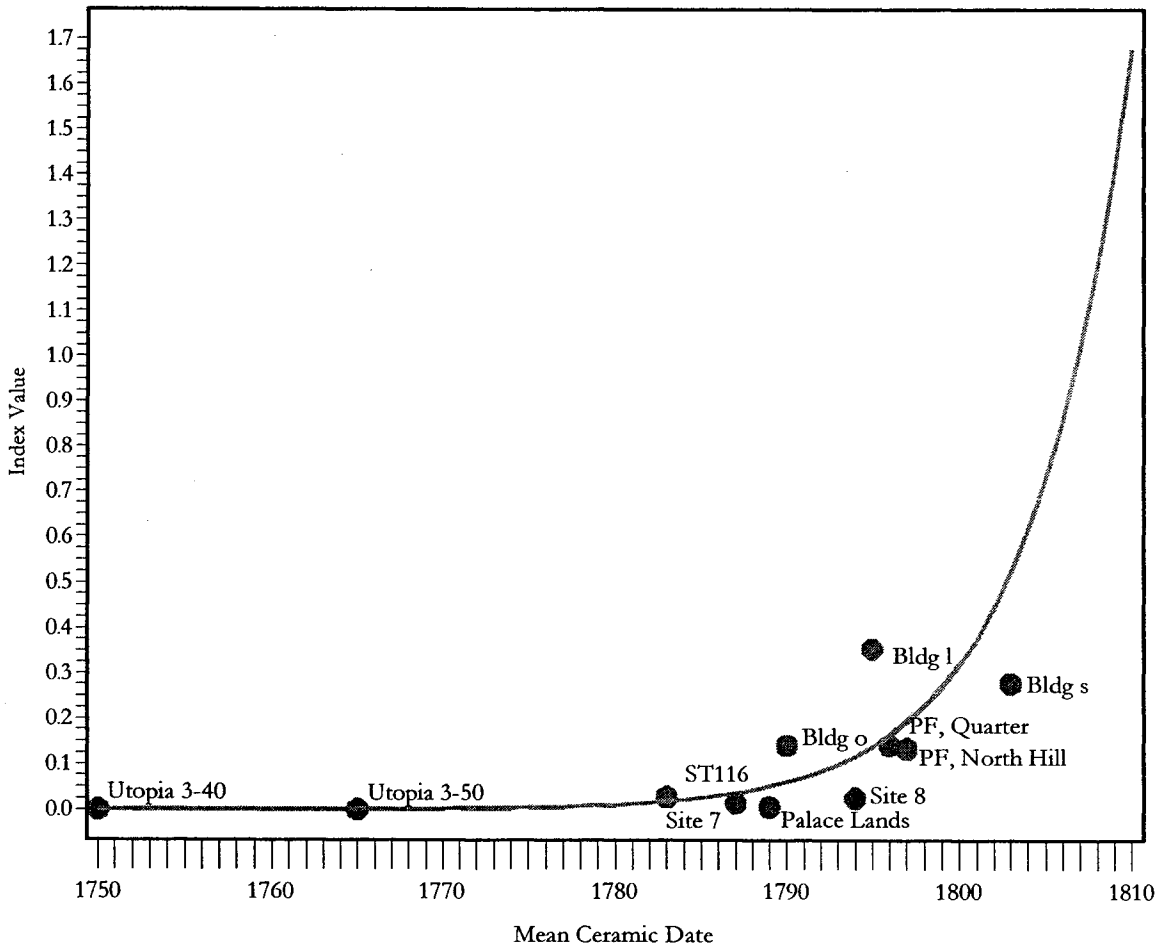
Creamware tablewares from plowzone where Y=Abundance Index Scores, X1=MCD



Pearlware teawares from plowzone where Y=Abundance Index Scores, X1=MCD



Pearlware tablewares from plowzone where Y=Abundance Index Scores, X1=MCD



Appendix 18: Negative binomial regression estimates for all categories of teawares where Y=Abundance Index Scores, X1=MCD and X2=Agricultural Diversification.

Table 18.1: Negative binomial regression estimates for all categories of teawares where Y=Abundance Index Scores, X_1=MCD and X_2=Agricultural Diversification.				
		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	p
Wine Bottle Index for All Refined Teawares				
MCD, plowzone	0.0327	-0.001	0.0664	0.057
Diversified, plowzone	0.1244	-0.7106	0.9594	0.7703
MCD, subfloor pits	0.0478	0.0229	0.0727	0.0002
Diversified, subfloor pits	1.5373	0.4102	2.6644	0.0075
Wine Bottle Index for Creamware Teaware				
MCD, plowzone	0.1051	0.0239	0.1864	0.0112
Diversified, plowzone	-0.5275	-1.8137	0.7588	0.4215
MCD, subfloor pits	0.1105	-0.0105	0.2315	0.0734
Diversified, subfloor pits	2.2463	-1.74	6.2326	0.2694
Wine Bottle Index for Chinese Porcelain Teaware				
MCD, plowzone	0.0798	0.019	0.1406	0.0101
Diversified, plowzone	-0.2944	-1.6669	1.0781	0.6742
MCD, subfloor pits	0.0625	0.0279	0.097	0.0004
Diversified, subfloor pits	1.7129	0.1082	3.3175	0.0364
Wine Bottle Index for Pearlware Teaware				
MCD, plowzone	0.158	0.0434	0.2725	0.0069
Diversified, plowzone	-0.2617	-1.8229	1.2995	0.7425
MCD, subfloor pits Diversified, subfloor pits	Warning: Negative of Hessian not positive. Model does not fit.			
Wine Bottle Index for White Salt Glaze Teaware				
MCD, plowzone	-0.025	-0.1093	0.0594	0.5617
Diversified, plowzone	0.2394	-1.579	2.0577	0.7964

MCD, subfloor pits	-0.0385	-0.1107	0.0337	0.2956
Diversified, subfloor pits	4.3607	1.537	7.1843	0.0025
Wine Bottle Index for Delft Teaware				
MCD, plowzone	0.0115	-0.2774	0.3005	0.9376
Diversified, plowzone	1.2595	-2.3995	4.9185	0.4999
MCD, subfloor pits	-0.0263	-0.1007	0.0481	0.4882
Diversified, subfloor pits	2.175	-0.4647	4.8146	0.1063

Table 18.2: Negative binomial regression estimates for all categories of tablewares where Y=Abundance Index Scores, X_1=MCD and X_2=Agricultural Diversification.

		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	p
Wine Bottle Index for All Refined Tablewares				
MCD, plowzone	0.0353	0.0156	0.055	0.0004
Diversified, plowzone	-0.2607	-0.8764	0.355	0.4066
MCD, subfloor pits	0.0262	0.0064	0.0461	0.0096
Diversified, subfloor pits	0.5745	-0.353	1.5021	0.2247
Wine Bottle Index for Creamware Tableware				
MCD, plowzone	0.1214	0.0629	0.18	<.0001
Diversified, plowzone	-1.0148	-1.9045	-0.1251	0.0254
MCD, subfloor pits	0.0866	0.0435	0.1296	<.0001
Diversified, subfloor pits	0.3451	-1.3046	1.9947	0.6818
Wine Bottle Index for Chinese Porcelain Tableware				
MCD, plowzone	0.0488	-0.0069	0.1045	0.0858
Diversified, plowzone	-0.6219	-2.3278	1.084	0.4749
MCD, subfloor pits	0.0518	0.0047	0.0988	0.0311
Diversified, subfloor pits	0.899	-1.1908	2.9887	0.3992
Wine Bottle Index for Pearlware Tableware				
MCD, plowzone	0.1773	0.0751	0.2796	0.0007
Diversified, plowzone	-0.3621	-1.624	0.8998	0.5739

MCD, subfloor pits	0.2304	0.0963	0.3645	0.0008
Diversified, subfloor pits	0.5664	-0.9845	2.1172	0.4741
Wine Bottle Index for White Salt Glaze Tableware				
MCD, plowzone	-0.0253	-0.0946	0.0441	0.475
Diversified, plowzone	-0.5108	-2.0296	1.008	0.5098
MCD, subfloor pits	-0.0035	-0.0798	0.0727	0.9276
Diversified, subfloor pits	3.7408	1.0342	6.4474	0.0068
Wine Bottle Index for Delft Tableware				
MCD, plowzone	-0.0447	-0.1279	0.0384	0.2918
Diversified, plowzone	-0.0788	-1.7635	1.6059	0.927
MCD, subfloor pits	-0.0302	-0.062	0.0017	0.0636
Diversified, subfloor pits	2.1311	0.7024	3.5598	0.0035

Appendix 19: Negative binomial regression estimates for all categories of teawares where Y=Abundance Index Scores, X_1=MCD and X_2=Proximity to Main House.

Table 19.1: Negative binomial regression estimates for all categories of teawares where Y=Abundance Index Scores, X_1=MCD and X_2=Proximity to Main House.

		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	p
Wine Bottle Index for Refined Teawares				
MCD, plowzone	0.0105	-0.0206	0.0416	0.508
Proximity to Main House, plowzone	1.0695	0.3022	1.8369	0.0063
MCD, subfloor pits	0.0346	-0.0025	0.0716	0.0676
Proximity to Main House, subfloor pits	0.8136	-0.8373	2.4646	0.3341
Wine Bottle Index for Creamware Teawares				
MCD, plowzone	0.0711	-0.0052	0.1474	0.0676
Proximity to Main House, plowzone	1.0582	-0.2201	2.3366	0.1047
MCD, subfloor pits	0.0663	-0.0056	0.1382	0.0709
Proximity to Main House, subfloor pits	1.8316	-0.6624	4.3255	0.15
Wine Bottle Index for Chinese Porcelain Teawares				
MCD, plowzone	0.0419	-0.0134	0.0972	0.1372
Proximity to Main House, plowzone	1.893	0.7027	3.0832	0.0018
MCD, subfloor pits	0.0292	-0.0249	0.0832	0.2906
Proximity to Main House, subfloor pits	1.5123	-0.9365	3.9611	0.2261
Wine Bottle Index for Pearlware Teawares				
MCD, plowzone	0.1078	0.0152	0.2004	0.0225
Proximity to Main House, plowzone	1.089	-0.4719	2.6499	0.1715
MCD, subfloor pits	Warning: Negative of Hessian not positive. Model does not fit.			
Proximity to Main House, subfloor pits				
Wine Bottle Index for White Salt Glaze Teawares				
MCD, plowzone	-0.0405	-0.1383	0.0573	0.4165
Proximity to Main House, plowzone	0.658	-1.3455	2.6614	0.5198

MCD, subfloor pits	-0.0069	-0.0928	0.079	0.8755
Proximity to Main House, subfloor pits	-0.2112	-3.1547	2.7322	0.8881
Wine Bottle Index for Delft Teawares				
MCD, plowzone	-0.0431	-0.3579	0.2718	0.7886
Proximity to Main House, plowzone	1.8345	-2.0788	5.7478	0.3582
MCD, subfloor pits	0.0049	-0.0641	0.0739	0.8896
Proximity to Main House, subfloor pits	-0.44	-3.3271	2.4472	0.7652

Table 19.2: Negative binomial regression estimates for all categories of tablewares where Y=Abundance Index Scores, X_1=MCD and X_2=Proximity to Main House.

		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	p
Wine Bottle Index for All Refined Tableware				
MCD, plowzone	0.0314	0.0081	0.0548	0.0084
Proximity to Main House, plowzone	0.29	-0.4007	0.9808	0.4106
MCD, subfloor pits	0.0193	-0.0049	0.0436	0.1176
Proximity to Main House, subfloor pits	0.5495	-0.702	1.8009	0.3895
Wine Bottle Index for Creamware Tableware				
MCD, plowzone	0.1199	0.049	0.1908	0.0009
Proximity to Main House, plowzone	-0.0093	-1.1731	1.1546	0.9876
MCD, subfloor pits	0.0808	0.0397	0.1219	0.0001
Proximity to Main House, subfloor pits	0.3193	-1.2861	1.9248	0.6966
Wine Bottle Index for Chinese Porcelain Tableware				
MCD, plowzone	0.0235	-0.0401	0.087	0.4695
Proximity to Main House, plowzone	1.4755	-0.2726	3.2236	0.0981
MCD, subfloor pits	0.0106	-0.0555	0.0766	0.7539
Proximity to Main House, subfloor pits	2.0636	-1.1297	5.2569	0.2053
Wine Bottle Index for Pearlware Tableware				
MCD, plowzone	0.1493	0.0628	0.2358	0.0007
Proximity to Main House, plowzone	0.5228	-0.7185	1.7641	0.4091

MCD, subfloor pits	0.2351	0.0782	0.3921	0.0033
Proximity to Main House, subfloor pits	14.5543	-2559.62	2588.728	0.9912
Wine Bottle Index for White Salt Glaze Tableware				
MCD, plowzone	-0.0245	-0.1159	0.067	0.6002
Proximity to Main House, plowzone	-0.069	-1.8495	1.7115	0.9395
MCD, subfloor pits	-0.0027	-0.113	0.1075	0.9611
Proximity to Main House, subfloor pits	0.775	-2.3729	3.9229	0.6294
Wine Bottle Index for Delft Tableware				
MCD, plowzone	-0.0679	-0.1646	0.0288	0.1686
Proximity to Main House, plowzone	0.9031	-0.8652	2.6714	0.3168
MCD, subfloor pits	-0.02	-0.0634	0.0235	0.3677
Proximity to Main House, subfloor pits	0.6069	-1.1948	2.4086	0.5091

Appendix 20: Negative binomial regression estimates for all categories of teawares where Y=Abundance Index Scores, X_1=MCD and X_2=Distance from Urban Center.

Table 20.1: Negative binomial regression estimates for all categories of teawares where Y=Abundance Index Scores, X_1=MCD and X_2=Distance from Urban Center.

		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	p
Wine Bottle Index for All Refined Teawares				
MCD, subfloor pits	0.0491	0.0234	0.0748	0.0002
Owner Presence, subfloor pits	1.4676	-0.5139	3.449	0.1466
Wine Bottle Index for Creamware Teaware				
MCD, subfloor pits	0.1214	0.0568	0.1859	0.0002
Distance to Urban Center, subfloor pits	5.0516	1.3686	8.7346	0.0072
Wine Bottle Index for Pearlware Teaware				
MCD, subfloor pits	Warning: Negative of Hessian not positive. Model does not fit.			
Distance to Urban Center, subfloor pits				
Wine Bottle Index for Chinese Porcelain Teaware				
MCD, subfloor pits	0.0588	0.0258	0.0918	0.0005
Distance to Urban Center, subfloor pits	0.9713	-1.3869	3.3296	0.4195
Wine Bottle Index for White Salt Glaze Teaware				
MCD, subfloor pits	-0.0164	-0.0888	0.0561	0.6576
Distance to Urban Center, subfloor pits	1.91	-2.4001	6.2201	0.3851
Wine Bottle Index for Delft Teawares				
MCD, subfloor pits	-0.004	-0.063	0.055	0.8943
Distance to Urban Center, subfloor pits	0.8955	-2.1623	3.9533	0.566

Table 20.2: Negative binomial regression estimates for all categories of tablewares where Y=Abundance Index Scores, X_1=MCD and X_2=Distance from Urban Center.				
		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	p
Wine Bottle Index for All Refined Tablewares				
MCD, subfloor pits	0.0266	0.0069	0.0464	0.0081
Distance to Urban Center, subfloor pits	0.6647	-0.8135	2.1429	0.3781
Wine Bottle Index for Creamware Tableware				
MCD, subfloor pits	0.1024	0.0641	0.1408	<.0001
Distance to Urban Center, subfloor pits	2.0958	-0.0533	4.2449	0.056
Wine Bottle Index for Pearlware Tableware				
MCD, subfloor pits	0.3264	0.1878	0.465	<.0001
Distance to Urban Center, subfloor pits	5.9695	0.1801	11.7589	0.0433
Wine Bottle Index for Chinese Porcelain Tableware				
MCD, subfloor pits	0.0459	0.004	0.0879	0.0319
Distance to Urban Center, subfloor pits	0.7682	-2.3654	3.9017	0.6309
Wine Bottle Index for WSG Tableware				
MCD, subfloor pits	-0.0027	-0.085	0.0796	0.9487
Distance to Urban Center, subfloor pits	2.5397	-1.7932	6.8725	0.2506
Wine Bottle Index for Delft Tableware				
MCD, subfloor pits	-0.0199	-0.0556	0.0158	0.2737
Distance to Urban Center, subfloor pits	1.6868	-0.6323	4.0059	0.154

Appendix 21: Negative binomial regression estimates for all categories of teawares where Y=Abundance Index Scores, X_1=MCD and X_2=Owner Presence.

Table 21.1: Negative binomial regression estimates for all categories of teawares where Y=Abundance Index Scores, X_1=MCD and X_2=Owner Presence.				
		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	p
Wine Bottle Index for All Refined Teawares				
MCD, subfloor pits	0.0459	0.0144	0.0775	0.0043
Owner Presence, subfloor pits	-0.1466	-1.6525	1.3592	0.8486
Wine Bottle Index for Creamware Teaware				
MCD, subfloor pits	0.0797	-0.0195	0.1789	0.1152
Owner Presence, subfloor pits	-0.0045	-3.0819	3.0728	0.9977
Wine Bottle Index for Pearlware Teaware				
MCD, subfloor pits	Warning: Negative of Hessian not positive. Model does not fit.			
Owner Presence, subfloor pits				
Wine Bottle Index for Chinese Porcelain Teaware				
MCD, subfloor pits	0.0571	0.0232	0.0911	0.001
Owner Presence, subfloor pits	0.8878	-0.8626	2.6382	0.3202
Wine Bottle Index for White Salt Glaze Teaware				
MCD, subfloor pits	-0.0101	-0.0847	0.0644	0.7902
Owner Presence, subfloor pits	-0.134	-2.6531	2.3852	0.917
Wine Bottle Index for Delft Teawares				
MCD, subfloor pits	-0.0002	-0.0602	0.0597	0.9936
Owner Presence, subfloor pits	0.2764	-2.3012	2.8539	0.8336

Table 21.2: Negative binomial regression estimates for all categories of tablewares where

Y=Abundance Index Scores, X_1=MCD and X_2=Owner Presence.				
		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	p
Wine Bottle Index for All Refined Tablewares				
MCD, subfloor pits	0.0252	0.0052	0.0452	0.0135
Thomas Jefferson, owner, subfloor pits	-0.3271	-1.5162	0.8619	0.5897
Wine Bottle Index for Creamware Tableware				
MCD, subfloor pits	0.0793	0.0404	0.1182	<.0001
Owner Presence, subfloor pits	-0.6728	-2.2491	0.9035	0.4028
Wine Bottle Index for Pearlware Tableware				
MCD, subfloor pits	0.2533	0.0887	0.4179	0.0026
Owner Presence, subfloor pits	1.2922	-0.5043	3.0888	0.1586
Wine Bottle Index for Chinese Porcelain Tableware				
MCD, subfloor pits	0.0566	0.0153	0.0978	0.0072
Owner Presence, subfloor pits	24.9721	24.9721	24.9721	.
Wine Bottle Index for WSG Tableware				
MCD, subfloor pits	0.0092	-0.0926	0.1109	0.86
Owner Presence, subfloor pits	0.439	-2.5771	3.455	0.7754
Wine Bottle Index for Delft Tableware				
MCD, subfloor pits	-0.0175	-0.0577	0.0227	0.3943
Owner Presence, subfloor pits	0.6009	-1.3282	2.53	0.5415

Appendix 22: Negative binomial regression estimates for all categories of teawares where Y=Abundance Index Scores, X_1=MCD and X_2=Thomas Jefferson, owner.

Table 22.1: Negative binomial regression estimates for all categories of teawares where Y=Abundance Index Scores, X_1=MCD and X_2=Thomas Jefferson, owner.				
		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	p
Wine Bottle Index for Refined Teawares				
MCD, plowzone	0.0339	-0.0053	0.0731	0.0899
Thomas Jefferson, owner, plowzone	-0.062	-1.1283	1.0043	0.9093
MCD, subfloor pits	0.1141	0.0598	0.1685	<.0001
Thomas Jefferson, owner, subfloor pits	-3.6303	-6.2142	-1.0463	0.0059
Wine Bottle Index for Creamware Teawares				
MCD, plowzone	0.1082	0.0223	0.194	0.0135
Thomas Jefferson, owner, plowzone	-0.1273	-1.5554	1.3009	0.8613
MCD, subfloor pits	0.236	0.0113	0.4608	0.0396
Thomas Jefferson, owner, subfloor pits	-6.5998	-14.3295	1.13	0.0942
Wine Bottle Index for Chinese Porcelain Teawares				
MCD, plowzone	0.0702	-0.003	0.1435	0.0603
Thomas Jefferson, owner, plowzone	0.4512	-1.2755	2.1779	0.6085
MCD, subfloor pits	0.1158	0.0225	0.2091	0.015
Thomas Jefferson, owner, subfloor pits	-2.8921	-7.0458	1.2617	0.1724
Wine Bottle Index for Pearlware Teawares				
MCD, plowzone	0.1022	0.0075	0.1969	0.0344
Thomas Jefferson, owner, plowzone	2.0896	0.4243	3.7549	0.0139
MCD, subfloor pits	Warning: Negative of Hessian not positive. Model does not fit.			
Thomas Jefferson, owner, subfloor pits				
Wine Bottle Index for White Salt Glaze Teawares				
MCD, plowzone	-0.0139	-0.0948	0.0669	0.7353
Thomas Jefferson, owner, plowzone	-0.875	-2.6834	0.9334	0.3429

MCD, subfloor pits	0.0856	-0.0244	0.1955	0.1271
Thomas Jefferson, owner, subfloor pits	-27.3357	-115031	114976	0.9996
Wine Bottle Index for Delft Teawares				
MCD, plowzone	0.0168	-0.1776	0.2112	0.8655
Thomas Jefferson, owner, plowzone	-2.4428	-5.2801	0.3945	0.0915
MCD, subfloor pits	0.0593	-0.0325	0.1511	0.2054
Thomas Jefferson, owner, subfloor pits	-28.0016	-480786	480729.7	0.9999

Table 22.2: Negative binomial regression estimates for all categories of tablewares where Y=Abundance Index Scores, X_1=MCD and X_2=Thomas Jefferson, owner.

		Wald 95% Confidence Limits		
	Estimate	LCL	UCL	p
Wine Bottle Index for All Refined Tablewares				
MCD, plowzone	0.0227	-0.0006	0.0461	0.0558
Thomas Jefferson, owner, plowzone	0.6788	-0.0292	1.3868	0.0602
MCD, subfloor pits	0.0294	-0.0034	0.0623	0.0788
Thomas Jefferson, owner, subfloor pits	-0.2405	-1.8266	1.3455	0.7663
Wine Bottle Index for Creamware Tableware				
MCD, plowzone	0.0903	0.0321	0.1485	0.0023
Thomas Jefferson, owner, plowzone	1.1037	0.1158	2.0916	0.0286
MCD, subfloor pits	0.1013	0.0346	0.168	0.0029
Thomas Jefferson, owner, subfloor pits	-0.8179	-3.3243	1.6886	0.5225
Wine Bottle Index for Chinese Porcelain Tableware				
MCD, plowzone	0.0289	-0.0452	0.103	0.445
Thomas Jefferson, owner, plowzone	1.1039	-1.0027	3.2104	0.3044
MCD, subfloor pits	0.0438	-0.0341	0.1218	0.2705
Thomas Jefferson, owner, subfloor pits	0.0847	-3.4815	3.6509	0.9629
Wine Bottle Index for Pearlware				

Tableware				
MCD, plowzone	0.1129	0.0326	0.1932	0.0059
Thomas Jefferson, owner, plowzone	1.9877	0.7075	3.2679	0.0023
MCD, subfloor pits	0.2606	0.0967	0.4246	0.0018
Thomas Jefferson, owner, subfloor pits	11.978	-3020.32	3044.276	0.9938
Wine Bottle Index for White Salt Glaze Tableware				
MCD, plowzone	-0.0251	-0.1059	0.0556	0.5415
Thomas Jefferson, owner, plowzone	-0.0941	-1.7046	1.5164	0.9088
MCD, subfloor pits	0.0725	-0.0312	0.1762	0.1707
Thomas Jefferson, owner, subfloor pits	-4.1992	-8.0132	-0.3853	0.0309
Wine Bottle Index for Delft Tableware				
MCD, plowzone	-0.0332	-0.1171	0.0508	0.4386
Thomas Jefferson, owner, plowzone	-0.8921	-2.5555	0.7713	0.2932
MCD, subfloor pits	0.01	-0.0263	0.0462	0.5899
Thomas Jefferson, owner, subfloor pits	-2.6251	-4.5848	-0.6653	0.0087

Appendix 23: Pearson Residuals for negative binomial temporal model for plowzone contexts where x=MCD and y=AI.

Site	Small Yellow Buttons	Small White Buttons	Large Yellow Buttons	Large White Buttons	All Yellow Buttons	All White Buttons	All Large Buttons
Bldg o	-1.250998885	0.74983651	-0.884490668	1.126076986	-0.950938121	1.4971798	-0.515340244.
Bldg l	0.731952868	0.244786776	0.268055374	0.228667909	0.348702618	0.154926696	0.258263907
Bldg s	-0.511959723	-0.902068316	-0.161344604	-1.085252902	0.31189616	-1.032541985	-0.457929082
ST116	-0.968820067	0.002571158	-0.054255794	-0.723516269	-0.759187986	-0.632640651	-0.711610979
PLQ	-1.261682742	-0.500642385	-0.363538665	-0.945874874	-0.842029114	-0.713663276	-0.730491378
PF Quarter	1.023265797	1.592550912	1.820556407	1.400669559	2.061134395	1.493411694	2.267548389
PF North Hill	1.143461266	0.954400897	0.592559791	0.476069889	0.747267988	0.452299357	1.040127576
Utopia3-40	-0.11260812	-0.259155441	1.031845462	-0.032318169	1.644285474	-0.157438232	2.426936958
Utopia3-50	-0.203139042	-0.327983615	-0.512081506	-0.087731514	-0.838578018	-0.284457051	-0.461327242
Site 7	1.957197663	-0.443111745	-0.620580501	-0.743855965	-0.619129515	-0.396770333	-0.936359721
Site 8	-0.614605	-1.266308753	-0.888541756	-0.346024197	-0.898279789	-0.985519765	-0.928549338

Site	All Small Buttons	All Teaware	All Tableware	White Salt Glaze Teaware	White Salt Glaze Tableware	Delft Teaware	Delft Tableware
Bldg o	-0.434132517	1.446817223	1.66750264	-0.419266919	-0.196513901	-0.343980199	1.033627448
Bldg l	0.711056352	0.825642003	1.13933448	-0.136443828	0.462777699	-0.333793102	-0.278825851
Bldg s	-0.915066054	0.005294183	-0.13416853	-0.276888198	0.591306687	-0.348632278	0.491471717
ST116	-0.433115362	-0.3939297	-1.14853178	-0.083807267	-0.74363649	0.018277809	-0.826846286
PLQ	-1.017207656	0.927003867	0.048590667	2.432936612	1.273851155	2.326311666	1.345804035
PF Quarter	1.452435834	-0.687981539	-0.51023881	-0.675843931	-0.941939586	-0.344646357	-0.894853791
PF North Hill	1.222747139	-0.893859877	-0.486711318	-0.66769127	-0.887259951	-0.337744299	-0.819245499
Utopia3-40	-0.113812489	0.408545051	0.723765172	-0.200121035	0.271291707	-0.292244524	0.319507454
Utopia3-50	-0.221363346	-1.121893637	-1.465049218	-0.667379981	-0.803925314	-0.286788527	-0.837335168
Site 7	0.603813873	0.285811836	0.766405235	1.097411216	1.114038644	0.229733546	0.470698618
Site 8	-1.029806054	-0.831351159	-0.652960833	-0.414900552	-0.186036275	-0.344048192	-0.127351694

Site	Creamware Tableware	Pearlware Teaware	Pearlware Tableware	Chinese Porcelain Tableware	Chinese Porcelain Teaware
Bldg o	2.047661235	1.46780397	1.530865146	2.375025477	2.6808285
Bldg l	0.353885221	1.707839485	1.786378568	0.670469536	1.099653628
Bldg s	-0.919486428	-0.12885594	-0.545821005	-0.1234193	-0.343440423
ST116	-0.83379394	-0.599150022	-0.658429478	-0.067013104	-0.150633276
PLQ	-0.147666311	-0.876284693	-1.027366385	-0.51932557	-0.01902837
PF Quarter	-0.529598868	-0.353676769	-0.156157594	-0.701965307	-0.836136069
PF North Hill	-0.538448452	-0.788218638	-0.352793231	-0.713653223	-0.866209427
Utopia3-40	-0.65510142	-0.199532171	-0.194511918	0.259523042	0.23824691
Utopia3-50	-0.92524869	-0.419032943	-0.466211446	-0.678122979	-0.721555181
Site 7	2.153429261	0.651149549	0.541822174	-0.228055753	-0.601152844
Site 8	-0.526425032	-0.863402273	-0.906341175	-0.295434124	-0.560222928

Appendix 24: Pearson Residuals for negative binomial temporal model for subfloor pit contexts where x=MCD and y=AI.

Site	Small Yellow Buttons	Small White Buttons	Large Yellow Buttons	Large White Buttons	All Yellow Buttons	All White Buttons	All Large Buttons
Bldg o	-0.88377632	-0.771877756	-1.16387373	-0.759313643	-1.134654095	-0.901917322	-1.086072375
Bldg s	-0.676020577	0.145119249	0.727566962	-0.342042932	-0.376189349	-0.156453269	-0.020108875
44JC298	-0.19236666	-0.008686406	-0.230714618	-0.036472252	-0.316495232	-0.03477836	-0.139805712
PLQ	0.490079914	-0.623762208	0.741304539	1.854430079	0.502313135	1.026799007	1.388795225
Richneck	-0.156424375	1.850285614	1.177617134	0.213866259	0.769391817	1.10902457	0.687838701
PF Quarter	0.504228223	0.616470824	1.411772871	-0.139527454	0.697309212	0.213133563	0.471342142
PF North Hill	2.118319139	0.41816225	1.159346025	1.057905862	1.633733489	0.832219591	1.06970194
Utopia2-01	-0.66715335	-0.133565879	0.129719253	-0.307063904	-0.487783853	-0.351957239	0.299820338
Utopia2-10	-0.852604521	-0.349446806	-0.412244922	-0.558837509	-0.548273487	-0.694472001	-0.330158516
Utopia2-20	1.236221115	-0.160260223	0.776997173	-0.348462571	0.848268881	-0.405503379	0.091492353
Utopia3-40	0.207154827	-0.348447779	-0.676209193	-0.460074638	-0.339345184	-0.601764561	-0.73348768
Utopia3-50	-0.83201143	-0.946769843	-1.017293517	-0.765599205	-0.872649359	-0.956562473	-0.933653427
Utopia4-140	0.607362542	0.744436207	0.483448991	0.708060898	1.060042548	1.090151701	0.652078971
Utopia4-150	-0.372727916	-0.13282389	-0.352008567	-0.221039677	-0.539302943	-0.278318967	-0.397423735
Utopia4-160	0.80319594	-0.108598086	-0.570186305	-0.237262034	0.04683155	-0.275985612	-0.517071548
Site 8	-0.582010147	-0.661806659	-1.12502276	-0.240518783	-0.943300316	-0.558996951	-0.755473613

Site	All Small Buttons	All Teaware	All Tableware	White Salt Glaze Teaware	White Salt Glaze Tableware	Delft Teaware	Delft Tableware
Bldg o	-1.006162968	-0.438880081	-0.146783449	-0.468439987	-0.398257157	-0.574682583	-0.580906946
Bldg s	0.019875999	-0.090966751	0.286957858	-0.373018002	-0.369682734	-0.344822804	-0.570246964
44JC298	-0.166600018	-0.21875449	1.934059941	-0.395027112	-0.278813209	-0.267641566	0.008148969
PLQ	-0.052503501	1.845025746	1.271051758	0.76609591	1.8439061	0.547839812	2.409067003
Richneck	0.784130494	0.721068167	0.013007437	0.935169003	0.383539823	0.110758369	-0.087156447
PF Quarter	0.974998017	0.002711245	-0.18855666	-0.309304012	-0.343806734	-0.25983553	-0.478344636
PF North Hill	0.650233258	-0.396025543	0.009547019	-0.350839466	-0.35594311	-0.303916036	-0.541946682
Utopia2-01	-0.779392475	-0.434266315	-0.587794756	-0.475443617	-0.389658494	0.11402358	-0.450937018
Utopia2-10	-0.828544206	-0.698600674	-0.854815929	-0.432731666	-0.400226107	-0.388783562	-0.57447156
Utopia2-20	0.982797941	-0.527233942	-1.071192561	-0.477875309	-0.39221525	-0.571556683	-0.713783213
Utopia3-40	-0.276132319	1.043768152	1.765369081	1.529371976	1.308872229	4.453296772	3.233328624
Utopia3-50	-0.961484153	-0.865333799	-1.085641197	-0.490282178	-0.403574152	-0.677108324	-0.647553551
Utopia4-140	1.480430507	1.212227249	0.39783023	1.08885065	0.563569822	-0.24445303	0.16035426
Utopia4-150	-0.487789854	-0.61120748	-0.398208606	-0.361539745	-0.322981195	-0.275588092	-0.573168684
Utopia4-160	0.559609881	-0.108646158	-0.289168938	-0.086327595	-0.371283706	-0.443171682	-0.514353241
Site 8	-0.922230913	-0.866709303	-0.285098769	-0.478543671	-0.315823177	-0.600090012	-0.527745805

Site	Creamware Teaware	Creamware Tableware	Pearlware Teaware	Pearlware Tableware	Chinese Porcelain Teaware	Chinese Porcelain Tableware
Bldgo	-0.223610523	-0.229510343	-1.684898362	0.058494834	-0.222266859	0.532868748
Bldgs	-0.326291239	-0.421300062	-0.199788949	1.305338795	1.192529494	0.475010188
44JC298	-0.038908185	-0.031408315	-0.000153961	-2.49487E-06	-0.065228801	-0.130802533
PLQ	3.364094114	1.711154493	-0.253513983	-0.05964054	0.907304917	0.831208834
Richneck	0.489131247	0.992123734	-0.243591236	-0.041231805	0.02590935	-0.563193256
PFQuarter	-0.415224898	-0.37464059	1.227385829	-0.991175046	-0.696579331	-0.525983501
PFNorthHill	-0.068654679	0.596677075	-1.260777018	-0.829288317	-0.678748255	-0.524357936
Utopia201	-0.305521198	-0.347721136	-0.010002314	-0.000605645	-0.440981234	-0.47837813
Utopia210	-0.394935592	-0.647440391	-0.041209227	-0.003614951	-0.692579146	-0.546247083
Utopia220	-0.328460823	-0.399420577	-0.013173922	-0.000866188	-0.488097587	-0.495730529
Utopia340	-0.383339553	-0.599717949	-0.100604292	-0.020109619	0.392015626	-0.10031564
Utopia350	-0.420904864	-0.852526149	-0.810808723	-0.202933565	-0.73933368	-0.567553576
Utopia4140	-0.411078633	-0.761574236	-0.108491326	-0.013784243	2.082636799	0.763643786
Utopia4150	-0.27158136	2.486935769	-0.026635475	-0.003991631	-0.299853871	-0.368274421
Utopia4160	-0.265611711	-0.280136774	-0.010144677	-0.000754755	-0.343318971	1.657451368
Site8	-0.413625355	-0.131081584	-0.26669325	-0.060197155	-0.762906502	0.024346404

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