

EVALUATION OF THE PENSACOLA RELATIVE CERAMIC CHRONOLOGY BY
PERCENTAGE STRATIGRAPHY SERIATION

by

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A THESIS

Submitted in partial fulfillment of the requirements
for the degree of Master of Arts
in the Department of Anthropology
in the Graduate School of
The University of Alabama

TUSCALOOSA, ALABAMA

2016

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ABSTRACT

In parts of the Southeastern United States, including south Alabama, relative ceramic chronologies for prehistoric archaeological sequences are based on descriptive type-variety systems of classification that have remained unevaluated by seriation methods. This project assesses the chronological utility of the type-variety classification for Pensacola archaeological culture ceramics through the application of seriation methods to collections from three extensively excavated sites around Mobile Bay. Chronological utility is defined here by application of the popularity principle with evidence of introduction, increase, and decrease in ceramic type-varieties through time as ordered by stratigraphic superposition. Lyman et al. (1998) refer to this combined method of frequency seriation and stratigraphic sequence as percentage stratigraphy seriation, which establishes a relative chronology based on a testable stylistic progression of ceramic types through time. Decorated ceramics from Shell Bank (1BA81), Andrews Place (1MB1), and D'Olive Creek (1BA196 and 1BA251) were sorted by previously established type-varieties and a seriation performed using the Excel macro created by Tim Hunt and Carl Lipo.

The results demonstrate the care with which Rick Fuller, Noel Stowe, Ian Brown, and Ashley Dumas devised and refined the Pensacola ceramic chronology through the years, despite the lack of evaluative seriation prior to this thesis. Although not all types seriate and there is still some ambiguity in the early and late phases of the sequence, the overall scheme is highly effective. This thesis provides refinement to the relative ceramic chronology and emphasizes the types that seriate best and should thus be used to define ceramic phases.

LIST OF ABBREVIATIONS AND SYMBOLS

<i>Var.</i>	Variety: a ceramic type-variety is described by the type in plain text followed by the variety indicated by this abbreviation and the use of italics
<	Less than
=	Equal to

ACKNOWLEDGEMENTS

First and foremost, I want to thank my committee chair, Dr. John Blitz for his unwavering support, boosts of confidence, and reminders to get my act together. I would additionally like to thank Dr. Ian Brown for lending his endless wisdom and Pensacola ceramic identification skills and Dr. Lisa LeCount for guiding me through the art of seriation. I would also like to thank my committee members, Dr. Keith Jacobi, Dr. Michael Murphy, and Dr. Ashley Dumas for their expertise, which has made this thesis the best it could be.

I am indebted to the Department of Anthropology for their financial and emotional support, as well as the Graduate School for awarding me the Graduate Council Fellowship and additional travel funding. I also would like to thank the Office of Archaeological Research (OAR) for providing access to collections and to the Alabama Department of Transportation for allowing use of the D'Olive Creek artifacts. I especially would like to thank Mr. Bill Allen at OAR for facilitating the loan of not one, but three sites worth of artifacts. Lastly, Jason Gardner and his research at Andrews Place have been singularly valuable to this study.

I would like to thank my family and friends. I want thank my mom and dad for their constant enthusiasm about what I do and knowing exactly when to ask questions and when to leave me alone. I want to thank my brother Alex and sister-in-law Marie for being a source warmth and respite during times of need. Lastly, I want to thank Nikki Henderson and Katie Lazzara for being the best roommates I could ask for on this whirlwind adventure. Thanks for the evenings at home, belly laughs, and Nina Garcia. I would not have made it through without this endless support from everyone involved.

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CHAPTER 1 INTRODUCTION

For over a century, archaeologists have recognized the use of ceramics in understanding archaeological cultures across time and space. In the Southeastern United States, there has been particular interest in the Mississippian period, which contains elaborately decorated ceramics that coincide with increasing sociopolitical complexity. The Pensacola archaeological culture is the coastal derivative of the Mississippian tradition from approximately A.D. 1250-1750. It spans the Northern Gulf Coast from Choctawhatchee Bay, Florida to the Mississippi Sound in Louisiana and then North up through Mobile Bay. Although there is evidence to suggest that the Pensacola archaeological culture began as a cultural offshoot of the Moundville and Plaquemine archaeological cultures, it rapidly developed a distinct ceramic identity that persisted into the historic period, well past the collapse of many nearby Mississippian societies (Dumas 2008; Fuller 1998, 2003; Gardner 2005). Although sweeping patterns of ceramic style have been identified, the current type-variety ceramic chronology has never been adequately assessed through seriation. Early efforts to record counts by level provide only a weak assessment of popularity through time and attempts at further evaluative methods were marred by inadequate classifications. Through this study, I hope to use just such methods to refine the ceramic chronology that has been in use in South Alabama since the 1980s.

Seriation as a methodology has come in and out of favor in North American archaeology. It has been used very successfully to verify relative ceramic chronologies in the Lower Mississippi Valley (Phillips 1970; Phillips, Ford, and Griffin 1951), but the rise of radiometric

dates have caused a decline in the popularity of relative chronologies as a whole. Despite its history, seriation provides a means of evaluating the chronological utility of the existing descriptive ceramic classification for the Mobile Bay region of the Pensacola archaeological culture.

For this study, I focus on an analysis of the type-varieties at three sites around Mobile Bay, which lies at the center of the Pensacola area. I hypothesize that ceramic type-varieties with chronological utility will seriate. The best way to measure gradual diachronic change using seriation is a method specifically referred to as percentage stratigraphy, which is a frequency seriation method with excavation levels used as the comparative assemblages along a y-axis and artifact types or attributes as the means of grouping along the x-axis. The resulting graph depicts type-variety percentages by level. The ultimate objective of this analysis is to highlight types that seriate and use them to verify or refine the ceramic phases defined by descriptive type-varieties.

In Chapter Two, two histories are explored. First, the history of ceramics as a tool for developing relative chronologies in archaeology is explored, building to an explanation of seriation as a tool for evaluating these chronological schemata. Seriation has a complex history in American archaeology that was often overcomplicated by imprecise language and poorly defined methods. This chapter clarifies terminology and explains the optimal utility of percentage stratigraphy seriation and interdigitation models. Second, the history of archaeological knowledge about the Pensacola archaeological culture is explored. Although this section begins with a broad description of the cultural traits that define the Pensacola archaeological culture, the focus is on the building of a ceramic chronology that archaeologists use to delimit ceramic phases and explain culture changes within the larger tradition. This chapter concludes with an expanded description of the five phases that subdivide the Pensacola

archaeological culture. Understanding these phases as presently defined by the ceramic type-varieties in the literature is important to this analysis.

Chapter Three shifts focus to the individual sites under investigation in this analysis. A key component of this project was selecting sites that fulfilled the necessary requirements for seriation. Chapter Three summarizes how the proximity of these sites and their cultural occupation make them ideal for this analysis. Each site has a unique history of excavation and analysis that informs its utility in a ceramic seriation.

Chapter Four combines methods and results in order to explain the more mechanical aspects of a seriation analysis. This chapter is arranged first by methodological steps and then presents results for each of the three sites. First, there is an explanation of sampling and data collection for all three sites. Next, I explain the software add-on used to produce frequencies and the graphical representations of the seriations. Finally, there is a careful description of the seriation refinement process that produces the best results for each site.

Chapter Five provides an important interpretation of the seriation results. There are two sides to seriation: there is the mathematical quantification of raw counts that are converted to percentages for each analytic unit and then there is the more careful refinement and broader meaning of the results. This chapter takes analysis to that next step. Seriation alone does not explain change through time. Organized by defined ceramic phases for the Pensacola archaeological culture, this chapter explains how the seriation of certain ceramic type-varieties can provide a clearer understanding of how archaeologists should use ceramics as a measure of relative chronology to date sites and understand length of occupation.

Lastly, Chapter Six offers conclusions about the Pensacola archaeological culture, delineations of ceramic phases, and ceramic chronologies as a whole. Chapter Six also

emphasizes areas where further research could be most productive, including a planned extension of the research presented here. This thesis is thus part of a growing body of knowledge about one of the longest lasting Mississippian cultures in the Southeastern United States.

CHAPTER 2 RESEARCH PROBLEM AND OBJECTIVE

The majority of culture-historical knowledge in American archaeology derives from an artifact-based chronology, including the order and arrangement of archaeological phases. Remnants of ceramic vessels may encode cultural knowledge. Because of their abundance in the archaeological record and this embedded cultural knowledge, they are commonly used to delineate archaeological cultures in time and space. The early to mid-twentieth century was permeated with endeavors to determine chronologies based on these ceramic typologies. Chronologies for prehistoric archaeological sequences are often based on descriptive type-variety systems of pottery classification that remained unevaluated despite available methods of testing, such as stratigraphic superposition and seriation. This system is especially pervasive in the Southeastern United States. In some regions, these type-variety schemas have been augmented by more precise methods of seriation and radiometric data, but scant radiometric dates are only useful if the relative ceramic sequence is better evaluated through metric seriation. Ceramics can be seriated based on attributes such as paste, temper, and surface treatment or design motifs. Seriation is a relative dating method for establishing a regional archaeological sequence based on a testable stylistic progression of ceramic types or attributes.

This project aims to evaluate the historical utility of the type-variety system for Pensacola archaeological culture ceramics through the application of statistical seriation methods (percentage stratigraphy seriation) to three sites in the Mobile Bay region of Alabama. If the descriptive ceramic classification for the Pensacola archaeological culture is historically useful,

then it is expected that the types will seriate. Testing several contemporaneous sites that span the Pensacola culture will provide a means to crosscheck the accuracy of the seriation and verify the utility of certain types. The objective of this project is to evaluate the historical utility of Pensacola ceramic types through a percentage stratigraphy seriation. By developing a relative ceramic chronology, I hope to identify useful ceramic type-varieties and reject those that lack historical utility. In so doing, I will offer refinements of ceramic types when possible.

Regional Terminology for Time-Space Concepts

Regional terminology for the relative ceramic chronology is based on the 1958 Willey and Phillips system, including their original definition of *tradition*. Lehmer (1971:32) introduced the term *variant* as “a unique and reasonably uniform expression of a cultural tradition which has a greater order of magnitude than a phase, and which is distinguished from other variants of the same tradition by its geographic distribution, age, and/or cultural content.” This is a variation of Willey and Phillips *phase*, but it represents less content, greater time span and greater spatial spread than a phase. It also implies less time span than a tradition and less spatial spread than a horizon.

For the purpose of this study, however, I prefer *archaeological culture* in the place of *variant*. Here I follow Knight (2010:16), who explains that the relationship between *variant* and tradition/horizon does not afford itself to use in the Southeastern United States, where units are not necessarily dependent on their place within a certain tradition or horizon. In fact, the general cultural categories of time and space used in the Southeast (“Mississippian” or the narrower “Middle Mississippian” or “Late Mississippian”) are nothing like the horizons and traditions proposed by Willey and Phillips (Knight 2010). *Archaeological culture*, on the other hand, has a more practical application. Although Willey and Phillips only define *culture* as the largest unit of

analysis, Knight (2010:15) defines it as encompassing “a cluster of closely related but distinguishable phases existing over a broad, contiguous area.” In order to qualify as a culture, a sequence of phases must also share a historical relationship, perhaps based in a common point of historical origin or exposure to common external stimuli. Archaeologists successfully applied the term to the chronology of the Lower Yazoo Basin and Knight and Steponaitis (1998) had equal success with the Moundville culture. This shift in terminology to the Pensacola culture could benefit our understanding of the sequence of phases within the Mobile Bay Region.

Seriation

The goal of seriation is to identify historic or chronological types, that is, artifacts that can be arranged in a relative order through time or across space, and because of this, seriation can be used to test if established artifact classifications have chronological utility. Lyman et al. (1998:239) define seriation as “the determination of the chronological sequence of styles, types, or assemblages of types (cultures) by any method or combination of methods.” Seriation is a broad method that works on a spectrum of artifact properties. It can be used to assess the spatial distribution or the chronological arrangement of artifacts. For a chronological measure, this method is successful on types in assemblages or characteristics of types (attributes). Orton and Hughes (2013) explain that type-variety seriation is more common than a characteristic assessment, but there are questions about which means of seriating is more useful in understanding ceramic style change through time.

Early seriations were based on a method known as phyletic seriation that originated in Europe and arranged stylistic types through a development of forms (O’Brien and Lyman 1999). Seriation did not initially specify chronological ordering and was completely unrelated to stratigraphic sequence or superposition. These seriations fell into two categories: evolutionary

and similiary. While evolutionary seriations specified a direction of change, similiary seriations (such as frequency, occurrence, and phyletic) do not propose directionality (O'Brien and Lyman 1999). Some archaeologists credit A. L. Kroeber (1916a, 1916b) as the first to apply frequency seriation among Zuñi ceramics in order to define stylistic changes across two periods. Others suggest that Kroeber's methods were too synchronic and A. V. Kidder was actually the first to do what would later be coined a seriation.

Frequency seriation revolutionized American archaeology. The new method required that archaeologists identify frequencies of types or attributes within several collections and then seriate those frequencies, or plot them in their superposed positions (O'Brien and Lyman 1999:83). Dunnell (1986:29) makes the claim that the addition of frequency seriation in archaeology brought the discipline beyond speculation and made it firmly scientific. Spier (1931) was the first to explain that a culture trait would ideally present a distribution of frequencies through time that reflected a normal curve. This was later defined as the "popularity principle" (Lyman, et al. 1997:43). By building on knowledge that had existed in archaeology since the late nineteenth century, this new dialogue set in motion a process that, for the first time, allowed archaeologists to understand diachronic time and culture change as a testable unit of analysis (O'Brien and Lyman 1999). This led to discussions of gradual change that superseded the previous lumping of time into long cultural epochs.

The introduction of stratigraphy into American archaeology occurred around the same time as this interest in quantifying gradual culture change through seriation methods. Thus, the development of stratigraphic methods is highly integrated into seriation procedures. Seriation is a useful tool for ordering and finding patterns in artifact assemblages, but there are some qualifications for use. The first condition is that contexts should be geographically limited. The

second condition is that contexts should reflect a single cultural tradition. Lastly, only cultural attributes can be seriated. These characteristics will be explained more in relation to the selection of sites for this analysis.

Additionally, there are several types of seriation that can be used depending on the context of artifact assemblages. The most common form is frequency seriation, which relies on horizontal provenience, but ignores any form of vertical provenience or stratigraphy. This method was pioneered in the Southeastern United States by James A. Ford (Phillips, Ford, and Griffin 1951). O'Brien and Lyman (1999) explain that this is a good method to test presence of types during a limited time period, but is problematic in terms of directionality. This problem of directionality has to do with understanding types in terms of age. Although frequency seriation shows trends in popularity, there is no way to determine which types are earlier and which are later based without something to anchor one type or another as distinctly early or late. Even Ford (1962) admitted that directionality was a shortcoming of frequency seriation. Improved forms of seriation that incorporate stratigraphy account for this problem of directionality.

An empirical method to create a relative chronology that measures gradual diachronic change in artifacts is percentage stratigraphy, which is a frequency seriation method with excavation levels used as the comparative assemblages along a y-axis and artifact types or attributes as the means of grouping along the x-axis. The resulting diagram arranges type-variety percentages by level. Chronologically sensitive types will conform to the popularity principle, which means the seriated levels will illustrate an increasing and decreasing percentage change over time. When methods are combined to produce a visual representation of type varieties through a stratigraphic sequence at multiple excavation areas (sites), Willey (1949) refers to the output as an "interdigitation" (see also Lyman et al. 1998). At the individual site level

superposition cannot be violated, but the resulting graph illustrates how seriation can provide a complex analytic result that metrically evaluates the arrangement of types through time at discrete spatial units. Although frequency seriation and other statistical methods somewhat lost favor around the time of the rise of radiocarbon dating, Smith and Neiman (2007) argue in favor of frequency seriation, because it is capable of delivering a continuous, relative chronological sequence. Scant radiocarbon dates in Southeastern archaeology may only have value if they can be placed in perspective with a precise relative ceramic chronology. Percentage stratigraphy seriation is the most accurate method for creating a relative ceramic chronology, because it can be used to define a ceramic phase by identifying the frequencies of pottery types in use during an interval of time. Once defined, the ceramic phase time interval can be assigned a calendar date range with absolute dating techniques such as radiocarbon.

Pensacola Ceramic Classification System

The Pensacola archaeological culture dates from approximately A.D. 1250-1700. Geographically, it spans the northern coast of the Gulf of Mexico from the Choctawhatchee Bay in western Florida, across Mobile Bay in Alabama, and to the Mississippi Sound in southeastern Louisiana (Blitz and Mann 2000; Brown 2003; Fuller 1998; Fuller and Stowe 1982; Milanich 1994). It is part of the pattern of the increasing sociopolitical complexity that occurred during the Mississippi period in the Southeastern United States. The Pensacola culture exhibits many common Mississippian traits, such as shell-tempered pottery with some sand tempering to the east (Brown 2003). In many ways, it is much like the rest of the Southeastern U.S. during the Mississippi period. People living in the region were sedentary agriculturalists with a hierarchical social and political organization. Also like interior Mississippian peoples, the Pensacola archaeological culture is characterized by platform mounds that appear to contain structural

remains, rather than burials. Excavations across the region suggest trade networks and interaction with other nearby Mississippian polities, such as Moundville in the Black Warrior River Valley and Plaquemine in the Lower Mississippi Valley.

For much of prehistory, and in the Southeastern U.S. in particular, the scale of archaeological knowledge is dependent on the resolution and historical utility of relative ceramic chronologies. Too few radiocarbon dates mean many sequences of ceramic phases are only loosely tied to absolute chronologies. Pensacola ceramics are still based on a system of chronology that has persisted since the 1960s. W. H. Holmes (1903) first described pottery in the Mobile Bay region. The name derived from a cluster of sites around Pensacola and Choctawhatchee bays (Willey 1949), but the center has since been identified as concentrated in Bottle Creek and around Mobile and Perdido Bays (Brown 2003). Although early components show ties to Moundville, a distinct regional complex emerged by the fourteenth century (Weinstein and Dumas 2008). In what Fuller (2003:62) defines as a “syncretic blend of Moundville and Plaquemine traits,” early Pensacola ceramics consist of a range of utilitarian cooking and serving wares with a fine shell temper. The surfaces can be burnished or unburnished depending on whether they are Bell Plain or Mississippi Plain ceramic types, both common in the Moundville ceramic complex. Vessel shapes, on the other hand, range from the typical Mississippian standard jar (a globular vessel with handles) to a range of bowl, plate, and wide-neck bottle forms common in the Plaquemine ceramic complex. Toward the end of the Late Mississippi and beginning of the Protohistoric periods, the decorative treatments diverged from these influences to form its own unique style (Fuller 2003).

E. Bruce Trickey (1958) attempted a rough frequency seriation of some Pensacola ceramics. Trickey relied heavily on Willey’s (1949) description of the Northwest Florida Gulf

Coast. Thus, he conflated Fort Walton and Pensacola archaeological cultures, which have since been identified as distinct (Gardner 2005). Fort Walton has a different developmental history and spatial distribution than Pensacola, leading to different material culture, sociopolitical, and economic systems (Milanich 1994). Fort Walton evolved from Weeden Island around A.D. 1100 in the Apalachicola and Chattahoochee River Valleys, so ceramic artifacts still contain sand and grog tempering and many Weeden Island motifs (Gardner 2005; Milanich 1994). Conversely, Pensacola ceramics are constructed from a distinct, fine shell-tempered paste more reminiscent of Moundville influence.

Wimberly (1960) crystallized and published a synthetic analysis of Willey's types. In the intervening years, no one has attempted to test the chronology using metric seriation. Wimberly (1960) explains that he did not attempt seriation because he thought contexts were too mixed and he was not enough of an expert. This analysis will test whether Wimberly (1960) was correct or perhaps too pessimistic in his critique. He proposes a very general order based on association, focusing on the earlier levels containing artifacts similar to other prehistoric contexts across the state of Alabama. In the end, because his analysis utilized Willey's (1949) ceramic types, that conflated Pensacola ceramics with Fort Walton ceramics to the east, it is no longer applicable to the updated regional relative ceramic chronology.

Whitlam (1981) used the Mobile Bay region to illustrate problems in ceramic classifications and chronologies. He attempted a computer-based classification of attributes from Wimberly's types, but used categories too gross to be useful. Although his analysis did not offer any useful classification, he did describe a framework necessary to rectify a regional chronology. Whitlam (1981:186) argued for a combination of (1) sufficient data, (2) the "organization of data into historical types," and (3) proof that the determined types have historical utility. The first two

parameters have been met over the years, but no one has attempted a metric refinement of the classification system and chronology of the Pensacola archaeological culture in the Mobile Bay region. Thus, there is no proof of historical utility in the present type-variety descriptions.

Fuller and Stowe (1982) defined the distinct Pensacola ceramic classification system currently in use. They used the type-variety system first introduced to the Southeastern United States by Phillips (1970) for the Lower Yazoo Basin. Phillips (1970) defines a *type* based on attributes of manufacture and design, while *varieties* are the local variations of *types* (Haag 1972). Phillips (1970) never directly defines the term *types*, but rather he applies a set of examples to define type-variety nomenclature and provides operational rules for formulation based on artifact sorting, utility, and continuity. Fuller and Stowe (1982) applied this system to Pensacola pottery, borrowing some of the type-varieties first defined at Moundville by Steponaitis (1983). Fuller and Stowe (1982) classified and defined seven ceramic types and the varieties within each type: Bell Plain (*Variety: Hale*), Mississippi Plain (*Varieties: Warrior and Pine Log*), D'Olive Incised (*Varieties: D'Olive, Arnica, Dominic, and Mary Ann*), Moundville Engraved, Moundville Incised (*Varieties: Bottle Creek (I and II) and Douglas*), Pensacola Incised (*Varieties: Pensacola, Bear Point, Gasque, Holmes, Jessamine, Moore, and Perdido Bay*), Salt Creek Cane Impressed (*Variety: Salt Creek*). They based their arrangements on Phillips' classificatory system for "Types, Modes, Treatments and Complexes" (Fuller and Stowe 1982; Phillips 1970). Through this ceramic classification system, Fuller and Stowe (1982) were able to chronologically anchor their types based on earliest types in association with known Moundville types and late types in association with European trade goods. The earlier type-varieties (such as Moundville Incised *var. Moundville*) were identified through association with known Late Woodland types and the later type-varieties (such as Pensacola Incised *var. Bear*

Point) were identified through association with early European artifacts. The remaining type-varieties were assigned a place within this scheme and a phase sequence was defined, but the rationale, method, or evidence for assigning these type-varieties to a phase was not made explicit. Fuller and Stowe (1982) focused on describing types and their approximated temporal position.

Unfortunately, type-varieties and the associated ceramic phases were never evaluated through seriation. A number of studies have arranged Pensacola type-variety counts by stratigraphic level (Blitz and Mann 2000; Fuller 2003; Gardner 2005). Blitz and Mann (2000) went as far as to provide an occurrence seriation of types and levels. The problem is that these data are never used to evaluate the phase sequence with greater precision or accuracy or confirm the historical utility of type-varieties. Chronological utility of types and varieties and the resultant phases are assumed *a priori* or otherwise not demonstrated with sufficient accuracy. There is no attempt to evaluate the hypothesized usefulness of the classification by quantitative methods.

Sequence of Ceramic Phases

The proposed type-variety system of Fuller and Stowe (1982) produced a relative ceramic chronology used to define ceramic phases. Hypothetically, these phases describe marked changes in stylistic treatment of ceramic artifacts and potentially isolate cultural changes through time. Richard Fuller (1998) provided the first, complete phase summary for the Pensacola ceramic phases. The report on recent investigations at the Plash Island site refined Fuller's phases by adding support for the incipient Mississippian Andrews Place phase and incorporating radiocarbon dates, but no seriation was attempted (Dumas 2008). Research by John H. Blitz and C. Baxter Mann (2000) on the Mississippi Gulf Coast defined a Pensacola phase sequence for

that region. In the process of refining the ceramic sequence, it is important to address the Pensacola ceramic phase sequence for the Mobile Bay region as it is currently understood from the terminal Woodland to the Protohistoric/Historic periods.

Andrews Place Phase (1100-1250?)

The terminal Woodland-Early Mississippian phase along the Alabama Gulf Coast is the Andrews Place phase. Currently, it is most clearly defined by a single site, the Andrews Place site (1MB1), with some suggested presence at Bottle Creek (1BA2) and some salt springs sites (Brown 2003; Gardner 2005; Weinstein and Dumas 2008). The phase is thought to extend from A.D. 1100-1250, but has yet to be adequately dated (Dumas 2008; Fuller 1998). Dates are based on the presence of Moundville I and Moundville II phase diagnostic ceramics, intermixed with Late Weeden Island Wakulla and transitional Late Coles Creek types. Initial investigations at Andrews Place (1MB1) and Bottle Creek (1BA2) suggest that the Moundville ceramics were a site-unit intrusion caused by brief contact that resulted in the limited spatial spread of these pottery types (Dumas 2008). A second analysis by Jason A. Gardner (2005) for his master's thesis found continuity of vessel form and the co-occurrence of ceramics types as more indicative of an extended period of interaction between Late Woodland groups near the coast and emergent Mississippian populations to the North (see also Dumas 2008). Whether this relationship suggests population displacement or cultural contact is still undetermined and limited evidence at the Plash Island site for an Andrews Place phase yields little clarification (Dumas 2008). In summary, the Andrews Place phase is tenuous and defined only by the co-occurrence in excavation levels of Moundville I/early Moundville II ceramics (Moundville Incised *var. Moundville*), Late Weeden Island Wakulla types (Wakulla check stamped) and transitional Late Coles Creek types (cord marked ceramics).

Bottle Creek I (AD 1250-1400) and Bottle Creek II (1400-1550) Phases

The Bottle Creek phases define the Mississippian tradition in southwest Alabama (Fuller 1998). The Mississippian tradition along the Gulf Coast shows signs of dramatic population growth and consolidation of ceramic styles over a larger area (Dumas 2008) and, by A.D. 1250, most of the Alabama Gulf Coast was a part of the Mississippian cultural tradition. At the heart of the Pensacola archaeological culture is the Bottle Creek site (1BA2) (Brown 2003; Fuller 2003; Fuller and Brown 1998). The Bottle Creek site (1BA2), which is the largest identified mound site in the region, lies at the heart of the Pensacola archaeological culture in the Mobile-Tensaw Delta. The majority of knowledge about Pensacola ceramics and the Mississippian period along the Gulf Coast comes from this site.

Fuller (1998:27), using “intuitive comparisons” and some newer stratigraphic data from the Bottle Creek site, divided the 350-year Bottle Creek phase into two sub-phases. Bottle Creek I spans from A.D. 1250 to 1400. This sub-phase is represented by the earliest known Pensacola ceramic types in the region and represents the divergence of the Pensacola ceramic series from its Moundville ties. This includes D’Olive Incised *vars. Dominic* and *Shell Bank*, D’Olive Engraved, Mound Place Incised *var. McMillan*, and some Moundville Incised *vars. Snows Bend* and *Moundville* (Dumas 2008). Because the Moundville varieties continue from the earlier Andrews Place phase and suggest connections to the North, the diagnostic types that Fuller (Brown 2003) uses to mark the start of the Bottle Creek I phase are the appearance of D’Olive and Mound Place type-varieties. In other words, D’Olive Incised and Mound Place Incised are *terminus post quem* markers for the Bottle Creek I sub-phase.

According to Fuller, by Bottle Creek II, these earlier Moundville types have given way to an exclusively Pensacola ceramic tradition. The evolved Moundville Incised variety is called

Bottle Creek. The presence of this new Moundville variety in conjunction with Pensacola Incised *vars. Gasque and Holmes* serve as the diagnostic markers for the Bottle Creek II phase.

Bear Point Phase (A.D. 1550-1700)

The Bear Point phase is considered the first protohistoric phase in southwest Alabama. The Protohistoric period immediately follows the Mississippi period. It begins at the time of European contact (about 1540) and continues until about 1700. The Bear Point phase is clearly a descendent of the Bottle Creek phases, but motifs, which were highly naturalistic during the Mississippian period, become more stylized. Fuller (1998:29) suggests that a transitional phase between the naturalistic Bottle Creek motifs and the stylized Bear Point motifs can be found at the Shell Bank site (1BA81). He suggests that this intermediate phase extends from A.D. 1500 to 1600. Diagnostic types of the Bear Point phase include Pensacola Incised *vars. Bear Point, Pensacola, Perdido Bay, and Matthews Landing*, as well D'Olive Incised *var. Arnica*, with the Arnica rim mode. Coarse ware jars are still present. Those that are decorated typically have crude Moundville Incised arch motifs and "Douglas" rims.

A possible sub-phase of Bear Point is the "Guillory complex," which contains a higher proportion of Guillory Plain ceramics with some Moundville Incised *var. Douglas* and Pensacola Incised *var. Pensacola* (Dumas 2008). Dumas (2008:189) suggests that the presence of the *Pensacola* variety may suggest that the Guillory Complex is at the later end of the Bear Point phase.

Port Dauphin Phase (A.D. 1700-1750)

The Port Dauphin phase is a historic period ceramic phase characterized by parallel, curvilinear incisions. The phase was first identified at the Port Dauphin site (1MB61) in conjunction with an early eighteenth-century French settlement (Fuller 1998). Port Dauphin

ceramics appear descendent from Pensacola Incised *var. Pensacola*, but the incised lines are narrower and typically more sloppily executed. The ware type only distinguishes varieties of Port Dauphin Incised ceramics: *var. Port Dauphin* is incised into Graveline Plain pottery and *var. Rinaud* is incised into Bell Plain pottery. Red, black, and brown filming is also present. Although Port Dauphin is known for curvilinear patterns, the ceramic designs are less homogenous than assemblages of other types.

Refinement through Seriation

Although there has been obvious utility in the scheme derived by Fuller and Stowe and some refinement has been made, the obvious shortcoming is the lack of stratigraphic confirmation. A percentage stratigraphy seriation provides the necessary quantitative analysis and evaluation to correct any errors that may exist in the relative chronology. This refinement occurs at the level of the individual sherd through an identification of chronologically sensitive types and varieties that can be identified in a ceramic assemblage. It also functions at a broader level by explaining how those chronologically sensitive types and varieties fit into the phase sequence that was determined based on the current understanding of ceramic change through time. This analysis will help archaeologists better understand the six-hundred year period from A.D. 1100-1700 along the northern Gulf Coast in southwest Alabama. In summary, I hypothesize that if the ceramic series for the Pensacola archaeological culture is based on chronologically sensitive attributes, then the types will seriate. A seriation of this sort will greatly benefit knowledge about the ceramic sequence, the Pensacola archaeological culture, and ceramic chronologies as a whole. The next chapter will lay the foundation for the data used to answer these questions of typology and chronology.

CHAPTER 3 SITE DESCRIPTIONS AROUND MOBILE BAY

Blitz and Mann (2000:104-105) identify the Mobile Basin as a cultural fulcrum for the northern Gulf Coast, with connections to Florida peoples to the east, the Lower Mississippi Valley to the west, and Moundville to the North. Excavations in this region did not begin in earnest until the depression era of archaeology. During the 1940s, David DeJarnette from the Alabama Museum of Natural History conducted excavations around Mobile Bay in conjunction with the Works Progress Administration (WPA) and the Civilian Conservation Corps (CCC). These excavations resulted in a series of chronological reports that detailed excavations across the state of Alabama (i.e., DeJarnette 1942, 1946; DeJarnette and Anderson 1941). Over the next several decades, most excavations around Mobile Bay were federally funded contract archaeology in conjunction with the University of Alabama. This, too, generated a number of technical reports and site forms based on archaeological content and site condition.

It was not until the 1980s and 1990s that there was a substantial effort to produce a synthetic understanding of the archaeological history around Mobile Bay. The majority of archaeological knowledge about the Pensacola archaeological culture stems from excavations around the Mobile-Tensaw delta, specifically at the large, multiple-mound Bottle Creek site. In the early 1990s, Dr. Ian W. Brown of the University of Alabama initiated the Bottle Creek project, which helped develop an understanding of the Bottle Creek site and the broader “origins, development, and lifeways of the Pensacola culture” (Brown 2003:10). Because small portions of Bottle Creek produced more archaeological evidence than surveys across the rest of the

Pensacola archaeological cultural area combined, the investigations and results from this site have remained the foremost source for information on the Pensacola archaeological culture (Brown 2003; Fuller and Brown 1998). This study uses excavations from the Mobile Bay area, just south of the Mobile-Tensaw Delta and the Bottle Creek site. Because of the ritual nature of activities at the Bottle Creek mound center and other reasons described below, it was excluded from this analysis. With this study, I hope to expand knowledge of the Pensacola archaeological culture beyond the limits of Bottle Creek.

Conditions for Seriation

Percentage stratigraphy seriation is a precise model that illustrates chronology in a sequence of artifacts. In order for this model to be effective, however, the collections must conform to a strict set of parameters that reduce conflating factors. As described in Chapter Two, Doran and Hodson (1975) first defined these constraints during a period of time when the scientific method and mathematical modeling in archaeology were prioritized above other forms of data collection and analysis. As is apparent in the subsequent site descriptions, these three parameters were the guiding principles in site selection for this study.

The first condition focuses on minimizing regional variation. To satisfy this condition, I focused on the southern portion Mobile Bay, which is located at the heart of the Pensacola ceramic culture. As one moves outward from this central region, local variability influenced by adjacent ceramic traditions becomes more common, especially along the coast (i.e., Blitz and Mann 2000:2-3). Types may exhibit a cline distribution in changing frequency away from the point of origin or location of maximum frequency. All three sites used in this analysis are in close proximity around the mouth of Mobile Bay. The second condition set forth by Doran and Hodson (1975) requires that all objects analyzed come from a single cultural tradition. All three

sites were generated during the Pensacola archaeological culture and restricted to this culture's time span. There is no evidence to suggest that the assemblages were affected by any other cultural tradition. The last condition for seriation is that traits or attributes must be cultural, not functional, in nature. This condition is not as critical to the site selection process, but it is still important to consider when looking at an assemblage. For this study, type varieties are used as the unit of analysis. All type-varieties are based primarily on cultural attributes of surface treatment, attachments (handles, rim modes, etc.), and temper. Although some scholars may argue that temper is a functional attribute, it is equally cultural. There are ranges of tempers that can serve a similar functional purpose. Because of these conditions, sites were selected carefully from among the range of excavations from the region that have been assigned to the Pensacola archaeological culture. This chapter explores the history of the sites selected for percentage stratigraphy seriation.

Sites Selected for Analysis

The sites selected for this seriation study are curated by the Office of Archaeological Research (OAR), a division of the University of Alabama Museums, under the *50 Years of Alabama Archaeology* project that is funded by a grant from the National Endowment for the Humanities (NEH). All sites are shell midden sites around Mobile Bay excavated in arbitrary and natural levels in what appeared to be relatively intact contexts. Although Doran and Hodson (1975) did not insist on this condition, I focused on shell midden sites to reduce any functional variation that may exist between various types of sites. It seems plausible that percentages of types and varieties may vary depending on the use of the site. Ritual centers, such as Bottle Creek for example, may contain higher proportion of certain types or varieties. This could cause too much dissimilarity in the seriations of the separate sites. Two of the sites selected for this

analysis were excavated during the WPA era under the direction of the Alabama Museum of Natural History and a third was excavated in the early 1970s under the direction of the University of Alabama Department of Anthropology. These sites were selected based on the size of their pottery sample and the quality of available excavation records. It was also critical that all three of these are similar types of sites located near each other.

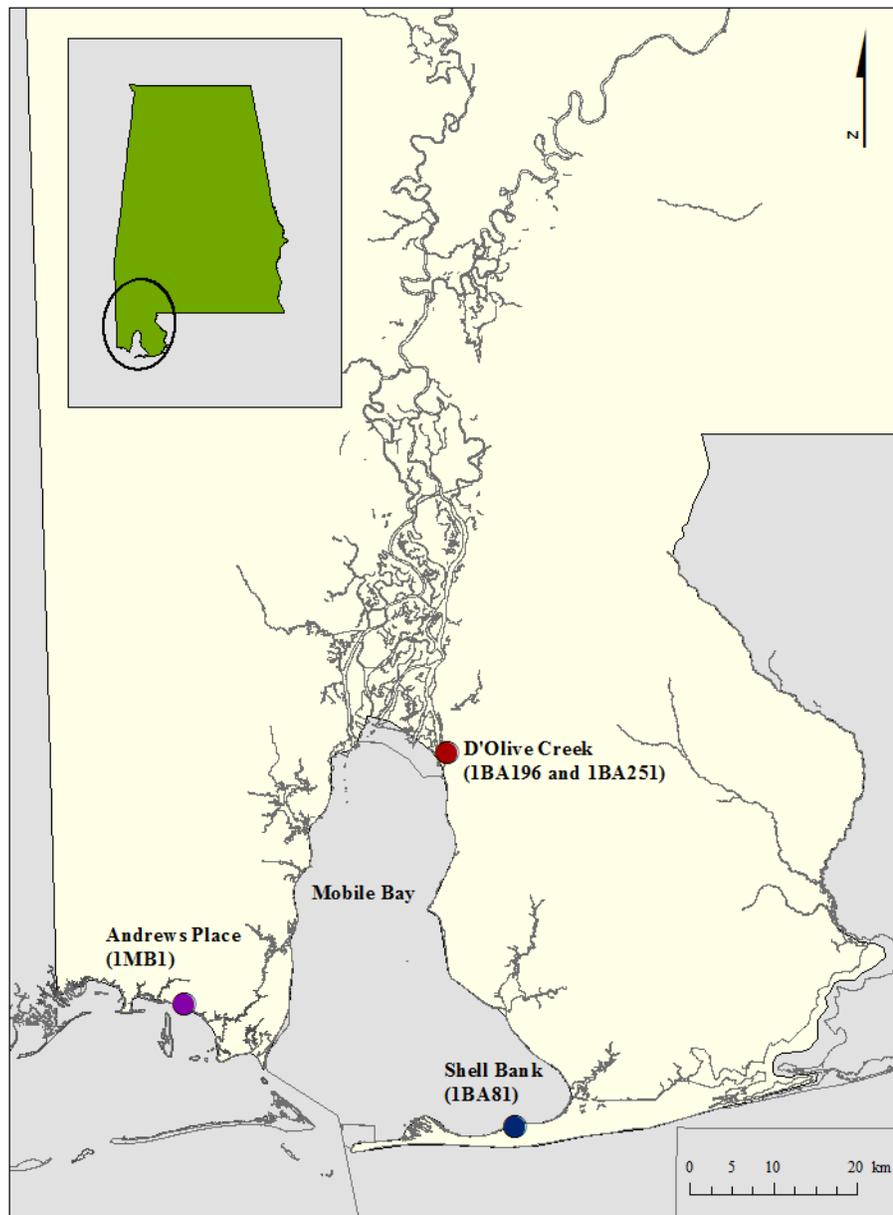


Figure 1. Map of Mobile Bay Region and sites analyzed

Shell Bank (1BA81)

The first site is Shell Bank (1BA81) located on the north shore of Fort Morgan peninsula between Bon Secour Bay and Strong Bayou (Figure 1). The site consists of a large shell mound measuring approximately 6 ft high, 25 ft, and 100 ft long. The mound was believed to originally be up to 20 ft high, but was severely damaged during a flood in 1916. The mound is surrounded by a habitation area, designated by DeJarnette as a possible village site (under the site number 1BA^V81). The overall extent of the site is 600 ft by 1200 ft. It was excavated by David DeJarnette (DeJarnette 1942; DeJarnette and Anderson 1941) from the Alabama Museum of Natural History with the help from the Civilian Conservation Corps (CCC) and the National Park Service. The matrix consists of shell midden that DeJarnette and his team excavated in 4 in levels up to 44 in. Excavations included three large excavation areas and five trenches, all sectioned off into 5 ft squares. The first was a block excavation method that involved isolating one large block with 5 ft trenches. It was then bisected with another 5 ft trench to form two separate blocks; one was 15 by 30 ft and the other was 20 by 30 ft. A subsequent review of each block helped determine 4 in as the optimal vertical excavation level. All other 5 ft squares were excavated accordingly. The use of screens and other tool types are not indicated in the original report (DeJarnette and Anderson 1941). There are just fewer than 16,000 sherds in the collection.

DeJarnette and Anderson (1941) provided a very simple assessment of ceramic types using temporary abbreviations to match very basic descriptions. His types included “hand-eye incised design” (T1), plates (T2), loops and scrolls (T3), and incised parallel lines (T4). In the 1970s, a partial type-variety analysis was started by Benjamin I. Coblantz, but results were never reported or published. This led to some confusion regarding type-variety names. Fuller and Stowe (1982) attempted to locate any possible information on Coblantz’s type-variety names, but

no written descriptions were ever made. This past spring semester, two undergraduate students in the Archaeological Ceramics class taught by Dr. Lisa LeCount at the University of Alabama conducted a sample classification of the site pottery. They identified pottery sherds from a sample of levels based on the Fuller and Stowe type-variety classification and developed a partial seriation of the types within a single excavation trench at Shell Bank. These preliminary results suggested that a larger sampling of the site collections would produce a successful seriation.

D'Olive Creek (1BA196 and 1BA251)

The second site, D'Olive Creek (1BA196 and 1BA251), consists of shell middens on either side of the original mouth of D'Olive Creek (Figure 1). Excavations occurred in 1973 and 1974 prior to the relocation of the creek and subsequent construction of I-10. The site is now bisected by the channelization of the creek. This project was part of a contract between the Alabama Museum of Natural History and the Alabama Department of Transportation. The project was more extensive at 1BA196 than at 1BA251 due to damage at the latter site. Thus, the majority of the sample for this analysis comes from 1BA196 (Nielson 1973). Excavations were conducted in 1 to 3 m squares forming trenches. Most of the trenches were excavated in 20 cm arbitrary levels and screened through $\frac{1}{4}$ in mesh. Once the stratigraphic sequence had been sufficiently determined, another portion of the site was isolated and excavated in natural levels and screened through 2 mm mesh (Nielson 1973). Three additional 2 m squares were excavated in 20 cm arbitrary levels at 1BA251 (Nielson 1973). The midden consists of alternating layers of shell and sand. A second season of excavations in the summer of 1974 focused on a 9 by 12 m excavation area at 1BA196 that was excavated using the trench and block method (Solis 1974). A 3 by 9 m area was isolated by three-meter trenches that were excavated in 20 cm arbitrary levels. The central block was then excavated using the natural strata. This second summer of

excavations also added fourteen two-meter squares at 1BA251 that were excavated in 20 cm arbitrary levels (Solis 1974). Although the exact sherd count of the collection is unknown, the presence of decorated ceramics was abundant enough to provide sufficient data for seriation.

Several follow-up investigations were conducted on collections from these excavations. The excavation of D'Olive Creek was the focus of a Master's thesis by Bruce Bizzoco (1978). His analysis covered all features and artifact types as well as an ethnohistoric overview of the area. Unfortunately, his analysis of the ceramic assemblage at the site was based on the typology proposed by Willey (1949) that conflated what would later become Pensacola ceramics with Fort Walton types. Vernon J. Knight and Ned Jenkins (1978) included the excavations at D'Olive Creek in a paper presented at The French Regime Symposium. Lastly, Cailup Curren (1971) published a zooarchaeological analysis of faunal remains at the site. This study is the first investigation of D'Olive Creek (1BA196 and 1BA251) artifacts since the 1970s.

Andrews Place (1MB1)

Andrews Place (1MB1), the third site, is a shell midden site located along Portersville Bay (Figure 1). Its assemblage shows evidence of early presence of Mississippian cultural traits at around A.D. 1100-1250 (Fuller 1998; Gardner 2005; Weinstein and Dumas 2008). The site is located on the edge of Portersville Bay near Coden Bayou. Excavations were conducted in 1940 and 1941 by the Alabama Museum of Natural History with help from the Works Progress Administration. Prior to excavations, the site had been extensively mined for shell for use in the construction of roads in Mobile County. Although the midden is estimated to have once been 10-12 ft deep, only 2.5 ft remained across the majority of the site. One section 35 ft wide reached a height of 8 ft. This portion was protected from mining by a large tree. Andrews Place is approximately 6.5 ha, spanning 400 m along Portersville Bay and 100 m north. The principle

investigators of the project were Theodore (Ted) Johansen, Carl F. Miller, and Harry Tourtelot with the Alabama Museum of Natural History. Write-ups of the excavations are included in progress reports written by DeJarnette (1940a; 1940b; 1940c; 1942) for the Alabama Museum of Natural History. The matrix was primarily sand and shell midden up to approximately 2.5 ft in depth (DeJarnette 1940a). Excavation methods varied, based on some mixture of block and trench excavation. The blocks (C and F) analyzed by Gardner were excavated in 3 in vertical cuts. The excavations produced a massive collection of ceramics and other artifacts.

Wimberly (1960) published a report for the Alabama Museum of Natural History on the WPA excavations that included a detailed analysis of excavations and material remains in Clarke and Mobile counties. Based on Wimberly's (1960) report and other improvements to the regional ceramic chronology, Jason A. Gardner (2005) completed a Master's thesis of an analysis of a sample of the Andrews Place collection. He primarily focused on assigning artifacts to the previously established type-variety system and an assessment of vessel form changes through time. Although Gardner's (2005) research is valuable to understanding the culture-history of Andrews Place, his recent investigation did little to improve the established chronology or understand its utility because he did not attempt a seriation. Because Gardner (2005) was consistent and reliable in his use of the type-variety system as it is currently defined by Fuller and colleagues (Brown 2003; Fuller 1998, 2003; Fuller and Brown 1993; Fuller and Stowe 1982), I will seriate his artifact identifications as an addendum and comparative sample to the first two sites.

Shell Bank (1BA81), D'Olive Creek (1BA196 and 1BA251), and Andrews Place (1MB1) provide the best possible opportunity for producing an accurate percentage stratigraphy seriation for Pensacola ceramics in the Mobile Bay area. As the site descriptions show, all three sites were

professionally excavated with thorough recording of excavation methods and archaeological context. Additionally, all three sites conform to the parameters established by Doran and Hodson (1975). By containing the sites to a localized geographic area, selecting predominantly single component sites at the center of the Pensacola archaeological culture, and focusing on cultural traits, these three sites should provide an accurate representation of the chronological utility of Fuller and Stowe's type varieties.

CHAPTER 4 SERIATION METHODS AND RESULTS

Selecting and Recording the Ceramic Sample

This analysis evaluates the chronological utility of the existing descriptive ceramic classification by using frequency seriation to place Pensacola ceramic types in an order that optimizes historical utility. For this study, all decorated pottery sherds with vertical provenience from Shell Bank (1BA81) and D'Olive Creek (1BA196 and 1BA251) were analyzed for descriptive type-variety. Fuller (1996) was used as the primary sorting guide, with some amendment based on more recent research from Fuller and Brown (1993), Fuller (1998), and Brown (2003). Additionally, the analysis of ceramics at Andrews Place (1MB1) by Jason Gardner for his 2005 master's thesis at the University of Southern Mississippi is incorporated as a comparative assemblage. Ceramic identifications were entered directly into an Excel spreadsheet in which counts of each type-variety were tabulated by provenience. The pivot table function within Excel rearranges the data into a table with counts of each type variety by stratigraphic level. This step is critical to providing the necessary data arrangement for seriation based on percentages within each provenience.

Initially the Lipo et al. (Lipo 2000; Lipo et al. 1997) seriation macro for Excel was used on the full pivot table of data for each site. This produced a seriation that was clunky and difficult to interpret, but provided a guide for determining patterns within the data. From here, further analysis was required by hand. First, levels with sherd counts below 50 were combined with adjoining levels (Ford 1962). Typically, a level with a low count would adjoin with another

relatively low count level to produce one of sufficient size unless there was a stratigraphic reason to do otherwise. Additional manipulation was the result of the logical combining of categories to determine sensitivity to chronology. Results will highlight those categories that show percentage changes through time and those that appear not to seriate at the sampled sites. It is important to remember that type-varieties that are rare or do not show chronological utility within the samples presented here may still carry temporal importance at another site or significance in other ways.

Type-Variety Identification

Identification by type-variety is not always a straightforward process. Type-variety descriptions derive from diagnostic artifacts that present the ideal condition. While it is possible to identify type and variety at the sherd level, the difficulty increases as the sherd size decreases. Size is not the only issue. In many cases, sherds were large enough, but provided a section of the vessel that was mostly plain or lacked decorative detail. Identification was not made to the variety level without absolute certainty. This undoubtedly reduced the total identified number of artifacts from the assemblage, but provided a more accurate measure of the type-varieties present at each site. Another confounding factor is the distinctiveness of each type-variety or, more specifically, the lack thereof. Nearly all decorated ceramics were easily categorized into types, but within each type, there are problems with sherd-level identification of varieties. This suggests that variety categories may not be as mutually exclusive as defined. A quick overview of each type will highlight the difficulties present in the identification process. Because of these problems with identification, certain types and varieties are likely more underrepresented or overrepresented in the data than others.

Moundville Incised

Of all of the types present in the Mobile Bay region, Moundville Incised ceramics are the

most readily identifiable. The incised arc and punctations motif is distinct from all other types in the assemblage. Primarily, identification is challenging if the sherd is broken as to prevent an absolute determination of the number of rows of dots present. These sherds compose the Moundville Incised *var. unspecified* category. Moundville Incised *var. Douglas* can be misleading, because it occasionally looks much like Moundville Incised *var. Snows Bend* with a single row of punctations at the top of the arch, but a disorganized patterning of punctations that fill the spandrel. Moundville Incised *var. Moundville* has disorganized punctations that fill the spandrel as with Moundville Incised *var. Douglas*, but usually has three to four neat rows of punctations above the incised arch. Additionally, Moundville Incised *var. Snows Bend*, with the single row of punctations, and Moundville Incised *var. Moundville*, with eyelash incising over the arc, are not always completely distinct. Single punctations can be made with a slight flick that elongates them up toward the rim and the eyelash marks range from almost as short as a single punctation or as long as the full distance to the rim.

D'Olive Incised

D'Olive Incised ceramics are relatively easy to identify to the variety level if enough of the sherd is present. They are likely the easiest to identify to the type level as they are the only plate form in the assemblage and the only type with incising on the inside of the vessel. The rim is often relatively large, which means there is a thick, undecorated section before the incising begins. When the incising is visible, D'Olive Incised sherds can usually be identified by variety, because the motifs are sufficiently distinct.

During the identification process, it became apparent that there is one D'Olive plate form that was not described in the existing literature on ceramic typologies in the Mobile Bay region. It is the simplest D'Olive Incised form in the assemblage. Like the other D'Olive Incised types,

this previously undefined variety is a shallow plate form with a rim line and occasional rim mode (especially the D'Olive rim mode), but it lacks any incisions or decorations on the interior of the rim line. Because D'Olive Incised *var. D'Olive* is a simple arc motif around the rim, it can be difficult to identify lack of incising from a portion of the plate that is largely plain. At Shell Bank (1BA81), however, there were a number of D'Olive Incised plate fragments that were large enough to suggest the absence of incised arcs or other decoration inside the rim line. These were separated into a form referred to temporarily as *var. A*. The presence of this more simplified D'Olive Incised *var. A* did make identification more difficult, because it required large enough sherds. A number of D'Olive Incised *var. A* artifacts were likely sorted into unspecified categories and may be underrepresented in the sample.

Mound Place Incised

Unlike Moundville Incised, Mound Place Incised is especially difficult to discern the varieties. The type, itself, is defined by a series of straight lines running parallel to the rim. Although rare in the assemblages, Mound Place Incised *var. Bon Secour* is the most identifiable, because of the alternating hatched bands. Mound Place Incised *var. Walton's Camp* and Mound Place Incised *var. Akron* are often impossible to discern. They are differentiated by trailing of the incised lines, the overall quality, and the (occasional) presence of black filming in *var. Akron*. Despite these definitional differences, the traits tend to be difficult to determine. Trailing can occur on some, all, or no incised lines within a single sherd, black filming wears off over time, and overall quality exists on a spectrum. Good examples of Mound Place Incised *var. McMillan* are also fairly distinguishable with very closely spacing and neat incising, but line spacing is never exact and also exists on a spectrum. Although *var. McMillan* is identifiable at its best, some cases may have blended into the wider spaced varieties.

Pensacola Incised

Pensacola Incised pottery is the defining feature of the Pensacola archaeological culture, but without a large potsherd or portion of the vessel, it is difficult to determine variety, even though the type is readily apparent. While many varieties, such as Pensacola Incised *var. Bear Point* are highly identifiable even in very small sherds, other varieties, such as Pensacola Incised *var. Pensacola*, are difficult to identify at the individual sherd level. Pensacola Incised *var. Pensacola* consists of a series of curvilinear parallel lines. This is a pattern present to some extent in nearly all of the Pensacola varieties. Pensacola Incised *var. Rutherford* is distinctly similar to Pensacola Incised *var. Pensacola* in that way. Pensacola Incised *var. Rutherford* is defined by interlocking curvilinear scrolls, but without a large enough sample of the interlocked portion of the decoration, the variety is nearly indistinguishable from Pensacola Incised *var. Pensacola* or even the S-shaped curves on Pensacola Incised *var. Jessamine*. Additionally, Pensacola Incised *var. Holmes*, Pensacola Incised *var. Jessamine*, and Pensacola Incised *var. Perdido Bay* all contain crosshatching. Although it is defined as more isolated in *vars. Jessamine* and *Perdido Bay*, it can be difficult to determine the extent of crosshatching in individual sherds.

The Unspecified Category

The objective of this study was to identify sherds to the variety level to the best of my ability, but variety specification requires absolute certainty. *Unspecified* categories were used when this was not possible. The *unspecified* category for each type is difficult to discuss because of its use as a catch-all category. Because of this condition, it may or may not show chronological sensitivity without the addition of all ceramics of that type. The majority of types should be represented throughout the sequence, except perhaps in the case of Andrews Place, because of the site's position early in time.

Site Seriation Methods and Results

Analysis began with arranging the data in a form that could be entered into the seriation program. The Pivot Table function through Excel arranged the data by counts of type-variety in each level. Once the data is arranged in this way, the seriation macro for Excel created by Tim Hunt and Carl Lipo (Lipo 2001; Lipo et al. 1997) creates percentages by provenience to test popularity of classifications. In this analysis, the analytic provenience units are stratigraphic levels and the classification categories are type-varieties. When run through the Excel seriation macro in its raw form, the results for all three sites were unrefined and overly complicated. Further refinement by hand was required to classify the data in more logical categories. This process was slightly different for each site. Because results are based on percentages, analytic units are highly impacted by low provenience counts and rare types. Condensing these categories is not a power that the seriation macro can conduct on its own.

Removing Type-Varieties

For clarity and concision in the presentation of the seriation results, certain type-variety categories were removed from the final iteration of the seriation. The sheer number of type-varieties present in the initial seriations was too many to be easily interpreted or visually coherent. Although the final model is still quite large, every effort was made to make the results as clear as possible. This meant removing some categories in order to boost proportions and remove clutter. The rationale behind this process is consistent with the rationale for focusing on decorated ceramics. Plain types are not useful for seriation, because they tend to span long periods of time. Likewise, certain types that lack chronological sensitivity create noise that can be mitigated across the other types in that provenience. The primary criterion for removal was the rarity of the type. All rare types, which were identified in low counts ($n < 4$), were removed,

unless their presence or absence was of importance to the discussion of the seriation. Type-varieties that are considered key diagnostic types were included regardless of these criteria. Such low numbers are highly subject to sampling error or otherwise do not provide useful information within the seriation. Conversely, other type-variety categories were removed because they were too long lived and erratic.

This process included removing all *unspecified* categories. The *unspecified* variety category exists for all types. It is the catch-all designation for ceramics that are identifiable to the type-level, but cannot be assigned to a particular variety with utmost certainty. By definition, this classification is problematic. It means that the category is poorly defined and lacks the discreet, mutually exclusive attributes necessary for seriation. Thus, it produces a category that is constantly present, but shows no chronological sensitivity. It is also part of the larger problem of identification of ceramics to variety with small sherds. Because identification can be difficult, this category is often relatively large. By removing it from the seriation, the proportionate measure of chronologically useful categories is amplified. The removal of long-lived type-varieties was cautiously performed. Although the *unspecified* categories were removed without hesitation, it is important in the discussion that follows to show which types and varieties seem to exist for such a long span of time as to make them equally useless in defining a more precise phase sequence. Some of these type-varieties were left in the seriation because of their presumed importance in understanding the Pensacola chronology.

Shell Bank (1BA81) Seriation

Shell Bank (1BA81) is a distinctly Pensacola site that contains few ceramics outside of the four main Pensacola ceramic types (Moundville Incised, Mound Place Incised, Pensacola Incised, and D'Olive Incised). In fact, the Office of Archaeological Research (OAR) at the

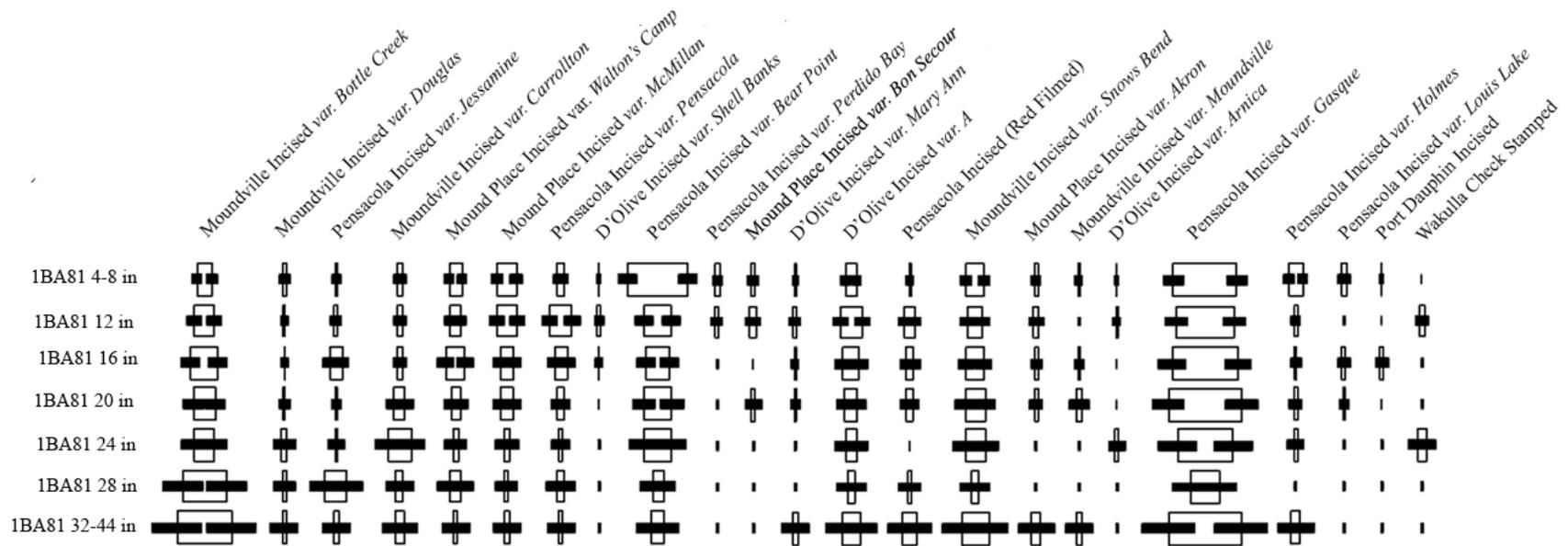


Figure 2. Percentage stratigraphy seriation of Shell Bank (1BA81)

University of Alabama reports that there are only 42 Woodland period ceramics out of nearly 16,000 sherds. This makes it a good case to test the chronology within the Pensacola ceramic sequence. Prior to further refinement, the seriation contained 11 stratigraphic levels and 34 type-variety categories.

The first step in cleaning up the data was combining analytic units with counts below 50 ($n < 50$). Where a level contained a count below 50 ($n < 50$), it could be combined with a level above or below, as long as the order of superposition is not violated. Shell Bank (1BA81) was excavated in 4 in levels, demarcated by the bottom depth (i.e. 4 in, 8 in, 12 in, etc.). Due to mixing and disturbance near the surface, the top two levels were combined into one analytic unit. Additionally, the 32 in level and below all contained counts below 50. The bottom four levels (32 - 44 in) were combined into one analytic unit. This resulted in seven provenience levels (4 - 8 in, 12 in, 16 in, 20 in, 24 in, 28 in, and 32 - 44 in). Not only was this more manageable, but the results were more meaningful (see Appendix A).

From here, it was easier to determine patterns within type-varieties. Shell Bank (1BA81) is understood to be a Pensacola sequence site, so it was not surprising that a number of the type-varieties are presented throughout the sequence in relatively stable proportions. Based on the seriation of decorated ceramics (Figure 2), Shell Bank (1BA81) consists of a relatively short occupation during the middle of the Pensacola archaeological culture. Several of the defining types show little patterning, while others represent slight trends. *Pensacola Incised var. Jessamine* is present and seriates fairly well, but it exists in low percentages throughout the seriation. This is also true of *Mound Place var. Walton's Camp*, *Mound Place Incised var. McMillan*, and *Moundville Incised var. Carrollton*. Nearly all of the D'Olive Incised varieties are rare at Shell Bank (1BA81) and are perhaps not part of the temporal sequence at the site.

Moundville Incised *var. Bottle Creek* is present nearly throughout the sequence in slightly decreasing proportions. Pensacola Incised *var. Gasque* is also present throughout the sequence at much higher proportionate frequencies, but it does not seriate well at the site level. Its prominence could suggest it was a key type for some extended period of time. The interdigitation may provide better evidence for seriation.

Presumably later types are present at Shell Bank (1BA81) and demonstrate some evidence of patterning. Pensacola Incised *var. Bear Point* is present throughout the sequence, but demonstrates increasing frequency. Pensacola Incised *var. Perdido Bay* and D'Olive incised *var. Arnica* both appear relatively late in the sequence, but they remain rare types. Lastly, Moundville Incised *var. Douglas* is present throughout the sequence with little to no demonstration of the popularity principle. These results would be consistent with a late Mississippian to Protohistoric Pensacola occupation.

D'Olive Creek (1BA196 and 1BA251) Seriation

D'Olive Creek (1BA196 and 1BA251) was initially thought to represent an eighteenth-century occupation of Mobilian, Tawasa, and Tensas groups (Bizzoco 1977; DeJarnette 1976; Knight and Jenkins 1976), but more recent research by Fuller and Brown (Fuller 1998; Fuller and Brown 1993) suggest an earlier occupation that places D'Olive Creek (1BA196 and 1BA251) in the later phases of the Pensacola sequence. Because it is potentially a later site, it could provide stronger evidence for the Protohistoric and Historic phases at the end of the Pensacola archaeological culture sequence. D'Olive Creek (1BA196 and 1BA251) consists of large trenches that were excavated in 20 cm arbitrary levels surrounding control blocks, which were excavated in natural levels referred to by zone. In some cases, lot numbers included phase and zone information. For this seriation, excavations by arbitrary levels were used in order to

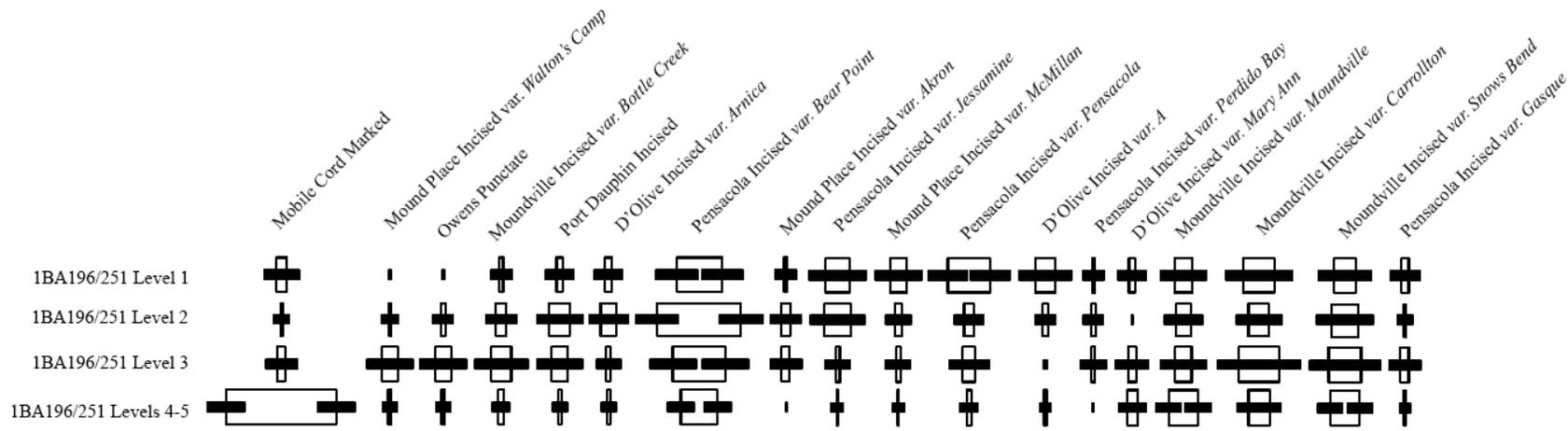


Figure 3. Percentage stratigraphy seriation of D'Olive Creek (1BA196/251)

remain consistent with results from Shell Bank (1BA81) and Andrews Place (1MB1). All decorated ceramics that were identified with information regarding arbitrary level were included in the seriation. Unfortunately, this had an impact on the sample size, so D'Olive Creek (1BA196 and 1BA251) presents a more reduced seriation than the other two sites. Despite these limitations, the seriation resulted in five analytic units based on the five arbitrary levels at the site and 23 type-variety categories.

The first step in cleaning up the data was combining analytic units with counts below fifty ($n < 50$). The only problematic analytic unit in this regard was level 5, which only contained twelve sherds ($n = 12$). As such, this level was combined with the one immediately above it to produce a larger sample. Because D'Olive Creek was excavated in 20 cm levels, the level of resolution for stratigraphic sequencing is much grosser. Once the fourth and fifth levels were merged, it spanned 40 cm of deposition. Although each level could potentially show a large span of culture history, this is still a useful way to assess percentage changes in ceramics through time. Modern archaeological methods are often based on 20 cm arbitrary levels and D'Olive Creek (1BA196 and 1BA251) shows the value in seriation even when resolution may be sacrificed in favor of excavation expediency. The final seriation for D'Olive Creek (1BA196 and 1BA251) (Figure 3) contained 18 type-variety categories across four analytic units (Level 1, Level 2, Level 3, and Level 4-5) (see Appendix B).

Within D'Olive Creek (1BA196 and 1BA251), as with Shell Bank (1BA81), a number type-varieties considered important to understanding the phase chronology exist throughout the sequence. Based on the seriation of decorated ceramics, D'Olive Creek was occupied for a relatively short span of time late in the Pensacola archaeological culture. Most notable is the strong presence of Port Dauphin Incised ceramics. These are supposedly indicative of the Early

Historic Port Dauphin phase. Another marker is zoned punctations as in Owens Punctate varieties. These were present in the sequence and relatively concurrent with the presence of Port Dauphin Incised ceramics. Pensacola Incised *var. Jessamine* presents a late seriation of increasing percentages. There is also a relatively strong presence of type-varieties associated with the Bear Point Phase that appear to seriate, including D'Olive Incised *var. Arnica* and Pensacola Incised *var. Bear Point*. Although percentages are much lower, Pensacola Incised *var. Perdido Bay* is also present, but does not appear to seriate. Some earlier Bottle Creek I and II types-varieties also continue to appear in the assemblage, including Moundville Incised *vars. Carrollton, Bottle Creek and Snow's Bend*. The Mound Place varieties seem to show a shift through time, despite low percentages. Once again, there is a marked difference in presence and quantity of certain ceramic types in comparison to Shell Bank (1BA81) and Andrews Place (1MB1). The meaning behind these differences should be explored further.

Andrews Place (1MB1) Seriation

Andrews Place (1MB1) is thought to begin chronologically earlier than Shell Bank and D'Olive Creek (1BA196 and 1BA251), because of the high rate of Late Woodland pottery types in apparent association with early Mississippian pottery types low in the stratigraphic sequence. Gardner's (2005) master's thesis suggests a migration model for the introduction of the Mississippian tradition in the Mobile Bay region as Mississippian peoples moved into the area and began to build settlements. Andrews Place was occupied throughout this transition and, according to Gardner (2005), well into the Protohistoric period. The presence of Late Woodland ceramic types help anchor the sequence in time. Without further refinement, the seriation of Andrews Place decorated ceramics produced ten stratigraphic levels and forty-five type-variety categories.

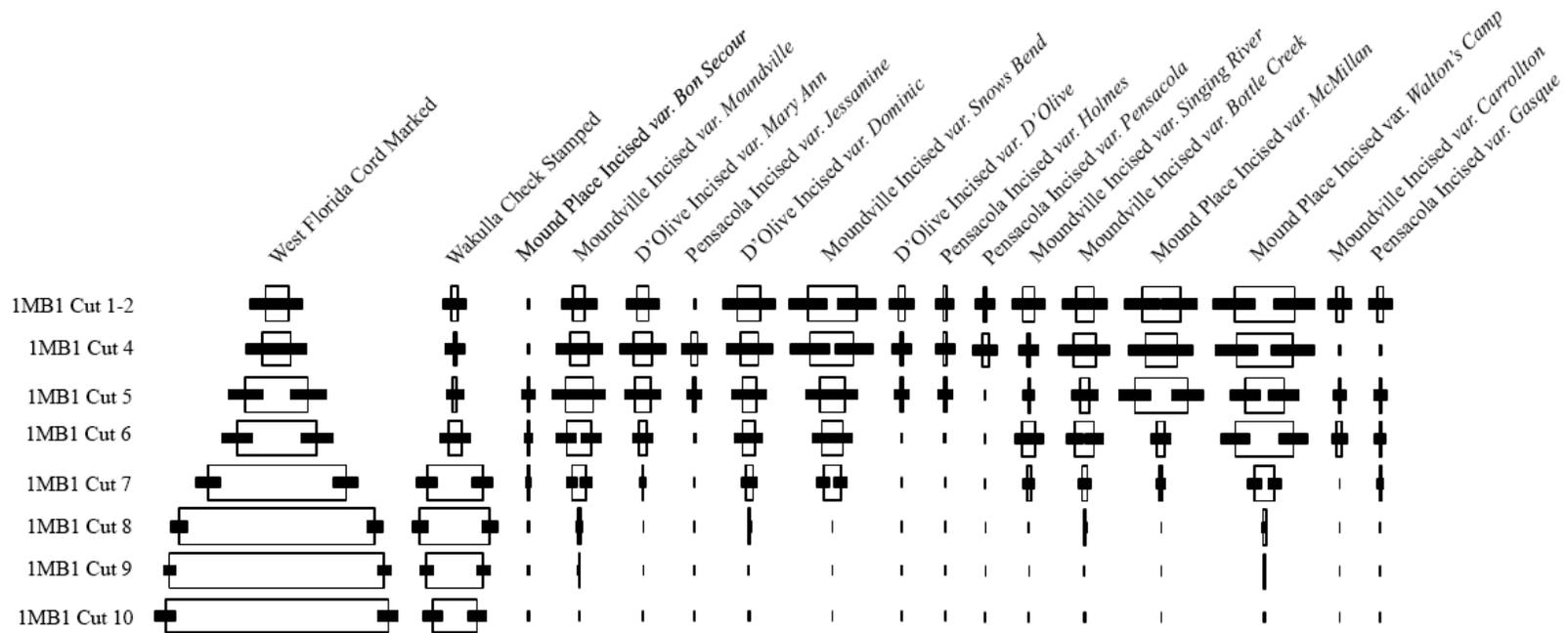


Figure 4. Percentage stratigraphy seriation of Andrews Place (1MB1)

Andrews Place was excavated in 3 in levels referred to as cuts. As with Shell Bank, the first step in cleaning up the data was combining analytic units with counts below fifty ($n < 50$). The only problematic analytic unit was the first cut, which was collapsed into the one below as with Shell Bank. Small upper levels are often heavily disturbed and contain a number of surface artifacts, which makes them a weak representative of ceramic distribution. Combining these arbitrary levels is a valuable way to increase raw count and reduce the proportional effect of ceramics displaced due to disturbance. Lastly, cut 3 was removed from this seriation due to evidence of disturbance. This resulted in 17 type-varieties across eight provenience levels (cuts 1 - 2, 4, 5, 6, 7, 8, 9, and 10) (see Appendix C). The seriation itself was very clean and did not require much additional refinement (Figure 4).

Within Andrews Place (1MB1), there is evidence of chronological sensitivity in very early types in conjunction with key Late Woodland types and some types that are thought to represent the protohistoric Bear Point phase. Gardner (2005:74-75) builds on Fuller and Brown's (1993:144) description of the Andrews Place Phase in which early Moundville types are found in association with Late Woodland types, such as cord marking and check stamping. Because of the dominance and importance of these two decorative types, they were highlighted in the seriations. Both Wakulla Check Stamped ceramics and West Florida Cord Marked ceramics appear in high frequencies in lower levels and decrease over time. While these Late Woodland types still dominate, Moundville, Mound Place, and D'Olive types are introduced. The Moundville and Mound Place times demonstrate a distinct point of introduction coinciding with the presence of Woodland types. Although percentages remain low, the data suggests that several of these early Moundville Incised varieties (i.e. *Bottle Creek*, *Moundville*, and *Snows Bend*) may effectively seriate. Most notably, D'Olive Incised *vars. Dominic* and *Mary Ann* show a dramatic increase

through stratigraphic levels over time. Other varieties occur in trace counts that are either outside of the temporal scope of the sequence or rare types that do not seriate. Trace here is typically used to refer to type-varieties present in counts below four ($n < 4$). This presentation of type-varieties is noticeably different than the type-varieties found at Shell Bank, which suggests either a chronological difference between the two sites or, conversely, a lack of chronological utility in the ceramic types.

The Interdigitation Model

The next methodological step is to explore the relationship between Shell Bank (1BA81), Andrews Place (1MB1), and D'Olive Creek (1BA196 and 1BA251). Although none of the three sites appear to be occupied during the full length of the Pensacola archaeological culture, nearly all important type-varieties emerge somewhere in the assemblages. Assuming that there should be some patterning in the ceramic sequence and that it is unlikely that after decades of study the chronology holds no value, it is possible that the intersite relationship is chronological. In other words, the degree of temporal overlap between the sites may be very limited. Not only would this explain the differences between the sites, but it would also explain the number of type-varieties that are consistently present for the duration of each site occupation. If this is the case, what Willey (1949) refers to as an "interdigitation," should provide a model that represents the scope of cultural development of the Pensacola ceramic sequence from A.D. 1100-1700. The interdigitation allows for the integration of all three sites as long as stratigraphic order is not violated for each site.

The process is relatively simple, but there is no way for the seriation macro (Lipo 2001; Lipo et al. 1997) or any other computer program to effectively arrange the analytic units in a way that conforms to the popularity principle and produces an accurate image of change through

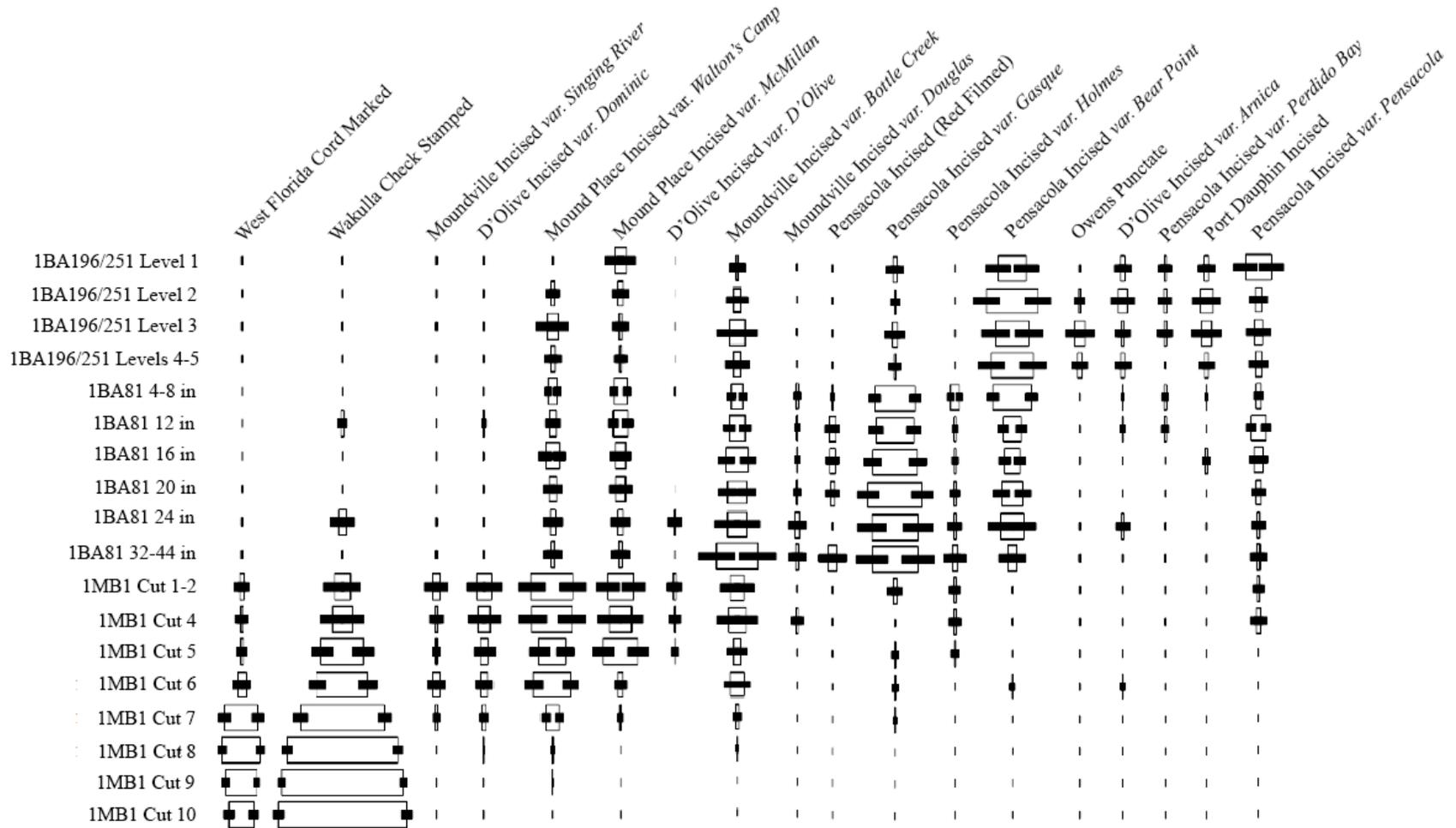


Figure 5. Percentage stratigraphy interdigitation of seriating types

time. Thus, methodologies shifted toward a more manual method of arrangement. For each site, all possible type-variety classifications were added back into the series and arranged alphabetically. This allowed for the manipulation of the order of analytic units. Once the arrangement that best demonstrated the popularity principle for type-varieties was confirmed, the data was entered back into a separate Excel spreadsheet and run through the seriation macro (Lipo 2001; Lipo et al. 1997) to produce a clean image of the interdigitation. Finally, this master seriation underwent a similar refinement process to the seriations for each site.

In the refinement stage of the master seriation, levels could no longer be collapsed and combined, because the combinations from the earlier seriations were used to generate the model. The most important refinement was the reduction of type-variety categories to make the data interpretable and patterns more apparent. In this master seriation (Figure 5), twelve type-variety classifications were removed, beginning with *unspecified* categories for D'Olive Incised, Mound Place Incised, Moundville Incised, and Pensacola Incised. Additionally, D'Olive Engraved, D'Olive Incised *var. Shell Banks*, Mound Place Incised *var. Bon Secour*, Moundville Engraved, Pensacola Incised *var. Louis Lake*, and Pensacola Incised *var. Rutherford* were removed for being rare types. Moundville Incised *var. Snow's Bend* was removed for being very long lived with deviating percentage change. Lastly, Mobile Cord Marked was removed because it was only present at one site and may not be a significant or diagnostic type within the Pensacola ceramic sequence. Although they are also Late Woodland types, West Florida Cord Marked and Wakulla Check Stamped ceramics were left in the seriation, because they have been used as defining types of the Andrews Place Phase (Dumas 2008; Gardner 2005). Likewise, Owens Punctate is left in the seriation, because it is often described in association with the Historic Port Dauphin phase. Because of this refinement, one level (Shell Bank 28 in level) had to be

removed, because it came into violation of the minimum necessary artifact count ($n < 50$) for analytical units. This level dropped to 41 sherds and was thus removed from the seriation. The final iteration of the master seriation contains 24 type-variety categories and twenty analytic units from all three sites (Figure 5). All though all type-varieties that conformed to the aforementioned requirements and were not removed from the seriation were in the final interdigitation seriation, a number of non-seriating types were excluded from the visual representation to produce a cleaner final product with eighteen type-varieties (Figures 5 and 6). There were six of these type-varieties: Pensacola Incised var. *Jessamine*, D'Olive Incised var. *A*, D'Olive Incised var. *Mary Ann*, Mound Place Incised var. *Akron*, Moundville Incised var.

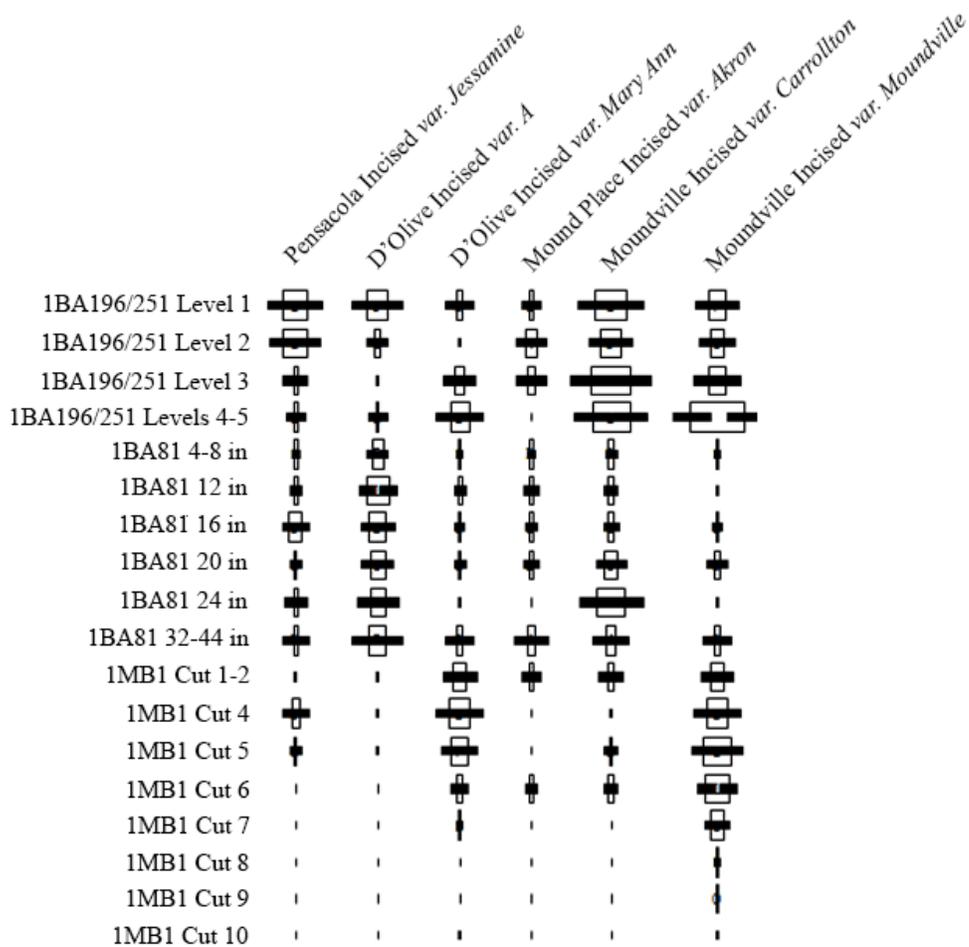


Figure 6. Percentage stratigraphy interdigitation of non-seriating types

Carrollton, and Moundville Incised var. *Moundville*. Based on the seriation results, there is reason to doubt the chronological utility of Pensacola Incised var. *Jessamine*, D'Olive Incised var. *A*, Mound Place Incised var. *Akron*, and Moundville Incised var. *Carrollton* (Figure 6). The fluctuation of percentages violates the popularity principle discussed as the measure of chronological sensitivity. There is less certainty about the lack of utility in Moundville Incised var. *Moundville* and D'Olive Incised var. *Mary Ann*. These appear to be early seriating types that could be affected by the components present at D'Olive Creek. This possible interaction is considered during the discussion of D'Olive Creek and these late phases.

The most interesting aspect of the master interdigitated seriation is that the sites stacked one on top of the next, as guided by the popularity principle for the type-varieties without levels from one site interspersed between levels of another site. All levels of Andrews Place (1MB1) were the earliest with all levels of Shell Bank (1BA81) immediately above them and, lastly, all levels of D'Olive Creek (1BA196 and 1BA251) at the very top. Although D'Olive Creek is thought to contain an earlier component (Fuller 1998; Fuller and Brown 1993), this analysis highlights the Pensacola occupation and ceramic chronology, thus it seems likely that much of the evidence for Tensaw Lake or Plaquemine cultural components was selected out of the seriation. Although the interdigitation is a subjective process, it is also self-correcting. The objective is to provide the solution that best models the popularity principle without violating stratigraphic sequence. The last step in presenting the interdigitation model is arranging the type-varieties from left to right in an order of earliest to latest, with non-utilitarian types placed at the end of the seriation. This highlights major patterns in the data. Thus, the model can be read from bottom left to upper right to understand shifting ceramic patterns through time.

Because they are considered Late Woodland types that predate the Pensacola

archaeological culture, it is understandable that West Florida Cord Marked and Wakulla Check Stamped pottery are the first two ceramic types in the sequence with chronological utility. As the seriation shows, these are followed by the introduction of D'Olive Incised, Mound Place Incised, and low levels of Moundville Incised pottery. The only common D'Olive Incised variety this early in time is *Dominic*. Analysis revealed that it is a very rare type at both Shell Bank (1BA81) and D'Olive Creek (1BA196 and 1BA251). The Mound Place varieties that appear early in the sequence are *Walton's Camp* and *McMillan*. Both varieties remain a relatively common type throughout the rest of the Pensacola archaeological culture, although they decrease in frequency near the end of the occupation of Andrews Place. D'Olive Incised *var. D'Olive* also presents around this time and exists at low percentages for a brief period of time early in the sequence. Moundville Incised *var. Bottle Creek* is introduced around the same time as the D'Olive Incised *var. Dominic*, but does not peak until much later. The seriation of *Bottle Creek* produced a nice battleship-shaped curve, even though the type is very long-lived and spans nearly the entire Pensacola sequence in relatively abundant quantities. The end of several of these types, especially D'Olive Incised *var. Dominic*, and the rise in popularity of *Bottle Creek* may be indicative of some sort of phase transition.

The next type in the series is Moundville Incised *var. Douglas*. This was thought to be a later, protohistoric type (around the Bear Point Phase), but it appears to be much earlier in time and only present in low percentages during this middle part of the Pensacola sequence at these sites. Around the same time is an equally sparse and brief period of Pensacola Incised red filmed ceramics, which were also thought to be a late decoration, and Pensacola Incised *var. Holmes*. As dominance of Pensacola Incised *var. Bottle Creek* begins to decline, Pensacola Incised *var. Gasque* begins to increase and becomes a large proportion of the assemblage. Although the

distribution of the curve is somewhat shaky, it shows a clear introduction, increase in popularity, and subsequent decrease in the larger pattern across all three sites. Because of its strong presence in the overall pattern of the seriation, it is considered effectively seriating.

As Pensacola Incised *var. Gasque* declines, Pensacola Incised *var. Bear Point* begins to increase. This could mark another phase transition in the sequence. Simultaneously, D'Olive Incised *var. Arnica* demonstrates a less dramatic (lower percentage) battleship-shaped curve of the popularity principle. Pensacola Incised *var. Pensacola* continues to increase as Pensacola Incised *var. Perdido Bay* and Port Dauphin Incised are introduced into the sequence.

Summary

The methods presented in this study have been successfully utilized in regions across North America to refine artifact sequences as a measure of archaeological culture change. Although these methods are not radical or new, they are honed and advanced as to provide the most accurate chronology in a region that lacks this level of critical evaluation. The selection of artifacts focuses on of the defining Pensacola ceramics and those closely affiliated with the sequence. By eliminating the preponderance of plain ceramics in each assemblage, the focus shifts to the attributes that are most readily used to define the ceramic phases.

The seriation macro for Excel created by Tim Hunt and Carl Lipo (Lipo 2001; Lipo et al. 1997) is the most accurate and effective way to derive frequencies by analytic unit. Although the program was designed for basic frequency seriation, it is equally effective for percentage stratigraphy seriation when the analytic units refer to stratigraphic levels. Refinement by hand allowed for the collapsing of small analytic units and the removal of problematic type-variety categories to provide more powerful results. Although seriation is a mathematical operation, it relies on user-editing and perception to produce the most representative graphical output. Despite

a series of identification concerns regarding the definitions and mutual exclusivity of some ceramic type-varieties, the results show important and useful patterns in the cultural development of the ceramic sequence. Surprisingly, the three sites selected for this study arrange sequentially, each provide a unique snapshot of a brief span of time during the Pensacola ceramic sequence. Site reports from Shell Bank (1BA1) suggested that the site was occupied for the duration of the Pensacola archaeological culture (DeJarnette 1942; DeJarnette and Anderson 1941). Results from the interdigitation suggest that it only spanned the Mississippi period of the Pensacola archaeological culture. None of the sites spanned the entire sequence as originally thought. While some patterns begin to appear at the site level, it is the interdigitation of the three sites that provides valuable modeling of the sequence of ceramic type-varieties.

The inspection and overview of the data summarized in this chapter illustrates that there are observable ceramic changes through time when the type-varieties are metrically evaluated through percentage stratigraphy. This suggests that there is a rationale to divide the lengthy Pensacola archaeological culture (A.D. 1250 to 1700) into a series of ceramic phases based on these measurable attributes of culture change.

CHAPTER 5 INTERPRETING THE SERIATIONS

The power of percentage stratigraphy seriation is not just its ability to quantify the presence of artifacts within a given site. Although this is a valuable measure, the ultimate objective of this study and most studies that employ this methodology is to more broadly identify and define cultural patterns. The previous chapter presents the seriations and highlights some of the major findings seen in the results, including the value of percentage stratigraphy and the interdigitation model. The next step is to place these results in terms of the phase sequence defined by Fuller and Stowe (1982) and refined over the past few decades, including more recent summaries by Brown (2003) and Dumas (2008). This chapter will focus on the five phases of the Pensacola archaeological culture spanning from the early Mississippian into the early Historic period and whether or not the criteria used to define these phases is chronologically useful.

Evaluation of the Pensacola Archaeological Culture Ceramic Phases

Andrews Place Phase (A.D. 1100-1250?)

As discussed in Chapter Two, the Andrews Place phase is defined by this co-occurrence of Moundville I/early Moundville II ceramics and Late Weeden Island Wakulla/transitional Late Coles Creek types along the Northern Gulf Coast. Although much of the current definition of the Andrews Place Phase is based on the same ceramic data set used in this study, Gardner (2005) does not define the relationship between these ceramic traditions and how the development of certain Pensacola type-varieties fit into this definition.

The seriation results presented here anchor the duration of the Andrews Place (1MB1)

occupation early in the chronology. The two earliest types present in the assemblage that provided good evidence for the popularity principle are Wakulla Check Stamped and West Florida Cord Marked ceramics. Brown (2003) describes Moundville Incised *var. Moundville* as a diagnostic type of this phase. At the site level seriation, Moundville Incised *var. Moundville* appears to mostly seriate with some slight overrepresentation in the highest level, but Moundville Incised *var. Moundville* also appears in high proportions at D'Olive Creek (1BA196 and 1BA251) in conjunction with later types and, thus, does not seriate in the interdigitation model. It is possible that the large levels led to increased mixing and that very early types have inadvertently trickled into higher levels. If D'Olive Creek (1BA196 and 1BA251) does contain the Late Woodland component mentioned by Fuller and Brown (1993, 1998) and followed by a period of vacancy before a much later occupation, this occupation pattern could explain the interaction between types that otherwise seem to seriate early in the sequence and types that otherwise seriate late in the sequence. If this is the case, there is a stronger argument for the use of Moundville Incised *var. Moundville* as an indicator of the Andrews Place Phase. Based on the current results, however, Moundville Incised *var. Moundville* along with other Moundville Incised varieties are long-lived and poor measures of chronological sensitivity.

Bottle Creek I (A.D. 1250-1400) and Bottle Creek II Phases (A.D. 1400-1550)

As described in Chapter Two, the Bottle Creek phase was subdivided by Fuller (1998) into Bottle Creek I and Bottle Creek II through more intuitive methods combined with some new stratigraphic evidence. Brown (2003) focuses on D'Olive Incised *var. Dominic*, Mound Place Incised *var. McMillan*, and Pensacola Incised *var. Jessamine* as the primary indicators of this phase, along with the introduction of a number of types that persist through the Bottle Creek II phase. Based on the seriated frequencies, D'Olive Incised *var. Dominic* has the most potential to

define the subdivision between Bottle Creek I and Bottle Creek II. Its presence was trace in both of the other sites, but it demonstrates an early introduction and increase during the dominance and gradual decline of Late Woodland type-varieties at Andrews Place (1MB1). Dumas (2008) suggests that D'Olive Incised *var. Shell Banks* is also an early D'Olive Incised variety, but it was an incredibly rare type at all three sites. Frequencies were low enough that it was removed from the seriation. D'Olive Incised *var. D'Olive* appears in low frequencies, but seriates around the peak occupation of the Bottle Creek I phase.

Also of note is the strong presence of two Mound Place varieties—*Walton's Camp* and *McMillan*. The prominence of both Mound Place types coincides with the presence of D'Olive Incised *var. Dominic*. Although there is some trace introduction of Pensacola Incised *var. Jessamine*, it does not effectively seriate and, in fact, suggests a later prominence through correspondence with later seriating types at D'Olive Creek (1BA196 and 1BA251). Thus, determination of a Bottle Creek I phase should focus on the popularity of D'Olive Incised *var. Dominic*, coinciding with higher proportions of Mound Place Incised *var. Walton's Camp* and *McMillan*.

As one last note, the master interdigitation (Figure 5) shows that Moundville Incised *var. Singing River* is the only Moundville type limited to this early time frame. Unfortunately, it was not identified at the other sites and does not appear to effectively seriate. This could potentially suggest a geographic variation of this type-variety, especially because it appears to be more common further west (Blitz and Mann 2000). Further analysis would be needed to investigate whether or not there is any chronological utility in this type.

Because Bottle Creek I and Bottle Creek II were only recently subdivided, it is important to highlight that ceramic assemblages for the two phases are likely very similar and a range of

types are present throughout this lengthy period (Fuller 1998). The seriation shows this to be the case with a number of most well-known Pensacola ceramic types. This can make it difficult to rationally subdivide longer periods, but the results here suggest that dividing the Bottle Creek phase should remain a very useful heuristic.

The Bottle Creek II phase is primarily defined by the introduction and presence of Moundville Incised *var. Bottle Creek*. As the interdigitation model illustrates, Pensacola Incised *var. Bottle Creek* has a lengthy span of existence, but seriates very nicely with the greatest popularity immediately following the decline Bottle Creek I varieties. There is a clear period of increased popularity immediately following the peak period of D'Olive Incised *var. Dominic* and Mound Place *vars. McMillan* and *Walton's Camp*. The peak of Moundville Incised *var. Bottle Creek* coincides with brief appearance of D'Olive Incised *var. D'Olive*. Although it is accurately described as introductory to Bottle Creek II, the seriation shows a transition based on these two types prior to the surge in popularity of other Bottle Creek II varieties.

The other two varieties thought to be associated with the Bottle Creek II phase are Pensacola Incised *vars. Gasque* and *Holmes*. Based on the interdigitation model, Pensacola Incised *var. Gasque* is introduced very early, but becomes a prominent type just as Moundville Incised *var. Bottle Creek* is back in decline. Pensacola Incised *var. Holmes* exists at consistently low levels throughout the rise and decline of these other two varieties.

Also of note in this portion of the seriation is the presence of Moundville Incised *var. Douglas* and Pensacola Incised (Red Filmed). Moundville Incised *var. Douglas* seriates fairly well despite low counts over a long span of levels. It is thought to be a late type associated with the subsequent Bear Point Phase. Its presence may actually be more useful as a chronological marker of the Bottle Creek II phase as defined here. Red filming is also thought to be a much

later attribute that may have a longer history earlier than initially thought. It does not appear to provide any chronological utility at this time. Further data, including a larger sample, is needed to define the utility of Moundville Incised *var. Douglas* and Pensacola Incised (Red Filmed) ceramics.

Although evidence is inconclusive, the seriation suggests that the Bottle Creek phases could include an intermediate phase between Bottle Creek I and Bottle Creek based on the florescence of Moundville Incised *var. Bottle Creek*. The seriation shows a transition first from the dominance of Mound Place and D'Olive Incised varieties to Moundville Incised *var. Bottle Creek* and then to Pensacola Incised *var. Gasque*. Thus, the number and arrangement of phases from A.D. 1250 to 1550 is still undetermined. These phases could be more clearly defined by a more precise measure of the percentage change in the various type-varieties.

Bear Point Phase (A.D. 1550-1700)

The Bear Point Phase is a Protohistoric phase that begins at the time of contact during a critical point of transformation across the Southeast in which many Mississippian groups are rapidly reorganizing and, in some cases, moving across the landscape. This phase covers a relatively long period of time considering the rate of culture change that has been documented across the region. Recent attempts have been made to identify sub-phases or further divide the relative chronology, such as a Guillory phase. These seriation results could clarify proposed subdivisions of the 250 years following European contact.

Brown (2003) describes the primary markers of the Bear Point phase as Pensacola Incised *vars. Bear Point* and *Perdido Bay*, D'Olive Incised *var. Arnica*, and Moundville Incised *var. Douglas*. A description of Moundville Incised *var. Douglas* was provided under the Bottle Creek II phase due to its position in the interdigitation seriation model. It seems highly unlikely

based on the results presented here that Moundville Incised *var. Douglas* can be used as a Bear Point phase diagnostic type. The other three varieties have more potential in highlighting this late protohistoric phase of the Pensacola archaeological culture.

Pensacola Incised *var. Bear Point* seriates well and provides strong evidence for this late phase. Many of the long lived type-varieties are still part of the assemblage, but just as the prominence of Pensacola Incised *var. Gasque* is starting to decline, Pensacola Incised *var. Bear Point* dramatically increases in percentage. Pensacola Incised *var. Perdido Bay* appears late, but remains in relatively consistently low proportions, which a poorly defined battleship-shaped frequency curve. D'Olive Incised *var. Arnica*, on the other hand, seriates very well despite low proportions. It appears late in the sequence with some trace appearances early in the seriation likely due to displacement. D'Olive Incised *var. Arnica* nicely parallels the increase and decrease in Pensacola Incised *var. Bear Point*.

Chapter Two also contained a brief discussion on the possibility of a Guillory sub-phase, introduced by Fuller (1998) and further defined by Dumas (2008). This is primarily defined by the Guillory rim mode. Because rim modes were not investigated separately in this analysis it is difficult to assess the presence of this sub-phase. Dumas (2008) suggests that the primary ceramic type-varieties that could identify a Guillory phase are Moundville Incised *var. Moundville* and Pensacola Incised *var. Pensacola*. The earlier discussion of Moundville Incised *var. Moundville* explains that this seriation illustrates that it is not a useful chronological type. Pensacola Incised *var. Pensacola* illustrates a clear popularity curve with slow, gradual increase over time from relatively early in the stratigraphic sequence. Very late in the sequence as defined by the interdigitation is also where Pensacola Incised *var. Jessamine* reaches its highest proportions. Based on evidence for the seriation of Pensacola Incised *var. Pensacola*, it is not

possible to preclude the existence of a Guillory sub-phase, even without an analysis of the presence of the Guillory rim mode. Because sub-phases are geographically influenced, they are not of primary concern in this analysis.

Port Dauphin Phase (A.D. 1700-1750)

The Port Dauphin phase is presumed to define 50 years immediately following the Bear Point phase. In relation to the previous four phases, this is a short period of time. It is primarily defined by Port Dauphin Incised, which is thought to be related to preceding Pensacola Incised ceramics and Fatherland Incised ceramics from the Lower Mississippi Valley (Brown 2003). Other new attributes include red filming (such as Chicot red) and zoned punctuating (late Owens Punctated varieties). These traits represent a shift away from the four main ceramic types representative of the Mississippian and protohistoric phases of the Mobile Bay region.

While two of the representative types seem to seriate fairly well, one is not represented in the sample used in this analysis. Red filming (Chicot Red), which is rare in the assemblage and only present in zone excavations of control blocks, is not represented in the sample presented here. Thus, the Port Dauphin phase should emphasize Owens Punctate and Port Dauphin Incised ceramics as diagnostic types. In fact, both Port Dauphin Incised and Owens Punctate peak at the same point in the seriation. The only difference is slightly higher frequencies of Port Dauphin Incised ceramics that span a slightly longer span of time.

Results for the Port Dauphin phase, however, are inconclusive. Contrary to the description of the Port Dauphin phase is evidence to suggest that Bear Point Phase ceramics not only continue after the brief period of Port Dauphin types, but actually continue to increase (i.e. Pensacola Incised *var. Pensacola*). Data from the seriation suggests that the Port Dauphin phase could be a sub-phase of the Bear Point phase, perhaps immediately preceding the proposed

Guillory phase. The sub-phase designation is used here to suggest a further division of time based changing patterns of ceramic varieties within larger patterns of popular ceramic types. Sub-phases are likely more geographically influenced. It is possible that this analysis is based on insufficient evidence to properly define the Port Dauphin phase. The seriation could illustrate the earliest introduction of Port Dauphin types, without extending the duration of the phase. There are no radiometric dates to confirm the length of occupation at D'Olive Creek (1BA196 and 1BA251), the latest site used in this study. Either one of these explanations is possible. Further data on the last couple of centuries of this ceramic chronology is needed to refine the end of the Protohistoric and Early Historic occupations in the Mobile Bay region.

Pensacola Ceramic Phase Refinement

The phase sequence for the Pensacola archaeological culture proposed by Fuller (1998) based on an intuitive determination of the order of type-varieties based on years of excavations across the Gulf Coast has been highly effective for understanding the regional chronology. In almost twenty years, only minor modifications have been made to Fuller's (1998) sequence. The results presented here offer a high degree of confirmation to Fuller's (1998) cultural chronology based on his earlier ceramic typologies and offer a few more helpful modifications. Relative ceramic chronologies have gone out of favor among some archaeologists because of the rise of radiometric dating. These results show that ceramic chronologies can be mathematically derived and illustrated. Beyond mere description, ceramic typologies provide a means of measuring stylistic culture change through time, which allows for more precise dating of site occupations.

There were relatively few types that did not seriate at all. These non-seriation type-varieties are Mound Place Incised *var. Akron*, Moundville Incised *vars. Carrollton* and *Moundville*, D'Olive Incised *var. Mary Ann* and the newly defined D'Olive Incised *var. A*

(Figure 6). Nearly all of these types span a long period of time with waxing and waning popularity. Mound Place Incised vars. *McMillan* and *Walton's Camp*, Moundville Incised vars. *Bottle Creek*, and Pensacola Incised vars. *Bear Point*, *Jessamine*, and *Pensacola* all show evidence of seriation, but include introduction early in the sequence and existence over a long span of time. Aside from Moundville Incised var. *Singing River*, which may demonstrate geographic variation, all of the Moundville Incised types are present for nearly the entire Pensacola archaeological culture. For this reason, using measures of proportion and focusing on these brief periods of dramatic florescence to determine phases may be a critical next step.

For much of the Southeast, ceramic phases are determined on the basis of a *terminus post quem* dating logic and the presence or absence of key diagnostic types. Understanding changes in cultural patterns of ceramic production is not so simple; presence or absence can be a misleading indicator of chronology. As many seriations have shown, even types that seriate very well often have long periods of introduction or decline. A more accurate definition and assessment of ceramic phases within archaeological cultures that have a preponderance of these long-lived types should be based on a percentage measure of types.

Seriation is a powerful tool for arranging a sequence of artifact attributes. The mechanical results are the arrangement of attributes, in this case pottery type-varieties, in a series or order. In this case, that order is reflective of stratigraphic excavation units and, thus, a temporal distribution of ceramic types. What makes this analysis valuable, however, is its power to speak not only to an order of types, but to the larger cultural patterns and ceramic phases that these type-varieties are believed to represent. The results demonstrate that it is reasonable to use a number of the defined types to subdivide the cultural tradition into a series of shorter, more precisely defined ceramic phases.

CHAPTER 6 CONCLUSIONS AND FUTURE DIRECTIONS

The purpose of this analysis was to investigate the chronological utility of the Pensacola ceramic type-varieties to evaluate the relative chronology for the Mississippi period in the Mobile Bay Region. The Pensacola archaeological culture is a Mississippian tradition along the Northern Gulf Coast that dominated from approximately A.D. 1100 and had influence into the early historic period. The archaeological understanding of the ceramic chronology was defined in the 1980s and 1990s. Since then, the scheme has been only minimally modified and never evaluated through seriation or other metric methods. This project investigated the types that show chronological utility and how they can be used to generate a more effective understanding of the regional relative ceramic chronology.

To perform this analysis, sites around Mobile Bay were selected based on the conditions for seriation. Thus, all sites are in close proximity as to reduce geographic variation, the sample is based on a single cultural group, and stylistic attributes were used for analysis (Doran and Hodson 1975). Additionally, it was important that only sites with large collections and good excavations were used in this analysis. Two sites, Shell Bank (1BA81) and D'Olive Creek (1BA196 and 1BA251), were selected for analysis, while a sample of ceramics from a third site, Andrews Place (1MB1), recently analyzed by Gardner (2005), was selected for comparison. Next, I classified all decorated ceramics from the first two sites. Decorated ceramics were sorted and tabulated by curation lot number. Each lot contains information based on provenience. Most important to this analysis was the calculation of identified type-varieties by stratigraphic level.

Data for all three sites was entered into Excel. The Excel pivot table function arranged the data in this way and the frequency seriation program created by Tim Hunt and Carl Lipo (Lipo 2001; Lipo et al. 1997) generated percentages based on analytic unit and provided graphical outputs for each site. Because the analytic units directly refer to stratigraphic order, this method of frequency seriation is known as percentage stratigraphy. Next, all three sites were integrated into one large master seriation referred to as an interdigitation (Willey 1949). This methodology provides a chronological measure of stylistic changes through time.

The individual site seriations offer some data on the seriation of specific, short-lived types, but it is the interdigitation model that provides the best diachronic assessment. First, the interdigitation demonstrates that each of the three sites represents a relatively brief occupation during the Pensacola archaeological culture and all three sites arrange sequentially. D'Olive Creek (1BA196 and 1BA251) may be slightly problematic in this regard, because it is believed to contain a minor early Mississippian component that may visually disrupt the seriation, despite the clearly defined seriation of later types. As expected, a number of types seriate as expected, while others, especially those that are rare or excessively long-lived should be excluded from discussions of temporal importance. A process of refinement revealed the best solution for the sequence of ceramic development. Overall, the seriation results are sufficient to offer an evaluation of ceramic phases for the Pensacola archaeological culture.

Because the effectiveness of type-varieties and their stratigraphic distribution is better understood, it is possible to confirm or reject the phases as currently defined. The seriations and summary of results offer little support for the Andrews Place phase, because it is defined by the introduction of Moundville Incised *var. Moundville*, which does not effectively seriate in this study. If the D'Olive Creek sample is thought to have an early occupation immediately followed

by a very late occupation, then a couple of these types may seriate when investigated further. This mixing of early and late types makes the lowest excavation levels of D'Olive Creek difficult to place in the seriation. If, perhaps, the presence of Moundville Incised *var. Moundville* at D'Olive Creek is introductory Mississippian, further investigations should reveal that Moundville Incised *var. Moundville* is potentially a chronologically sensitive type.

Next, the Bottle Creek phases should first be assessed as a whole. As described in the previous chapter, the majority of types are present during the span covering the Bottle Creek I/II phases. Looking at major types in this mid-range of the seriation, there appears to be evidence for the division between Bottle Creek I and Bottle Creek II, with a shift from early D'Olive and Mound Place types to local Moundville and early Pensacola types. As suggested by Fuller (2003), this transition occurs at the apex of the Moundville Incised *var. Bottle Creek*, which could suggest evidence for further refinement in the ceramic phase sequence based on changing percentages, with shifts from D'Olive and Mound Place types to Moundville Incised *var. Bottle Creek* and then Pensacola Incised *var. Gasque*.

The Protohistoric period is demarcated fairly well by the Bear Point phase, but the chronology is increasingly unclear near the end of the sequence. The Bear Point Phase is, as expected, defined by the well-seriating Pensacola incised *var. Bear Point*. The seriation becomes more complicated in a discussion of the later Port Dauphin phase, which should come at the zenith of the seriation. Although a couple of the types that define the Port Dauphin phase seriate quite nicely (later Owens Punctate varieties and Port Dauphin Incised), they appear to fall prior to the end of the proposed Guillory sub-phase of the Bear Point phase. Further research and a larger sample of later phase ceramics is needed to better assess the chronological power of these types.

The purpose of this study was to evaluate the historical utility of the type-variety typology for the Pensacola ceramic sequence and it was quite successful in that regard. Pottery is an optimal medium for cultural reproduction and change over time and space. With the proper analysis, it can aid in the reconstruction of social chronologies for past peoples. Gosselain (2000) argues that many aspects of the production process, especially post-manufacturing stages, are highly visible and subject to broader social influence. Decoration is “visible and technically malleable,” which means it is more likely to reflect wider, superficial, and socially adaptable affiliations (Gosselain 2000:193). Because of this, seriations of pottery provide measurable classifications of culture change and chronology. In many regions, ceramic type-varieties were assigned prior to the availability of reliable radiometric dates, but seriation and other methods of metric evaluation have been available for almost one hundred years. In the case of the Pensacola region, the typology has served as the culture history framework through decades of excavations, and thus this evaluative step was never taken until now. Importantly, the key diagnostic types pattern as suggested by Fuller (1998) for the Bottle Creek and Bear Point phases. However, the evidence provided here is insufficient to confirm the early Andrews Place phase as defined by Brown (2003), Gardner (2005), and Dumas (2008). Additionally, seriation of the late Port Dauphin phase types falls earlier in the sequence than hypothesized.

These results suggest that there is still a great need for investigation into the early and late phases. This could be facilitated through additional percentage stratigraphy seriations of sites believed to span these periods of occupation. Other research should focus on better defining phases. The first step in this direction would be a precise quantification of the type-variety percentages that define these long-lived time spans. Due to sample size and the emphasis on highlighting important Pensacola type-varieties, the data I have presented here are insufficient to

argue for percentage ranges for types that define each phase. This important refinement would require an expanded analysis that includes all decorated and undecorated ceramics to determine percentage estimates.

Additional research is already planned as a post-hoc assessment of the data derived during this study. Following the work conducted here, two steps outside of the scope of this thesis could help inform the archaeological understanding of the Pensacola ceramic phases. The first would be the percentage stratigraphy seriation of the Bottle Creek (1BA2) site data (Brown 2003). The conclusions drawn from Bottle Creek (1BA2) heavily impacted knowledge regarding the Pensacola archaeological culture. Many of those conclusions are reflected in the schema evaluated in this analysis. The addition of Bottle Creek (1BA2) would provide data from the largest mound center in the region. Fuller (2003) argues that Bottle Creek (1BA2) was occupied as early as the twelfth century. There is evidence of early Moundville I and Moundville II ceramic types coinciding with Late Woodland Weeden Island, providing support for the presence of an incipient Mississippian Andrews Place phase. Fuller (2003) also suggests that there is a Gulf Historic tradition that would include Port Dauphin phase ceramics. Thus, there is evidence to suggest that the Bottle Creek site (1BA2) spans the duration of the Pensacola archaeological culture and could be an excellent addition to the results presented here, as long as it does not violate any of the rules for seriation and regional variation appears minimal. If the data from Bottle Creek (1BA2) substantially seriates and correlates well with the results provided by Shell Bank (1BA81), D'Olive Creek (1BA196 and 1BA251), and Andrews Place (1MB1), then the second step would be to run a multidimensional scaling (MDS) analysis that would provide additional statistical evidence for the clustering of type-varieties into phases (Fry 2013, Mainfort 2003).

Although further research will undoubtedly continue to improve knowledge about the Pensacola archaeological culture, this thesis provides a crucial step by refining a ceramic sequence that has been in practice for several decades. Although this study is specific to the Mobile Bay region of the Pensacola archaeological culture, it demonstrates the necessity of verifying intuitive ceramic sequences through quantification, stratigraphic sequence, and seriation. This study contributes to the growing body of literature on the Pensacola archaeological culture specifically and knowledge about relative ceramic chronologies in general.

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APPENDIX A

TABLE OF TYPE-VARIETY COUNTS BY LEVEL PRESENT AT SHELL BANK (1BA81)

Type-Variety	4-8 in	12 in	16 in	20 in	24 in	28 in	32- 44 in	TOTAL
Moundville Incised var. <i>Bottle Creek</i>	25	22	23	14	7	12	12	115
Moundville Incised var. <i>Douglas</i>	7	2	1	1	2	1	1	15
Pensacola Incised var. <i>Jessamine</i>	5	4	10	1	1	6	1	28
Moundville Incised var. <i>Carrollton</i>	8	5	4	7	8	2	2	36
Mound Place Incised var. <i>Walton's Camp</i>	22	11	16	6	2	3	1	61
Mound Place Incised var. <i>McMillan</i>	32	23	12	8	2	1	1	79
Pensacola Incised var. <i>Pensacola</i>	12	25	11	4	1	2	1	56
D'Olive Incised var. <i>Shell Banks</i>	1	3	1					5
Pensacola Incised var. <i>Bear Point</i>	101	30	19	18	10	3	3	184
Pensacola Incised var. <i>Perdido Bay</i>	7	4						11
Mound Place Incised var. <i>Bon Secour</i>	8	7		3				18
D'Olive Incised var. <i>Mary Ann</i>	2	4	1	1			1	9
D'Olive Incised var. <i>A</i>	19	24	14	8	4	2	4	75
Pensacola Incised (Red Filmed)	3	12	7	4		1	3	30
Moundville Incised var. <i>Snows Bend</i>	29	17	15	13	7	2	6	89
Mound Place Incised var. <i>Akron</i>	6	6	2	2			2	18
Moundville Incised var. <i>Moundville</i>	4		2	4			1	11
D'Olive Incised var. <i>Arnica</i>	1	2			1			4
Pensacola Incised var. <i>Gasque</i>	106	64	56	47	20	8	16	317
Pensacola Incised var. <i>Holmes</i>	23	3	2	2	1		2	33
Pensacola Incised var. <i>Louis Lake</i>	8		3	1				12
Port Dauphin Incised	1		3					4
Wakulla Check Stamped		5			3			8
TOTAL	430	273	202	144	69	43	57	1218

APPENDIX B
 TABLE OF TYPE-VARIETY COUNTS BY LEVEL PRESENT AT D'OLIVE CREEK
 (1BA196 AND 1BA251)

Type-Varieties	Levels				TOTAL
	Level 1	Level 2	Level 3	4 - 5	
Mobile Cord Marked	3	1	2	63	69
Owens Punctate		1	4	2	7
Mound Place Incised var. <i>Walton's Camp</i>		2	4	2	8
Moundville Incised var. <i>Bottle Creek</i>	1	4	5	3	13
Port Dauphin Incised	2	8	4	2	16
D'Olive Incised var. <i>Arnica</i>	2	6	1	2	11
Pensacola Incised var. <i>Bear Point</i>	13	33	13	21	80
Mound Place Incised var. <i>Akron</i>	1	4	2		7
Pensacola Incised var. <i>Jessamine</i>	7	10	1	1	19
Mound Place Incised var. <i>McMillan</i>	5	3	1	1	10
Pensacola Incised var. <i>Pensacola</i>	12	4	3	3	22
D'Olive Incised var. <i>A</i>	6	2		1	9
Pensacola Incised var. <i>Perdido Bay</i>	1	2	1		4
D'Olive Incised var. <i>Mary Ann</i>	2		2	6	10
Moundville Incised var. <i>Moundville</i>	5	6	4	17	32
Moundville Incised var. <i>Carrollton</i>	9	8	10	12	39
Moundville Incised var. <i>Snows Bend</i>	6	11	8	17	42
Pensacola Incised var. <i>Gasque</i>	2	1	2	1	6
TOTAL	77	106	67	154	404

APPENDIX C
TABLE OF TYPE-VARIETY COUNTS BY LEVEL PRESENT AT ANDREWS PLACE
(1MB1)

Type-Varieties	Cut 1-2	Cut 4	Cut 5	Cut 6	Cut 7	Cut 8	Cut 9	Cut 10	TOTAL
Wakulla Check Stamped	8	9	32	62	194	509	864	303	1981
West Florida Cord Marked	2	1	2	11	79	181	229	61	566
Mound Place Incised var. <i>Bon Secour</i>			1	1	2				4
Moundville Incised var. <i>Moundville</i>	4	6	14	19	20	6	1		70
D'Olive Incised var. <i>Mary Ann</i>	4	6	8	6	2				26
Pensacola Incised var. <i>Jessamine</i>		2	1						3
D'Olive Incised var. <i>Dominic</i>	8	6	7	10	11	1			43
Moundville Incised var. <i>Snows Bend</i>	17	14	13	16	25				85
D'Olive Incised var. <i>D'Olive</i>	2	1	1						4
Pensacola Incised var. <i>Holmes</i>	1	1	1						3
Pensacola Incised var. <i>Pensacola</i>	1	2							3
Moundville Incised var. <i>Singing River</i>	4	1	1	10	6				22
Moundville Incised var. <i>Bottle Creek</i>	6	7	5	15	7	2			42
Mound Place Incised var. <i>McMillan</i>	13	10	27	6	4				60
Mound Place Incised var. <i>Walton's Camp</i>	21	18	20	45	29	6	1		140
Moundville Incised var. <i>Carrollton</i>	2		1	4					7
Pensacola Incised var. <i>Gasque</i>	2		1	2	2				7
TOTAL	95	84	135	207	381	705	1095	364	3066