WOODLAND CERAMICS AND SOCIAL BOUNDARIES OF COASTAL NORTH CAROLINA

by
Joseph Miner Herbert

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Approved by

Reader: Professor R. P. Stephen Davis, Jr.

Reader: Professor Brett H. Riggs

Reader: Professor Margaret Scarry

Advisor: Professor Vincas P. Steponaitis

Reader: Professor Emeritus Richard A. Yarnell

UMI Number: 3086539

ProQuest Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346

ABSTRACT

JOSEPH MINER HERBERT

Woodland Ceramics and Social Boundaries of Coastal North Carolina

(Under the direction of Vincas P. Steponaitis.)

This dissertation concerns the ceramic traditions of prehistoric Native Americans who inhabited the Coastal Plain and Sandhills provinces of North Carolina from about 2000 B.C. to. A.D. 1600. The study begins with a consideration ceramic taxonomy. Several currently existing typological schemes are synthesized into a single taxonomy for the entire coastal region. Pottery assemblages from stratified midden deposits at the Bandon, Whalen, and Cape Creek sites provide data critical for sequencing types on the northern coast. Net-impressed and cord-marked, sand-tempered and sand-and-granule tempered New River and Mount Pleasant series wares appear early in the sequence. Granule-tempered net-impressed wares are among the earliest, with coarse sand-tempered ware being more common through the middle period. Occurring throughout the sequence, fabric-impressed wares are most frequent in the middle period. Flexible-warp textiles are more common early in the order with rigid-warp fabrics occurring more frequently later. Shell-tempered Townsend series wares occur late in the range along with a sand-tempered series, as yet undefined.

Thermoluminescence (TL) dates for samples from sites in the Sandhills and lower Cape Fear River basin, combined with petrographic data, allows the development of a pottery type sequence for the southern coast. New River series sherds (2000 B.C. –A. D. 400) exhibit dense (> 15%) sand/grit-temper, with net-impressed or cord-marked (parallel, over-stamped) surfaces. Cape Fear series sherds (400 B.C.–A.D. 400) are tempered with a low or moderate proportion (< 15%) of sand/grit temper and exhibit parallel cord marking (more common from 400–200 B.C.), rigid-warp fabric impressing, and perpendicular cord marking (more common from A.D. 200–400). Hanover I (A.D 400–800) is characterized by sand/grog temper (more sand than grog) with cord-marked, check-

stamped, or fabric-impressed surfaces. Hanover II (A.D. 800–1500) is grog/sand tempered (more grog than sand) and primarily fabric-impressed.

Distributional maps indicate that pottery series and types occurred over vast geographic regions, almost certainly encompassing many disparate ethnic and linguistic groups. Archaeologically observable geographic boundaries of ceramic technological styles reflect the limits of transcultural communities of practice in which the social contexts of reproduction played a central role in shaping the patterns observed archaeologically.

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This dissertation is dedicated to the memory of two UNC graduate school collegues and good friends, Tim Mooney and Tom Hargrove, whose lives were tragically ended as they pursued their own dissertation research. I would like to think that a little of the passion that these guys felt for their own work rubbed off in the long hours of conversation about archaeological issues that we shared on so many happy occasions. I would also like to dedicate this dissertation to my wife Trish, my daughter Anne, and my son Sam, whose love and support are the joy of my life — may it always be so.

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CHAPTER 1
INTRODUCTION

Differences among Native American cultures that inhabited the Coastal Plain of North Carolina during the Woodland era are known to archaeologists principally by variations in their pottery. Yet despite decades of study, much remains to be learned of pottery making practices, how they changed over time and varied across regions. The task at hand is an exploration of the prehistoric potter's art and how it reflects the communities in which potters practiced. It is assumed that the technology in question, pottery making, was gender specific and that the time-space variation of its archaeological reflection represents that one gender, within the society at large. Given that the structural properties of Woodland societies entailed gender roles that prescribed the rules of co-residency and marriage, it follows that the gender-specific technology is a reasonable measure of the social structure and social boundaries. Ethnoarchaelogical case studies provide one means of assessing the mechanics of how social structure and gender roles may have affected the transmission of pottery making techniques, and therefore pottery traits, and how socio-cultural boundaries are reflected in the distribution of ceramic traditions. Replication experiments also provide a means of understanding the practical techniques that lie behind the pottery traits. Both of these methods are used to interpret the archaeological record described in this monograph.

Pottery types, composed of specific sets of attributes, have long been defined for various periods and areas of the coast, but their relationships and meaning have yet to be closely examined. In exploring these relationships, I examine the manner in which pottery characteristics cross-cut formal types, test the proposition that communities of practice existed at several scales, and question the notion of ceramic types as ethnic markers. Before such issues can reasonably be explored, however, much background research is needed to document the temporal sequence and spatial distribution of ceramic variation. At the outset of this project, typological classes and sequences in some regions were sketchy and the number of dates associated with ceramic types scarce. In areas where the picture appeared particularly murky, an attempt has been made to sharpen the focus through a program of detailed analysis and description, together with the addition of absolute dates for key types. The results of these efforts are described in Chapter 3, which presents a unified typology, and Chapter 4 which describes the results of chronological research. With some improvement of typological and chronological control, a revised ceramic sequence for eastern North Carolina is presented in Chapter 5. The geographic patterning of types is then explored through GIS mapping in Chapter 6. Chapter 7 investigates the behavioral basis for pottery-making traditions in temporal and spatial context and probes the social causes for the patterns.

The geographic focus of this study includes the entire Coastal Plain of North Carolina from the Atlantic Ocean on the east to the Piedmont on the west, from South Carolina line on the south to the Virginia line at the north. Three environmental zones are discussed in this study: (1) the Embayed Section of the coast, encompassing the broad estuaries and tidal rivers that lie behind the Outer Banks from the Neuse River north; (2) the Sea Island Section of the coast, encompassing the narrow sounds and tidal rivers lying behind the barrier islands south of the Neuse, and (3) the Sandhills, consisting of the oldest, most elevated, westernmost portion of the Coastal Plain occurring in a few counties in the south central part of the state (Figure 1.1).

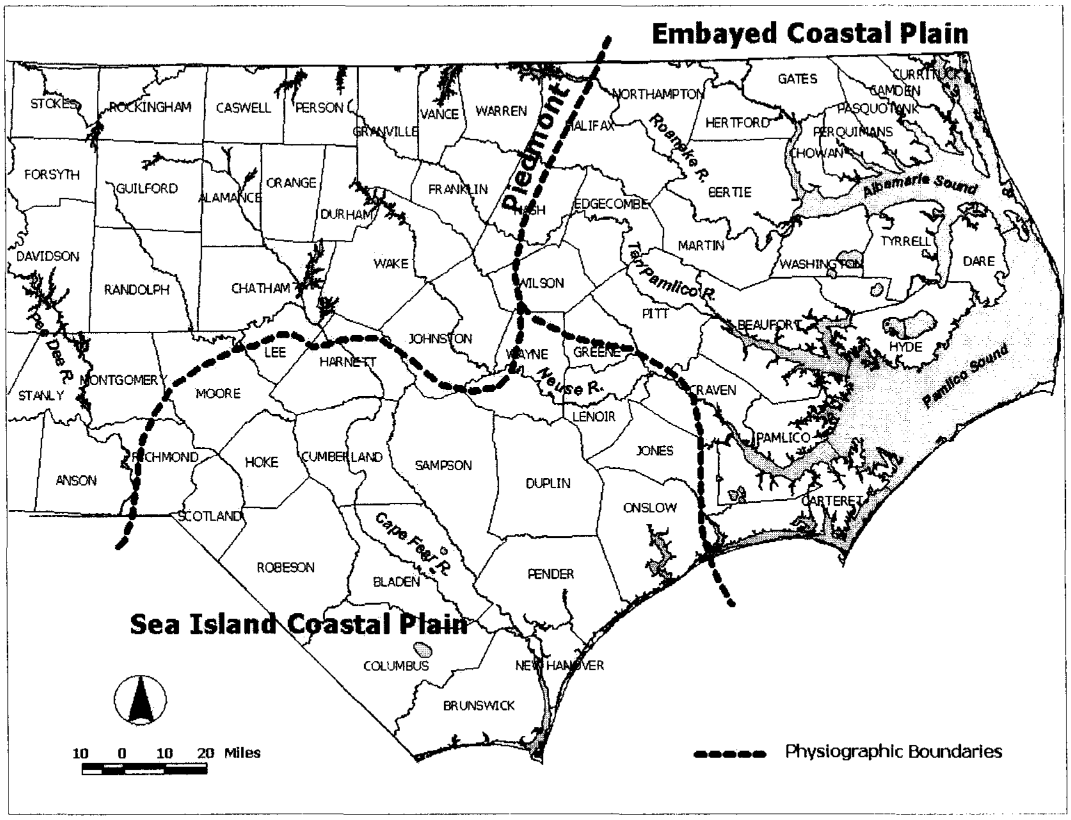

Figure 1.1. Map of eastern North Carolina indicating physiographic provinces.

The temporal focus encompasses the time from the inception of pottery making in the Late Archaic period until the time of European contact (2200 B.C.–A.D. 1600[1]). The adequacy of coverage, however, is dependent on the site assemblages composing the data set and it cannot be assumed that all periods are equally well represented. Despite unavoidable spatial and temporal gaps, broad temporal and geographic focuses are adopted for two very important reasons. First, lacking adequate chronological control, ceramic sequences in some regions were quite vague and it was impossible, therefore, to restrict the study at the outset to a limited portion of the Woodland era, based on pottery attributes alone. Second, a broad geographic scope was adopted in order to gain a better understanding of potential social boundaries that existed in the periods *prior* to the time when European observers recorded the whereabouts of culturally and linguistically related groups. As an essentially exploratory study of regions of ceramic similarity, it was felt that a broad geographic focus was appropriate to capture the potential variability that may have existed in cultural behaviors of social groups living on the coast at different times. For example, whereas in Late Woodland, Mississippian, or post Contact periods, when more sedentary agricultural societies responding to population pressure and inter-tribal aggression may have occupied more restricted regional territories, similar territorialism cannot be assumed for earlier times when groups were more mobile, population levels lower, and agricultural practices still nascent or nonexistent. It is expected that significant differences in environmental conditions, subsistence technology, population density, residential mobility, and social systems, considered over such a broad temporal period, would result in significant variation in pottery-making practices. Whatever the source of cultural variation, under circumstances where significant variation is expected, a broad geographic focus is appropriate for monitoring changes in technological style.

Culture History Overview

In this study the Woodland era is divided into Early (2200–400 B.C.), Middle (400 B.C.–A.D. 800), and Late (A.D. 800–1600) periods. In theory, such boundaries are designed to coincide with fundamental shifts in technology and major differences in social and economic traditions. In practice, however, the data with which to measure shifting socio-economic conditions

[1] The date A.D. 1600 is used as a general rather than precise marker of the historic era.

is often uneven, or totally lacking. In such cases, boundaries are based on differences in a limited suite of material-culture traditions, often pottery, and are imposed as a means of establishing chronological order and identifying spatial relationships. In many parts of Eastern North Carolina, where obtaining even basic subsistence data is difficult, especially for Early and Middle Woodland cultural components, model building must rely on inference.

Early Woodland Period

The Early Woodland period in eastern North Carolina begins about 2200 B.C. The period is distinguished from the preceding Late Archaic principally by the emergence of ceramic technology. Studies on the lower Savannah River and Coastal Plain of South Carolina have shown that the earliest pottery made in the Atlantic coastal region (fiber-tempered Stallings) has been found in contexts dated at least as early as 2500 B.C. (Sassaman 1993:102–110, Figure 11, Appendix). As the earliest Stallings pottery is contemporary with contexts bearing Late Archaic period Savannah River phase materials, many researchers now assign the early portion of the Stallings phase to the Late Archaic period. Regardless of cultural affiliation, along the Atlantic Coast the period from 2500–500 B.C. encompasses the emergence of ceramic technology within an Archaic period economic system. In the Savannah River valley, perforated soapstone disks or slabs, presumably used in basket or bladder cooking, appeared about 3000 B.C. (Sassaman 1993:185). Soapstone-slab technology was followed by the innovation of ceramic vessel technology. Sassaman (1993) contends that the earliest fiber-tempered vessels in the Savannah region were used as containers for boiling-stone cookery, not placed directly on cooking fires and that in some areas soapstone bowl technology continued to be used long after the advent of pottery making.

This may also be true of early pottery from North Carolina, such as the Croaker Landing series (Byrd 1999; Egloff et al. 1988; Pullins et al.1996). Although these earliest pottery series such as Stallings and Croaker Landing are found several hundred miles apart, they appear to reflect very similar technological styles. Vessels were typically thick-walled, slab-built, flat-bottomed containers that were inherently porous, rather soft due to low firing temperature, and probably cumbersome — in many ways, not a large advance over soapstone bowls. In just a few centuries, however, this technological style seems to have given way to broad-scale experimentation. On the southern and central coasts, there is slight evidence that fiber temper (Spanish moss or otherwise) continued to be added to sand-tempered clay, but quartz in a variety of sizes and densities became the standard tempering agent. The slab-built, flat-bottomed method of construction gave way to a coil-built, paddle-and-anvil system that produced thin-walled, conical-based pots that were fired at higher temperatures and thus, served well as cooking pots used directly on the fire.

This second generation of Early Woodland vessels along the North Carolina coast were tempered with a variety of substances including fiber and sand, soapstone, and granules. In the Sandhills, crushed metamorphic stone such as saprolitic granite were sometimes used as tempering agents. Ingredients that reflect Piedmont sources suggest the perpetuation of the Late Archaic procurement networks by which soapstone slabs and bowls, along with rhyolite for projectile points and tools, were acquired (Culpepper et al. 1999; Sassaman 1993; Waselkov 1982).

Middle Woodland Period

The Middle Woodland period (beginning ca. 400 B.C.) is recognized primarily by a shift in ceramic technology. Middle Woodland potters raised the coil-building method to an art. The most common vessels were small, conical-based cooking pots whose walls were thinned by paddling and whose exterior surfaces were stamped with net, cordage or fabric. By 400 B.C., ceramic vessels were an integral part of the tool kit of the working social group and were commonly transported by even the smallest parties. About this same time, stemless, triangular points (Badin and Yadkin and possibly, Swansboro) emerge from the Late Archaic tradition of square-stemmed dart points (Savannah River and Gypsy types).

Overviews typically contrast the Middle Woodland period to the antecedent Early Woodland by positing increased sedentism, a shift to more logistical collecting, intensification of horticultural activities, growing social regionalism, expansion of commodity exchange and the emergence of social stratification. In truth, very few of these expected developments are observable in the Middle Woodland archaeological record from eastern North Carolina. Current archaeological data suggest that the Middle Woodland period in much of the Coastal Plain of North Carolina can be characterized as a time of dispersed settlement and relatively high rate of residential mobility by groups the size of extended families using resources in very much the same manner as their Early Woodland and Archaic forebears. An increased incidence of Middle Woodland sites (as indicated by a higher frequency of Middle Woodland ceramic components) suggests a little more than a population increase over the preceding Early Woodland period. Sites along the coast suggest the possibility of intensified use of marine resources, especially shellfish, but few large shell middens accreted during this time. (Potential sampling bias resulting from sea-level that may have risen as much as two meters over this period has not been thoroughly assessed.) Small sites, located along marsh edges in the Tidewater, upper Coastal Plain and Sandhills, appear to be more common during this period (Anderson et al. 1982; Culpepper et al. 1999; Klein et al. 1994; Trinkley 1989). Site structure at interior marsh-edge locations suggests seasonal or short-term campsites with activities focused on bottomland resources. Trinkley (1989:78) notes "settlement fragmentation" or "splintering" beginning at the end of the Thom's Creek phase (during Deptford II) corresponding to a 2-m rise in sea level between 1200 and 950 B.C. In contrast, on the northern coast, Phelps (1983:33) notes "a noticeable decrease in the number of small sites along the smaller tributary streams in the interior and an increase in sites along the major trunk streams and estuaries and on the coast" during the Middle Woodland Mount Pleasant phase.

Middle Woodland sites have more archaeological visibility than Early Woodland sites in the Sandhills and on the southern coast, due in part to generally increased population size and dispersion, high residential mobility by relatively small groups and, perhaps, as the result of more routine use of ceramic cooking vessels. There were several changes in ceramic technology that occurred at this time. Fiber tempering was superseded by sand tempering on the South Carolina coast. Limestone tempering appears in the Hamp's Landing series on the southern coast of North Carolina and in the Wando series of northern South Carolina. The size grade of sand used to temper New River series (Deep Creek) ware appears to shift from coarse to medium (Phelps 1983), and Mount Pleasant series ware has been described as exhibiting an increase in the proportion of granule and pebble-sized particles in the northern coastal region during the Middle Woodland (Phelps 1983, cf. results from the Bandon midden in Chapter 4). Middle Woodland vessel shapes include larger jars with conical bases and straight walls, a transformation that emphasizes the intensified use of ceramic containers as cooking vessels. The carved-paddle stamping technique that emerged in the Refuge and Deptford phases in South Carolina and in the Hamp's Landing, New River series in North Carolina, expanded to include wrapped-paddle cord-marking, fabric and net-impressing in the three North Carolina series. Trends in surface-treatment types during the Middle Woodland period have not been thoroughly studied, but it is significant from a typological standpoint that very few of the Middle Woodland sand-tempered specimens from the Coastal Plain have been found to exhibit simple stamping. This stands in distinct contrast to the Early Woodland Deep Creek and Hamp's Landing series. Simple stamping occurs in both the Cape Fear and Hanover series in coastal South Carolina

(Anderson et al. 1982; Cable et al. 1998), but not in North Carolina where it is found to reappear only in the Late Woodland period Colington and Cashie series (Phelps 1981b, 1983).

An often-cited feature of the Middle Woodland period on the southern coast is the presence of approximately 18 burial mounds (Irwin et al. 1999; Keel 1970; MacCord 1966; Phelps 1983, Figure 1.4; South 1966; Wetmore 1979). Most of these were first recorded late in the nineteenth century and many have been destroyed. The McLean Mound is the most intensively examined and records or recollections remain for at least 17 others (Irwin et al. 1999; MacCord 1966; Phelps 1983). Culpepper et al. (1999) suggest that these mounds "seem to reflect ritualized land use and the gathering of locally dispersed, but socially allied groups for sacred activities." Mortuary behavior consisting of secondary bundle-burials suggests a dispersed population transporting their dead to these ritual sites. Grave goods, including engraved stone pipes, shell gorgets, shell beads, copper and mica, point toward interregional exchange for items possibly symbolizing personal prestige. A recent reanalysis of these mounds, particularly materials from McLean Mound, proposes that although their origins may have been in the Middle Woodland period, they also exhibit Late Woodland characteristics (Irwin et al. 1999). Two radiocarbon dates from McLean Mound, 1250 ± 40 B.P. (cal A.D. 675–880 [p=.05]), (Beta-413709) and 980 ± 110 B.P. (cal A.D. 821–1282 [p=.05]), support this interpretation.

Late Woodland Period

The Late Woodland period (post A.D. 800) is noted for a number of socio-cultural and technological changes such as the emergence of agriculture, increased social complexity as reflected in mortuary behavior and site architecture, increased commodity exchange, and intensification of cultural regionalism. This regionalism, also expressed in pottery, is perhaps best represented by the shell-tempered pottery (White Oak and Colington series) of the central and northern coasts. Clearly bounded in geographic distribution, the makers of White Oak and Colington pottery faithfully constructed shell-tempered vessels with fabric-impressed or simple-stamped surfaces, often fired in a reduced atmosphere. Their southern neighbors made very similar shell-tempered ware, with some interesting differences. White Oak does not appear to include a simple-stamped type but does have a burnished type only rarely seen in Colington. Small triangular arrow points (Uwharrie, Clarksville and Caraway types), marine-shell beads (primarily in burials from the latest period), and tobacco pipes are indices for these cultures.

During the first centuries of the Late Woodland period, economic, organizational, and ideological structures in eastern Carolina are marked by increasing sedentism, tribalization, territoriality, and ceremonialism. The hallmark of the Mississippian economy—corn agriculture—was not well established in the Piedmont until by about A.D. 1200 (Ward 1983:73). Sedentary villages, evidenced by site size, architectural and storage facilities, and the remains of cultivars such as squash, beans and corn, are particularly evident on the coast and in the Tidewater region where abundant marine resources helped to sustain village life. Current evidence suggests significant differences in residential settlement strategies in the various areas of eastern Carolina. In the Sea Island and Sandhills sections of the Coastal Plain sites are small and broadly scattered, suggesting relatively high mobility and dispersed settlement (Culpepper et al. 2000). In the Piedmont and the Embayed Section of the coast larger village sites located along the sounds, estuaries, major rivers and their tributaries suggest more sedentism and regionalization (Phelps 1983:39). While sites on estuaries often provide evidence for subsistence activities which focused on seasonally abundant maritime resources such as anadromous fish or shellfish, most sites seem to be located where agriculture, hunting, gathering, and fishing could all be accomplished within the same area (Phelps 1983:40). Three culture areas have been proposed for coastal North Carolina that conform to ethnohistorically recorded linguistic regions: Algonkian speakers on the northern coast and tidewater; Iroquoian speakers occupying the northern interior Coastal Plain; and Siouan speakers in the Piedmont and southern Coastal Plain. Archaeologically, these culture areas are recognized by regional differences in ceramics and notable differences in burial customs and architectural forms (Loftfield 1990; Loftfield and Jones 1995).

Phelps (1983:39) proposes that the southern extent of the Algonkian culture, and the corresponding distribution of Colington ceramics, was just south of the Neuse River (cf. Loftfield 1976). Loftfield and Jones (1995) have suggested that the distribution of Colington phase cultures during prehistoric times may have extended as far south as Onslow County. These authors cite evidence including not only shell-tempered ceramics, but also mortuary and architectural features, e.g., ossuary burials and longhouses typical of Algonkian culture found to the north. Ceramic data from the current study suggest that the southernmost extent of the Algonkian societies was northern Pender County where some degree of interaction among Algonkian- and Iroquoian-speaking groups may have occurred.

Project Overview

The proximate objectives of this study are to refine the regional ceramic taxonomy, to improve the sequencing of types, and to assess the geographic distribution of types with the ultimate aim of understanding the social causes of the observed patterns. Therefore, in as much as these goals are met, this research is designed to enhance our understanding of the prehistoric pottery-making traditions of the southern Coastal Plain of North Carolina by developing data of three sorts: taxonomic, chronological and geographic. It is hoped that it will also broaden our comprehension of the social conditions that lay behind the observed archaeological patterns.

Ceramic analysis is a powerful tool for understanding Woodland period cultural traditions, but particular conditions on North Carolina's southern coast offer serious challenges. Over the past 50 years, several typologies have been independently designed for pottery collections from coastal North Carolina (Crawford 1966; Haag 1958; Loftfield 1976; Phelps 1983; South 1976). Most of these studies began with surface collections from sites in a specific area and generated taxonomic sequences independent of those designed for the pottery of adjacent areas. Consequently, a modern ceramics researcher studying a collection in one region may be faced with choosing from several overlapping taxonomies composed of broadly defined pottery classes with which very few absolute dates are associated. These circumstances impose difficulties for archaeological research in the region as it appears that in several instances independently defined types refer to a single class of pottery (Herbert and Mathis 1997). Certain taxonomic systems (e.g., Crawford 1966) have fallen out of use due to historical circumstance. Other typological sequenences (e.g., South 1960) have persisted for decades despite the meagerness of absolute dates confirming estimates of the chronological provenience of types. One of the tasks of the present study, then, is to present a unified, rigorous descriptive typology based on attributes independent of dates. Selecting a type name that appear to describe a single class of pottery from among those previously published involves the consideration of a number of things including historical precedence, the adequacy of existing descriptions, and the current level of use of the system among professionals. While I have not chosen to burden the reader with a full description of the complexities of such decisions in every case, I hope that the logic of the process, and certainly the result, will be apparent.

The evaluation of several co-existing taxonomic schemes is made possible by the adoption of a broad temporal and spatial focus and an analytical approach based on attributes. Developing chronological data has also been critical. At the time this study was undertaken there were only 14 chronometric dates for pottery from Coastal Plain counties of North Carolina south of the Neuse River (an area comprising some 10,000 mi^2, or 1/5 of the area of the state). Chronology building for the southern coast has been advanced through this research by obtaining 43 thermoluminescence (TL) dates for pottery sites in the Cape Fear Basin. Such chronology building is essential for understanding the development of the pottery-making traditions of the southern coast and much remains to be done in this region. The taxonomic and chronological data generated by pottery analysis and dating is used in a GIS analysis designed to reveal geographic distributions of taxonomic classes and attribute categories. Each of the phases of research (analysis, dating, and GIS procedures) are described in more detail in the methods section which appears later in this chapter.

The analysis of pottery was conducted in two stages and is presented accordingly. The first stage considers specimens recovered from stratified contexts, single components such as burial-mound assemblages, or individual sherd samples that were TL dated, and is presented in Chapter 2. In this stage, emphasis is placed on defining classes based on attribute variation and on exploring temporal relationships. The second stage of the analysis focuses on surface-collected samples using classes defined in the first stage, and any classes that are subsequently required. The purpose of this second level of analysis, presented in Chapter 4, is to discover and delineate broad geographic regions with shared traits that may denote social areas and boundaries. Before presenting the results of these analyses, however, an overview of the current understanding of culture history in eastern North Carolina is presented in Chapter 2.

Methodological Considerations

The goals of this research as introduced above are: (1) to consider attribute variation; (2) to refine taxonomy; (3) to improve chronological sequencing, and; (4) to determine the geographic distribution of prehistoric pottery-making practices within the region. With this information in hand, the more ambitious goal of exploring the behavioral and social causes of the spatial and temporal pattern of pottery making on the North Carolina coast is undertaken. Each of these analytical steps entails certain practical conditions and theoretical possibilities. In the section that follows, I consider some of these issues.

Pottery Taxonomy and Defining Types

Ceramic research on the Carolina Coast is constrained in some ways by the historically predominant use of the typological approach. Although most researchers who have coined pottery types have been careful to publish detailed descriptions, a few types, long in use, still lack thorough, published definitions. Even having a full and detailed description of every type, however, the normative principal of a typological approach limits our ability to observe technological differences that cross-cut types. Once types are defined, sherds may be classified to one or the other type, with technical reports often consisting of the enumeration of sherds of each type from each context. The problem presented by this approach is that it focuses analytical attention on taxonomic classes to the exclusion of attributes that may vary in space and time independent of those classes. Types, defined as mutually exclusive sets of attributes, are meant to denote distinct traditions of pottery making that were practiced in specific temporal periods and geographic areas. Variation among attributes *within* each type tends to be de-emphasized in order to avoid the problem which arises when the logical requirements of defining mutually exclusive types are not met. Despite the best intentions, once types are defined they tend to become concretized, growing in metaphysical stature to achieve the status of a unified ceramic tradition assumed to represent a homogeneous cultural style. Variation in the frequency of type specimens within and between regions and periods comes to be understood as reflecting the distance between geographically and temporally distinct cultural traditions and by implication, ethnic groups — obviously, a leap of faith. Variation through time is viewed in terms of shifting proportions of types, often attributed to the progressive transformation of historical traditions through one of Kroeber's (1939) three sources: innovation, diffusion, or migration.

The potential deficiency of relying exclusively on a typological approach for exploring ceramic boundaries is that important variation may be overlooked. The definition of a pottery type, comprises a temporally variable cluster of attributes (temper, surface treatment, decoration, vessel form). Each sort of attribute reflects a different step in the chain of operations performed in making pottery, and each may vary independently with respect to time and space. The imperative for all samples to be sorted into mutually exclusive classes may draw attention away from variation existing *within* classes that may be important for identifying boundaries or relationships at different scales and for explaining or accounting for the mechanisms that may have caused the observed variation. The objective, then, is to form classes composed of attributes exhibiting significant temporal and spatial variation, while reporting data at the attribute level.

If a recurring attribute pattern is found to be chronologically or spatially circumscribed, there is little reason to doubt that a typological classification describing this pattern represents past technological traditions that have cultural bases. The identification of the temporal and spatial dimensions of such traditions is, in fact, one of the objectives of this study. The utility of characterizing assemblages or collections in terms of such types is obvious — it simplifies the denotation of attribute combinations so that their temporal and spatial variation may be more easily observed, and it provides a means of exploring the way material culture was patterned by those who used it. This research, therefore, employs both an attribute analysis designed to improve our understanding of the variation in specific technological practices independent of types, and a typological approach to reduce the complexity of pottery-making practices into more easily observed units that are hypothesized to correspond to identifiable patterns of cultural behavior and social structure. Ultimately, the goal is to identify these behaviors and structures.

Following from the approach outlined above, two points may be made that fundamentally affect how we view the classes proposed here. First, following functionalist theory, pots as tools represent an expression of human adaptation. The process of building pots in the period of prehistory with which we are concerned is assumed to have always been conducted at the household level by women whose behaviors were influenced by specific environmental and social parameters. These parameters are, in fact, our principal anthropological interest, aside from the aesthetic appreciation of the potter's craftsmanship and artistry. We can assume then that the decisions about what sort of vessel to make, and the manners in which that vessel would or could be made, were at all times dependent on a number of factors such as the nature of the clay available for use, the availability of preferred tempering materials, and weather conditions at the time of building and firing. The nature of the task the pot was intended to accomplish, its functional intention, was paramount in the decision-making process. The list of social factors that might influence these decisions would seem to be endless. The learning process itself might vary according to the nature of the social groups and communities of practice in which that learning was situated, but we must also consider the variability of the content of the information learned.

Knowing what we do of the lifestyle of the prehistoric native peoples who inhabited coastal North Carolina, it is safe to say that throughout the Woodland era they subsisted largely in a foraging economy with greater or lesser dependency on marine resources depending on a number of factors, not the least of which was the habitat in the location in which they were living. With the possible exception of the very Late Woodland (post A.D. 1200) Algonkian villages on the northern coast (and possibly the Tuscarora villages from the same, or somewhat later, period), the archaeological evidence suggests that residential mobility was always relatively high; the hallmarks of Mississippian culture (a settled-village agricultural economy and hierarchical political organization) never appear to have gained a foothold in the southern and interior regions of the coast. The implications of this are that the potential for a potter to encounter different environmental resources and conditions, in different social settings for information exchange, would stand to be compounded by frequent residential moves.

The second point that affects how we view the classification of pottery follows from the first. Given the contingencies potentially influencing a potter's decision-making processes, a few of which are briefly sketched above, it follows that the template of procedures to which a potter adhered in making vessels throughout his or her lifetime should not be characterized as a static, or rigidly formulaic process. Not only would this sort of approach to pot-making simply not work in the continuously varying environment encountered by mobile hunter-gatherers, the notion of a static process discounts the learning process. Presumably potters at all times recognize causal relationships between their materials, methods of construction, and vessel performance. The inescapable implication of this is that pot-making procedures of an individual potter changed through their lifetime.

So what does this have to do with the way that we conceptualize the classification of potsherds? In one sense, it means that our classes (series, types and varieties) are ultimately arbitrary circumscriptions of sets of characteristics chosen from a finite, but broad set of possible alternatives. We construct these sets of characteristics through an inductive process that is dependent on the methods, tools, and creative energy that we bring to the examination of the artifacts, as well as the nature of the artifacts themselves (e.g., the sample size, state of preservation, contextual provenience, etc.). The categories of the classification system are therefore not conceptualized as necessarily embodying modern-day approximations of well-established, well-adapted, successful, consistent, distinctive, unified traditions of pot making that existed in the past and that underlie the similarities we see in the artifacts (cf. Espenshade 1996). To view them as such, presents a model characterized by well-bounded units composed of an internally invariant suite of traits (e.g., temper, surface treatment, decoration, vessel form, rim and lip form) that supercede one another in time, like a stack of boxes, and meet each other in space like bubbles in a foam. We know from ethnographic studies, however, that group membership in hunter-gatherer societies could be quite fluid (for very good reasons). Flexibility in forming alliances through such means as fictive-kin relationships allows a measure of risk avoidance that also assures a permeable membership structure. On a larger scale, alliances between groups are equally flexible, responding to constantly shifting environmental conditions, political power negotiations, and inter-ethnic conflict. If we cannot expect the social groups on the ground to behave as well-bounded, internally consistent units, how then can we expect their material culture to reflect such homogeneity?

Shepard's (1956:315) views on the notion of the pottery type are perennially worthy of repeating, "the condition of the average pottery sample and particularly the incompleteness of stylistic data make of the pottery type a tentative, hypothetical class to be re-examined, corrected, and amplified from time to time as evidence accumulates: a class that may be split or combined with another, re-defined, or discarded. It is a category in the process of formulation instead of a fixed standard of reference."

The typology used in this study is, perhaps, best seen as an exploratory vehicle. The classes themselves are hypothetical constructions which, although they have been defined in close accordance with formal types described in previous studies, are considered to be propositions to be tested against the set of chronological and spatial data taken as evidence of their utility. Since the nature of the pottery sample has many limitations, as do the chronological and spatial data with which they are evaluated, the conclusions of this study regarding the typology should be viewed as equally eligible for re-assessment, modification and rejection.

Having qualified the typological method as exploratory and essentially temporary (always open to question, testing and revision), it might then be asked, what is it that is to be identified by the temporal and spatial delimitation of sets of ceramic attributes? This can be answered at two levels that must be simultaneously borne in mind. First, the various pottery traits that compose the definition of a series or a type must be viewed as independently varying in time and space. A change in one pottery making behavior (e.g., stamping the surface, shaping the rim, or finishing the lip) does not necessarily require changes in the others. Therefore, explaining the nature of a change in the expression of pottery series in a single location, for example the shift from Cape Fear Fabric Impressed *variety St. Stephens* to Santee Simple Stamped *variety Santee* that appears to have occurred at about A.D. 800 at the Mattassee Lakes sites in South Carolina, will require reducing those series to their component parts (corresponding to the traits chosen to define them). The conditions that might prompt a potter to add to or modify vessel shapes (e.g., from straight rims with stamped-flattened lips to flaring, everted rims with rounded lips) in their repertoire could be very different than the conditions that might influence their decisions about changing surface-treatment styles. Do the inducements for each of these changes arise from the same source? Not necessarily. So, that which is being identified by delimiting trait occurrences at various times and places are independent components of pottery making behavior.

The second way of thinking about patterns that are identified by recurrent sets of pottery traits through a period and in a region is to consider the suite of traits as a package. This is the more common approach that has been taken in ceramic typology in the Southeast. Returning to our example, Santee Simple Stamped *variety Santee* is tempered with medium quartz sand with occasional coarse and very coarse quartz particles, simple stamped by a tool that created narrow, shallow, v-shaped grooves, applied by over-stamping in oblique or perpendicular orientation, with rims that are either straight or excurvate, lips that are either rounded or flattened by stamping and interiors that are poorly smoothed (Anderson et al. 1982:303–309). Pots fitting this description were more or less faithfully reproduced by 17 generations of potters (based on a 40-year generational interval) living on the Santee River about 50 miles from the South Carolina coast (and possibly covering an area extending to the coast (if the McClellanville Simple Stamped type is subsumed, as suggested by Anderson and others, into the Santee series) during the period from about A.D. 800 to 1500. To say that this sort of vessel was reproduced by 17 generations of potters suggests a degree of fidelity in the replication of pottery making behavior that is truly remarkable from our modern perspective. There are several implications. First, since clay is such a wonderfully flexible medium, there must have been some very good reasons for not changing any aspect of the design and (or) remarkably effective social institutions specifying consistent replication. The co-existence of different pottery series in adjacent areas at that time attests to the fact that very effective vessels were made with a different suite of traits (for example the shell-tempered, Colington Simple Stamped type of the northern North Carolina coast that dates to the same period and covers an area of approximately the same size). This would seem to argue against a technological or functional requirement that encouraged careful replication. The fact that the Santee simple-stamping tradition is seen to emerge out of Cape Fear Fabric Impressed *variety St. Stephens*, (that differs in rim and lip form, and surface treatment) appears to contradict the notion of strong social strictures prohibiting innovation. The most compelling explanation seems to be that the Santee potters replicated the styles of pottery making by participating in a community defined, in part, by those practices; doing so identified them as participants.

Dating and Sequencing Pottery Types

Improving the chronological sequence of ceramic traditions on the southern coast is the second major objective of this research. Ceramic chronology building typically begins by sequencing types based on relative dating techniques. Radiocarbon chronometrics are then used to refine age ranges in more absolute terms. Unfortunately, contextual factors related to the sandy Coastal Plain soil often limits opportunities for obtaining relative dating information or radiocarbon dates. Generally speaking, the soils of North Carolina's southern Coastal Plain are composed of unconsolidated sand, highly permeable and strongly acidic. In the few instances where burials have been recognized by excavators—primarily in sand mounds—skeletal remains are typically so thoroughly decomposed that only a few fragmentary elements survive removal (Coe et al. 1982; Holmes 1916; Keel 1970; MacCauley 1966; MacCord 1966; Peabody 1910; South 1966; Wetmore 1978). Excessive leaching also promotes decomposition of carbonized plant remains and other organic materials. As a result, the soil staining associated with pits, hearths, postmolds, burials and other features, is typically not observable by excavators working in the southern Coastal Plain and Sandhills provinces (Abbott 1993; Abbott et al. 1999; Cable et al. 1996; Gunn and Wilson 1993; O'Steen 1994). One exception to this is the soils underlying shell middens where calcium salts neutralize pH levels.

In addition to excessive permeability and acidity, unconsolidated sand is unusually susceptible to bioturbation. It has recently been suggested that bioturbation is the principal geomorphic process responsible for artifact burial and site formation on upland or interfluvial landforms over much of the Coastal Plain (Leigh 1998a, 1998b; Michie 1990). Under such conditions, the boundaries between stratigraphic zones are typically diffuse. Artifacts ranging from the Early Archaic to the Late Woodland periods are typically found within a homogeneous E-horizon (a leached transitional zone) undifferentiated by observable stratigraphy. The sequential deposition of artifacts does insure some vertical sorting, but mixing is common (Benson 2000). Features are generally defined based on artifact clustering, not soil staining. Where carbonized plant remains are found together with diagnostic artifacts, their association is often open to question. This is especially true when charcoal for dating is recovered from the flotation of soil samples gathered around artifact clusters, as seen at the Riegelwood site (Sanborn and Abbott 1999; Abbott et al. 1999).

Because of poor preservation of charcoal for ^{14}C dating and mixed stratigraphic profiles, current pottery typologies are composed of broad taxonomic classes representing culture periods of long temporal duration defined by few convincingly associated absolute dates. This is especially true of the Woodland period prior to A.D. 1000. Directly dating pottery specimens using the TL method, the only means of obtaining direct absolute dates for sherds of each type, may represent the best strategy for addressing these circumstances. Sequencing therefore entailed two procedures: analyzing the relative stratigraphic position of sherds from excavated or dated context, and absolute dating with thermoluminescence.

Three small exploratory excavations conducted by W. G. Haag in 1955 provide the stratified site samples reanalyzed for this study. While these excavated samples are relatively small, they provide information about the sequence. Two of the excavations were conducted at sites strategically located in the areas where Haag's surface-collected site samples were concentrated. The Cape Creek site (312Dr1) is located near Hatteras on the Outer Banks where surface collections were made at several sites in the area. This is also true of the Whalen site (31Bf26) on the Pamlico River near Bath. The Bandon site (31Co1), on the Chowan River, was a deep shell midden with a well stratified ceramic assemblage. Although few surface collections were made by Haag in the Chowan basin, the Bandon materials nevertheless provide an interesting glimpse of ceramic trends in the upper Albemarle Sound region. All three sites were useful in determining the relative sequence of pottery making traditions.

An equally important sequencing tool used in this study is thermoluminescence (TL) dating. The most important advantage of using TL for dating pottery is that it does not rely on associated organic material, but dates the artifact itself (Aitken 1990:3; Feathers 1993:5; Godfrey-Smith et al. 1997:253). This is a critical factor in the southern Coastal Plain of North Carolina where extremely acidic and highly permeable soils rapidly decompose datable organic remains associated with archaeological deposits. In a pilot study designed for this purpose, TL proved to be an effective method for dating sand- or grog-tempered pottery from the southern coastal area of North Carolina, where little opportunity exists for dating by the radiocarbon method (Herbert 1997, 1998). Encouraged by the results of the pilot study, an additional 20 TL dates for pottery from Fort Bragg, from the upper Cape Fear River basin, and 18 TL dates from the lower Cape Fear River basin were submitted for this study. The methods used in TL dating are described in Chapter 3, and the results of this TL-dating project are presented in Chapter 4.

Pottery as a Marker of Social Groups and Boundaries

Determining geographic distributions of different pottery making styles, at various times over 3,600 years of the Woodland period, comprises the third major objective of this study. Previous studies have focused on the relationship of certain pottery types and ethnohistorically documented Native American groups occupying specific geographic areas of the coast (Loftfield 1976; Phelps 1983; South 1976). Ethnographic studies, however, provide little evidence that regional pottery-making traditions follow linguistic boundaries. Instead, pottery-making methods that can be recognized as regional styles respond to a very complex suite of environmental, demographic, social, economic, and political conditions that can affect decision making and technical choice. The proximate goal of this study is to identify discrete pottery-making areas. Once the pottery taxonomy is refined through detailed attribute analyses, and the classes sequenced with absolute dates, mapping the distribution of classes or attributes identifies ceramic regions. Certainly, these distributions prompt numerous hypotheses regarding the causes of the patterns that emerge.

The research described thus far may be thought of as necessary steps for developing a foundation of information for exploring the spatial and temporal patterning of pottery attributes as they may reflect prehistoric social communities of practice and their boundaries. The position taken in this study concerning the exploration of social boundaries through the analysis of pottery variation requires clarification. First, as many have noted, pots are tools and the variation observed in pottery may be explained in functional terms, i.e., those affecting vessel performance (e.g., Braun 1983, 1987; Dunnell and Feathers 1986; Prezzano 1985; Schiffer and Skibo 1987; Steponaitis 1983). In this sense, pottery making as human behavior may be viewed as an adaptive mechanism and, as some have argued, an extension of the human phenotype (O'Brien and Holland 1995; O'Brien et al. 1994). The critical point here is that pottery making, as an adaptive mechanism that is socially transmitted, exists within environmental and social contexts, i.e., a selective environment comprised of natural and social components. Although technological practices may affect the characteristics of vessel performance in ways that maximize risk avoidance or minimize effort, thereby increasing functional effectiveness, the same practices may also symbolize personal achievement, or express participation in, and fidelity to, a social group, thereby building bonds of interdependence. Whether one sees ceramic technological change (regardless of its actual effects on vessel performance) as the result of determined behavioral modification resulting from decisions based on an understanding of functional technological properties of the materials or simply the replication of techniques choreographed through social prescription, the bottom line is that, at the temporal and geographic scale adopted for this study, change was continuously occurring in response to fluctuating environmental and social conditions. Whether the change we observe archaeologically is evolutionary, or some other form of variation (e.g., cyclic, irregular, maturative, ontological), each pot-making event occurs within the context of ever-changing natural and social environments. This perspective has some interesting implications not only for the interpretation of the meaning of pottery variation, but also for the way we conceive of the taxonomic units used to classify pottery.

For example, although surface treatment has been shown to affect the thermal conductivity of a vessel (Schiffer et al. 1994), the range of variation observed in this study of net-impressed, cord-marked and fabric-impressed vessels, composing the majority of this study collection, is not likely to result in significantly different thermal properties. Several ethnographic and archaeological studies, however, suggest that the specific structure of perishable materials stamped or impressed on vessel surfaces may reflect social groups (Drooker 1992; Petersen and Hamilton 1984; Maslowski 1984; Minar 1999). Cordage-twist direction, for example, has been used as a tool to identify Middle Woodland culture phases on the Florida and Georgia coasts (Minar 1999). Therefore, although surface treatment may affect vessel performance, it may also provide a tool for detecting social boundaries. The Late Woodland Iroquoian and Algonquian ceramics of southern New England and eastern New York are an example of technologically distinct wares also reflecting different cultural traditions (Chilton 1996, 1998). This may also be true of Late Woodland pottery from the northern coast of North Carolina thought to be associated with Iroquoian- and Algonkian-speaking groups.

The size, shape, proportion and nature of tempering material can significantly affect vessel strength and shock resistence (Bishop et al. 1982; Braun 1982, 1983; Bronitsky 1986; Bronitsky and Hamer 1986; Feathers 1989; Neff et al. 1989; Rye 1976). These characteristics also control thermal conductivity that, in turn, can affect vessel performance in cooking or storage (Braun 1983; Bronitsky 1986; Bronitsky and Hamer 1986; Feathers 1989; Neff et al. 1989; Rye 1981; Steponaitis 1984). These same characteristics may also be considered as emblems of style, symbols of cultural affiliation, or vehicles for conveying cultural information. Choices about visual characteristics of artifacts may be intended to convey cultural meaning, personal identity, family or clan membership, village, regional, or ethnic affiliation. Sackett (1973, 1990) refers to this as iconographic style and it is well documented ethnographically (Wiessner 1983, 1985). Indeed, material culture can be understood as a fundamental mode of human communication, no less important than language (Schiffer 1999). Intentional signaling, however, need not be involved for a pot to convey stylistic information. Pottery-making behaviors themselves, usually learned early in life in an apprentice relationship and ingrained as habitual motor skills, communicate group participation. A potter may simply reproduce a style because the apprenticeship process has instilled certain pot-making techniques. Because social customs govern the apprenticeship process, similarities in pot-making styles (and hence, pots) may parallel social groups. Such an inquiry into how pots were made moves beyond the argument of style and function and focuses on the relations between practice and society to identify technological traditions (Chilton 1998:133).

The potential degree of variation among cultural factors that could account for stylistic variation in pottery, however, suggests a very complex relationship between archaeological effects and their cultural causes. We have little information about the social contexts within which pots were designed, manufactured, distributed and used on local and regional levels. Estimates of population density, post-marital residence rules, market systems and political complexity must be inferred from archaeological data for most periods and, for these social and cultural features, data are quite scarce. Even if these conditions were precisely known, ethnographic evidence suggests that there is little warrant to expect ceramic styles to co-occur with tribal or ethnic groupings rather than on social or geographic levels greater or smaller than the tribal or ethnic group (Maceachern 1998:113).

Nevertheless, the ceramic data examined in this study provides the temporal and geographic range necessary to test hypotheses concerning the existence and nature of social boundaries over much of North Carolina's Coastal Plain throughout the Woodland era. All technological styles are a product of social activities and the broad aspects of social conditions potentially influencing pottery making in the region can be inferred with reasonable confidence. The distribution of site assemblages proposed for study represent both a north-south transect along the coast, and an upper-lower Coastal Plain transect on the Cape Fear basin.

The Late Archaic and Early Woodland Stallings, Thom's Creek, and Refuge traditions, geographically focused along the lower Savannah River and South Carolina coast, are represented by distinctive technological and stylistic ceramic traditions, in their place of development (Sassaman and Rudolphi 2001). Although present, undecorated fiber-tempered pottery is scarcely represented in assemblages from the southernmost counties of North Carolina and rarely further north (South 1976; Phelps 1983). The intensity of interaction in the Late Archaic soapstone trade and degree of sedentism exhibited in the Stallings culture area were social factors contributing to the development and spread of fiber-tempered pottery (Sassaman 1993). Evidence for intensive trade networks and semi-sedentary residences is not found on the southern coast of North Carolina. Small, highly mobile Early Woodland groups continued to utilize a wide range of resources in much the same way as their Archaic forbears.

The same pattern appears to have continued though the Early and Middle Woodland periods but some evidence for social boundaries within the region is suggested by restricted spatial distributions of check-stamped (Deptford series) and crushed-rock tempered (Yadkin series) pottery. These series are relatively well represented among Sandhills assemblages, but seldom seen in assemblages from the Lower Coastal Plain. The Middle Woodland Mount Pleasant series, focused along the northern coast of North Carolina, is not generally recognized in collections from the southern part of the coast.

From one perspective, regional patterns of pottery might be expected to be more varied from periods in which population groups were small and highly mobile, as the isolation of groups would encourage innovation. Following this logic, it might be assumed that with the adoption of agriculture, when groups became more sedentary, the standardization of pottery production would respond to the reification of ethnic identity and territorial boundaries by becoming more regionally distinct. By the latter portion of the Middle Woodland and early Late Woodland periods, distinctive evidence for social aggregation on the southern coast is exhibited by the presence of numerous sand burial mounds (Irwin et al. 1999; MacCord 1966). A small portion of the pottery found in these sand mounds (viz., the sand-tempered plain ware with decorative punctations found at the McLean and Buie Mounds) is similar to the Mississippian Pee Dee series, an Irene-related plain and complicated-stamped ware recognized at the Town Creek site. But most of the pottery from the McLean Mound is grog/sand, fabric-impressed ware similar to the indigenous Middle Woodland Hanover series (Irwin et al. 1999). The exact nature of the Late Woodland pottery from the southern coast is yet to be identified as pottery dated to this period or found in stratified contexts indicative of a late position in the sequence has yet to be found. Some have suggested that a stylistic boundary between the Late Woodland pottery of the northern and southern regions may correspond to a social boundary between Algonquian and Siouan populations (Mathis 1999; Phelps 1983). A discussion of this boundary is presented in Chapter 6, but the characteristics of the pottery that might be associated with the region of Siouan speakers on the southern coast remains hypothetical at this time.

Such a boundary is proposed for in late Contact and Colonial periods between Iroquoian and Algonquian villages on the northern coast of North Carolina (Phelps 1983; Phelps and Heath 1998). In New England, a similar social distinction appears, in part, to have been influenced by European manipulation (Goodby 1994, 1998). An absence of evidence for population aggregation and social intensification on the southern coast during the Late Woodland is a potentially complicating factor. The slowly evolving pottery traditions on the southern coast do not appear to have developed stylistic forms distinct from their Middle Woodland predecessors. The results developed in the following chapters attempt to confirm and explain this pattern.

The goal of explaining social causes of empirical patterns is undisputedly challenging; the social distance between the student and object of study and the nature of the evidence pose real constraints. To say simply that many theoretical issues are raised with any attempt to discover the social causes of cultural patterns does not do justice to the vastness of the anthropological literature written on the subject, or the variety that exists in conceptual and methodological approaches championed at various points in the history of this and other disciplines. It is imperative however, to narrow the focus to a few key theoretical issues that are most relevant to the problems at hand. Aspects of evolutionary-selectionist theory, social agency, practice and learning theory, often characterized as opposing ways of explaining the source of archaeologically observed variation, are employed here as a suite of approaches each of which explores the nature of variation at a slightly different scale. Consideration is given to the use of series, types and varieties as units of measure. Functional and stylistic variation, often used by archaeologists as common-sense categories, are examined as manifestations of learning, practice and social agency that function within a given social and environmental context as prescribed by psychological filters evolved in the adaptive environment. Of central importance are the concepts of ethnicity, ethnic groups, and ethnic boundaries in modeling how cultural information is shared within and between groups, and how patterns of apparent homogeneity, continuity and stability in technological style emerge from systems that are essentially diverse, dynamic, and continuously changing.

I use the term *technology* in the following discussion in its etymological sense, derived from the Greek *techne* or "art" and *logos* or "word," thus defining technology as the study of practical arts encompassing both *knowledge and artistry* or practice (*sensu* Dobres 2000). From this perspective, *ceramic technology* does not refer exclusively to the functional characteristics of pottery, and the host of ways that materials-science studies have of measuring characteristics of ceramic vessel performance, but moreover to the whole package of knowledge and artistry arising in social context. The sherds comprising the study collections are seen as fragments of vessels, themselves the product of complex acts of performance artistry. And I refer to this package of knowledge and artistry in spatio-temporal context as *technological style*. My view of the first component of this conjunction, technology, has been briefly defined. The second component, style, requires further consideration.

When ethnographers immersed in the living languages and cultures of existent societies have approached the problem of distinguishing ethnic groups and identifying territorial boundaries, the sheer complexity of the cultural systems seem often to have overwhelmed their best efforts to render dynamic processes into static patterns (Leach 1954). The obviousness of these circumstances and other factors long ago led social anthropologists to move away from the idea that ethnic groups could be identified by a set of cultural traits (Barth 1969). Overwhelming evidence indicates that ethnic homogeneity may be maintained over a broad area despite a diversity of behavioral styles and forms of social organization (Barth 1969) and similarly, ceramic technological styles often transcend ethnic boundaries (Macheachern 1998). So, it is important to understand at the outset of this discussion that the ceramic styles, periods and areas under examination are not assumed *a priori* to represent bounded ethnic or social groups. At the same time it is obvious that the temporal and spatial patterns in material culture that are archaeologically observable, most certainly are the product of techniques and technological systems that are social and historical in nature.

In the middle of the twentieth century archaeologists underwent a philosophical transformation mirroring to some degree that of ethnography. In some ways the temptation to render dynamic cultural processes into static patterns is even more alluring for archaeologists than ethnographers — the objects of study are, after all, objects, no longer associated with the dynamic cultural systems that created them. It is easy enough to conceptualize pottery of a distinctive style defined as a type, representing a cultural tradition, as standing for a culture period and social group. For example, once net-impressed, shell-tempered pottery is pinned down to the Middle Woodland period along the Middle Atlantic coast, and is defined as the Mockley series, we have little trouble conceptualizing a Mockley phase, peopled by the members of the 'Mockley culture'. The philosophy of processualist theory reacted critically to the assumption that the goal of archaeology was to move conceptually from the creation of artifact classes to the idea of ethnically distinct groups behind those classes. Moreover, according to the 'new' view of the middle twentieth century, such conceptual connections explained little about the dynamic processes responsible for the observed archaeological patterns. Post-processualist theorists, in turn fashioned their approach on a foundation critical of the objective posture assumed by processualist archaeologists whose goal, for a short while at least, was the discovery of universal functional relationships between culture as an adaptive mechanism and the environment, to the exclusion of human intent. From our present vantage point, we are fortunately able to avail ourselves of the strengths of both processual and post-processual approaches.

Theoretical Considerations

The archaeological record is composed of empirical variants that are observed to persist at different frequencies through time. Socio-cultural mechanisms exist for transmitting and preserving variation among and between generations. Prevailing conditions, both environmental and social, favor particular variants. Accordingly, it follows that "the differential persistence of cultural traits — behaviors, artifacts, or technologies — is significantly influenced by natural selection" (Jones et al. 1995:14). Although evolutionary explanations are historical narratives (Mayr 1991), they do more than sequentially order events; they require conscious model building (Leonard and Jones 1987; Jones et al. 1995). The purpose of evolutionary narrative in archaeological context is to explain variation observed in the artifactual record. The focus in this study, therefore, is variation that survives at such frequency and for sufficient time as to be archaeologically evident and manifested in the data developed through the analyses laid out in previous chapters.

An evolutionary approach is particularly well suited to archaeological studies for several reasons. Archaeological projects such the present study consist of a phenetic taxonomy (a system in which phenotypic variation is classified without initial regard to phylogenetic relationships) and the exploration of spatial and temporal relationships among pottery types or traditions (phenotypic variants) that have the potential to illustrate homologous relationships (analogous to cladistic groups). In an evolutionary account of the pattern of events, consideration is first given to how the substantive archaeological record expresses variation relevant to the causal processes believed to be significant in this case. The task then turns to showing the histories of the classes, or building an evolutionary phylogeny. Thus, the explication of the relatedness of types depends on the antecedent processes of classification and measurement, which therefore cannot include relatedness as part of the definition of classes (Jones et al. 1995). This requirement is amply met by the attribute analysis used in this study.

The data used in this study represent a broad geographic region over which *relatively* uniform environmental conditions are expected to have prevailed over the approximately 3,000 year period in question. Broad scale climatic changes may have affected the entire region, but faunal and botanical responses are not expected to have differed widely between each of the three coastal areas. An ample temporal span is represented by the data. Cultural materials represent Early Woodland (ca. 1,500–200 B.C.), Middle Woodland (ca. 200 B.C.–A.D.900), and Late Woodland (ca. A.D. 900–1500) periods. The comparative data sample comprises all of the artifacts exposed on the surface at the time the collections were made.

Types and Varieties as Units of Measure

Classification imposes order on the phenomenological realm. Taxonomic classes of pottery are definitional referents, that is, artifacts of observation that focus on the modal expression of a set of traits exhibited by specimens in an assemblage, rather than the variability continuously expressed in the sample. The implications of using defined (static) sets of attributes to model continuous (dynamic) variation is what Dunnell (1995a) has referred to as the materialist paradox. This conceptual problem draws our attention to the critical importance of maintaining the distinction between empirical units and theoretical units. Artifact classes do not evolve; classes are counting units which partition variation so that when arrayed chronologically, distinct classes are differentially represented over time (Dunnell 1995a; Jones et al. 1995; Teltser 1995). The usefulness of types for assessing or resolving questions about variation in space and time depends upon the sets of traits of which they are composed.

Traditionally, the process of defining pottery types has arisen from the desire to identify criteria (attribute sets) sufficient to segregate groups of potsherds thought to have culture-historical significance. Logically, the process has moved inductively from the observation of variation to the formation of classes. Reasoning then works from hypotheses (often, including assumptions about the linkage between regularly patterned data and cultural behavior) to inferences about the empirical data, that is, if culture groups are differentiated in space and time, so should types be. If the observations of empirical phenomena conform to the implications, then the hypothesis is supported, thus, if pottery types are found to cluster in space and time, they are interpreted as evidence of discriminate culture groups. The problem, as Jones and others (1995:15) point out is that, "although the observations may be *sufficient* to support the hypothesis, they may not be a necessary consequent of *only that causal process* specified in the hypothesis" (emphasis added). In short, several explanations may account for the same observation. The problem of equifinality is similarly encountered in evolutionary narratives. A solution to this problem may be sought by employing multiple working hypotheses or differential scales of measure (Dunnell 1995b) or through actualistic studies (Binford 1989, 1992) both of which seek to evaluate the accuracy of alternative explanations.

Dunnell (1978, 1995) has proposed a fundamental dichotomy between stylistic and functional realms and this has figured prominently in the development of evolutionary theory in archaeology. If stylistic and functional variation may be independently identified in the archaeological record, then these realms of variation may provide the basis for testing hypotheses at different scales and generating alternative explanations. Before considering the strengths and weaknesses of this aspect of the theory and how it might be operationalized with the proposed data, further consideration of style and function is necessary.

Functional and Stylistic Variation

The notion that pottery traditions are simply the result of cultural choice among optional ways of doing things (Sackett 1977, 1982, 1983, 1990:33) or just a "way of doing" (Hodder 1990:45) has been stridently opposed as having no explanatory potential (Binford 1989). Pottery-making traditions, it has been argued, consist of information about the production and use of pots as tools (Braun 1983, 1987). From this perspective, if tool making is a mode of human adaptation, then the remains of tool-making activities are the physical evidence of the evolution of human adaptive behavior (Lipo et al. 1996; Neff 1992, 1993; Neiman 1995). The potential for variation in pottery traditions arises continuously (at least in theory) as a result of differential opportunities for learning or implementing what is known (Neiman 1995), or as innovation — creating new techniques designed to improve performance (Rye 1976:118-119; Steponaitis 1984:112-114).

Much of the recent literature addressing the application of evolutionary theory in archaeological explanations suggests a direct relationship between artifact performance and the selection of cultural activities (Dunnell 1980, 1989, 1995a; Fox 1990; Jones, et al. 1995; Lipo et al. 1996; Neff 1992; Neiman 1995; O'Brien and Fox 1994; O'Brien and Holland 1990, 1992, 1995; Teltser 1995). From this perspective, pottery-making traits that affect the performance of the vessel (functional traits) tend to be perpetuated by virtue of their effectiveness in the specific context of the ecological and social niche in which they are employed. Ineffective techniques tend not to be perpetuated. The process by which traits not affecting vessel performance (stylistic or neutral traits) arise and are perpetuated can be thought of as sampling error (drift) in cultural transmission controlled by the effective population size and the rate of introduction of new information (Dunnell 1978, 1989, 1995a; Neiman 1995).

Often, however, traits that at the prima facie level might be considered selectively neutral, function as symbols that convey specific social meaning (Conkey 1978; Conkey and Hastorf 1990; DeBoer 1990; DeBoer and Moore 1982; Hodder 1982; Larick 1985; Sackett 1977, 1985a, 1985b; Sinopoli 1991; Wiessner 1983, 1984; Wobst 1977). If, by virtue of this actively symbolic role, such traits affect the adaptedness of the bearers, therefore they must be considered selectively active. For example, if some feature of stylistic ornamentation signals inclusion in a group in which membership serves to reduce individual risk, then that trait, or more precisely the psychological and social impetus for signaling group identity through ornamentation, would be subject to selection. It is also true that variation in traits affecting vessel performance (e.g., shape, wall thickness, temper type) may not affect performance to such a degree that they are subject to selection. For example, within the class of conical-based vessels a range of variation in specific base shape is exhibited. While this represents variation within a performance-related class, it may not be sufficient variation to affect vessel performance as measured by cooking effectiveness. In this case, the variation observed in a performance-related trait would be neutral. It must be concluded that, any one trait may be selectively active and "functional" at one scale and selectively neutral or "stylistic" at another scale. Thus, while a pottery trait may indeed be explained as the expression of personal choice within a given cultural or ethnic tradition, or as the result of problem-solving behavior, at the transgenerational scale at which the trait is replicated and observed archaeologically, it may appear selectively neutral. The degree and manner in which a trait, observed at a transgenerational scale, is affected by selective pressure can, in theory, be modeled.

Followers of selectionism reason that differences in the way selectively active and neutral traits evolve have implications for what might be expected in the archaeological record. Neutral traits, not directly affected by the selective environment, would not be expected to evolve (or be patterned in the archaeological record) the same as selectively active traits. Change in active traits should coincide with changes in certain aspects of the selective environment. Neutral trait change should occur independent of changes in the selective environment. From this perspective, what might be called ceramic middle-range theory may be useful in explaining aspects of the selective environment. Every step in the process of making and using pottery, including resource selection and procurement (Neff 1995), vessel design, construction, and performance (Braun 1982, 1987; Bishop et al. 1982; Bronitsky 1986, 1989; Bronitsky and Hamer 1986; Feathers 1989; Prezzano 1985; Schiffer

1990; Schiffer and Skibo 1987; Steponaitis 1983, 1984; van der Leeuw and Pritchard 1984), involves decisions that potentially affect the functional characteristics of the vessel. Modeling this aspect of human ecology requires an intimate knowledge of clay resource availability, constituents, and mechanical properties, as well as a general knowledge of pottery making technology (Rice 1987; Rye 1976, 1981; Shepard 1956). No less important are socio-cultural conditions, including such factors as group size and mobility, the existence and firmness of territorial boundaries, territory size, marriage, kinship and residence rules, and the nature of the economic activities in which pottery played a role (e.g., cooking, food storage and trade) and a host of cultural customs that may affect social conception and interaction, many of which are essentially unknowable in this case.

If we reverse this inferential process, however, changes observed in pottery technology may imply changes in prehistoric economic activities. For example, temporal change in traits affecting cooking performance may be taken as evidence of trends in subsistence activities. Several studies have taken this approach (e.g., Braun 1983, 1987; Dunnell and Feathers 1986; Prezzano 1985; Schiffer and Skibo 1987). In Braun's (1983) study of Late Woodland ceramics from the central Midwest, trends in body wall thickness and tempering techniques are explained in functional terms. Braun hypothesizes that as prehistoric people came to rely on starchy seeds and corn as principal components of their diet, cooking required more frequent and extended boiling. In response to these conditions, ceramic technology shifted to the production of vessels more effective for this operation. His analysis demonstrates an overall trend of decreasing sherd thickness, a reduction in the density and size of temper, a decrease in the frequency of flat-bottomed vessels and a corresponding increase in round-bottomed vessels that function more effectively in cooking. While these conclusions seem to agree with the Middle and Late Woodland trends in the Midwest, data from coastal North Carolina may differ significantly. The Cashie series is an example of a Late Woodland ware that is densely tempered with large (granule- and pebble-sized) quartz and quartzite particles. A similar contradiction is illustrated by the trend in temper size in the Piedmont with the sand-tempered Badin series that developed into the coarse, crushed-quartz tempered Uwharrie series.

Although subsistence change, per se, is not at issue, Dunnell and Feathers (1991) pursue a similar line of reasoning, using patterned functional traits to infer changes in prehistoric ceramic technology. They attribute the introduction and spread of shell tempering in pottery from southwest Missouri to innovations in low-temperature firing techniques. The low-firing technique, they suggest, avoided the problem associated with firing pottery tempered with calcium carbonate at temperatures greater than about 750 °C, at which point the chemical decomposition of calcite, and consequent lime-spalling, occurs (Rice 1987:410; Rye 1981: 32–33; Shepard 1956:30). Dunnell and Feathers (1991) conclude that the adaptive advantages of shell-tempered pottery, less brittle than sand-tempered wares, were selected as new low-temperature firing techniques increased the effectiveness of the production method. Other ceramicists who have studied Mississippian period shell-tempered wares have concluded that the shell was pre-heated before being added to the clay (Million 1975a:219, 1975b:202; Steponaitis 1983:20). This process eliminates the problem of the differential thermal expansion of temper and ceramic body by inciting the aragonite-calcite inversion (which occurs at ca. 500°C) before the temper is added (Rice 1987:410; Rye 1981:33, 107).

In a comparative study of Mississippian pottery from Moundville, Steponaitis (1983:33-45) demonstrates that potters were using different pastes (varying in temper size and proportion) for making vessels with different functions or functional characteristics. Bowls and bottles were used as eating and storage vessels, and unburnished jars were used as cooking wares. The differences in mechanical and thermal performance that characterize these two groups of vessels suggest that they were selected for the advantages they conferred in specific task settings (i.e., cooking or serving and storage). It is further suggested that changes in tempering technique from the use of quartz-rich materials to limestone or grog and ultimately to shell throughout the Southeast can be seen as "a logical progression resulting in the gradual improvement of cooking vessels" (Steponaitis 1984:112-113).

Accordingly, it follows that a taxonomic system composed of functional traits should not be expected to vary in the same manner as a system composed exclusively of stylistic traits. Functional traits should vary in a manner marked by relationships of similarity in form that affect performance. But once again we are faced by the fact that decorative traits may be functional, and traits affecting vessel performance may serve as cultural symbols, thereby warranting interpretation as stylistic. Search for an accurate explanation requires an account of the history of the system in which the artifacts were made, used and deposited. Such an explanation seeks to examine the evolution of traditions of pottery making and use.

Selectionist accounts are evolutionary but differ from adaptationist accounts in several ways (Braun 1995; Dunnell 1980; Jones et al. 1995:17). In adaptationist accounts, phenotypic variation arises to enhance adaptive fit; humans "actively and intentionally direct change in their strategies and tactics for survival" (Jones et al. 1995:18). While such an explanation would be characterized as extreme Lamarkism if applied to the evolution of physiological phenotypic traits, a large part of prehistoric material culture may be viewed as the result of purposeful survival tactics. The change that is evident in pottery traits from multi-component sites represents the evolution of traits that has occurred over several hundred years. Some of this change may have been driven by purposeful problem solving, and some may be the product of actions taken with no regard to problem solving or symbolic signaling. At the scale our pottery data affords, purposeful action provides only one source of trait variation. Trait evolution (the pattern of changing pottery characteristics) is the result of a combination of selective factors which serve to enhance the likelihood that certain traits will persist in time and spread across space while others will enjoy only brief expression in a restricted area.

According to Rindos (1985:70), the adaptationist views an adaptation as "a 'new' response to changed conditions that simultaneously serves to [enhance adaptedness, and] correct the problem that made the adaptation necessary." In the adaptationist view, evolution is a one-step process in which the generation of variation and the selection of variants occurs simultaneously. Braun (1995) points out that although intentional behavior directed toward improving adaptedness is a plausible explanation for many cultural practices on the day-to-day scale, there is no necessary connection between the intended and actual outcomes of purposive behavior. At the transgenerational scale, it is not necessarily the intended outcome which is perpetuated. The selectionist view focuses only on the outcome, not the intention of cultural actions. The generation of variation and the selection of variants are two separate processes (Rindos 1989:8). Innovative variation, however, is not resigned to the ranks of random occurrence — variation can be generated to solve a problem and with knowledge of the problems, this sort of variation can be modeled. The generation of that innovation, however, is seen as independent of its selection (Jones et al. 1995:18). This is, perhaps, more apparent when the measure of change consists of archaeological data such as long-term trends in ceramic technology. Innovative change in ceramic technology need not have been especially effective in solving the problems that they were intended to solve in order to have persisted over sufficient time to be evident in the archaeological record. Solutions posed to solve problems of one sort may have failed in their intended application, but unintentionally solved problems of another sort. Selectionism, then, views archaeological patterning not as a record of the intentions of individuals, but as a record of the differential sorting of artifactual variants in response to selective agents. It shifts the focus of attention away from the question of the motives and intentions of individuals or systems to an investigation of why a particular variant conferred an apparent or potential adaptive advantage on members of the population possessing it at a particular time (Jones et al. 1995:19).

Following this reasoning, the fact that variation and selection operate independently has certain implications for explaining patterns of functional (having adaptive significance) and stylistic (selectively neutral) traits. The rules regarding the behavior of neutral traits have been modeled through stochastic simulation (Gould et al. 1977, 1987; Neiman 1995). Neiman's model employs a simple trait-transmission process whereby each member of a generation (G_i) encounters one and only one member of the subsequent generation (G_{i+1}) at random. That is, each member of G_i has an equal chance of encountering a member of G_{i+1}. At each encounter, G_{i+1} takes on the trait of a G_i. Given identical parameters of population size, number of initial variants, and rate of innovation, transgenerational drift produces a unique series of variant frequencies for each population trajectory or history that, when graphed, form lenticular, or battleship, curves characteristic of seriation graphs. By holding all variables except population size constant it is shown that drift destroys trait variation more quickly in smaller populations. Innovation, on the other hand serves to increase trait variation and is positively correlated with group size and rate of intergroup trait transmission. Furthermore, the greater the degree of intergroup transmission, the more rapidly the groups will reach an equilibrium of "between-group distance" or similarity of variants.

While such a model serves to illustrate some of the parameters of the long-term patterns expected with extremely simplified transmission mechanisms, the cultural reality is much more complex. Groups may be distributed discontinuously across an environment of spatially and seasonally varying resources. Cultural rules of behavior may predicate acceptable modes of information transmission. These and countless other parameters present formidable obstacles for predictive modeling (or retrodictive explanation) in selectionist accounts.

In simplified form, however, the model suggests that the two major sorts of variants, active and neutral, could be expected to vary in different ways. One interpretation suggests that the Markovian pattern exhibited as battleship curves is not expected for functional variants (O'Brien and Holland 1995). Traits not influenced by selective factors would have an inception, increase in popularity to a point of maximum expression, then decline steadily at the expense of other traits. The period of trait expression (length of the "battleship") would be affected only by the size of the group and rate of innovation. It is argued that functional variants such as vessel form, sherd thickness, or temper type, are expected to exhibit long-term trends that do not conform to the pattern characteristic of the seriation of neutral traits such as decoration. With functional traits, frequency curves are expected to have an inception and increase in popularity much as neutral traits. Functional traits however, may be expected to increase or decrease in popularity quite precipitously depending on their effectiveness, thus yielding curves with steep sub- or supra-linear tails. In addition, the timing of the inception, increase and decrease in frequency of functional traits are expected to be correlated with other subsistence related developments. For example, vessel wall thickness (which influences the effectiveness of thermal conductivity) is expected to be negatively correlated with the intensification in the consumption of corn and related requirements for longer boiling times (Braun 1983; Prezzano 1985). Similarly, traits that determine how well a pot functions as a cooking vessel may be correlated with long-term trends in subsistence technology. Such trends are not expected to fluctuate temporally as rapidly as trends in the popularity of a mode of decorative ornamentation. It is also expected that functional traits (or suites of traits) will be represented over a broader geographic region than stylistic traits.

If the basic elements of this simplified model are assumed to be true, then it may be possible to distinguish between traits that are functional and those that are stylistic by comparing their distributions in space and time. Traits that seriate into lenticular patterns over relatively brief periods occurring in restricted areas are likely to represent cultural communities or demes. Traits that span long periods of prehistory and are observed over vast regions are more likely to represent technological traditions that do not necessarily coincide with specific culture groups or community boundaries.

It should be clear from the preceding sketch, however, that seriation is only one line of evidence that may be brought to bear on the question of identifying prehistoric cultural communities. In fact, seriation is particularly problematic when applied to multi-component surface-collected assemblages such as the one used in this study. Ideally, seriation is designed to measure the waxing and waning of the popularity of classes of traits expressed within one culture group, from a single region. In addition, seriation assumes that the artifacts composing each assemblage in the series were deposited over temporal periods of equal duration (Dunnell 1970; Marquardt 1973). Clearly, these three conditions are violated by the data proposed in this study. It may nevertheless be possible to view the departures from expected results of seriation analyses as indication of sources of influence (Dunnell 1970). In addition, it may be possible to develop other lines of evidence, such as the comparability of non-ceramic artifacts or features to assess the relatedness of cultural traditions (e.g., Hodder and Orton 1976; Loftfield 1990, 1995; Phelps 1983; Sampson 1988). The specific application of such a strategy to the proposed research is best explored by building a model of expected patterns.

Learning, Practice, and Ritual

Before embarking on an examination of ceramic patterns armed only with the interpretive framework of selectionist theory as portrayed above, it is important to consider the limitations of that approach represented in the growing body of theory focused on an examination of the sociocultural processes that might have shaped ceramic technological styles. Typically, a selectionist account is not concerned with social agency, intentionality, modes of learning, practice and ritual; viewed as modes of variation, these social factors are simply off the radar screen. The *source* of the variation, however, is of central importance in an explanatory narrative.

If, for example, the meaning of technological style is that it constitutes symbolic expression, then it stands to reason that the language or grammar of the symbolism and the context in which it is learned and practiced is critical to understanding how it influences the technology. For example, Weissner (1984:191–192; 1989:56) proposes that the fundamental human cognitive process of social identification by comparison underlies the behavioral basis of style in material culture. This approach utilizes theory developed in the field of social psychology asserting that the negotiation of personal and social identity and the formation of self-image occurs through a comparative process whereby an individual evaluates their own characteristics and abilities against those of others. Weissner (1989:57–59) states that,

> ...Through comparing themselves with similar others, people evaluate their characteristics and abilities against those of others surrounding them, not in any absolute terms, and develop a self-image which they try to present positively to others. The value of this process is obvious — in order to be socially competent, people must know where they stand relative of others, and to a certain extent must have this position accepted by others. ... If style is regarded as having one underlying behavioral basis, then efforts to deal with the different aspects of style should concentrate on questions concerning conditions around social and stylistic comparison that lead to qualitatively and quantitatively different uses of style of communication, rather than classifying style according to its qualities. ...Secondly, when style is seen as having its behavioral basis in identification via comparison, the roles of history and cultural context cannot be ignored, since cultural symbolic structures define people and styles as comparable and identity is negotiated in terms of these... Thirdly, if style is seen as a means of negotiating personal and social identity, then this supports the use of style to provide information of groups, boundaries and interaction. ...Finally, if style is a means by which persons negotiate and communicate personal and social identity *vis-a-vis* others, then this points to a new potential use of style in archaeology — as an indicator of the balance between the interests of the individual and society.

The influence of this psychological process might be expected to be very compelling in prehistoric settings in which group size was small and anonymity impossible. It is very likely that the potters who made the vessels examined in this study made their pots in a community in which they and the products of their crafts were intimately known by most members of the group. In this heightened state of awareness there is little doubt that pottery making was learned and practiced in a highly charged environment of interpersonal comparison. Weissner (1984:193) asserts that with few exceptions stylistic similarity is "stipulated culturally." This "stipulation" is described as personal choices "made according to existing cultural structures" and the restrictive or constraining effect of feelings of insecurity which arise from the perception that one's expression is different from others'. The fact that cultural stipulation or prescription constrains the process of personal choice implies that changes in personal choice will arise only with changes in existing cultural structures and perceived insecurities.

Stylistic *variation* and developmental *change* are the principal subjects of interest in most studies employing social agency theories. Focused as it is on change, this approach will be most effective if the subjects of study are artifacts made by members of a social group in which advantages accrue to those who differentiate themselves. But what about societies in which long-term technological stability appears to have obtained? By and large, the ceramic technological styles that are the subject of the present study were practiced with very little change (perceptible at the level obtained with the current data) for several hundred years, over areas encompassing major portions of several states. In such a case, should we expect the members of a social group with a uniform pottery-making style to have exhibited mal-formed or underdeveloped self-images?

Insights may also be sought in the theory of situated learning that focuses on the attainment of group membership, and hence social identity, as a function of participatory practice (Sassaman and Rudolphi 2001). The theory of situated learning, that resonates with practice theory in anthropology, proposes that learning is a process of participation in communities of practice — participation that is at first peripheral but that increases gradually in engagement and complexity (Lave and Wenger 1991:49–50). Similar to socio-psychological theories of the development of self-image through comparison, situated learning theory asserts that the process of learning, consisting of group participation, evolves through one's lifetime as the roles of participation change. The difference between the two approaches appears to focus on the issue of individual motivation. In the "self-evaluative" approach the motivation for conformity is personal feelings of insecurity that arise when a participant becomes aware that their practices depart from the norm (the expected behavior or outcome of practice). The personal insecurity felt by deviating participants is presumably enough to stimulate corrective measures without external coercive pressures. In the "situated learning" approach, conformity is assumed as part of the learning process; one learns by participating, and by participating conforms. In other words, learning is conforming through participation.

Sassaman and Rudolphi (2001) contend that there is no necessary connection between the community of practice and the content of that practice. Like the selfish gene, the *raison d'être* of the community appears to be to reproduce itself, not the product of the craft. Pfaffenberger (1992) suggests that this rather turns the standard view of the meaning of the production of functional artifacts on its head. Sassaman and Rudolphi (2001) conclude that the histories of the technological styles of artifacts bear no necessary relationship to the histories of the social identities of the artisans, "rendering untenable the isomorphism that underlies archaeological time-space systematics." Nevertheless, Sassaman was able to construct not only a space-time system allowing the definition of a "Classic Stallings" period and ware, but is also able to construct kinship and matrilocal residence patterns of distinct groups from data interpreted as reflecting the handedness of potters.

Pfaffenberger (1992:498) asserts that "... those who seek to develop new technologies must concern themselves not only with techniques and artifacts; they must also engineer the social, economic, legal, scientific, and political context on the technology." Often silent in practice and almost always silent in the archaeological record, ritual represents one of the most effective mechanisms for the coordination of labor under conditions of stateless or local autonomy. Further, he states that,

> ... one can argue that a major rationale for the creation of sociotechnical systems, beyond mere Necessity, is the elaboration of the material symbols that are indispensable for the conduct of every day life. And one can identify here another form of linkage, as yet unexplored: the linkage between the rituals that coordinate labor and the rituals that frame human social behavior by employing material artifacts as cues. It seems likely that such linkages amount to a formidable apparatus of domination, even under conditions of statelessness, thus belying the mythos of egalitarianism in stateless societies. If no form of domination goes unresisted, then one would expect artifacts to be employed in regressive rituals that are specifically designed to mute or counter the invidious status implication of the dominant ritual system. (Pfaffenberger 1992:505)

The use of social artifacts, then is a process of nonverbal communication. In this process, each new act of ritual framing is a statement in an ongoing dialogue of ritual statements and counter-statements which help to constitute social relations as a polity. Pfaffenberger calls this polity-building process a "technological drama."

Summary

In summary, each of the goals of this research — (1) considering attribute variation in prehistoric ceramics; (2) refining ceramic taxonomy; (3) improving chronological sequencing; (4) determining the geographic distribution of pottery types, and; (5) exploring the behavioral and social meaning of the patterning — entail certain practical conditions and theoretical possibilities. Aspects of evolutionary-selectionist theory, social agency, practice and learning theory, often characterized as opposing ways of explaining the source of archaeologically observed variation, are employed here as a suite of approaches each of which explores the meaning of variation at a slightly different scale. Consideration is given to the use of ceramic series, types and varieties as units of measure that parse the continuous variation that exists in the archaeological record. Variation in any attribute state, whether temper, surface treatment, or vessel form, may be independent of the other and may reflect a unique response to changing social or environmental conditions. Functional and stylistic variation, often used by archaeologists as opposing categories, are viewed as manifestations of learning, practice, and individual agency expressed in the pottery-making craft as women achieve group membership through the replication of technological styles. The concepts of ethnicity, ethnic groups, and ethnic boundaries are of central importance in modeling how cultural information is shared within and between groups. These concepts are equally important in understanding how archaeologically observed patterns of apparent homogeneity, continuity and stability in ceramic technological style emerge from systems that are essentially diverse, dynamic, and continuously evolving.

As the conceptual bridge from broken bits of pottery on the sorting tray to a regional perspective of the sequence of ceramic stylistic horizons across the coast is complex, it is essential to begin with a description of the methods used to traverse this connection. In the following chapter I review the methods used for classifying and sorting pottery, analyzing temper and surface treatment, sequencing types with relative and absolute dating techniques, and assessing the geographic distribution of types across the region.

CHAPTER 2
METHODS OF ANALYSIS

The goal of this research is to gain a better understanding of prehistoric pottery from coastal North Carolina, and especially the southern region. Refining classificatory descriptions, comparing regional taxonomies, augmenting chronological data, and determining the geographic distribution of types are tools to be used, or steps to be taken, in achieving this goal. The methods used in each phase of study are described below.

Classification System and Sorting Criteria

Issues concerning the classificatory method used to compare existing collections of Coastal Plain pottery require clarification. For the sake of consistency or continuity, it was desirable to keep the classification system comparable to, or commensurate with, existent typological schemes. One problem, as mentioned, was that in many cases several different type names might apply to a single class of pottery and in the final analysis, only one type name could apply. In part, this study is designed to assess the similarity of independently constructed taxonomic classes and synthesize these into a single system described below. It is important therefore that pottery not be simply classified to one or the other existing type, but that the attribute states composing classes be observed across the data spectrum without regard to types. Therefore, an attribute analysis is employed that records the details of temper, surface treatment, decoration, vessel form, and manufacturing technique. In the analysis of attributes, data are first analyzed on several scales, independently evaluated or lumped into composite classes. Once attribute-level variation is understood, existent types are evaluated, modified or, when necessary, disregarded for the purposes of this study. The pottery sorting guide or classification key may be found in Appendix A.

Before describing the criteria and set of behaviors used to classify the pottery that served as the basis for this study, it might be useful to identify the theoretical and methodological vantage points assumed in the analysis as it shaped the conceptualization of the taxonomic system used to classify sherds. I am fortunate to have some very clearly articulated statements on taxonomic issues presented by contemporary ceramicists working in this and other regions of the Southeast (Anderson 1982; Espenshade 1996: Steponaitis 1983). I make use of these statements to develop the system used in this study and to draw distinctions between their approaches and my own when necessary.

The system of classifying pottery by series, types and varieties is hierarchical, and employs three levels of inclusiveness. A series may comprise several types each of which may include several varieties. The decision to use this approach was partly conditioned by the fact that the type descriptions used by earlier researchers were, in some cases, too broad to explore potential temporal and spatial variation on the scale that I desired. The use of the type-variety system allows the recognition of finer categories (varieties) without having to discard the structure of previously identified types. It also has the advantage of making the local typology more consistent with the system recently introduced on the South Carolina coast (e.g., Anderson et al. 1982, 1996). In fact, although a type-variety system is used, there are very few cases in which varieties are actually used.

Series are generally defined based on characteristics of paste and types are typically defined on the basis of surface finish characteristics. For some series, it is adequate to know only the sort of temper to classify the sherd. For other series the temper in combination with surface treatment is necessary. Types are generally defined on the basis of fairly broad differences in surface treatment and occasionally varieties are used to sort out more specific surface-treatment. Once defined, series and types are typically given proper names. In this study, as in others from this region (see Anderson et al. 1996), varieties are denoted by descriptive terms rather than formal names. In cases where attributes do not fit existing type descriptions, they are listed as unspecified.

The relationships among attributes, local series and types are illustrated with a dendritic key (Figure 2.1). The local typology is a tree-type classification (Whallon 1972) in which there is a hierarchy of importance of attributes that determines the order in which attributes are considered in determining class inclusion. The criteria for classification may also vary depending on which branch of the tree one is following. The primary attribute is temper type. Once this determination is made, a broad set of surface-treatment attributes is considered. This is all that is necessary to determine most types, for example if a sherd is shell-tempered and simple-stamped it is classifiable as Colington Simple Stamped. A more specific set of surface-treatment attributes is necessary for distinguishing certain types such as sand-tempered fabric-impressed and cord-marked types. The series and types used in this study are described in Chapter 3.

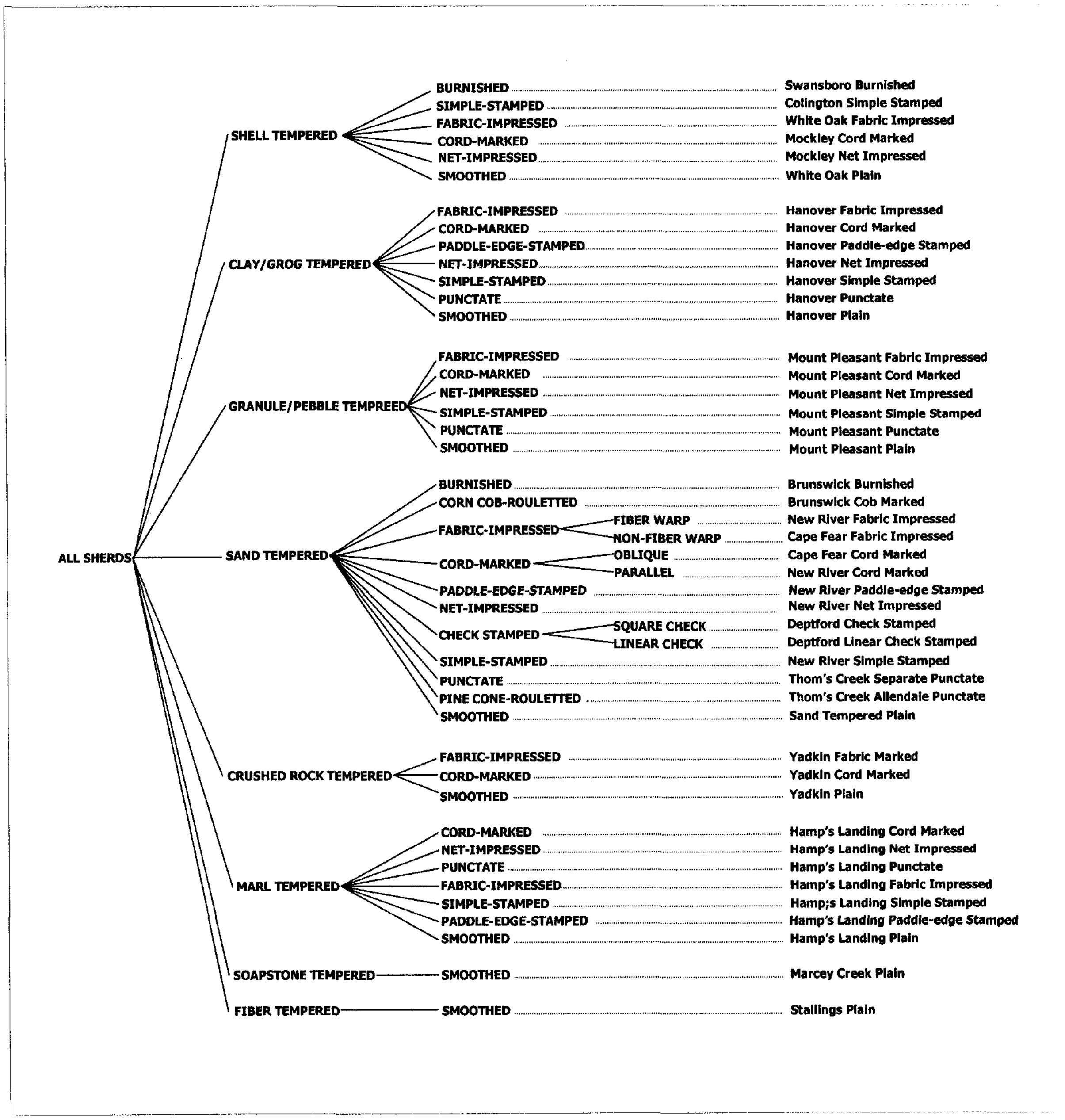

Figure 2.1. Dendritic key for classifying local pottery types.

Temper Analysis

An attribute analysis was used to distinguish varieties within broad temper and surface-treatment classes (Appendix A). Temper classes were determined on the basis of the results of observation of freshly broken sections. For the excavated sample, temper particle size, shape and proportion were described using low-powered microscopy (Rice 1987; Shepard 1956). A binocular microscope with fiber-optic light was used to assess the characteristics of temper particles. Particle dimensions were measured at 10X with an ocular micrometer. Size classes follow Wentworth standards (medium, <0.5 mm; coarse, 0.5–1 mm; very coarse, 1–2 mm; granule, 2–4 mm; and pebble, >4 mm). Temper particles in the fine (.25–.5 mm) and smaller size range are considered less likely to have been purposefully added and small enough to be commonly found in the clay matrix. It is recognized that this lower limit is substantially higher than the 0.05 mm size suggested by Rice (1987:412) as the appropriate boundary. Two broad categories are used: (1) fine, medium, and coarse size grades (.125–1.0 mm) are referred to as sand, and (2) very coarse and granule size grades (> 1.0 mm) are referred to as grit. Sand-and-grit-, or sand/grit-tempered ware, therefore, includes sand in the fine through coarse fraction as well as grains in the very coarse and larger. The proportion or density of grain-size fractions in the matrix was estimated (e.g., 3–5% very fine–medium, or 1–3% medium–granule), but the precision of these data are not appropriate for defining classes based on exact proportions of each Wentworth size grade. In most cases, the sand was quartz in either a monocrystalline or polycrystalline (less frequent, but common) form, but microline, feldspar, epidote, and plagioclase were also commonly observed at proportions less than three percent. Sand grains were found most often to be of subrounded or subangular shape, but angular grains were also occasionally noted.

Crushed rock was found in several samples. Rock fragments were angular, subangular, or irregularly shaped, medium to very coarse grains of granitic igneous material. The composition of the igneous rock was some combination of plagioclase and one or more other minerals including quartz, K-feldspar, amphibole, epidote, opaques, and biotite. Crushed-rock temper fragments were often macroscopically visible on the surfaces of hand samples, but did not exceed ten percent density in the thin-section analysis.

It should be noted however, that most ceramic studies in this region have not utilized microscopic measurements of temper sizes. Consequently, sherds typically classified as tempered with "fine sand" probably have included grain sizes that feel fine to the touch, perhaps up to one millimeter in diameter. Since most former studies have not employed attribute analyses using Wentworth size grades, the results of those studies are not necessarily comparable.

Point counting was not used to determine temper proportions, but the largest five particles in the field of view (typically the broken section of a sherd) were taken as characterizing the temper. Temper proportions for excavated samples were estimated following Rice (1987:349, Table 12.2). Temper proportions were not estimated for surface-collected samples. Temper particle angularity was subjectively sorted into four classes, rounded, sub-rounded, sub-angular and angular for sherds tempered with sand or crushed rock. Grains with any rounding at all were considered to have been derived from a naturally occurring sedimentary context. Angular grains (with no rounding whatsoever) were interpreted as crushed rock prepared especially for use as temper. It should be noted that this distinction is not without its problems. Angular grains of quartz ranging in size from fine sand to pebbles can be created by the natural decomposition of quartzite from weathering. Such material has been collected by the author in erosional lag deposits on the surface of plowed fields in Orange County, North Carolina and it is assumed that it may be found throughout the eastern Piedmont and wherever quartzite is present.

Some introduction is necessary to the discussion of the methods used for identifying and classifying grog-tempered sherds. For quite some time ceramicists working with assemblages from the Mid-Atlantic coast have been struggling with the problem of distinguishing naturally occurring clay clasts, mineralized lumps, and crushed pot sherds in grog-tempered pottery such as the Wilmington and Hanover series. Since these aplastic materials exhibit similar visual characteristics in the hand-held specimen, ambiguity has crept into the sorting process. In some instances, the term "clay-tempered" has been used to characterize sherds tempered with either crushed pottery or lumps of aplastic (pre-fired) clay thought to be something other than crushed pottery. Loftfield (1976:154) described his clay-tempered Carteret series in the following way:

> The temper consists of intentional inclusions of aplastic clay. These were either old sherds or fire-hardened pieces of clay added to the wet, plastic clay of which the vessel was formed. The pieces of aplastic tended in the construction process to begin to soften and lose definition in relation to the plastic portion of the paste.

This is an interesting characterization since it incorporates both possibilities at once, going on to suggest that the source of analytical difficulty in distinguishing clay lumps has to do with their loss of "definition" when they are added to wet clay paste. This is an undeniably creative solution, but perhaps more creative than the data warrant. Since lumps of dried clay may be included, possibly unintentionally, during mixing, it would seem that an explanation positing a preparation method requiring several extra steps involving the pre-firing of clay to be used as temper would be over ambitious. This is especially true considering that there are no ethnographic or experimental bases for the process. Alternatively, Espenshade has argued for a tripartite definition as follows:

> [1] Sherd-tempered for bodies with discernible crushed sherds; [2] grog-tempered for bodies with distinct clay lump inclusions; [3] clay-tempered for bodies of small or extremely weathered sherds in which indeterminate temper (sherd or lump) is present (1996:44, parenthetic numerals added) .

Although this solution is more efficient and more in keeping with the facts as we currently understand them, it is also problematic. The term "grog" has long been understood as crushed sherds, ground brick, tile, or other fired product (Rice 1987:74,409; Rye 1981:33; Shepard 1956:25). To apply this term to clay lumps of uncertain origin is potentially confusing.

In the current analysis, the class "grog" was split into two categories based on attributes presumed to be observable in a hand sample using low-powered microscopy. The distinction was to be made between clay-temper (rounded inclusions or lumps distinguished from the surrounding matrix primarily by contrasting color and texture) and grog-temper (angular inclusions possibly distinguishable by the presence of remnant sherd surfaces and different aplastic inclusions and alignment of these particles in the grog than in the matrix). While this distinction was attempted in the analysis, it soon became clear that the difference between clay and grog could not confidently be ascertained and that only the most obvious examples of crushed sherds were being identified. Analysis of thin sections with petrographic microscopy stands a better chance of distinguishing grog by identifying diagnostic characteristics of inclusions such as angularity, presence of a shrink rim, internal micro-structure, composition distinct from the host matrix, difference in proportion and sorting of grain size, distribution and proportion of inclusions within host matrix, color, and presence of remnant surfaces (Cuomo di Caprio and Vaughan 1993: 25, Table 1; Whibread 1986). In addition to the fact that most of these distinguishing characteristics can be routinely recognized only through petrographic analysis, the small size and low proportion of grog particles may prevent recognition with macroscopic or low-powered microscopic techniques. In one petrographic study of Lowland Maya pottery, grog particles were typically less than one millimeter in size and less than frequent (Jones 1986:20). The results of the petrographic analysis of samples from the upper Cape Fear presented in Chapter 3 of this study describe many sherds containing grog particles (fine to granule size grades) in proportions from 3–15 percent, occasionally found alongside clay lumps also ranging in size from fine to granule size. These results suggest that the distinction between crushed sherd and clay lump is difficult with petrographic techniques and probably very unreliable in a hand sample. Nevertheless, the distinction between grog (crushed sherds) and clay (clay clasts of uncertain origin) temper was attempted in this analysis both macroscopically and with low-powered microscopy and, when possible, the results are considered.

The foregoing discussion raises the question, why attempt to distinguish clay lumps from crushed sherds anyway? There are several reasons for attempting to distinguish grog from clay temper. The techniques used to prepare the two tempering agents stands to be quite different and may therefore be linked to different communities of practice. One might expect the process for preparing grog (crushed sherds) to be well understood in archaeological context and fully documented ethnograpically. In fact, although materials-science based studies have discussed the theoretical advantages of grog-tempered pottery in terms of performance characteristics (Rice 1987:229–230; Rye 1976:117; Steponaitis 1984:111), there are few studies from the Eastern Woodlands with explicit descriptions of grog.

The potential occurrence of naturally forming clay clasts is a tenacious problem. Rye (1981:36) mentions in his discussion of slaking that some clay such as montmorillionite does not slake well, forming lumps when minerals at the surface of a lump swell rapidly preventing moisture from penetrating to the interior. The author has found clay with properties similar to those described by Rye exposed in road cuts in Brunswick County. This suggests that clay with similarly slow or irregular water-absorption properties (tending to be lumpy) may exist in other deposits across the coastal region and could possibly produce pastes with clay clast inclusions. Incidently, this clay was found on top of a marl deposit near the location of a historic marl mining pit. At the chemical level, marly sedimentary clays would be expected to exhibit greater plasticity as a result of finer clay mineral particle size and smaller highly charged divalent ions. The addition of divalent ions such as $CaCO_3$ (calcium carbonate) will floculate a clay, increasing ion charge in adsorbed water, thereby increasing plasticity (Rice 1989:59–60, 78). It seems possible that the addition of marl to locally occurring clay may have had a beneficial effect, enhancing the workability of the clay. So many factors regarding the chemical nature of locally occurring coastal clays are unknown, however, that these musings should only be thought of as possibilities for future research.

A further obfuscating factor in identifying clay clasts versus grog is presented by the possibility of naturally occurring argillaceous or mineralized concretions in pottery made from clay found in Coastal Plain context. Such mineral concretions are commonly observed in Coastal Plain clays and are routinely found in locally made pottery. Daniel (1999:113, Figures 4.1 and 4.2) describes the presence of "the ferric concretion limonite" in clay deposits and sherds found on the coast of Onslow County and it is assumed, quite rightly, that such lumps are incidental to the tempering process. Recently, ceramicists have taken pains to distinguish naturally occurring "argillaceous inclusions" from grog in pottery from prehistoric Aegean and Italian sites (Cuomo di Caprio and Vaughan 1993; Whitbread 1986) and have described the differences in quite explicit terms. Despite this effort, there continues to be a general agreement about the difficulty of distinguishing grog from argillaceous inclusions in thin section, echoing Shepard's (1956: 406–407, 438–439) warnings of the challenges of positively identifying grog without thin sections.

For a very small number of sherds in this study, the presence of crushed pottery or clay lumps was positively identified through the petrographic analysis of thin sections to identify the mineralogy, particle size, shape, and proportion of temper from each TL dated sample. Thin sections were commercially made by Spectrum Petrographics and analyzed by Ann Cordell of the Florida Museum of Natural History. Cordell's work with ceramic petrography has furthered an understanding of patterns of resource selection in Weeden Island pottery and distinguished chronological variability in ceramic paste composition in Deptford and Savannah period pottery (1983, 1984, 1993).

In the analysis of thin sections, particle size was measured according to the Wentworth Scale. Particle frequency was estimated using Rice's (1987:349, Figure 12.2) comparison chart for estimating various quantities of different sizes and shapes of particles in a sherd cross section. All sections were studied under plain-polarized and cross-polarized light. Most observations were made at 40x and 100x, but each was also scanned using the 250x under plain polarized light to note the presence of phytoliths. The surfaces of the epoxy blocks from which the thin sections were cut were also polished and analyzed with a binocular microscope at 30x under fiber-optic (incident) light. Observations were made on the size, shape and proportion of voids and aplastic constituents of each thin-section sample from each TL-dated sherd. Accompanying the data on each thin section were descriptions of the matrix color, homogeneity of distribution of aplastic particles, resemblance of each section to others in the sample of 20, and an interpretation of the sources of clay and temper.

In some instances, the distinction between naturally occurring constituents and added temper could be made based on the material. For instance, grog (crushed pottery) and rock fragments are considered added, while mica is considered a natural constituent of clays. For more ambiguous materials such as quartz, which occurs naturally in clay and was also added as temper, this distinction was based primarily on particle size with silt to very fine sizes designated as matrix constituents and larger grains as temper. Inevitably, this process is somewhat arbitrary but if executed systematically can yield excellent results as shown below.

In several instances, the description of temper type provided by Cordell's analysis of the thin sections differed from those made by the analyst studying freshly broken sherd cross sections with a binocular microscope at 10x magnification with fiber-optic lighting. The classification of sherds according to temper attributes was adjusted to conform to Cordell's observations and the results presented below therefore reflect temper types based on the analysis of the thin sections, not hand samples.

The results of the petrographic analysis allowed temper identifications to be refined, helping to improve the accuracy of the final temper classes. Classes based on petrographic data, however, do not necessarily reflect classes based on macroscopic analysis and so are only replicable with petrography. While this may be viewed as a limiting factor from the perspective of the mass analyst (obviously, sectioning all sherds in a collection is impossible), classes based on petrography, however, provide information that cannot be ignored.

Surface Treatment Analysis

Surface-treatment categories were evaluated by making casts of archaeological samples and comparing these to the results of experimentally produced test tiles impressed with replicated cordage and textiles (Herbert 1999b). The impressions observed on the surface of prehistoric pottery were made by netting, cordage, or fabric that was wrapped around the paddle and the carved surfaces of the paddle face itself. In addition to providing information about the structure of the perishable materials, the impressions also hold clues to the techniques of the paddling that appear to have varied in space and time. The pottery sample is divided into four broad classes of surface treatment, net impressing, cord marking, check stamping and fabric impressing. The netting used to impress vessel surfaces was made by knotting (as opposed to looping, for example) and this class was further subdivided by the width of the mesh (< 5 mm, closed mesh; > 5 mm open mesh).

Cord-marked wares almost always showed evidence of over-stamping. Two distinctive varieties of over-stamping were recognized in the analysis of materials from the Papanow and Pond Trail sites (Herbert 1997). One variety, referred to as parallel, exhibited over-stamped cord impressions that were roughly parallel or slightly oblique. A second variety, perpendicular, showed cord impressions that were distinctively perpendicular or nearly so. Early interpretation of the perpendicular variety was purposefully vague about its structure, characterizing it as "over-stamped with perpendicular cords, or impressed with open, twined textile" (Herbert and Mathis 1996:170). The interpretation of the perpendicular variety as twined or plaited, net-like, open-weave textile was prompted by close analysis of casts. This interpretation has since been found to be wrong. This "interwoven textile" it was proposed, could only be created if the cords were first interwoven, then applied to the surface. Other researchers in the region who have paid close attention to casts of over-stamped, cord-marked wares have come to similar conclusions (Steen 2000:135, Figure 110). A series of replication experiments subsequently demonstrated that perpendicular cord marking could indeed be made by over-stamping with a cord-wrapped paddle, effectively eliminating the necessity of the alternative interpretation of perpendicular impressions as interwoven netting (Herbert 1999b).

An interesting conclusion of the study was that a very different set of paddle-stamping behaviors is needed to produce parallel and perpendicular varieties of over-stamped cord-marked ware. Although both parallel and perpendicular types appear to be made by over-stamping with a cord-wrapped paddle, the techniques used to produce each are different enough to warrant the exploration of how these surface treatments might vary independently in time and space.

Although there is some evidence from the Eastern Woodlands that cordage twist direction is diagnostic of geographically or temporally distinct cultural traditions (Johnson 1996; Johnson and Speedy 1992; Petersen 1996, 1999; Petersen and Hamilton 1984) no temporal patterning was observed in the twist direction of cordage in the sample of sherds studied for the current study.

Fabric impressed wares were subdivided into five categories. Three of these categories consist of weft-faced fabric made of plied-cordage weft elements interwoven over rigid (non-cordage) warp elements. The three categories are distinguished by the diameter of the weft cordage (fine, < 1 mm; medium, 1-2 mm; coarse, > 2 mm). A fourth category, also weft-faced, interwoven fabric, is distinguished by pliable warp elements of approximately the same diameter as the weft, yielding a more elastic textile than the first three classes. The fifth category of fabric-impressed wares is characterized by very broad (approximately 5 mm) warp elements and typically, fine weft elements (1 mm or less in diameter). The weft elements in all five categories are assumed to have been plied cordage. In addition to the net-impressed, cord-marked and fabric-impressed specimens, one sherd in the sample was check stamped.

Sequencing With Relative and Absolute Dating

Temporal sequencing of types was achieved with two techniques; (1) the analysis of assemblages from excavated contexts and (2) absolute dating. The first assemblages analyzed were those excavated from sites with stratified pottery assemblages. Vertical sorting of pottery classes within the soil column was analyzed to establish the broad trend of sequencing. The determination of the absolute ages for 43 representative samples through thermoluminescence (TL) dating is also discussed.

Excavated Samples

Samples from excavated contexts analyzed for vertical sorting include assemblages from three sites in the northern area: (1) the Bandon site (31Co1), including 847 sherds from 15 3-inch levels (Haag 1958); (2) the Cape Creek site (31Dr1), including 238 sherds from five 3-inch levels (Haag 1958); and (3) the Whalen site (331Bf26), comprising 46 sherds from five 3-inch levels. Each of these sites was excavated by William G. Haag and reported in *The Archaeology of Coastal North Carolina* (1958). These three sites represent three areas of the northern coast where clusters of sites were surface collected by Haag. The surface-collected assemblages form the basis of the geographic analysis comprising Chapter Four and, therefore, the excavated assemblages provide an important means of discerning temporal trends apparent in pottery attributes.

Thermoluminescence Dated Samples

The potential of the thermoluminescence (TL) dating method has not yet been realized by archaeologists in the southeastern U.S. for a variety of reasons including availability, cost, and perceived reliability (Feathers 2000). The accuracy of dating pottery by TL has been established for 30 years, however, and improvements in technique through that time have increased precision (Adameic and Aitken 1986; Aitken et al. 1964; Barnett 1999, 2000; Dykeman 2000; Dykeman et al. 2002; Feathers 1994, 2001; Feathers and Rhode 1998; Fleming and Stoneham 1973; Godfrey-Smith et al. 1997; Guibert et al. 1994; Ichikawa et al. 1978; Kojo 1991; Mejdahl and L. Bøtter-Jensen 1994; Prescott et al. 1993; Prescott and Hutton 1988; Sampson et al. 1972; Whittle and Armaud 1975; Zimmerman and Huxtable 1969, 1971). Costs per sample are currently less than AMS dates and with the increasing use of automated equipment may soon approach the cost of conventional radiocarbon dates.

The most important advantage of using TL for dating pottery is that it does not rely on associated organic material but dates the artifact itself (Aitken 1990:3; Feathers 1993:5, 1997; Godfrey-Smith et al. 1997:253). TL dating is based on radiation-induced stored energy that has accumulated since the time when the material was last heated to at least 450-500°C. For pottery, this event corresponds in most cases to the time of manufacture or use, precisely the event of archaeological interest. The energy is released as luminescence when heated, and the intensity of this light is proportional to age. Principles of TL are described by Aitken (1985), and applications to a variety of archaeological contexts have been demonstrated (Dunnell and Feathers 1994; Feathers 1997a, 1997b, 1997c; Feathers and and Roberts 1997; Huntley et al. 1993; Towner et al. 2002). The TL procedures used for the pottery in this study are summarized in Herbert et al. (2002).

Pottery samples for TL dating were drawn from two sources, excavated site assemblages from the Papanow site (31Nh690) in the lower Cape Fear River valley (Herbert 1997), and the several sites from Fort Bragg on the upper Cape Fear valley (Herbert et al. 2002). In 1996 the author and volunteers investigated the Papanow site, on the lower Cape Fear, for the purpose of recovering pottery samples for TL dating (Herbert 1997). Testing included the excavation of a 2-x-2-m unit from which several hundred sherds were recovered. The pottery found represents the New River (Early Woodland), Hanover, and Cape Fear (Middle Woodland) series as described by South (1976). Five TL dates were obtained for specimens at the Papanow and Pond Trail sites. Two New River, two Hanover and one Cape Fear series sherd were dated. The sampling strategy for pottery for TL dating from Fort Bragg was based on the variation observed in temper and surface-treatment attributes, since there was no pre-existing typology to guide the selection process. Samples were selected to represent a range of temper and surface-treatment characteristics commonly observed among sherds from sites across the study area. Sherds to be dated were selected from excavated contexts where the spatial relationships of associated artifacts were controlled and where soil samples were collected specifically for assessing the background radiation dose rate.

With samples from both regions of the Cape Fear valley, attributes of weight, thickness, color, porosity, temper and surface treatment were measured and recorded for each sherd, and permanent casts and digital images were made of the exterior surfaces. Munsell color values were taken on clean, freshly broken cross sections at the exterior, interior, and middle of each cross section. Casts were made with commercial modeling compound (Sculpey). Following attribute analyses, a small portion of each sherd to be dated was removed to provide a thin-section sample for petrographic analysis.

Radiocarbon Dated Samples

The radiocarbon dates that appear in this volume have been calibrated with the Calib 4.3 program using the INTCAL98 calibration curves (Stuiver and Reimer 1993). Non-marine radiocarbon samples were calibrated with the decadal atmospheric/inferred atmospheric curve. Marine shell samples were calibrated with marine data set to compensate for differences in availability of radiocarbon in reservoirs. Organisms from marine (and lacustrine) environments have been exposed to different levels of ^{14}C than their terrestrial counterparts. The marine calibration incorporates a time-dependent global ocean reservoir correction of about 410 years. Local reservoir effects were corrected by applying the ΔR value derived from coral dates in the Bahamas (-5 ± 20) which is the closest analog for coastal Carolina samples (Stuiver and Braziunas 1993; P. Reimer, personal communication 2002). For samples of human bone collagen, the carbon was assumed to be derived from a mixture of 50 % marine and 50 % terrestrial carbon. These proportions are estimates based on recent stable isotope data indicating that marine resources were a very significant part of the diet of coastal populations up to about A.D. 1500, even after the advent of the introduction of corn agriculture around A.D. 1000 (Hutchinson 2002).

All radiocarbon samples that appear in this volume have been corrected for $\delta^{13}C$ isotope fractionation. This was accomplished with the assistance of Beta Analytic which provided information from their records about the status of $\delta^{13}C$ correction (R. Hatfield, personal communication, 2002). Information about corrections made for $\delta^{13}C$ isotope fractionation is typically not reported along with ^{14}C age estimates in the published literature. In cases where Beta Analytic's records indicated that a sample had not been corrected, the correction was applied. In cases where there were no records indicating whether a particular sample had or had not been corrected, a determination to correct the sample was based on the date the sample was run. Samples processed prior to 1990, for which laboratory records were ambiguous on this point, were corrected.

The ^{14}C age estimates that appear in this volume are calculated with method A (simple intercepts with linear interpolation of data points on selected calibration curve) with the standard lab-error multiplier k. Results are presented with calibrated intercepts and minimum and maximum calibrated 2-σ (.95) ranges. Multiple calibrated intercepts for error ranges are not reported.

Geographic Analysis

The exploration of potential prehistoric ceramic-area boundaries relies on mapping the occurrence of attributes and taxonomic classes along what might be envisioned as two transects. The first encompasses the entire length of the outer coast (tidewater), and the second an east-west transect comprising the upper and lower Cape Fear River basin. Surface collections were selected for this study for several reasons. The number of surface-collected assemblages is far greater than excavated samples from this region and their spatial distribution provides a denser coverage of the coastal region. Among thousands of sites and hundreds of thousands of sherds available for study, two collections (the Haag collection and the Loftfield collection) were chosen based on their size (number of sites and sherds) and site area of coverage. The Haag collection, made in 1956, is composed of 14,204 sherds from about 222 sites in 10 counties. This collection provides a sample of sites and assemblages from several major river basins in the Tidewater region of the coast of North Carolina. The Loftfield collection, made in 1979, consists of 2,987 sherds from 127 sites in three counties providing a representative sample of sites and assemblages from the portion of the upper Cape Fear River basin within the 250-mi^2 area of the Fort Bragg military reservation (Table 2.1, Figure 2.2).

Table 2.1. Surface Collection Sample.

County	Sites (count)	Sherds (count)
Beaufort	30	4707
Brunswick	23	1848
Columbus	7	589
Cumberland	24	627
Currituck	7	887
Carteret	16	1401
Dare	19	2138
Hoke	181	2177
Hyde	6	567
New Hanover	22	1444
Onslow	9	456
Pender	1	167
Scotland	22	183
Total	367	17191

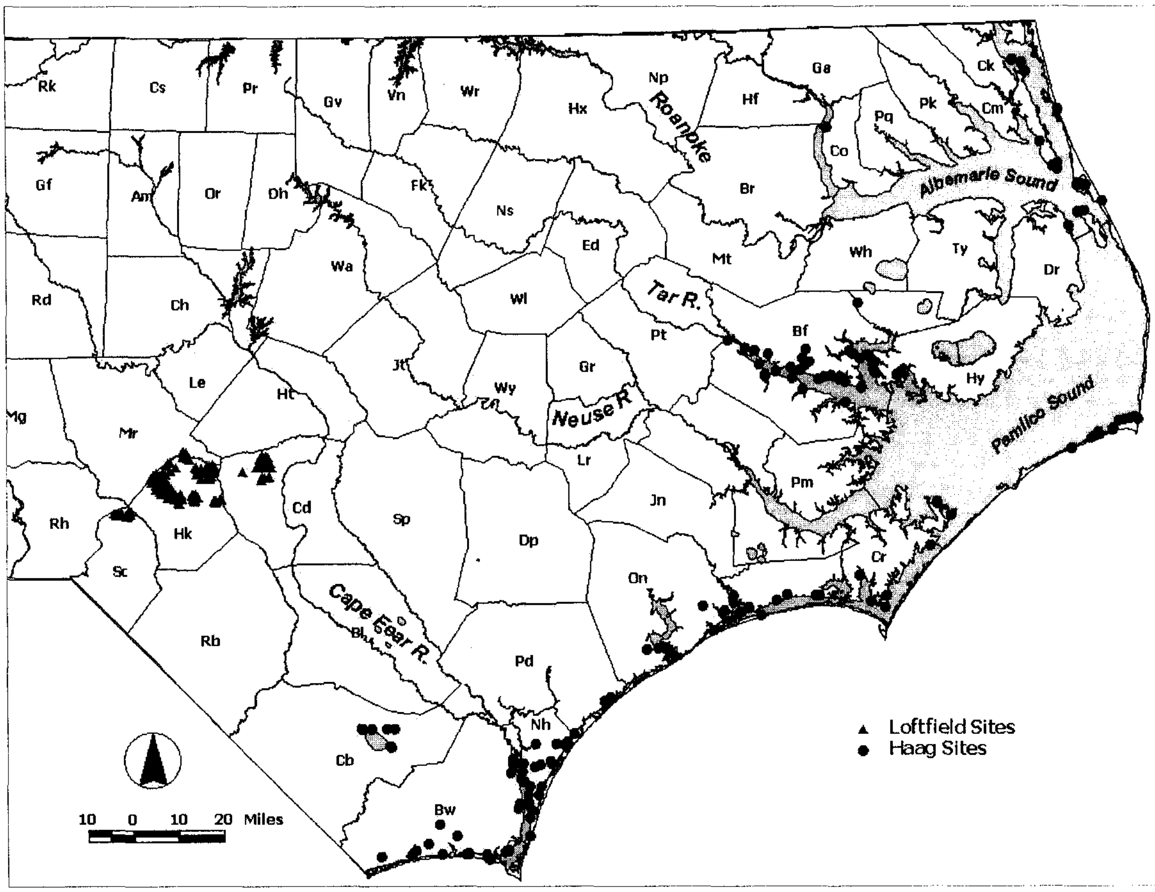

Figure 2.2. Surface-collected assemblages analyzed for this study.

The Haag collection is housed at the University of North Carolina, Research Laboratories of Archaeology (RLA). Collections made by Federal contractors on the Fort Bragg military reservation (including the Thomas C. Loftfield collection) are housed at the Fort Bragg Cultural Resources Curation Facility. These two collections are large enough to provide ample opportunity to observe the major types of variability and small enough to be a manageable for this project. Using just two collections minimized variability in collecting methods among individual site samples, but there were some differences between the two collection methods. The sample is unquestionably uneven; sites are clustered geographically, due to sampling logistics, with some rather large spaces between. A few Haag site samples are quite large (more than 1000 sherds) while most of the site samples in the Loftfield collection have fewer than 10 sherds. Nevertheless, the pattern of site samples is considered adequate to reflect regions of technological style and any boundaries that may exist within the region represented by the site samples.

Geographic distributions of the pottery classes were mapped using GIS software. As relative frequencies or proportions (percentages) of trait occurrence at each site may be masked by problems of multicomponency in surface collections, several alternative measures are used to look for patterns. Among these are raw frequencies and frequencies within subsets of types that are roughly contemporary. Analyzing maps of counts (the raw frequency of traits, or sherds of various types), it is apparent that most surface treatment types, if viewed independently of series, occur rather uniformly across the study area. In part, this may be due to the analytical method. The relative frequency of a type or trait, calculated as a percentage of the total pottery from a site, is a more sensitive indicator than raw counts for illustrating both the location and relative importance of traits. An inherent problem with this approach when applied to surface collections, however, is that it may simply monitor settlement history at each site. In other words, when the data are multi-component assemblages derived from site-occupation periods of unknown duration, the potential for mixing may mask variation if the trait of interest is known to occur in more than one period. To minimize this problem, samples were classified according to approximate age (Early, Middle, or Late Woodland periods), then relative frequencies were calculated for site assemblages from each period. This does not eliminate the problem, but mitigates it somewhat by calculating trait frequency relative to one period in which, it is assumed, the duration of site occupation would be similar. This assumption rests on our knowledge of the economic differences among the periods and the effects that these differences might have on residential mobility.

Having described the methods to be used in this study, the following chapter presents a unified taxonomy for eastern North Carolina that refines existing classificatory descriptions and synthesizes the various currently existing taxonomies.

CHAPTER 3

A CERAMIC TYPOLOGY FOR EASTERN NORTH CAROLINA

The following ceramic typology for eastern North Carolina is based upon the author's interpretation of descriptions existing in the current literature and on the results of the analysis of pottery in this study. The brief sketches of pottery types that follow are not intended to be full definitions or formal type descriptions for the region, but serve two important functions. First, they are intended to familiarize the reader with the series and types that appear in subsequent discussions. Second, they synthesize multiple or competing descriptions into a single unified typology composed of mutually exclusive (non-overlapping) classes. In some cases, the types presented here represent pottery classes that have been defined in more than one previously published source. A single type description was chosen to best represent the class. The construction of formal descriptions for those types that have yet to be defined would in fact be useful but, lacking adequate data, such definitions are outside the scope of this study. Instead, the descriptions that follow represent a synthesis of published types.

Stallings Series

Examples of Early Woodland fiber-tempered Stallings series (Griffin 1943; Sassaman 1993; Stoltman 1972, 1974) ware (2500–1100 B.C.) have been reported in collections from as far north as the Chowan basin (Phelps 1983), and as far west as the Sandhills (Culpepper et al.1999), though their frequency is higher in collections from the southern portion of the coast (see Chapter 6). In the current analysis, 66 sherds were identified as having some fiber in the paste. Of these samples, 13 (20%) were primarily sand tempered, but also with some fiber. Most fiber-tempered material is plainware, having simple smoothed exterior surfaces. Among the sand/fiber sherds were one cord-marked specimen and one check-stamped specimen.

Marcey Creek Series

Specimens of soapstone-tempered Early Woodland Marcey Creek series (1200–800 B.C.) of the Potomac basin (Egloff and Potter 1982; Evans 1955; Manson 1948) are occasionally found in the northern part of the coast (Phelps 1983), and rarely in the southern area (South 1976). Three soapstone-tempered sherds were found in the Haag Collection from sites in Currituck and Dare Counties. Two were cord-marked and the other was smoothed.

Croaker Landing Series

The Early Woodland Croaker Landing series is identified primarily on the basis of clay temper and thick vessel walls (Egloff et al. 1988). Egloff and others (1988:17) indicate that "fifty percent of the paste is composed of subangular clay particles 2–7 mm in diameter. Occasional rounded stone particles, 2–4 mm in diameter, occur in the paste as natural inclusions." There is general agreement since the type description published by Egloff and others, that Croaker Landing pottery is not tempered with crushed potsherds, but with pre-fired clay. Exterior surfaces are either plain or cord-marked and interior surfaces are smoothed. Vessel form is perhaps the most distinctive feature of the series, including round, oval and rectanguloid flat bases and lug handles. Croaker Landing appears to be very similar to the Marcey Creek series that exhibits similar vessel forms, varying only in temper and slightly different spatial distributions. Croaker Landing is found mostly in the southern coastal region of Virginia, whereas Marcey Creek ware is more prevalent in the interior in the James and Potomac River basins.

A Croaker Landing component was found at the Davenport site on the western shore of the Albemarle Sound in Bertie County (Byrd 1999). The pottery described by Byrd included flat bases and lug handles diagnostic of the Croaker Landing series together with plain and cord-marked clay-tempered body sherds found in the lowest levels beneath the Early Woodland Deep Creek (New River) and Middle Woodland Mount Pleasant series. Lacking flat-basal sherds or lug handles, the positive identification of Croaker Landing ware in Haag's surface-collected assemblages was impossible. As the Middle Woodland clay/grog-tempered Hanover series also includes cord-marked and plain types, it is likely that any Croaker Landing body sherds that may be in the surface-collected assemblages are inextricably mixed with the Hanover series sherds.

Hamp's Landing Series

Hamp's Landing is an Early Woodland or early Middle Woodland, limestone or marl-tempered series (Hargrove 1993; Hargrove and Eastman 1997, 1998; Herbert and Mathis 1996; Mathis 1999). From stratigraphic data, it is thought that Hamp's Landing occupies a position in the sequence between the Thom's Creek and Hanover series.(Hargrove 1993). In this stratigraphic position the Hamp's Landing series appears to be approximately contemporary with the Refuge series on the South Carolina coast. Hamp's Landing series pottery has been found in the lower Cape Fear drainage and along the coastal margin as far north as Beaufort and Hyde Counties where it occurs on sites on the north shore of the Pamlico River. Hamp's Landing may be related to the limestone-tempered Wando series (Adams and Trinkley 1993) found in Horry County, South Carolina (Hargrove and Eastman 1997).

Hamp's Landing pottery is characterized by voids in the paste where the limestone temper has dissolved. These voids can be easily mistaken for leached shell as the limestone and marl formations from which the temper was procured is fossiliferous and voids are sometimes lenticular. Crushed limestone fragments are typically less than two mm in diameter, composing about 15 percent of the paste. In the Haag collection 692 Hamp's Landing sherds were identified. Among these, 55 percent were tempered with crushed limestone, 42 percent with nearly equal parts crushed limestone and quartz sand (typically less than two mm in diameter), and three percent included both limestone and grog or clay lumps (Table 3.1). The Hamp's Landing series exhibits a very broad range of variation in surface treatment, but one whose signature is essentially early in character. Among the 341 Hamp's Landing sherds in the Haag Collection with identifiable surface-treatment styles, about 50 percent were cord marked (26% parallel, 23% perpendicular). Other surface-treatment types include net impressed (13%), punctate (Allendale type random straw-bundle,10%), and fabric impressed (flexible, non-fiber warp, 5%). Less frequently sherds were observed to be simple stamped (narrow, 4%), smoothed over scraped (4%), and several other varieties occurring in low frequency (Table 3.1).

Table 3.1. Hamp's Landing Temper and Surface Treatment Variations.

	Temper Type			
Surface Treatment	Marl	Sand/Marl	Clay/Marl	Total
Indeterminate	206	140	5	351
Cord Marked Parallel	35	48	7	90
Cord Marked Perpendicular	19	58	2	79
Net Impressed, Knotted	39	4	1	44
Punctate, Random Straw Bundle	18	12	4	34
Fabric Impressed, Flexible	11	7		18
Simple Stamped, Narrow	14	1		15
Smoothed-over Scraped	13	1		14
Smoothed-over Simple Stamped	8	1		9
Fabric Impressed, Medium	1	6	1	8
Smoothed-over Stamped	5	3		8
Cord-wrapped Paddle Edge		7		7
Smoothed-over Cord Marked	4			4
Check Stamped, Square	3			3
Punctate, Separate	1	1		2
Fabric Impressed, Coarse		2		2
Fabric Impressed	1			1
Fabric Impressed, Fine		1		1
Simple Stamped Broad	1			1
Smoothed		1		1
Total	379	293	20	692

Hamp's Landing Cord Marked

Both the parallel and perpendicular varieties of cord marking are observed in the Hamp's Landing series. Among the 42 cord-marked specimens with recognizable twist direction, 35 (83%) were Z-twist and 7 (17%) were S-twist, all but one of the S-twist sherds were among the parallel cord-marked variety.

Hamp's Landing Net Impressed

Knotted netting is the only variety observed in the Hamp's Landing series.

Hamp's Landing Punctate

Two punctation varieties were observed among Hamp's Landing sherds. The random "straw-bundle" or Allendale variety was most common, with a few specimens exhibiting separate reed punctations. Both styles suggest an affinity with the Early Woodland Thom's Creek and Refuge series from the coast of South Carolina.

Hamp's Landing Fabric Impressed

Fabric impressing is only occasionally observed in the Hamp's Landing series. The most frequent variety is characterized by cordage weft interwoven or twined over flexible fiber warp elements. Less often, medium-diameter (1–2 mm) weft cordage is interwoven over non-fiber warps, and in very low frequency, coarse- and fine-wefted varieties are found.

Hamp's Landing Simple Stamped

Both the narrow and wide simple stamped varieties are observed in the Hamp's Landing series. In the Haag Collection sample, the narrow variety was more common.

Hamp's Landing Paddle-edge Stamped

Paddle-edge stamped is an infrequently observed surface treatment trait in the Hamp's Landing series.

Other Hamp's Landing Types

Several other surface-treatment styles occur in the Hamp's Landing series. In the Haag Collection, 35 specimens were smoothed over some sort of stamping including cord-marked and simple-stamped. Fourteen of these smoothed-over sherds appeared to have been scraped, rather than stamped prior to smoothing. Three specimens were check stamped (square) and one specimen was simply smoothed.

Yadkin Series

In the southeastern Piedmont of North Carolina, the Middle Woodland period is distinguished by Yadkin series pottery (Coe 1964:30–32). The Yadkin series was interpreted by Coe as a direct descendant of the fine sand-tempered Early Woodland Badin series reflecting a long period of gradual change characterized by improvements in technology evidenced by the addition of coarse angular aggregate and surface treatments exhibiting cords of more delicate construction and fabrics of finer weave (Coe 1995:154). The shape and dimensions of Yadkin vessels were thought to be essentially the same as Badin vessels, but a major change in tempering was seen. The Yadkin series is defined as having angular fragments of quartz (1–8 mm) added to the paste in proportions commonly as high as 40–50 percent (Coe 1964:31). This defining characteristic of the series has often been overlooked in more recent identifications of Yadkin series sherds (cf. Blanton et al. 1986; Claggett and Cable 1982; and even Coe 1995).

About 50 percent of the Yadkin sherds from the Doerschuk site are fabric-impressed, about 40 percent are cord-marked, and 10 percent are check-stamped (Dickens et al. 1987:211, Table 8.22). Yadkin series sherds from Town Creek also include several surface treatment types including smoothed (or plain) (51%), cord-marked (33%), simple-stamped (12%), fabric-impressed (2%), and check-stamped (1%). Coe (1995:154) suggests that Yadkin at Town Creek "occurred at a late point in the ceramic continuum." He apparently came to this conclusion by noting that smoothed and cord-marked surface treatments were most common and that fabric-impressed and check-stamped types were nearly absent. Ward and Davis (1999:83) however, conclude that the presence of simple-, check-, and linear-check stamping "tie Yadkin phase pottery to the Early Woodland Deptford wares." This interpretation makes sense in light of the TL dates for crushed-rock-tempered pottery from Fort Bragg, however, it is not at all clear that the sherds identified as Yadkin from Town Creek date to the Early and Middle Woodland periods (R.P.S. Davis, personal communication, 2000).

So little research has focused on the Early and Middle Woodland periods in the North Carolina Piedmont that there is little certainty at this time with regard to the age range or suite of attributes expected for the Yadkin series. For that reason, any sherds in this analysis tempered with crushed rock, and only sherds so tempered, were classified as Yadkin series. Further research may provide grounds for pushing the age of the crushed-rock tempering tradition back to the Early Woodland in the Piedmont or into the Late Woodand (Uwharrie phase) in the western Coastal Plain, but thus far such evidence is lacking. Among the 268 specimens classified for this study were 129

(48%) tempered with crushed granitic rock, 75 (28%) crushed quartz, 63 (24%) crushed feldspar, and one specimen with crushed ferrous sandstone temper (Table 3.2). Most of these were found in the Fort Bragg assemblages. Of the 159 that had identifiable surface treatment styles, 64 percent were fabric impressed, 18 percent were cord marked, 10 percent were plain, five percent cord-wrapped paddle-edge, and the remaining three percent were smoothed-over stamped.

Table 3.2. Yadkin Series Temper and Surface Treatment Variation.

	Crushed Rock Temper Type				
Surface Treatment	Granite	Quartz	Feldspar	Sandstone	Total
Indeterminate	51	38	19	1	109
Fabric Impressed, Flexible	44	18	33		95
Smoothed (Plain)	11	2	3		16
Cord Marked, Parallel	5	7	3		15
Cord-wrapped Paddle Edge	10	3			13
Cord Marked, Perpendicular	2	2	4		8
Smoothed-over Fabric Impressed	5				5
Fabric Impressed, Fine		4			4
Fabric Impressed, Medium	1	1	1		3
Total	129	75	63	1	268

In this study, Yadkin series sherds were identified based on the presence or crushed rock. Crushed rock temper was identified on the basis of the angularity of grains observed in the paste. Four categories of angularity were recognized, three of which exhibited some degree of roundedness and a fourth that exhibited no rounding whatever. This fourth category is interpreted as a result of the preparation of quartz temper by crushing. It is possible for very friable quartzite to weather naturally into angular grains, but the tradition for preparing rock for temper by crushing is clearly evident in the Early Woodland Marcey Creek (crushed soapstone) and Hamp's Landing (crushed marl or limestone) and the Middle Woodland Yadkin series (crushed quartz, granite or feldspar). Coe (1964:30) described the temper characterizing the Yadkin series as "crushed quartz ... added in quantities that it frequently would constitute 30 or 40 per cent of the body of the paste." Grain size varied from 1–8 mm with the majority being in the granule size (2–4 mm). A portion of the Yadkin material from the Doerschuk site included clay temper along with crushed quartz in the paste, suggesting a possible relationship to the Middle Woodland Hanover series.

The Yadkin series originally included three types, Yadkin Cord Marked, Fabric Marked and Linear Check Stamped. One dentate-stamped sherd (tempered with clay and crushed quartz) was also found in the Doerschuk assemblage, further suggesting ties to Early Woodland traditions on the coast of South Carolina. The Yadkin assemblage found at the Town Creek site, on the other hand, comprised mostly plain (smoothed, 51.5 percent) and cord-marked (33.5 percent) surface types, but also included simple- and check-stamped types. Interestingly, the photographs of the Yadkin series plain ware from Town Creek suggest that it is very well smoothed, or partially burnished with some folded and flaring, everted rims (Coe 1995:155, Figure 9.1). Similar folded and everted rims are pictured among the Yadkin Simple Stamped materials from Town Creek (Coe 1995:157, Figure 9.3). Such rim forms are very unusual in Middle Woodland series from the coastal region, more often considered a hallmark of Late Woodland wares.

Sherds from the Sandhills that are tempered with crushed granitic rock, feldspar, and ferrugenous sandstone are subsumed as varieties of the Yadkin series. In the collection used in this study there are 193 Yadkin series sherds, including 129 tempered with granitic rock, 63 tempered with feldspar, and one sherd tempered with ferrugenous sandstone. The types of surface treatment observed among the Yadkin series sherds in this study (all but five sherds were found in the Sandhills sample) probably represent an early Middle Woodland tradition related to the Yadkin assemblage found by Coe (1964) at the Doerschuk site. Certainly, granitic rock and feldspar are not found naturally occurring in the Sandhills, but originate in the Piedmont. Evidence is growing to support the theory that the Yadkin series sherds found on Sandhills sites were brought, as vessels, from the Piedmont. It is notable that 67 percent (regardless of the rock type used as temper) are fabric-impressed. And within the fabric-impressed class, 89 percent are impressed with the variety of fabric characterized by flexible, cordage warp elements. This variety of surface treatment is thought to occur earlier, in general, than the rigid, non-cordage-warp varieties (fine, medium and coarse).

Yadkin Fabric Impressed

Four varieties of fabric may be found in the Yadkin series: (1) fine weft cordage (<1 mm) interwoven with non-fiber warp elements; (2) medium weft cordage (1–2 mm) interwoven with non-fiber warp elements; (3) coarse weft cordage (>2 mm) interwoven with non-fiber warp elements; and (4) any diameter weft cordage interwoven with flexible fiber warp elements. Of these types, variety four, interwoven on flexible warp elements, was by far the most frequently found variety (60%) among the Yadkin series sherds with identifiable surface treatment styles.

Yadkin Cord Marked

Both parallel and perpendicular over-stamped cord-marked surfaces are found on Yadkin series sherds. In the Loftfield collection, the parallel variety was slightly more frequent (10%) then the perpendicular variety (5%). Among cord-marked specimens with recognizable twist direction, 10 specimens (59%) exhibited S-twist direction in the final ply of the cordage and 7 sherds (41%) exhibited S-twist direction.

Yadkin Plain

Yadkin series plain vessels exhibit well smoothed exteriors. About 10 percent of the Yadkin sherds in this study were smoothed.

Yadkin Paddle-edge Stamped

As described above, this type of surface impression was made by striking the wet clay vessel with the narrow edge of a flat, cord-wrapped paddle. About eight percent of the Yadkin sherds in this study exhibited paddle-edge stamping.

Thom's Creek Series

Found throughout the Coastal Plain and Fall Line areas of eastern Georgia, South Carolina, and southwestern North Carolina, this series is distinguished by homogeneous paste tempered with very fine and fine subrounded quartz sand (or occasionally temperless), rarely including grains larger than one mm (Anderson et al. 1982: 263–264; DePratter et al. 1979; Phelps 1968; Trinkley 1980; Waring and Holder 1968). Vessels are typically rather thin walled (5–7 mm) and sherds feel light and relatively smooth (occasionally soapy) to the touch. Over most of its range, the Thom's Creek series is thought to follow the Stallings fiber-tempered series, although it is coeval with the latter portion of the fiber-tempering period over much of this region and precedes fiber-tempered ware on the lower Savannah River.

Thom's Creek Separate Punctate

This type is distinguished by the presence of reed punctations, typically placed in parallel rows surrounding the rim. The type was initially defined by Griffin (1945:467) based on a small sample of sherds from the Thom's Creek site on the upper Congaree River in South Carolina. Additional detailed descriptions have been presented by South (1960:47–49), Phelps (1968:20–21), DePratter et al. (1973:45–52) and Anderson et al. (1979:47–49). A total of 97 Thom's Creek Separate Punctate (including one finger-nail punctate specimen) were identified in the present study.

Refuge Series

Allendale Punctate

The Allendale Punctate type was originally defined by Stoltman (1974:276–277) based on a sample of 158 sherds from 16 sites on Groton Plantation on the lower Savannah River, South Carolina. Most often these days, Allendale Punctate is classified in the Refuge series following Petersen (1971) and Anderson et al. (1982). In the current study, however, the few specimens exhibiting Allendale-like random punctations were uniformly characterized by Thom's Creek series paste and vessel attributes. Stoltman (1974:276) described the surface treatment as "closely spaced, randomly oriented punctations that must have been made by a composite instrument rather than one impression at a time — a handful of straw or twigs?" Simple replication experiments conducted during the present analysis suggest that a pattern of strikingly similar punctations can be achieved by rouletting with a pine cone. Sixty-two sherds with these attributes were found in the Haag Collection assemblages.

Deptford Series

The Deptford Bold Check Stamped type was first defined by Caldwell and Waring (1939) for materials found at the Deptford shell midden and several other sites in the vicinity of Savannah Georgia. It was recognized as part of a series that includes linear check-stamped, bold (square) check-stamped and simple-stamped types that were found to be stratigraphically intermediate between Stallings and Wilmington (grog-tempered) wares at sites in the Savannah region. The principal identifying characteristic of Deptford — check stamping — was hugely popular, occuring over much of the southeastern Atlantic and Gulf slopes from Alabama and Florida throughout Georgia and South Carolina and into southern North Carolina (Anderson et al. 1996). Over this enormous range, of course, many type names (e.g., Alexander Check Stamped, Booger Bottom, Cartersville, McLeod Check Stamped, and Wright Check Stamped) have denoted sand-tempered (or limestone-tempered), check-stamped wares that range in age from about 600 B.C. to A.D. 500. The Deptford series is tempered with medium and coarse quartz sand in moderate proportion (10–20%).

Deptford Check Stamped

Check stamped surfaces are created by stamping with a checkered paddle face apparently made by incising by two sets of parallel lines that intersect at nearly right angles. The square-checked type is distinguished by checks that are roughly square. Thirteen Deptford Check Stamped sherds were found among the Haag Collection site samples.

Deptford Linear Check Stamped

The linear-checked type of the Deptford series is discriminated by the rectilinear structure of the checking. If the two sets of parallel incisions are characterized as longitudinal and transverse, in a linear check-stamped paddle the pattern of incised lines creates rectangular checks, with the longitudinal axis roughly twice the length of the transverse axis. Linear check stamping occurs far more frequently than square check stamping in Deptford series wares found on the South Carolina Coastal Plain. Despite this apparent difference in geographic distribution, linear and square check stamping appear to be coeval, not temporally distinct (Anderson et al. 1996:204). Eleven Deptford Linear Check Stamped sherds were found in the Haag Collection.

New River Series

The New River series was defined as tempered primarily with coarse sand, homogeneous and compact paste, and cord-, fabric-, and simple-stamped ("thong-marked"), and plain (smoothed) surface treatment types (Loftfield 1976:149). The high proportion of sand appears to have been a key element in sorting. Loftfield (1976:187) also determined by means of the seriation of 48 assemblages from Onslow, Carteret, Jones, and Pender Counties that the New River series was an Early Woodland period ware. Sand/grit-tempered ware thought to date to the Early Woodland period (2200–400 B.C.) was first described for materials found in Lenoir County that were defined as the Lenoir series (Crawford 1966:34). Crawford's Lenoir series included cord-marked, fabric-impressed and simple-stamped types and his seriation chart (Crawford 1966:101) offered support for an Early Woodland association of these types. Ceramics of this description were also reported by Phelps (1975:77–79) from the Parker site on Deep Creek in Edgecombe County, and later, Phelps (1983) defined the Deep Creek series for these materials. Phelps envisioned three subperiods of the Deep Creek ceramic sequence. The first is characterized by a majority of cord-marked wares with some fabric impressed and occasionally simple stamped. The second is distinguished by higher frequency of simple-stamped, net-impressed, and fabric-impressed wares. The third subperiod is exemplified by a decrease in the frequency of simple-stamped specimens (Phelps 1983). In the sequence developed for the current study, the Lenoir and Deep Creek series are subsumed within the New River series.

A total of 1343 sand/grit tempered sherds are identified in this study are classified to the Early Woodland New River series (Table 3.3). Approximately 43 percent of these were tempered with quartz sand that appeared to be primarily of medium size (0.5–1.0 mm). The remaining portion of the sample was tempered with fine (< 0.5 mm) quartz sand (29%) or coarse (1.0–2.0 mm) quartz sand. Nearly equal proportions of cord-marked (27%), net-impressed (25%), and fabric-impressed (24%) specimens were identified along with a smaller number of simple-stamped (8%), cord-wrapped paddle edge stamped (4%), and smoothed-over stamped sherds (2%).

Table 3.3. New River Series Temper and Surface Treatment Variations.

Surface Treatment	Temper Type			Total
	Medium Sand	Fine Sand	Coarse Sand	
Cord Marked, Parallel	152	82	133	367
Net Impressed, Knotted	148	125	63	336
Fabric Impressed, Flexible	163	86	75	324
Indeterminate	67	38	19	124
Simple Stamped, Narrow	18	26	53	97
Cord-wrapped Paddle Edge	20	18	10	48
Simple Stamped, Broad	6	1	8	15
Smoothed-over Simple Stamped	3	6	6	15
Smoothed-over Net Impressed	1	9		10
Net Impressed, Twined	1	3		4
Net Impressed, Looped		2		2
Punctate, Zone Linear			1	1
Total	579	396	368	1343

New River Cord Marked

The sand/grit-tempered New River Cord Marked type is distinguished from Cape Fear Cord Marked by the characteristics of parallel, rather than perpendicular, cordage impressions. Among cord-marked specimens with recognizable twist direction, 84 specimens (43%) exhibited S-twist direction in the final ply of the cordage and 113 sherds (57%) exhibited S-twist direction.

New River Net Impressed

Knotted netting was used to stamp the majority of the New River Net Impressed sherds. A few specimens appeared to have been impressed with twined or looped netting but these variations were rare.

New River Fabric Impressed

This type is defined as impressed with weft-faced, interwoven or twined fabric made with flexible, fiber warp elements over which is woven multi-ply cordage, typically one to two mm in diameter. Based on chronological evidence presented in Chapter 3, it is hypothesized that wares impressed with flexible-warp (cordage warp) fabrics are, on average, older than wares impressed with non-cordage-warp fabrics. At the Pond Trail site, Hanover Fabric Impressed (a non-cordage-warp fabric) dated A.D. 680 ± 145 (Herbert 1997:24, Figure 8). Also from the Pond Trail site, New River Fabric Impressed (a flexible, cordage-warp textile) dated 434 ± 250 B.C. Herbert 1997:38, Figure 11). Sand-tempered sherds impressed with flexible cordage-warp textiles were also observed along with other New River types at the Riegelwood site that date to the Early Woodland and early portion of the Middle Woodland period. Sand-tempered sherds impressed with flexible-warp fabrics are therefore included in the Early Woodland under the assumption that most will predate sherds impressed with rigid, non-cordage-warp fabric. It should be mentioned, however, that clearly described assemblages of sand-tempered, fabric-impressed sherds from the Matassee Lakes sites (Cape Fear *variety St. Stephens*, see Anderson et al. 1982:293–299) with pliable, cordage warp have been securely dated to the Late Woodland period (A.D. 800–1500).

New River Simple Stamped

Loftfield (1976:149–150) originally described this type as "thong-marked" as the simple stamped impressions suggest wide (2–5 mm) flat elements that typically have square edges. Loftfield's idea was that a paddle wrapped with a leather thong had been used to create the impressions. Because this pattern might also have been made by a carved paddle, or a paddle wrapped with cane splints or similar plant material, it is here referred to as simple stamped. The New River Simple Stamped type as used here subsumes Loftfield's (1976: 149–150) New River Thong Marked and Phelps' (1981, 1983:29–30) Deep Creek Simple Stamped. The two varieties are distinguished on the basis of the differences in the stamping. In the wide land type, the "impressions are flat with square edges indicating a cut material" (Loftfield 1976:150). As the type name implied, Loftfield was convinced that the lands, or raised portions of the paddle face, used to impress the simple stamping observed on sand-tempered sherds in his collection were created by wrapping a leather thong around a paddle. Indeed, very cleanly stamped examples of Hamp's Landing simple-stamped specimens from sites along the central coast have clear impressions that are rectangular in cross-section very much resembling impressions that could be made by a wide flat leather strip (Herbert and Mathis 1996:180–181, Figures 3 and 4). Loftfield (1976:149) noted that lands were "up to 5 mm in width with 2 to 3 mm the average." On quite a number of sherds in the Haag collection, however, land width was found to be less than two millimeters (often nearer one millimeter) with cross-sectional shape more rounded or u-shaped than flat, not at all thong-like in cross section. Consequently, a distinction was made in this study among wide (>2 mm) and narrow (< 2 mm) simple-stamped patterns. Phelps (1983:31) made a similar distinction noting that:

> both dowel-like impressions [narrow and more rounded in cross-section] reminiscent of Stallings and Thom's Creek simple-stamping ... and the rectangular land and groove type of Deptford ... are present in the North Coastal region, but the former type probably belongs in the Deep Creek I phase [1500–800 B.C.].

This suggests that narrow-grooved impressions may be more common in early phases coeval with Stallings, Thom's Creek, Refuge, and Deep Creek I (or early New River), whereas the wide-flat impressions might be more common in later assemblages contemporary with Deptford. It should be noted, however, that both the narrow and wide varieties have been noted in the Hamp's Landing series (e.g., see Herbert and Mathis 1996:181, Figures 4 and 5) that, presumably, predates or is contemporary to early New River series. It is also important to note that the securely dated Late Woodland type, Santee Simple Stamped *variety Santee*, from the Mattassee Lakes sites is characterized by "tapered, v-shaped longitudinal grooves ... [with] impressions (typically) narrow (about 1.0–2.0 mm) and shallow (1.0–2.0 mm)" (Anderson et al. 1982:304, Figures 87 and 88). It may well be the case, however, that the simple-stamping technology fell out of use during the centuries of the Middle Woodland, to re-emerge in the Late Woodland Colington Simple Stamped on the North Carolina coast.

In this study, proportions of the narrow and broad varieties of simple stamping were very similar among marl-tempered Hamp's Landing and sand-tempered New River series, suggesting little difference between the two with regard to the attribute of land width (Table 3.4).

Table 3.4. Early Woodland Simple Stamped Land Width.

Type	Land Width (%)			Total
	Narrow (< 2 mm)	Broad (> 2 mm)	Indeterminate	
Hamp's Landing	0.05	0.71	0.24	1
New River	0.12	0.76	0.12	1
Total	0.11	0.75	0.14	1

In an attempt to identify possible variations that might suggest a Late Woodland component in the sand-tempered simple-stamped ware, proportions of the two impression-width classes were computed among sand-size categories (Table 3.5). Both the Early Woodland Deep Creek and New River series are described as tempered with coarse sand, while the Late Woodland Santee Simple Stamped type, (as well as the Adams Creek Fabric Impressed type) is tempered principally with fine and medium sand.

Table 3.5. Simple-stamped Land Width among Sand Size Grades.

Sand Size Grades	Land Width n (%)		
	Narrow (< 2 mm)	Broad (> 2 mm)	Total
Very Coarse (1-2 mm)	53 (0.55)	8 (0.53)	61 (0.54)
Coarse (.5-1 mm)	18 (0.19)	1 (0.07)	24 (0.22)
Medium (< .5 mm)	26 (0.27)	6 (0.40)	27 (0.24)
Total	97 (1.00)	15 (1.00)	112 (1.00)

The χ^2 value for this table is 4.711 ($v = 2$), which is significant at the $\alpha = 0.10$ level, but not at the $\alpha = .05$ level. Considering the small size of the sample for the broad type (violating the minimum rule of 5 for every cell), there is little reason to reject the H_0, that simple-stamped land width is equally distributed across all sand-size grades of temper. Although sand size grades do not appear to be useful in this instance to sort out potentially different temporal components, other vessel attributes may be of more help. Anderson and others (1982) suggest several features that may distinguish Early and Middle Woodland simple stamping from the Late Woodland varieties. These features include: predominant orientation of impressions (parallel over-stamping in the earlier components, oblique in the later); rim form (predominantly straight rims in the earlier, with more everted rims in the later); lip form (rounded lips more common in earlier components, with paddle flattened lips occurring more often in the later), and; interior stamping (more frequent stamping down the interior of the rim in later components).

New River Paddle-edge Stamped

As described above, this type of surface impression was made by striking the wet clay vessel with the narrow edge of a flat, cord-wrapped paddle.

Cape Fear Series

The Cape Fear series, first defined by South (1960, 1976), was described as having a high percentage of sand and a rough sandy feel. The texture of the paste was described as finer and more compact than Hanover ware with hardness varying from 2.5–3 Moh's, and the color typically red-brown with evidence for reduced cores often observed. Surface finishes identified by South included cord marked, fabric impressed, and net impressed. Some stamping down the interior of the vessel neck was noted. In the 1960 survey South found the ratio of cord-marked to fabric-impressed sherds to be about 1.6:1.0 and this led him to speculate that Cape Fear followed Hanover in the coastal sequence.

In the current study, 1993 sherds were identified as Cape Fear series with 87 percent tempered with fine or medium sand and 13 percent having coarse sand. Among the sample were fabric-impressed (71%), cord-marked (13%), a few smoothed-over stamped (<1%), paddle-edge stamped (<1%), and one brushed sherds (Table 3.6).

Table 3.6. Cape Fear Series Temper and Surface Treatment Variations.

	Temper Type			
Surface Treatment	Medium Sand	Fine Sand	Coarse Sand	Total
Fabric Impressed, Medium	462	523	92	1077
Cord Marked, Perpendicular	286	144	122	552
Fabric Impressed, Fine	94	116	42	252
Fabric Impressed, Coarse	32	57	6	95
Smoothed-over Stamped	4	9		13
Cord-wrapped Paddle Edge			3	3
Brushed			1	1
Total	878	849	266	1993

In the Haag collection, proportions among fabric-impressed and cord-marked surface-treatment classes were the reverse of proportion observed in South's collection. The ratio of cord-marked to fabric-impressed sherds is 0.39:1.0. This is undoubtedly influenced by the fact that only perpendicular cord-marked wares are included in the Cape Fear series in this analysis. Even with the addition of sand-tempered parallel cord-marked sherds (here classified as New River series), the ratio of cord-marked to fabric impressed sherds is 0.65:1.0. Another difference between this analysis and South's is that sand-tempered, net-impressed wares are classified as New River, not the Cape Fear series.

Cape Fear Fabric Impressed

The variety of textile most often (54%) impressed on the surfaces of Cape Fear series ware is weft-faced fabric consisting of non-fiber warp elements (2-5 mm diameters) over which is interwoven medium width, multi-ply cordage of 1-2 mm diameters. Similarly constructed fabric with fine (<1 mm) weft elements accounts for 13 percent of the sample and five percent of the sample is stamped with coarsely wefted (>2 mm) fabric.

Cape Fear Cord Marked

By definition, only perpendicular over-stamped cord-marked ware is represented in the Cape Fear series. The diameters of cord impressions are typically one to two mm, separated by a 2-mm space. Among cord-marked specimens with recognizable twist direction, 81 specimens (35%) exhibited S-twist direction in the final ply of the cordage and 151sherds (65%) exhibited S-twist direction.

Mount Pleasant Series

The Mount Pleasant series was described by Phelps (1981:42; 1983:32) as ware tempered with sand and larger clastic inclusions (granules or pebbles). Often the sand component of the paste is fine or very fine, giving the appearance of "backgound" or incidental aplastic. The grit component, defined in the current study as rounded or subrounded quartz grains in the granule (2–4 mm) or pebble (greater than 4 mm) size ranges, appears to have been added as temper (cf. Haag 1958: 71). The absence of angular quartz grains is a critical feature as it indicates a sedimentary source for the temper inclusions. Quartz grains of similar size that exhibit angular shape, are interpreted as crushed quartz and therefore are not included in this class. More often than not, granule and pebble size grains were one component of a group of sand sizes included in the paste of sherds classified as granule/pebble-tempered. Also comprised in the most inclusive level of this class are sherds with both granules and clay. The Mount Pleasant series was described by Phelps (1983:32) as "tempered with sand and larger clastic inclusions (pebbles, 'grit') in varying amounts." Elsewhere (Phelps 1984:41), Mount Pleasant temper is described as consisting of:

> variable amounts of fine to medium sand with frequent particles of coarse sand and pebbles (2–7 mm), both rounded and angular. Apparently within the normal range of temper variation are some specimens with only fine to medium sand temper, and others which contain primarily coarse sand and pebbles. Also present ... are sherds that combine the classic sand and pebble temper with a small to moderate amount of fired clay lumps.

By restricting the class definition to only sherds including rounded and subrounded, granule and pebble size, quartz and those including both granules and clay, the sherds in this category very likely fall within the range of temper types described for the Mount Pleasant series, but may not represent the entire range of temper types that might actually be represented in the Mount Pleasant series as conceptualized by Phelps, or in an assemblage from a given site.

Phelps described vessel forms as simple jars with sub-conical bases, straight walls and rims and, insofar as data from the current study allowed, this description appears entirely appropriate. In the current study, 942 sherds were identified as Mount Pleasant series with 34 percent including some amount of grog or clay (Table 3.7). Among the Mount Pleasant sample were fabric-impressed (29%), cord-marked (13%), net-impressed (3.5%), simple-stamped (10%), and plain (4%) surface treatments. In the assemblage at 31Dr15 on Colington Island, Phelps (1981: 42) documented an incised plain vessel. To this, the current study adds punctate types, comprising 15 percent of the sample, including a decorative zoned incised variety and the random "stick-bundle" incised variety associated with the Refuge series Allendale type.

Mount Pleasant Fabric Impressed

The varieties of textiles impressed on the surface of Mount Pleasant series Fabric Impressed vessels include the following: (1) fine (14% of all Mount Pleasant sherds); (2) medium (46%); and

Table 3.7. Mount Pleasant Series Temper and Surface Treatment Variation.

	Temper			
Surface Treatment	Granule	Granule/Clay	Pebble	Total
Indeterminate	173	65		238
Fabric Impressed, Medium	102	22	2	126
Punctate, Random Straw Bundle	50	69		119
Fabric Impressed, Flexible	25	72		97
Cord Marked, Perpendicular	38	58		96
Simple Stamped, Narrow	93			93
Fabric Impressed, Fine	34	1		35
Smoothed (plain)	27	8		35
Net Impressed, Knotted	15	12		27
Cord Marked, Parallel	23	2		25
Punctate, Zone Linear	24			24
Fabric Impressed, Coarse	8			8
Net Impressed, Twined		6		6
Fabric Impressed, indeterminate		5		5
Check Stamped, Square	2			2
Smoothed-over Cord Marked	1	1		2
Smoothed-over Fabric Impressed	1	1		2
Smoothed-over Simple Stamped		1		1
Burnished	1			1
Total	618	275	2	942

(3) coarse cordage wefts interwoven over non-fiber warp elements (4%); and (4) cordage wefts interwoven with cordage or fiber warp elements (36%). No paddle-edge stamped surfaces were identified on Mount Pleasant ware.

Mount Pleasant Cord Marked

Although about 25 sherds (2% of all Mount Pleasant sherds) with parallel cord marking were identified among the Mount Pleasant ware assemblage, most (10%) were characterized by perpendicular over-stamped cord marking. Among cord-marked specimens with recognizable twist direction, 15 specimens (58%) exhibited S-twist direction in the final ply of the cordage and 11 sherds (42%) exhibited Z-twist direction.

Mount Pleasant Net Impressed

Only 32 net-impressed specimens were found among the Mount Pleasant series sherds. Six of these appear to have been impressed with a form of twined net, while the balance indicated stamping with knotted net.

Mount Pleasant Simple Stamped

Ninety three (10% of all Mount Pleasant series sherds) speciments were found to be simple stamped and all of these were characterized by the narrow, rounded variety of simple stamp.

Mount Pleasant Punctate

Two varieties of punctation were observed among the Mount Pleasant sherds: random "stick-bundle" punctate (13%), and zoned incised (3%). The stick-bundle variety is restricted to the southern coast and is related to the Refuge series Allendale variety from the South Carolina coast. The zoned punctate ware appears to be a decorative application, but sherd size precluded any determination of the overall design pattern.

Mount Pleasant Plain

Only 35 (4%) Mount Pleasant sherds were found to be smoothed, exhibiting no other surface treatment application.

Hanover Series

The Hanover series, first defined by South (1960:16–17), is primarily a Middle Woodland period (400 B.C. – A.D. 900) pottery type. It was originally considered to date to the early part of the Middle Woodland period (400 B.C.– A.D. 200, see South 1976:28, Figure 12), and assumed to follow in sequence after the Wilmington series of the Georgia and South Carolina coasts (Caldwell 1952:316) and precede the Cape Fear series. As this research shows, however, the age range for the Hanover series is much longer and somewhat later than first assumed (A.D. 200–1500). Hanover series pottery was described as tempered with "large lumps of aplastic clay…that appear to be crushed sherds." The large lumps of grog results in a rough, lumpy interior surface, with a series of small cracks forming around larger lumps during the drying and firing process. Loftfield (1979:154–157) described the same ware, but called it the Carteret series. Loftfield's description of the paste refers to temper consisting of crushed sherds or "fire-hardened pieces of clay." He also added that the paste seemed "poorly kneaded being lumpy and contorted" and feeling "very chalky to the touch." South (1976) identified only cord-marked and fabric-impressed types in his analysis of sherds from the lower Cape Fear Basin. To this, Loftfield's analysis of sherds from the New River Basin (1979:157) added a smoothed or plain type.

In the present analysis 3643 sherds with clay or grog temper were classified to the Hanover series (Table 3.8). Among these were four variations of temper: (1) clay (48%); (2) clay/sand (35%); (3) grog (10%); and (4) grog/sand (7%). In addition, there was the small sample of sherds appearing to be tempered with both clay and granules, that were classified to the Mount Pleasant

Table 3.8. Hanover Series Temper and Surface Treatment Variation.

	Temper				
Surface Treatment	Clay	Clay/Sand	Grog	Grog/Sand	Total
Indeterminate	531	631	148	82	1392
Fabric Impressed, Medium	349	59	57	132	597
Cord Marked, Perpendicular	254	92	66	22	434
Fabric Impressed, Flexible	138	231	22	8	399
Cord-wrapped Paddle Edge	177	80	6	2	265
Fabric Impressed, Fine	95	70	33	7	205
Cord Marked, Parallel	82	48	11	2	143
Smoothed	25	17	6	6	54
Fabric Impressed, Coarse	38	5	1	2	46
Net Impressed, Knotted	24	2			26
Smoothed-over, Cord Marked	12	8			20
Smoothed-over, Fabric Impressed	5	14			19
Check Stamped, Square		13			13
Fabric Impressed, indetermiate	7	2			9
Smoothed-over, Stamped		6	1		7
Smoothed-over, Simple Stamped	1		4		5
Punctate, indeterminate		2		2	4
Simple Stamped, Narrow	1	1			2
Smoothed-over, Scraped		1			1
Punctate, Random Straw Bundle	1				1
Simple Stamped, Broad		1			1
Total	1740	1283	355	265	3643

series (see below). The surface treatment types represented among the Hanover series sherds included: (1) fabric impressed; (2) cord marked; (3) paddle-edge stamped; (4) net-impressed; (5) simple-stamped; (6) plain; and (7) smoothed-over stamped wares; (8) check-stamped. The balance of the Hanover sherds (38%) was not identifiable as to surface treatment.

Hanover Fabric Impressed

The varieties of textiles impressed on the surface of Hanover series Fabric Impressed vessels are the same as those identified for the Townsend series White Oak Fabric Impressed type: (1) medium cordage wefts interwoven over non-fiber warp elements (16% of all Hanover sherds); (2) cordage wefts interwoven with cordage elements (11%); (3) fine weft, non-fiber warp (6%); and (4) coarse weft, non-fiber warp (1%). In general, these treatments do not give the impression of haphazard over-stamping, but are applied with some care to create the seamless appearance of the structure of a textile.

Hanover Cord Marked

This type is identified by cord impressions that are stamped on the vessel surface. It is thought that the impressions were made when the vessel walls were shaped with a cord-wrapped paddle. The cordage is typically multi-ply (typically two-ply) twine wrapped around the paddle with 1–3-mm spaces between the cords. Vessels walls were typically shaped by paddling with the paddle oriented in at least two opposing angles, often as much as 90°, creating a criss-cross effect. Such over-stamping is the rule rather than the exception with Hanover Cord Marked and does not appear to be a random process (cf. Loftfield 1979:155). Two varieties of cord-marked surfaces were identified among the Hanover series sherds in this study: perpendicular (75%), and parallel (25%). Among cord-marked specimens with recognizable twist direction, 243 specimens (81%) exhibited S-twist direction in the final ply of the cordage and 56 sherds (19%) exhibited S-twist direction.

Hanover Paddle-edge Stamped

Paddle-edge stamping has generally not been identified as a separate surface-treatment type, but has more often been identified as over-stamped fabric-impressions (see South 1976:17, Figure 6A, Right). The width of the paddle impressions, however, suggests that the edge and not the face of the paddle was used to create this surface pattern. As the structure of the impressions is inconclusive as to whether the paddle was wrapped with cordage or textile, it is premature to subsume it in either cord-marked or fabric-impressed types. Weft cordage was typically about 1mm diameter and estimated paddle-edge width averaged about 3 mm, but warps as wide as 5 mm were noted. More often than not, paddle orientation was alternated in an over-stamped perpendicular pattern. A single cord-wrapped paddle-edge impression may look like a cord-wrapped dowel or cord-wrapped stick impression. If the vessel is struck repeatedly with the paddle orientation the resulting effect is similar to impressions of fabric with non-fiber warp. It is very likely that the paddle-edge stamped type includes specimens have been interpreted by others as cord-wrapped dowel stamped or simply as fabric impressed. Similar to Hanover Cord Marked, the paddle-edge stamped type is typically over-stamped and nearly right angles. A total of 265 (7%) paddle-edge stamped sherds were recognized in the class of Hanover series sherds.

Hanover Net Impressed

This minority type is characterized by surface impressions of knotted net. Cordage width varies from 1–2 mm, and mesh width varies from about 2–5 mm. Over-stamping is common. Only 26 sherds (<1%) were observed among the Hanover series.

Hanover Simple Stamped

This rare form of the Hanover series is represented by a few examples stamped with paddle faces scored with parallel lines. The type includes a narrow variety (< 2 mm), a wide variety (> 2 mm), and a variety where the simple stamping has been subsequently smoothed-over. Nevertheless, only 8 sherds among the Hanover series were found to be simple stamped.

Hanover Punctate

A few specimens of Hanover Plain were decorated with random or separate punctations that appear to have been made with a round stylus. In one example, "stick-bundle" type of punctation, similar to the Refuge series Allendale type, was found on a sherd with Hanover series paste characteristics. In all, however, only 5 Hanover sherds were decorated with punctations.

Hanover Plain

Hanover Plain exhibits smoothed exterior surfaces, with no evidence that the smoothing occurred subsequent to stamping with a textured paddle. Only 54 (1%) smoothed sherds were observed.

Hanover Check Stamped

Thirteen linear check-stamped sherds with clay or grog temper were found in this analysis. Their position in the sequence is unknown at present and as check stamping occurs in the Deptford series, thought to be prior to Hanover, and in the Savannah series, known to be later, speculation on their chronological position is as yet unwarranted. All occur on sites in the southern portion of the coast.

Mockley Series

Shell-tempered pottery representing the latter half of the Middle Woodland period is recognized as the Mockley series. This ware was defined by Robert Stephenson and others (1963:105–109) as consisting of three types: Mockley Cord Marked, Mockley Net Impressed, and Mockley Plain. The Mockley series nomenclature was adopted in this study in preference to Evans' (1955:46–47) Chickahominy Cord Marked and Potts Net Impressed and Roughened types, that are considered synonymous, in order to more precisely identify Middle Woodland shell-tempered types from their Late Woodland counterparts (Potter 1982:118). Dates for the Mockly series from southern Deleware to the James River on the Virginia coast range from about A.D. 200 to A.D. 880 (Artusy 1976:9; Barka and McCarry 1997:43; Gardner and McNett 1971:29; Opperman 1980:4; Potter 1982:121; Waselkov 1982). In this region, Mockley ware is characterized as having thick vessel walls, coarse shell temper, cord-marked or net-impressed surfaces, and simple conical jar forms with direct rims, wide mouths, and semiconical or rounded bottoms (Table 3.9) (Potter 1982:124).

Mockley series vessels, were first described by Stephenson et al. (1963:105–109) as large, coil-built jars with thick walls, straight or slightly everted rims, and rounded or semi-conical bases. Egloff and Potter (1982:103–104) note that the paste is often "clayey" and commonly includes sand, limonite, and organic matter. The size of the crushed, unfired, oyster-shell temper ranges up to one cm diameter, and composes 20–30% of the paste. Paste appears to be poorly consolidated and vessel walls range in thickness from 5–13 mm. A small percentage of Mockley sherds have been smoothed below the rim and decorated with broad, incised lines or punctations (Egloff and Potter 1982:103–104; Griffith and Artusy 1977:17–19; Opperman 1980:30; Potter 1982:124; Stephenson et

Table 3.9. Mockley Series Temper and Surface Treatment Variation.

Surface Treatment	Temper: Coarse Shell	Medium Shell	Fine Shell	Total
Net Impressed, Knotted	13	57	13	83
Cord Marked, indeterminate	5	12		17
Cord Marked, Parallel	7	5	1	13
Cord Marked, Perpendicular		5		5
Smoothed-over Net Impressed	1			1
Smoothed-over Cord Marked	1			1
Total	27	79	14	120

al. 1963:105–109; Steponaitis 1986:190). Potter (1982:124) suggests that in the tidewater region of Virginia cord marking was more common in the earlier part of the phase with net impressing more frequent in the later part. This trend has not been noted in southern Maryland (Herbert 1995:20) or on the coast of North Carolina, where net impressing appears to be the more popular of the two surface-treatment styles early in the sequence, with cord marking more popular in the later part of the period, persisting into the earliest portion of the Late Woodland (A.D. 800–900).

Mockley Cord Marked

This type is distinguished by cordage impressions on the exterior surface. Multi-ply (typically two-ply) cordage of 1–2 mm diameters appears to have been wrapped around a paddle sequentially with spaces between cords of 1–2 mm. Paddling created cord impressions that are typically parallel or oblique, appearing somewhat haphazard, often over-stamped and accidentally smeared or smoothed. Among specimens with recognizable twist direction, six specimens exhibited S-twist direction in the final ply of the cordage and three sherds exhibited Z-twist direction.

Mockley Net Impressed

This type is identified on the basis of net impressions on exterior vessel surfaces. The netting appears to have been made by knotting cordage with diameters from 1–2 mm, to create mesh dimensions ranging from 5–10 mm. The appearance of the surface often shows little other than the knot impressions, and over-stamping creates a visual effect that in other series has been called "knot roughened."

Townsend Series

The Townsend series is a Late Woodland (A.D. 900–1600) shell-tempered series found in the circum-Chesapeake area from coastal Delaware, Maryland, Virginia and North Carolina (Blaker 1963; Clark 1976:178–208; Egloff and Potter 1982:107–108; Griffith 1977:146–147, 1980:32; Peck 1978:19–22; Potter 1993: 114–119; Stephenson et al. 1963; Steponaitis 1980:16, 1986:191–192; Wright 1973:16–24). Blaker (1963) originally defined the Townsend series as a shell-tempered, fabric-impressed ware, and several types have subsequently been defined principally on the basis of decorations made by incision or direct cord-impression (Clark 1976:178–208; Griffith 1977:146–147, 1980:32; Peck 1978:19–22; Steponaitis 1980:16, 1986:191–192; Wright 1973:16–24). The types identified in this study for the North Carolina coast include Townsend Fabric Impressed, Townsend Plain, and Colington Simple Stamped. The shell-tempered pottery defined by Phelps (1983) as associated with the Colington phase, and that defined by Loftfield (1979) as the White Oak series are here subsumed under the Townsend series.

Townsend Fabric Impressed

This type is identified by fabric-impressed surfaces. There is some suggestion that two sorts of Townsend Fabric Impressed may be distinguished. The first is characterized by mostly undecorated vessels with paddle-edge impressions that usually extend more than four centimeters down the interior of the neck (Marshall 1999). The second is charcterized by vessels that are often decorated around the neck with incised designs, and paddle-edge impressions that typically extend less than four centimeters down the interior of the neck. Whereas these differences may reflect geographic or temporal variants, it is unlikely that they represent different series or types. Five sorts of fabrics have been identified based on the structure of textiles including those with: (1) fine, (2) medium or (3) coarse cordage wefts interwoven over non-fiber warp elements, and (4) cordage wefts (usually medium) interwoven with flexible warp cordage elements. These variations, however, have not yet been found to have spatial or temporal significance and it would appear that all five textile types can be expected in either of the two varieties. By far the most common is medium width wefts interwoven over non-fiber warps.

Townsend Plain

This type is characterized by exterior surfaces that have been smoothed.

Colington Simple Stamped

This type is recognized by two varieties of simple stamping characterized by: (1) narrow (typically < 3 mm) impressions with rounded cross section, and (2) wide (about 5 mm) flat impressions that are typically rather shallow, suggesting that they were applied when the vessel was approaching the leather-hard stage of drying. Often, the simple-stamped surfaces appear to have been subsequently smoothed or partially burnished. Defined by Phelps (1983) this type appears to be restricted to the northern coast of North Carolina.

Swansboro Series

This series is characterized by fine-textured paste, fine or medium crushed shell temper, thin vessel walls, and burnished surfaces. It is thought to be late in the Late Woodland sequence or possibly Contact period and may be related to the Yeocomico series found on the Virginia coast (Potter 1982; Waselkov 1982) and to the Warekeck series (Binford 1965) found on sites in southeastern Virginia (principally Southampton County). It is not included in the Townsend series, but certainly appears to be a late manifestation of the shell-tempering tradition associated with the coastal Algonkians. Twenty-five shell-tempered burnished sherds were identified in this study and classified as Swansboro Burnished series. The crushed shell temper included fine (5), medium (18) and coarse (2) size grades. The larger size grades of shell used as temper marks a departure from the original type description for this series, but the presence of burnishing is thought to be a late characteristic. Of the 25 specimens found in this study, 16 were also burnished on the interior.

Brunswick Series

This Contact and Historic period (A.D. 1400–1700) series is characterized by paste to which fine or very fine sand has been added in very low proportions, or paste to which no sand at all has been added. Vessel walls are typically thin (averaging 6 mm) and well compacted. Color is usually grey to black, often with a buff colored outer film. The series was first defined by South (1960) to describe Colono-Indian ware found at Brunswick Town and Bath. South included burnished and plain types in the series. As plain sand-tempered sherds could be subsumed in many series, the Brunswick Plain type was not identified in this study of surface-collected sherds. In addition, the series as defined in this analysis, was expanded to three types: (1) burnished, (2) corncob-marked, or (3) bushed. The decision to include the few cob marked and brushed sherds executed on temperless paste in the Brunswick series was one of expedience. Although these samples are not associated with Colonial period contexts, it seems likely that they date to the same period as the Brunswick Burnished type, perhaps to the period just preceding European settlement. In the absence of information about vessel form, a critical component of the definition of the Brunswick series, the addition of Brushed and Cob Marked types to the Brunswick series is provisional. Although provisional, the inclusion of these surface treatment styles in the Brunswick series conveys the notion that the practice of burnishing high-fired, thin-walled, temperless ceramics was a prehistoric tradition in which vessel forms were modified in the historic period in response to European consumer demands.

Brunswick Burnished

The Brunswick Burnished type is identified by burnished exterior and often interior surface, and includes a variety of vessel forms including scalloped-lipped plates and loop-handled bowls that seem to mimic European ceramics, especially English White Salt-glazed Stoneware. They have been found at both the Brunswick Town and Bath sites in contexts with Oriental Porcelain, Delft, and White Salt-glazed Stoneware (South 1976). In this study, only three Brunswick Burnished sherds were identified.

Brunswick Cob Marked

This type, added to South's original Brunswick series, is similarly tempered, but exterior surfaces are marked by corncob impressions. The impressions may have been rouletted, or stamped. The corncob impressed type is thought to date to the latest portion of the Late Woodland and contact periods and may be related to Ashley Corncob Impressed from the coast of South Carolina (South 1976). Only two cob-marked sherds were found in this study.

Brunswick Brushed

This type is recognized by brushed exterior surface finishes. It is assumed to date to the same post-Contact and Contact periods, but no dates for the type have yet confirmed this assumption. Only one Brunswick Brushed sherd was identified in this study.

CHAPTER 4

EXCAVATED SITES AND TEMPORAL TRENDS

This chapter presents the evidence provided by several key sites with stratified artifact assemblages or dated samples with the aim of identifying temporal trends in pottery styles.

Bandon, Cape Creek and Whalen Sites

Pottery assemblages from three stratified sites excavated by William G. Haag in 1956 are analyzed: the Bandon site (31CO1), representing the lower Chowan River basin and upper Albemarle Sound, the Cape Creek site (31DR1) representing the Outer Banks, and the Whalen site (31BF26) representing the Pamlico River and Pamlico Sound area. Sites with dated samples discussed in this chapter include the Papanow and Pond Trail sites (Herbert 1997) and the Riegelwood site (Abbott et al. 1999) from the lower Cape Fear River basin, the McLean Mound assemblage (Irwin et al. 1999; MacCord 1966) from the upper Cape Fear River, and several TL-dated samples from sites on Fort Bragg (Herbert et al. 2002) representing the Sandhills. Although sample sizes are relatively small, these excavated assemblages and dated samples provide the information necessary to sequence the pottery types described in Chapter 3 and represented in the surface-collected assemblages used to assess geographic distributions (see Chapter 6).

Bandon Site

The rich prehistoric shell midden at the Bandon site on what was then "the John and Inglis Fletcher plantation" was well known to avocational and professional archaeologists working in the mid-fifties (Haag 1958:47). Haag, however, was the only one of his contemporaries to excavate there. His description of the site and results of analysis are reported in *The Archaeology of Coastal North Carolina* (Haag 1958). Haag (1958:47) began his discussion of the Bandon site in the following way, "This fine midden is one of the largest in northeastern North Carolina. It is most probable that an extensive excavation would prove rewarding." In addition to the shell midden, he noted the presence of two sand mounds known to the local residents as Indian mounds. Unfortunately, professional excavations have not been conducted at the Bandon site since the time of Haag's visit and much of the site has been lost to erosion and residential development.

The Bandon site is located about 15 miles north of Denton on a high bluff overlooking the Chowan River, just above the Albemarle Sound (Figure 4.1). The Chowan is fresh at this location and Haag reported that none of the shell composing the midden was oyster. At the time of his visit, the shell midden was about 1000 feet long and 200 feet wide. Haag judged the maximum thickness (depth) of the shell midden to be slightly less than ten feet. In the location where his excavation unit was placed, the midden was just over six feet deep. It is reported that the shell from this deep midden was mined for agricultural lime in the years before (and possibly after) excavation and it is likely that the upper portion of the midden was significantly disturbed in many areas. Haag indicates that he consciously selected the placement of his excavation in an area he thought to be least disturbed by farming. The 5-x-5-ft unit, excavated in arbitrary 3-in levels, represents an unparalleled opportunity to explore the prehistoric ceramic sequence from the lower Chowan basin and upper Albemarle sound.

Haag's analysis reported 847 sherds from 15 excavation levels (all were 3-in levels except Level 1, which was 9 in bring the total depth of the pottery-bearing zones to 48 in) and 92 sherds from a pit intruding into the subsoil beneath the midden (Haag 1958:101, Table 5). The upper nine inches of fill was almost certainly plowzone and contained numerous historic artifacts including pig bones, bricks, plaster, glass, crockery and kaolin pipe fragments. Haag (1958:102) made two observations, the absence of shell-tempered ware and an abundance of net-impressed wares in the lower levels, that he said demonstrated "the cultural position of the site to be quite different from the Cape Creek site and other Outer Banks sites." The first of these observations was incorrect; shell-tempered Colington series ware is represented in the upper levels. Certain, however, is the observation that the majority of the midden is attributable to a very long occupational history that spanned the Middle and possibly Early Woodland periods when the tradition of net impressing flourished and then waned.

Differences between Haag's results (1958:101, Table 5) and those presented in this analysis regarding the total number of prehistoric sherds and attributes observed are due to the use of different artifact class definitions and analytical techniques. Pottery from the Bandon site analyzed for this

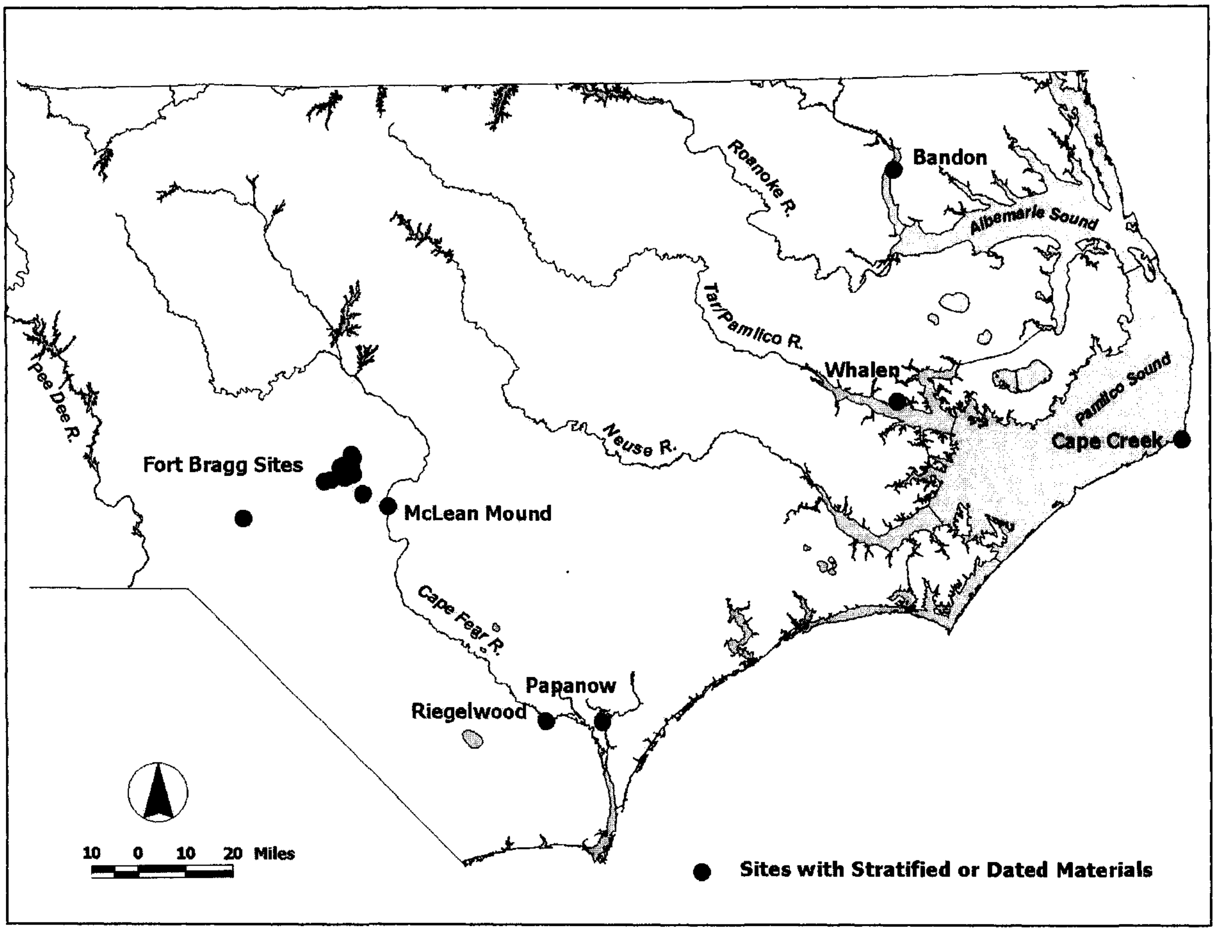

Figure 4.1. Map of eastern North Carolina showing locations of excavated sites with stratified or dated pottery assemblages discussed in this chapter.

study includes 910 sherds from 15 levels and those from the sub-midden pit (Table 4.1). Sherds were distributed among eight temper classes and eight surface-treatment classes. The majority (90%) of the sherds was tempered with quartz sand and most include some very coarse or granule size grains. Smaller numbers of sherds with clay or shell temper were observed. Most sherds (73%) were fabric impressed with fewer having net-impressed, cord-marked, stamped/smoothed, or simple-stamped surfaces.

The relative frequency of types among excavation levels suggests the possibility of multiple temporal components, or pottery series recognizable by variations in temper (Table 4.2). This is easily seen in a frequency percentage graph (Figure 4.2). Although frequency percentage graphs appear similar to seriation charts, the box sizes in each row correspond to the relative frequency of pottery attributes found in each excavation level.

Table 4.1. Crosstabulation of Temper and Exterior Surface Treatment of Bandon Site Pottery.

	Temper										
Exterior Surface Treatment	None	Medium Sand	Coarse Sand	Very Coarse Sand	Very Coarse Sand/Shell	Granule	Granule/ Shell	Clay	Clay/ Marl	Shell	Total
None			4	1		9					14
Smoothed		3	3	6		1		1			14
Smoothed/Simple-stamped				5		2					7
Smoothed/Cord-marked			1								1
Smoothed/Fabric-impressed				2		3				3	8
Simple-stamped										3	3
Net-impressed	4	4	2	1				5			16
Net-impressed, knotted (open)		2	16	10		10		4			42
Net-impressed, knotted (closed)		7	5	3		31	4	1	3	2	56
Net-impressed, looped				2							2
Cord-marked, parallel				1							1
Cord-marked, parallel (s-twist)		10		3		1		1			15
Cord-marked, parallel (z-twist)				4		17					21
Cord-marked, perpendicular (s-twist)		1	2	9							12
Cord-marked, perpendicular (z-twist)			1	4		2					7
Fabric-impressed				49		15		3		2	69
Fabric-impressed, coarse-weft				20		11					31
Fabric-impressed, medium-weft	1		5	238	4	103				33	384
Fabric-impressed, fine-weft				56		14				14	84
Fabric-impressed, flexible warp		1	1	52		29					83
Fabric-impressed, spaced weft		6				20					26
Eroded		3	6					5			14
Total	5	37	46	466	4	268	4	20	3	57	910

Table 4.2. Temper Types by Level at the Bandon Site.

Level	Temper: None	Medium Sand	Coarse Sand	Very Coarse Sand	Granule	Clay	Shell	Granule/ Shell	Total
1			1	2					3
2				17			1		18
3	1		3	2			2		8
4			1	25			4		30
5				52			24		76
6				71			13		84
7			2	76			4		82
8		1	7	55	6		3		72
9		3	6	74	1	1	1		86
10			6	68	2				76
11		2	1	8	59	8			78
12		1	5	1	51	10			68
13		5		1	38				44
14		8	12	12	18			8	58
15	4	6		2	22		3		37
Pit		11	2		71	4	2		90
Total	5	37	46	466	268	23	57	8	910

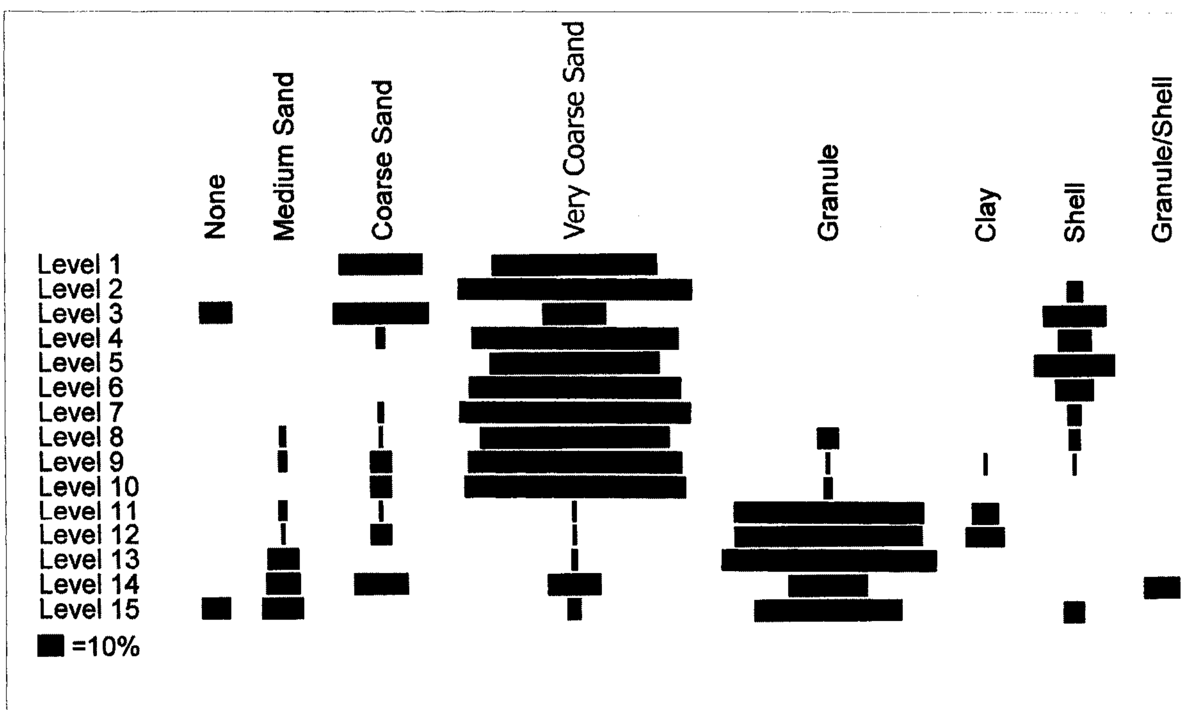

Figure 4.2. Frequency percentage chart of temper by level from the Bandon site.

A similar pattern is exhibited by sherds tempered with granules (usually rounded or sub-rounded quartz grains [>2 mm] comprising less that 15 percent of the paste). Above Level 11, the majority of sherds are tempered with coarse sand and below Level 10 with granules. Shell-tempered sherds occur primarily in the upper nine levels, but there are also a small number of sherds in levels 14 and 15 and the sub-midden pit that are tempered with shell or mixtures of shell and coarse sand or shell and granules occasionally also including clay lumps. In addition, three of the four clay-tempered sherds found in the sub-midden pit appear to include some marl. Although lumped with the clay-tempered sherds in this illustration, the sherds including marl are classified as Hamp's Landing in the discussion of series and types that follows. The sherds in the sub-midden pit which include mostly granule-tempered ware but also sherds with odd mixtures of clay, shell, and marl suggest an eclectic tempering tradition early in the occupational sequence.

Several components are also indicated by proportions of surface-treatment types in each level (Table 4.3 and Figure 4.3). Fabric impressing contributes the greatest proportion in every level except Level 1 (where sample sizes are too small to be representative), but proportions are slightly reduced in the lower levels. Net-impressed ware is not represented above Level 6 and is most frequent in Level 13, placing it early in the sequence. Cord marking appears in low frequency in almost every level below Level 3 (except for one cord-marked sherd in the plowzone, Level 1). The only evidence that might provide a clue as to the temporal placement of cord marking is its absence in Levels 2 and 3, where all sherds were fabric impressed, suggesting that cord marking is not late in the series at the Bandon site. Simple stamping is almost completely absent; three simple-stamped sherds were noted in Level 5.

There is also some indication of temporal variation in the data recorded about differences in the structure of fabric impressed on vessel surfaces (Table 4.4). Two sorts of fabrics were recognized; those with rigid warp elements and those with flexible warp elements. Samples impressed with rigid-warp textile were further subdivided according to weft diameter into coarse (>2 mm), medium (1–2 mm), and fine (<1 mm). In almost all cases the fabric was weft-faced, such that weft elements were packed tightly together leaving the warp elements completely covered except where weft cords were worn through. A small subset of rigid-warp fabric, however, exhibited wefts that were interwoven with spaces between them, usually about the width of the diameter of the weft cord itself. (In small sherds or special cases, this variety is difficult to distinguish from surfaces stamped with the paddle edge.) In general, the rigid-warp, medium-weft interwoven (or plaited)

Table 4.3. Surface-treatment Types by Level at the Bandon Site.

Level	Surface Treatment								
	None	Smoothed	Smoothed/ Stamped	Simple-stamped	Net-impressed	Cord-marked	Fabric-impressed	Eroded	Total
1		1	1			1			3
2							18		18
3							8		8
4			2			1	27		30
5				3		4	69		76
6		1			1	2	80		84
7		1			2	1	78		82
8		6			10	4	52		72
9		4	2		9	5	60	6	86
10	5		4		3	2	61	1	76
11			1		11	3	56	7	78
12		1	3		9	2	40	13	68
13					16	2	26		44
14					15		34	9	58
15			3		8	2	22	2	37
Pit	9				31	27	23		90
Total	14	14	16	3	115	56	654	38	910

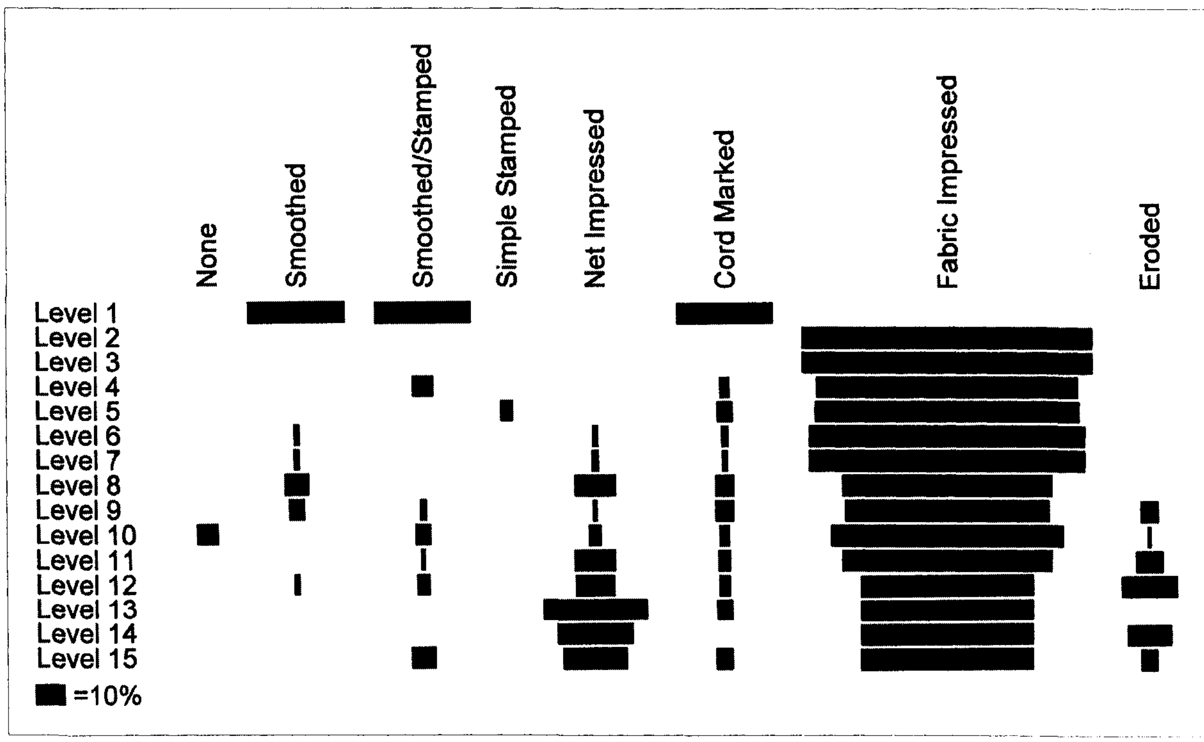

Figure 4.3. Frequency percentage chart of surface treatment by level from the Bandon site.

Table 4.4. Frequency of Sherds among Fabric Classes by Level from the Bandon Site.

Level	Fabric Structure						Total
	Fabric-impressed	Coarse-weft	Medium-weft	Fine-weft	Spaced-weft	Flexible-warp	
1							
2			18				18
3			8				8
4			21	6			27
5		3	50	11		5	69
6	16	4	41	14		5	80
7	29	2	29	15		3	78
8		2	29	6		15	52
9		4	25	9		22	60
10		7	42	9		3	61
11	1	3	29	9		14	56
12		4	28			8	40
13		1	20			5	26
14			21	2	11		34
15			5	2	15		22
Pit		1	18	1		3	23
Total	46	31	384	84	26	83	654

textile was most common in every level. There is some suggestion that rigid-warp fine-weft fabric is later in the sequence than flexible-warp fabric, but this pattern is not especially strong. Spaced-weft fabric was identified only in the lower two levels (14 and 15), suggesting it may be an earlier variant.

The structure of cordage used in marking pottery was also investigated as a potential temporal indicator (Table 4.5). Cord-marked ware was divided into two categories, those with cord impressions that were essentially parallel and those exhibiting cord impressions that were over-stamped at nearly perpendicular angles. There is some evidence that the parallel cord-marked variety is earlier than the perpendicular variant in the series, but the data are merely suggestive. Cord-marked sherds occasionally exhibited such clear impressions that the twist direction of the cordage could be determined. The Bandon data reveal no preference for one or the other of these cord-making techniques at any point in time.

Table 4.5. Frequency of Sherds among Cordage Classes by Level from the Bandon Site.

Level	Cordage Structure					Total
	Parallel	Parallel (s-twist)	Parallel (z-twist)	Perpendicular (s-twist)	Perpendicular (z-twist)	
1					1	1
2						
3						
4					1	1
5				2	2	4
6		1		1		2
7				1		1
8	1		2		1	4
9				5		5
10			2			2
11			1	1	1	3
12		1			1	2
13			2			2
14						
15		2				2
Pit		11	14	2		27
Total	1	15	21	12	7	56

Given this arrangement of traits, and based on the series and type definitions presented in Chapter 2, it can be concluded that seven ceramic series are represented in the assemblage from the midden at Bandon: Hamp's Landing (represented by the three clay and marl-tempered sherds from the pit), New River, Hanover, Mockley, Mount Pleasant, Cape Fear, and Townsend (Table 4.6 and Table 4.4). Although the application of taxonomic series defined for the southern or central coastal areas, such as Hamp's Landing, New River and Cape Fear, may appear inappropriate for the Chowan Basin, it should be remembered that individual sherds were assigned to series and type classes on the basis of attributes and the taxonomic system described in Chapter 2. Applying this analytical procedure to pottery from the Bandon midden provides some very interesting results. The series illustrated in Table 4.6 and Figure 4.4 are arranged in approximate chronological order (oldest to youngest reading left to right), based on current interpretations. Given the definitions provided in Chapter 2, however, it appears that certain series and types are out of order. New River Net Impressed (its northern series equivalent being Deep Creek) is most frequent in the lower third of the midden (levels 11–15) as expected, but New River Fabric Impressed is more common in the middle third (levels 6–10).

Table 4.6. Frequency of Pottery Series and Types by Level from the Bandon Midden

	Hamp's	New River			Hanover				Mockley	Mount Pleasant				Cape Fear		Townsend[1]		Sand	
Level	Net	Net	Cord	Fabric	Net	Cord	Fabirc	Plain	Net	Net	Cord	Fabric	Plain	Cord	Fabric	Fabric	Stamped	Plain	Total
1														2				1	3
2															17	1			18
3															6	2			8
4		1												1	24	4			30
5				5										4	43	21	3		76
6		1	1	5										1	62	13		1	84
7		2		3										1	71	4		1	82
8		5	2	15						5	1			1	34	5		4	72
9		9		22				1				1		5	44	1		3	86
10		3	2	3								2			56			4	70
11		7	1		3		3			1	1	56	1	1	2				76
12		3		1	6	1				1	1	47	2		1				63
13		6								10	2	20							38
14		11		9								15			11				46
15		8	2									22				3		2	37
Pit	3	1	10		1				2	23	15	24		2					81
Total	3	57	18	63	10	1	3	1	2	40	20	187	3	18	371	54	3	16	870

[1]The Townsend series is comprised of White Oak Fabric Impressed and Colington Simple Stamped types.

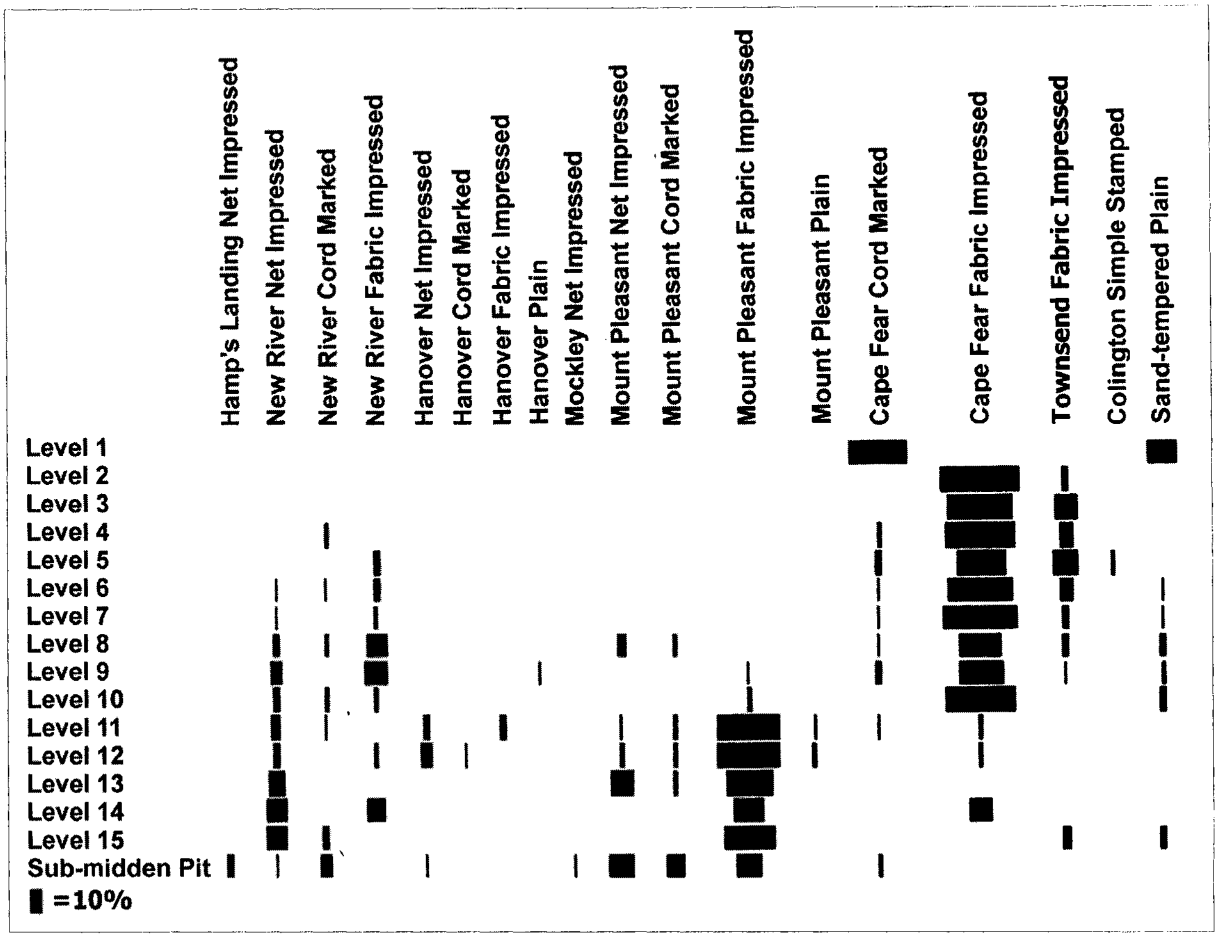

Figure 4.4. Percentage of pottery types by level from the Bandon site midden.

The Mount Pleasant series (granule and larger quartz temper) occurs almost entirely in the lowest five levels apparently contemporary with New River Net Impressed sherds. The sand/grit-tempered Cape Fear series, dominated by its Fabric Impressed type, is most frequent in the upper two thirds of the midden, co-occurring with shell-tempered Townsend series sherds.

The pottery from the Bandon midden raises a number of intriguing questions. Obviously, the classification of the major component of the pottery from the middle or late portions of the sequence as Cape Fear series is provocative in terms of the prehistory of the northern coastal region as we now know it. As current type descriptions stand, the sand/grit-tempered ware here classified as Cape Fear could not be classified to either the Cashie, or Mount Pleasant series. Detailed attribute analyses of large assemblages of Cashie and Mount Pleasant series pottery have yet to be published, but given the detailed description of the Cashie series offered by Phelps and Heath (1998), it very unlikely that this material is Cashie. No folded or decorated rims were noted in the assemblage and vessel interiors seemed to be normally treated, not extensively smoothed or floated. There are two remaining taxonomic options: (1) that this sand/grit-tempered, cord-marked and fabric-impressed material represents a variant of the Middle Woodland Mount Pleasant series without the characteristic granule or pebble temper (in which case it may also be classified as Cape Fear), or (2) that it represents a Late Woodland sand tempering tradition that has yet to be recognized, defined, and reported for assemblages from sites in the northern coastal area. Lacking chronometric data from the Bandon midden, or the pottery itself, it is impossible to determine if this material represents a Middle Woodland or Late Woodland component. Its position in the stratigraphic column certainly suggests that it coexisted with Townsend series shell-tempered ware. Overall, what these data suggest is that the taxonomic and chronological differences among sand-, sand/grit-, and sand/granule-tempered wares are not very well understood in the northern coastal region. Much more work is needed to fully characterize the differences between New River, Mount Pleasant, and any Late Woodland sand-tempered series that may exist in this region.

Cape Creek Site

The Cape Creek site (31DR1), now known to be the historically documented site of Croatan village, is located on the Outer Banks near Cape Hatteras, one-half mile west of the old tower and water tank support, northeast of Buxton, near the mouth of Cape Creek on the Pamlico Sound (Figure 4.1). W. G. Haag visited this site during the summer of 1956 as part of his survey of coastal North Carolina and reported it "the best midden found on the Outer Banks" (Haag:1957:28). He was preceded by H. R. Harrington and Joffre L. Coe, both of whom made collections from the site.

Haag found the site to be an extensive midden consisting of shell and bone, drifted over with one to five feet of sand (Haag 1958:26). He estimated the midden occupied an area 500 feet square, with a depth, in the locations tested, rarely exceeding two feet. He speculated, however, that its size had been greatly diminished by shoreline erosion, attested by the local residents to be a consistent seasonal phenomenon and not the result of exceptional storms. Haag noted that no construction, plowing, or previous archaeological investigation had disturbed the site, but speculated that borrowing shell for road material had reduced the upper portion of the midden in some locations, especially where two roads transected the midden. Accordingly, Haag situated his 5-x-10-ft excavation "in the most propitious spot, that is, the least disturbed." Excavating in arbitrary threeinch levels, Haag found a rich humus zone beneath the shell midden suggesting to him the existence of a forest cover prior to prehistoric settlement. In the upper nine inches of the midden Haag found a number of historic artifacts including pipe bowl and stem fragments (of both native clay and kaolin), a metal button (Level 1), iron spikes, a cut brass fragment, a gun flint, and a historic potsherd. (Only the pipe fragments and gun flint are reported in Haag [1957]). A great deal of research has been conducted at the site in recent years by David S. Phelps, East Carolina University. Phelps also has found abundant evidence of European occupation at the site. European artifacts suggest that this period of the site's occupation was between 1690 and 1730; early in the historic era to be sure, but many decades later than the Roanoke colony that Haag hoped to find.

Haag's (1957:97, Table 3) tabulation of pottery from the excavation included 238 sherds. The analysis conducted for this study includes 442 sherds, the discrepancy possibly being due to the large number of eroded sherds that Haag may have ignored (Table 4.7). The pottery assemblage from Cape Creek is distinctly different from the Bandon site. Among the Cape Creek sherds 80 percent are shell-tempered, only nine percent are tempered with sand of any size grade, and only eight percent include granule-size quartz. Fifty-one percent of sherd surfaces are fabric impressed and 34 percent are simple stamped. Only three sherds are net impressed and two are cord marked. Although the shallowness of the midden where the excavation was placed prompted Haag (1957:97) to conclude that, "not much may be learned from this excavation . . . it is a homogeneous site with shell-tempered pottery," temporal patterning is discernable among pottery attributes observed by level (Table 4.8). Historic artifacts were found in Levels 1–3, but none were found in Levels 4 or 5. The fact that historic materials are found to a depth of 30 cm below the surface suggests some degree of vertical mixing has taken place within the midden at the test location. Shell-tempered sherds, while present in every level, were most numerous in Level 4. Also found in Level 4 were a significant number of sand-and-granule- (or sand-and-grit), and fine sand-tempered sherds. The near absence of these temper types among sherds found in Levels 1–3 suggests that these tempering traditions may not have persisted into historic times but were present in the pre-contact period. Although relative frequencies (proportions) of temper types in each level do not exhibit increasing or decreasing trends, the differences between the upper three levels and the lower two are apparent (Figure 4.5).

Table 4.7. Cross-tabulation of Temper by Surface Treatment from the Cape Creek Site.

Exterior Surface Treatment	Temper: None	Medium Sand	Coarse Sand	Very Coarse Sand	Granule	Sand/ Granule	Clay	Medium Shell	Coarse Shell	Total
None			2							2
Smoothed		2				1			25	28
Smoothed, Fabric-impressed									13	13
Smothedk, Simple-stamped									16	16
Simple-stamped										3
Simple-stamped, broad									6	6
Simple-stamped, narrow									124	124
Net-impressed, open-weave		1								1
Net-impressed, closed-weave			1			1				2
Cord-marked, parallel (s-twist)					1					1
Cord-marked, perpendicular (s-twist)						1				1
Fabric-impressed, coarse-weft			1			5				6
Fabric-impressed, medium-weft	1	25				15	9	11	13	74
Fabric-impressed, fine-weft								4	1	5
Fabric-impressed, flelxile-warp						3				3
Eroded		1		1	1			22	111	136
Eroded stamped		7				9		4	1	21
Total	1	36	4	1	2	35	9	44	310	442

Table 4.8. Temper Types by Level at the Cape Creek Site.

Level	Temper: None	Medium Sand	Coarse Sand	Very Coarse Sand	Granule	Sand/ Granule	Clay	Shell	Total
1		2	1					36	39
2				1	2			59	62
3	1	3	1					88	93
4		31				35	9	131	206
5			2					40	42
Total	1	36	4	1	2	35	9	354	442

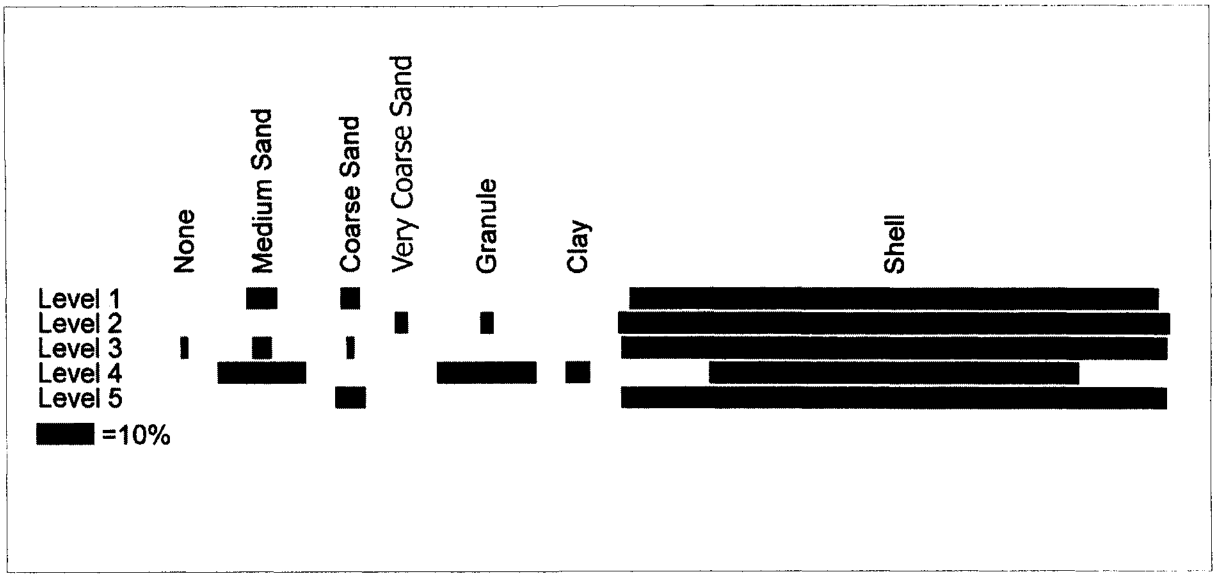

Figure 4.5. Frequency percentage chart of temper by level from the Cape Creek site.

Surface-treatment frequencies also show some temporal patterning (Table 4.9). The number of simple-stamped sherds is greatest in Levels 2–4. The number of fabric-impressed sherds is greatest in Levels 4 and 5. Smoothed (plain) sherds are most common in Level 3, and smoothed-over stamped sherds are most common in Level 4. Relative frequencies of surface treatment in each level illustrate the trends more clearly (Figure 4.6). Fabric impressing has the highest proportion in Level 5 and deceases throughout the level above. The greatest proportion of simple-stamped sherds occurs in Level 2, and proportions decrease in successively deeper levels.

Table 4.9. Surface Treatment Types by Level at the Cape Creek Site.

Level	None	Smoothed	Smoothed-Stamped	Simple Stamped	Net Impressed	Cord Marked	Fabric Impressed	Eroded	Total
1		1	2	7	1		5	23	39
2			9	37		1	4	11	62
3		20	5	38	1		4	25	93
4		7	14	48	1	1	60	75	206
5	2			3			15	22	42
Total	2	28	30	133	3	2	88	156	442

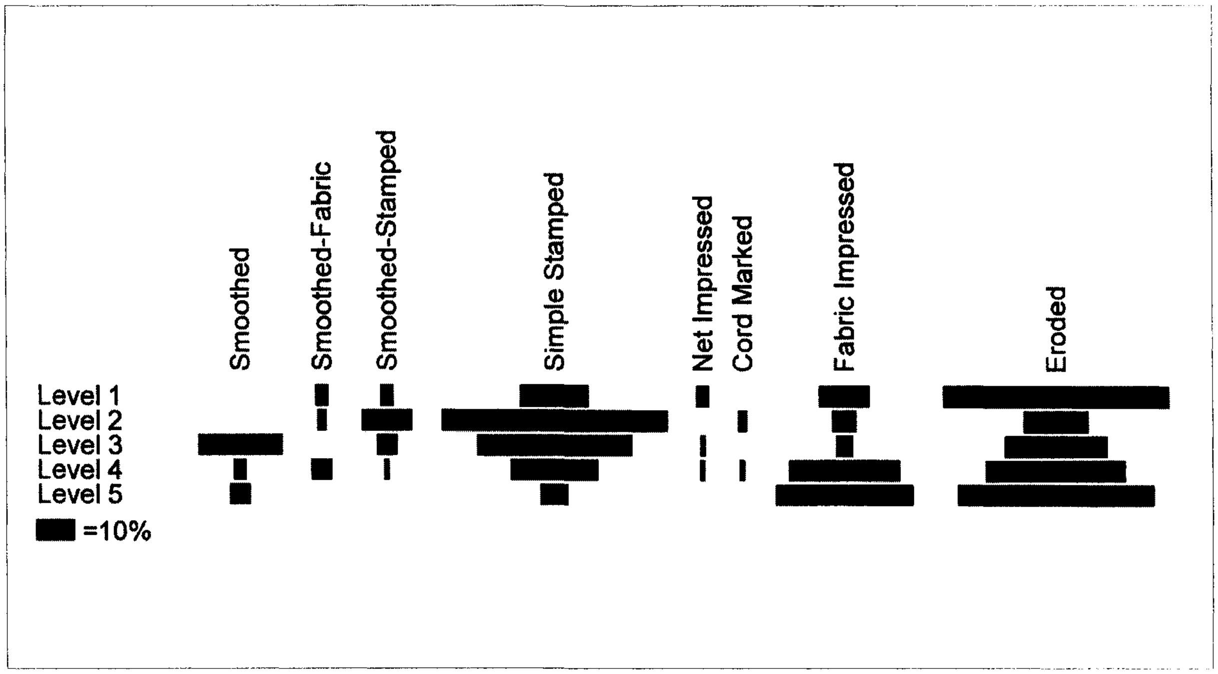

Figure 4.6. Frequency percentage chart of surface treatment by level from Cape Creek.

When combined in the taxonomic classes presented in Chapter 1, the ceramic series within the midden at Cape Creek are much more complex than might be expected (Figure 4.7). As the chart indicates, there are several Early and Middle Woodland sherds mixed with the Townsend series material. New River Net Impressed and Mount Pleasant Net Impressed reflect an early component. The fact that a few New River Net Impressed sherds were found in the first level probably reflects a certain amount of vertical mixing due to post depositional disturbance. Mount Pleasant Plain and Fabric Impressed, Hanover Fabric Impressed and Cape Fear Fabric Impressed series are all represented in Level 4 in very small amounts. The distribution of the Townsend series sherds illustrates the temporal relationships of types in this series. Townsend Fabric Impressed and Plain is more frequent in the lower levels with Colington Simple Stamped predominating in the upper levels. Throughout the column are found a small number of plain sand-tempered sherds.

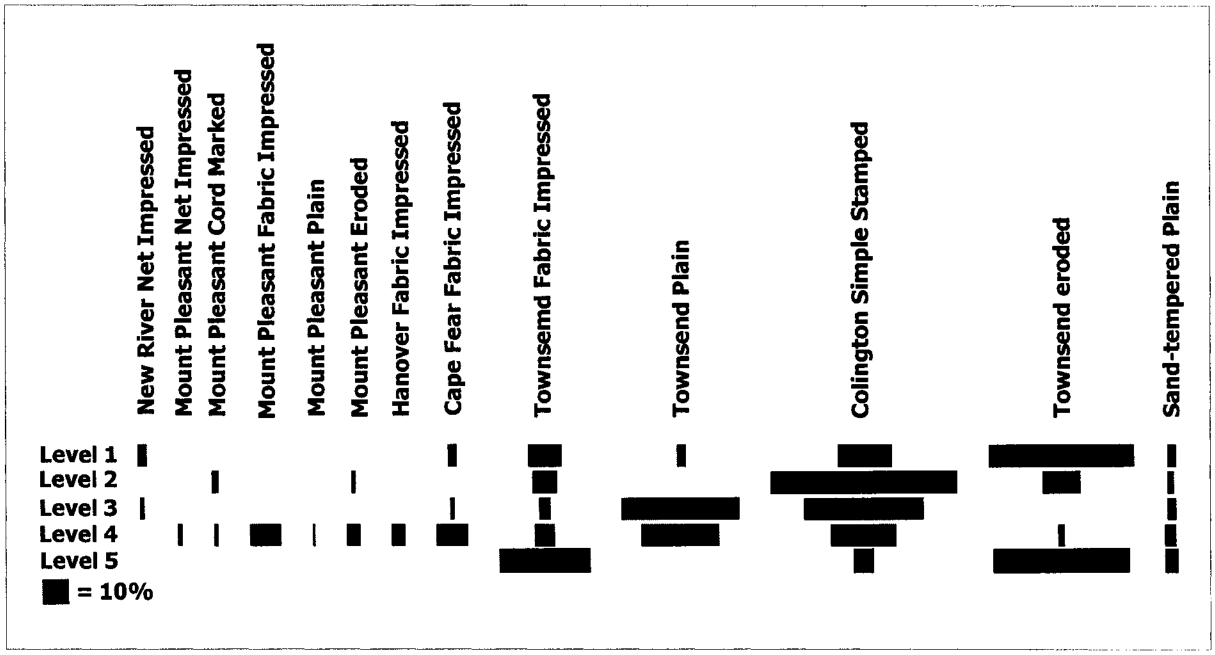

Figure 4.7. Frequency percentage chart of ceramic types by level from the Cape Creek site.

Whalen Site

The Whalen site (31BF26) is located on the west bank of St. Clair Creek at its conjunction with the Pamlico River (Figure 4.1). At this spot, a bluff extends for about eight hundred feet and upon this bluff is the Whalen site, what Haag (1957:48) referred to as "an excellent midden." Although the midden shape was irregular at the time of Haag's visit, he estimated based on surface indications that the site extended at least 600 feet back from the bluff edge in some places. As might be imagined, the site had long been known to local residents and previous "investigations" were reported, but none that Haag could "specifically determine."

Haag (1957:98) reports that storms in 1954 had cut away about 25 feet of the site and serious damage was also reported in 1955. A 5-x-5-ft test unit was placed in an area of the site Haag thought never to have been plowed and excavation proceeded in 3-inch arbitrary levels. The top three inches yielded soil mixed with shell and the next six inches "was nearly solid shell." Below nine inches "the shell was nearly absent although potsherds were more numerous. The soil gradually decreased in humus content and was quite clean at a depth of two feet."

Haag (1957:99, Table 4) tabulated 42 sherds recovered from his excavation. The reanalysis of that sample for this study includes 51 sherds (Table 4.10).

Table 4.10. Cross-tabulation of Temper and Surface Treatment of Sherds from Cape Creek.

	Temper						
Surface Treatment	Medium Sand	Coarse Sand	Granule	Clay	Clay/ Granule	Medium Shell	Total
Smoothed				1	2		3
Smoothed, Fabric-impressed				1	9		10
Net-impressed, closed weave		3		2			5
Cord-marked, perpendicular (z-twist)	1						1
Fabric-impressed, medium weft		1		5			6
Fabric-impressed, fine weft				5	2		7
Fabric-impressed, flexible warp			1	11			12
Eroded		2					2
Eroded cord-marked				2		2	4
Eroded net-impressed		1					1
Total	1	7	1	27	13	2	51

Unfortunately, the size of the sample of pottery recovered at the Whalen site was quite small. The distribution of temper attributes among the six excavation levels, therefore, provides only a suggestion of relative temporal sequence. Most sherds (50 %) were found in Level 5 and most of these (76 %) were tempered with clay (Table 4.11). There is some suggestion that clay-and-granule tempered sherds occupy a position later in the sequence than sherds tempered with clay alone, and the fact that the only shell-tempered sherds (n=2) were found in Level 1 suggests that they comprise the latest position in the sequence (Figure 4.8).

Table 4.11. Frequency of Sherds by Temper Class in Each Level from the Whalen Site.

	Temper						
Level	Medium Sand	Coarse Sand	Granule	Clay	Clay/ Granule	Shell	Total
1		2		1		2	5
2				2	3		5
3		1			6		7
4		1		5	2		8
5	1	2	1	19	2		25
6		1					1
Total	1	7	1	27	13	2	51

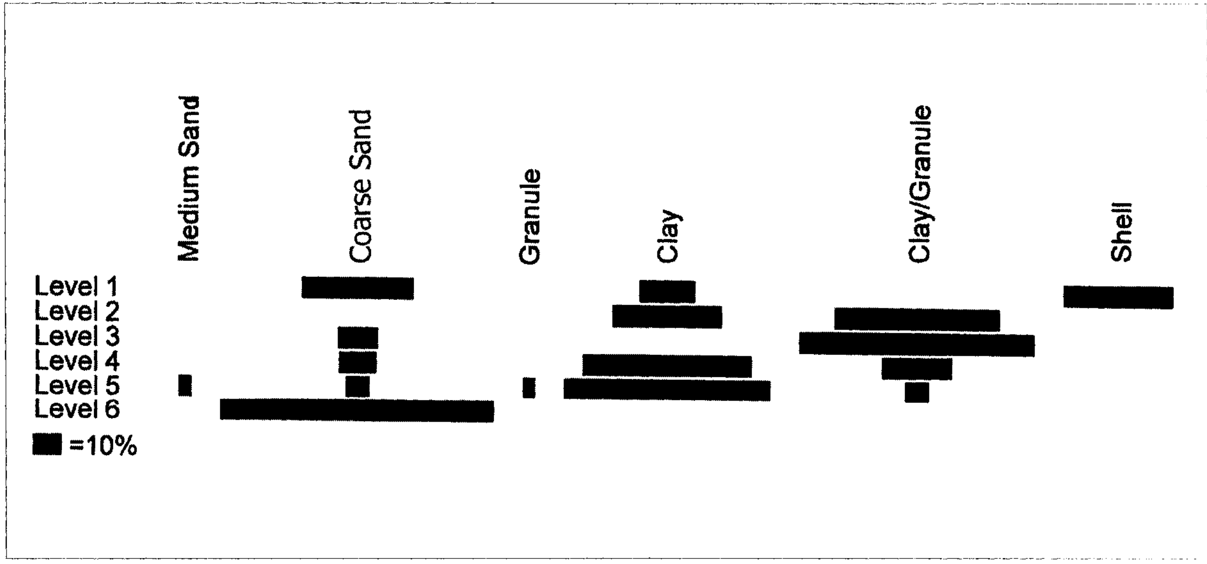

Figure 4.8. Frequency percentage chart of temper types by level at the Whalen site.

Evidence for sequencing surface-treatment attributes must also be considered tenuous because of the small sample size. The majority (59 %) of the sherds were fabric-impressed and these occurred in every level except Level 6 (Table 4.12). A small number (n=10) of sherds with smoothed-over stamped surfaces were found in Levels 2 and 3, and five net-impressed sherds were found in Levels 4–6 (Figure 4.9). Comparing the relative frequency of surface-treatment types in each level suggests that net-impressed sherds are among the earliest, and surface smoothing appears to occur late in the sequence.

Table 4.12. Frequency of Sherds among Surface-treatment Classes by Level from the Whalen Site.

	Surface Treatment						
Level	Smoothed	Soothed Stamped	Net Impressed	Cord Marked	Fabric Impressed	Eroded	Total
1	1				2	2	5
2		4			1		5
3		6			1		7
4	2		1		5		8
5			3	1	21		25
6			1				1
Total	3	10	5	1	30	2	51

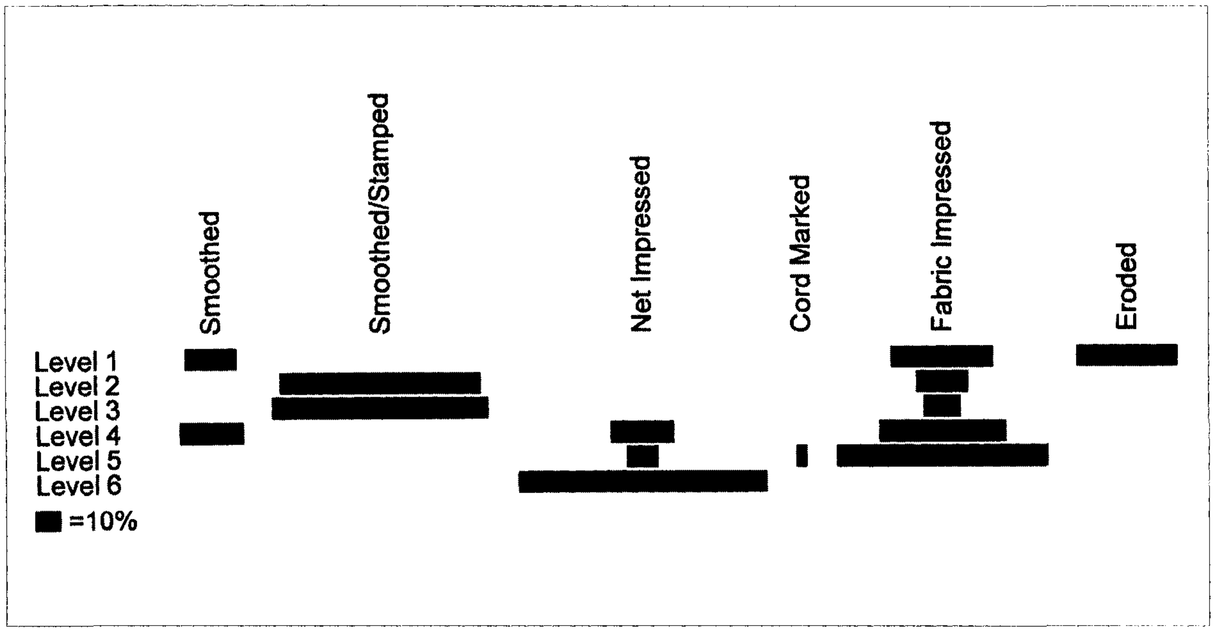

Figure 4.9. Frequency percentage chart of surface treatment by level from the Whalen site.

The vertical distribution of ceramic types among the levels at the Whalen site indicates that New River Net Impressed series materials are among the oldest (Figure 4.10). Interestingly, the Hanover Fabric Impressed and Mount Pleasant Fabric Impressed sherds appear in reverse order, with the Hanover series appearing earlier than Mount Pleasant. This arrangement may be due in part to the fact that most of the sherds classified as Mount Pleasant, based on the presence of granule-size quartz inclusions, also some contained clay temper. It may be that a local variant of the Hanover series includes some granules. Cape Fear Fabric Impressed sherds are only very slghtly represented in Level 4, and a few eroded sand-tempered sherds were found in the uppermost level. Townsend Fabric Impressed occur only in the uppermost level suggesting that they are the youngest of the series represented.

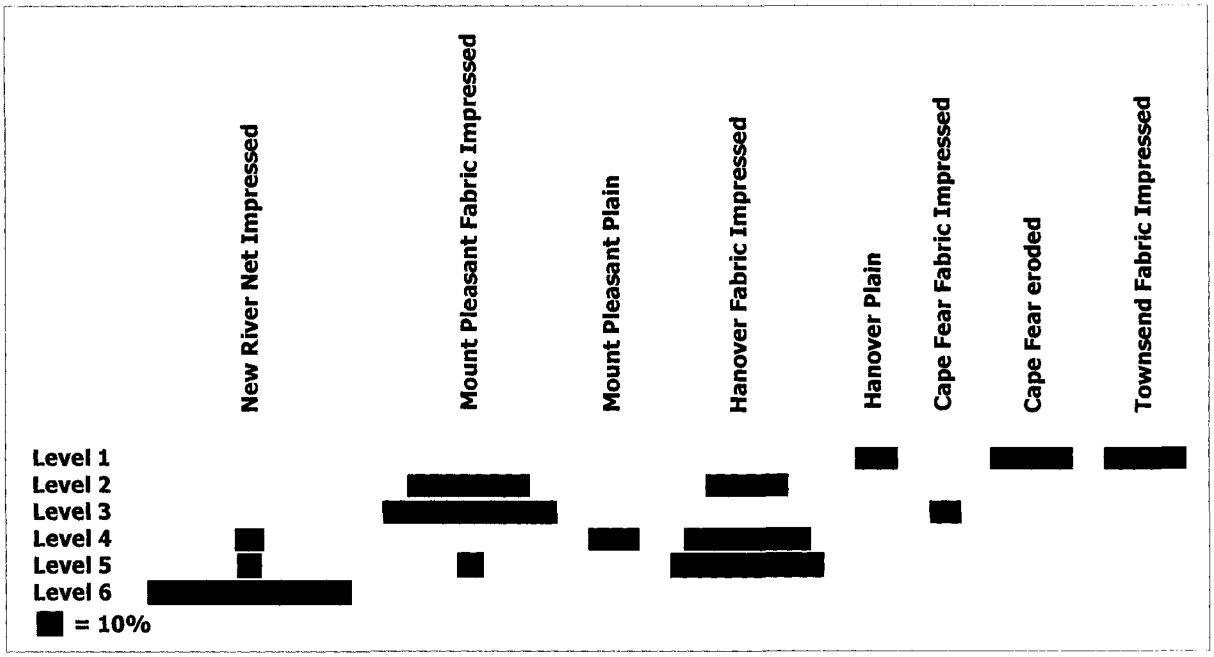

Figure 4.10. Frequency percentage chart of ceramic types from the Whalen site midden.

Conclusion

The Bandon site midden was deep and wonderfully rich. The pottery from the excavation is more diverse than the other two sites from the northern region and, perhaps because of the depth of the deposit, more clearly stratified. In the deepest levels, a certain number of sherds tempered with fine sand were noted (Table 4.2, Figure 4.2). About 37 percent of these were net-impressed, 29 percent cord-marked (parallel) and 20 percent fabric-impressed (flexible warp). The attribution of these sherds to the New River series is warranted based on Phelps' (1983:33) indication of the wide range in grain sizes of sand temper expected in this series. Most often, these sherds were net-impressed. Two varieties of net impressing were observed: knotted, open-weave, and knotted, closed-weave, sometimes referred to as "knot-roughened" (Figure 4.11). The data do not suggest any particular sequence for these varieties.

The pottery illustrated in Figure 4.11 is classified as New River series, although net-impressed surface treatment and sand tempering may also be found in the Mount Pleasant series (Phelps 1983: 33). Apparently, both sand tempering and net impressing are traditions that spanned many generations, finding expression in the wares of both Early and Middle Woodland potters. Phelps (1983:33) suggested that the frequency of net impressing increased through time with a greater proportion of net impressing found in the Mount Pleasant series than in Deep Creek (New River series). Data from the midden at Bandon, however, simply indicate higher percentages of net-impressed wares in the lower levels. Distinguishing between New River and Mount Pleasant series sherds in the Bandon assemblage was challenging. Distinction was made by identifying quartz sand grain sizes and proportions in fresh breaks under low power (10X) magnification. Sherds with a high proportion (> 20 %) of medium or fine sand, lacking granule-sized grains, were classified as New River. Those tempered principally with either fine sand or very fine sand, with granules or coarse sand grains occurring in low proportion (< 10 %), were classified as Mount Pleasant. In most cases, the distinction between these wares was relatively clear; even in hand-sample the surfaces of New River vessel fragments feel rough to the touch, while the Mount Pleasant sherds feel smoother, with obvious, occasional larger grains. The attribution of either ware to a unique culture phase associated with the series, however, would be inappropriate based on these data.

It is worth noting that the distinction between these two wares, hinging as it does in this context on the size and proportion of sand in the ceramic matrix, is based on a functional, rather than stylistic, feature of pot making. Since the range of sizes, shapes and proportions of sand observed in

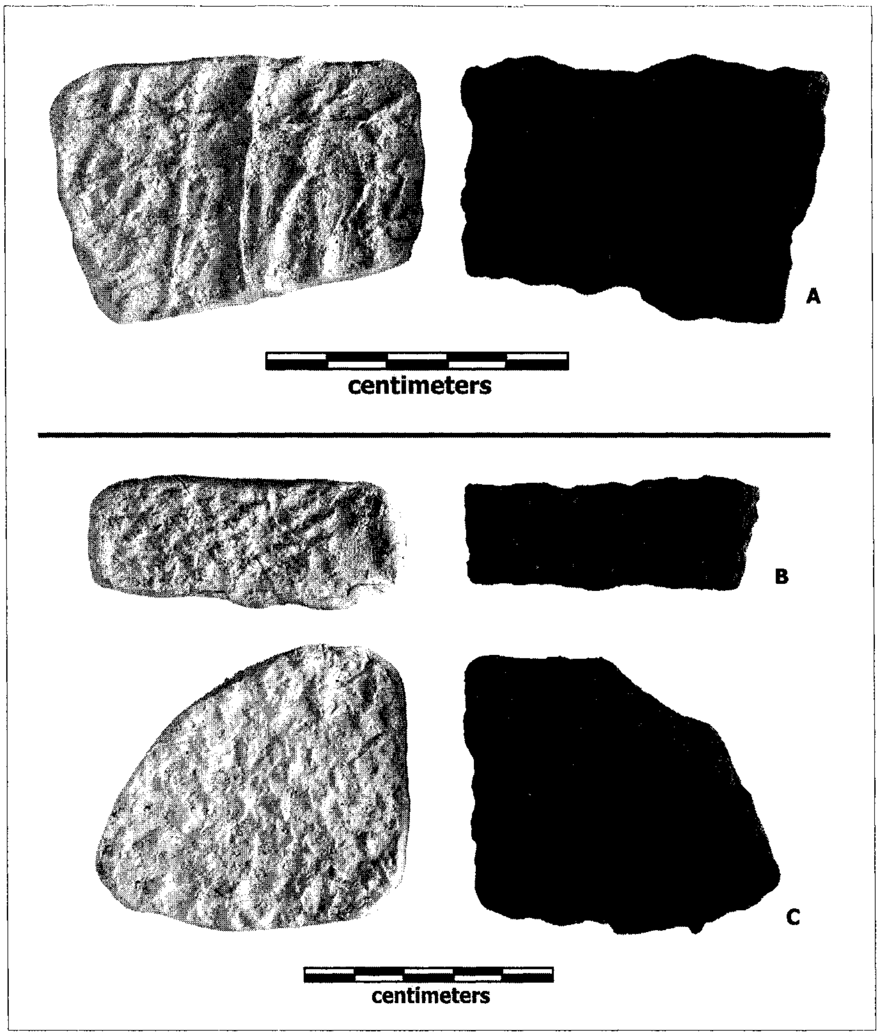

Figure 4.11. Sand-tempered, New River series pottery with net-impressed open-weave (A) and closed weave (B–C) surface treatment. Samples A and B are from the Bandon site, Level 9, and Sample C is from the surface at site 31Dr15.

the Bandon shreds was not outside the range that might occur in sediment included naturally in clay, the distinction between these two types may be enhanced in future studies with petrograpic studies. Furthermore, Phelps (1983:33) suggests that the Deep Creek (New River) and Mount Pleasant ceramic series represent phases of a continuous technological tradition. However, whereas Phelps (1983:33) suggests that the proportion of granule- or pebble-sized grains increases in proportion through time from the Deep Creek (New River) to Mount Pleasant series, data from the Bandon midden shows a shift from a higher frequency of the use of granule grain sizes in the lowest levels to an increased incidence of grains in the coarse sand size range in the middle levels (Table 4.2, Figure

4.2). The presence of clay-tempered sherds in Levels 11 and 12 might be taken as markers of the Middle Woodland tempering tradition associated with the Hanover series, but for the fact that they are principally net-impressed. The fact that they could only be identified as tempered with clay lumps, not clearly recognized as crushed pottery, or grog, leaves open to question that the inclusion of clay pellets was incidental to the technological process.

If, in fact, New River and Mount Pleasant series are accurately reflected in the classes of pottery described above as identified in this study, this continuum is very clearly illustrated in the Bandon midden by the replication of surface treatments in both temper series. The Mount Pleasant and New River series at Bandon included both open- and closed-weave net-impressed types (Figure 4.11, 4.12 and 4.13).

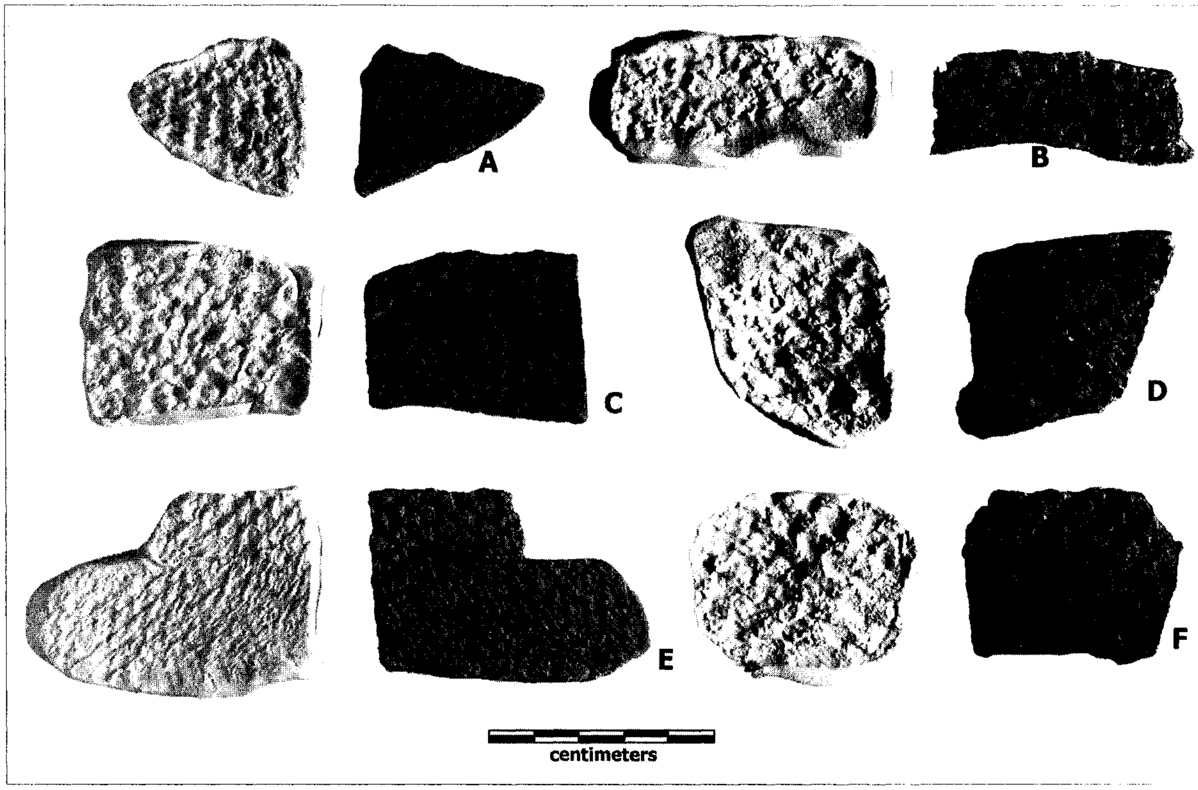

Figure 4.12. Mount Pleasant Net Impressed (knotted, closed-weave). All specimens are from the Bandon midden: (A and B) Level 12; (C) Level 11; (D and F) sub-midden pit; (E) Level 9.

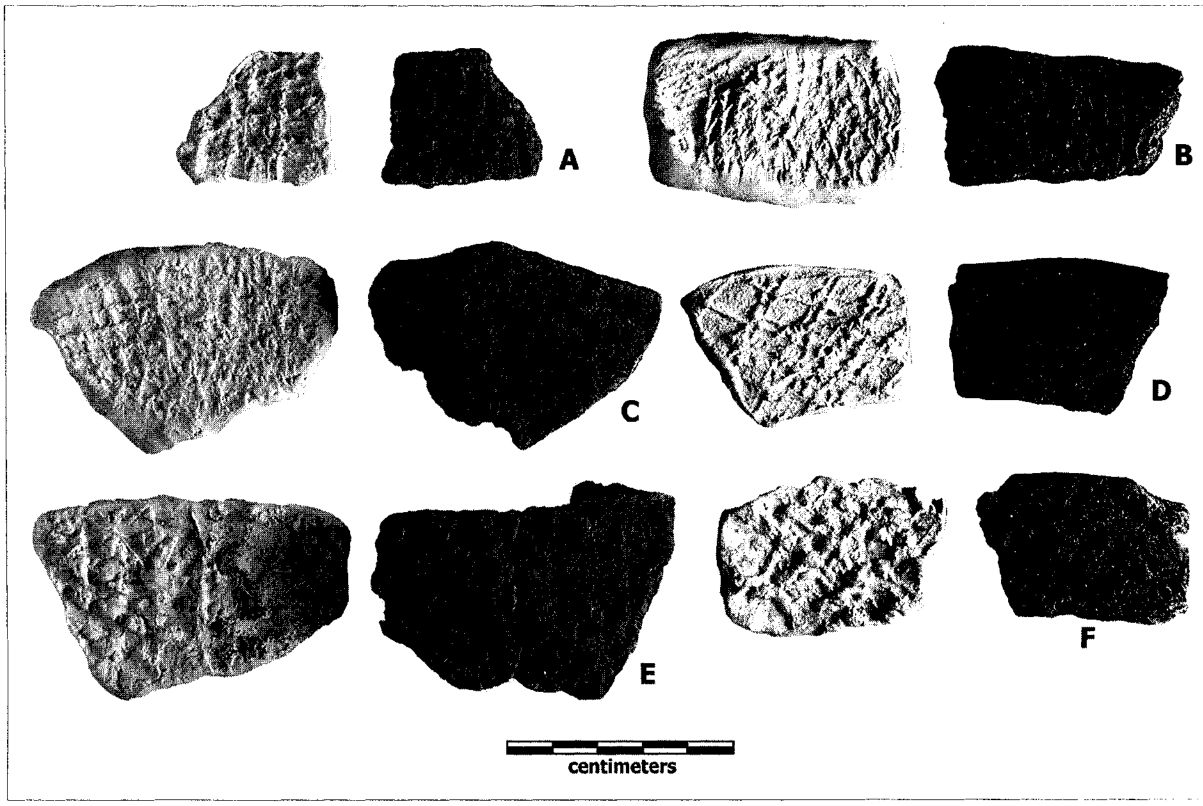

Figure 4.13. Mount Pleasant Net Impressed, (knotted, open-weave variety). All specimens are from the Bandon midden: (A and F) Level 10; (B and D) Level 12; (C and E) sub-midden pit.

Both series also included parallel and perpendicular cord-marked types (Figures 4.14 and 4.15). The Mount Pleasant series sherds included four types of fabric-impressed ware. The two broad categories of fabric-impressed ware (those with flexible cordage warp, and those with a non-cordage warp) are composed of four types: (1) a coarse weft-faced textile constructed of wefts greater than 2 mm diameter interwoven or twined around non-cordage warp and (Figure 4.16); (2) a medium weft-faced textile made with weft cordage 1–2 mm in diameter, interwoven or twined over non-cordage warp (Figure 4.17); (3) a fine weft-faced variety constructed of weft cordage with diameters less than or equal to 1 mm, interwoven or twined around non-cordage warp elements of a 2-4 mm diameter (Figure 4.18), and; (4) medium weft-faced textile interwoven or twined around flexible cordage or yarn of approximately the same diameter (Figure 4.19). The New River series wares included only the medium weft-faced, non-cordage warp, and medium weft-faced, flexible-warp types.

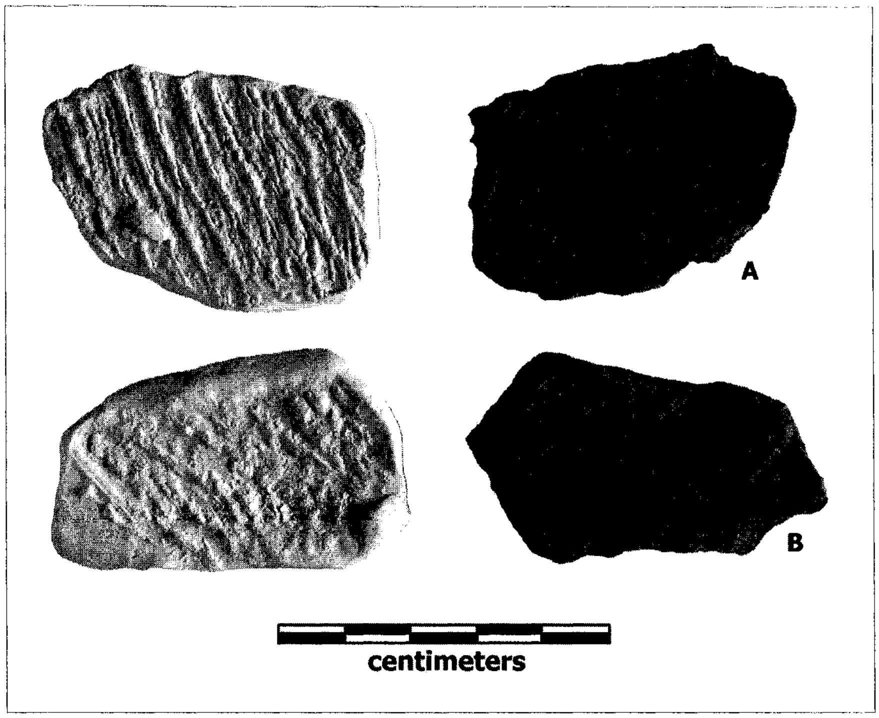

Figure 4.14. Mount Pleasant Cord Marked (parallel). Both specimens are from the Bandon midden: (A) Level 10; (B) Level 14.

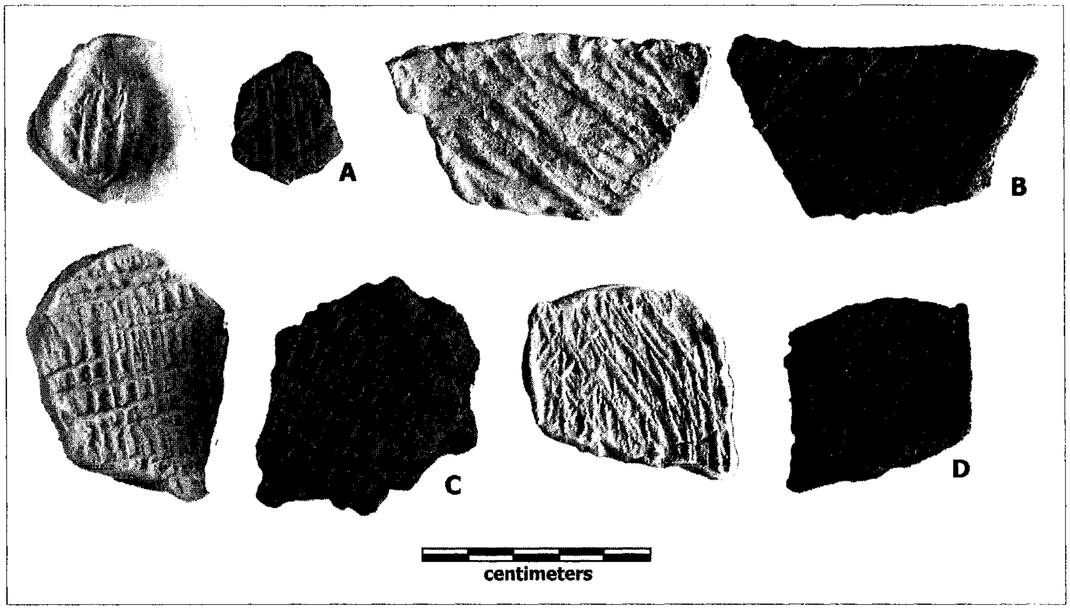

Figure 4.15. Mount Pleasant Cord Marked (perpendicular). All specimens are from the Bandon midden: (A) Level 5; (B) Level 10; (C) Level 9; (D) Level 12.

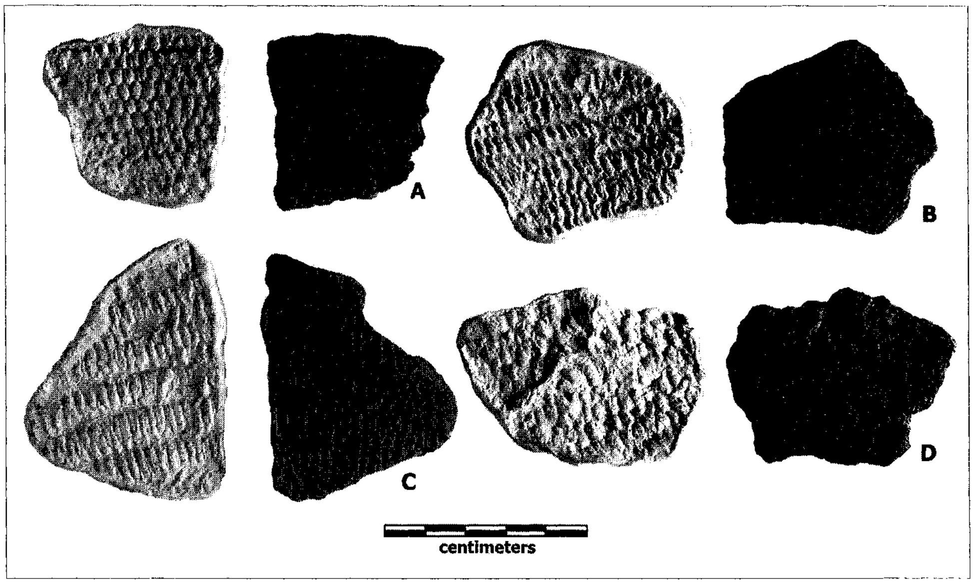

Figure 4.16. Mount Pleasant Fabric Impressed (coarse weft). All specimens are from the Bandon midden: (A and D) Level 8; (B) Level 9; (C) sub-midden pit.

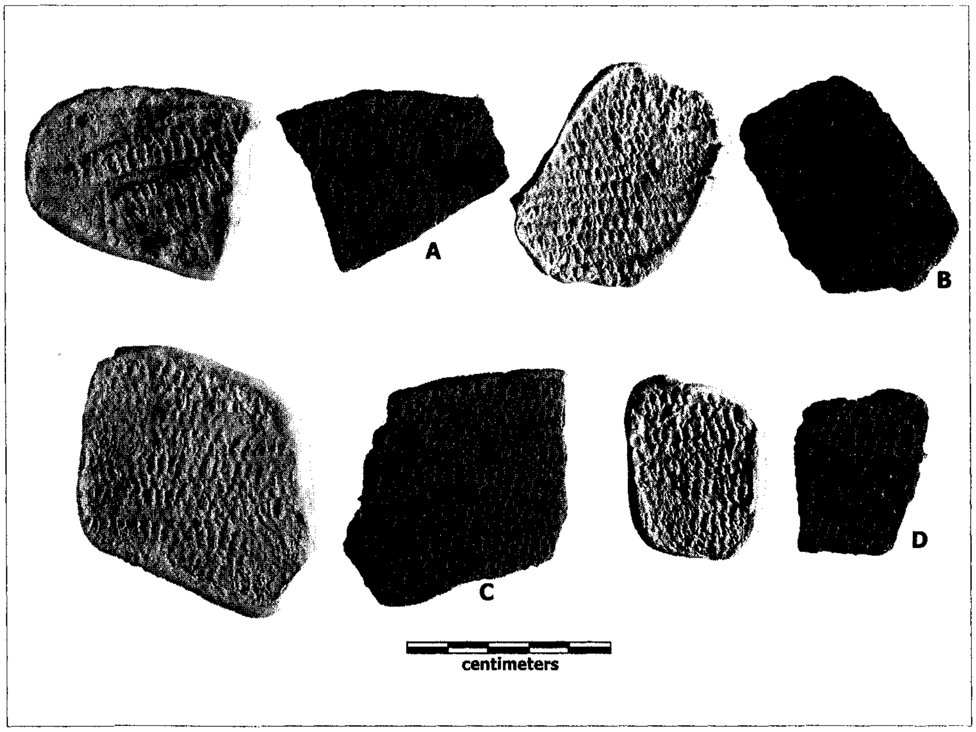

Figure 4.17. Mount Pleasant Fabric Impressed (medium-weft). All specimens are from the Bandon midden: (A and B) Level 7; (C and D) Level 8.

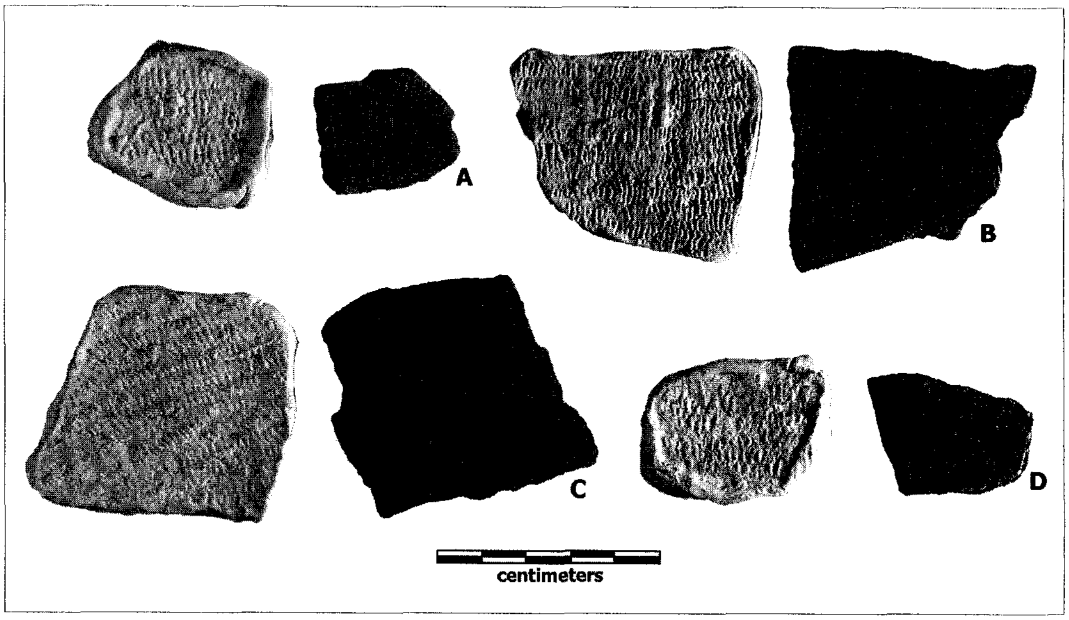

Figure 4.18. Mount Pleasant Fabric Impressed (fine-weft). All specimens are from the Bandon midden: (A and B) Level 9; (C) Level 7; (D) Level 8.

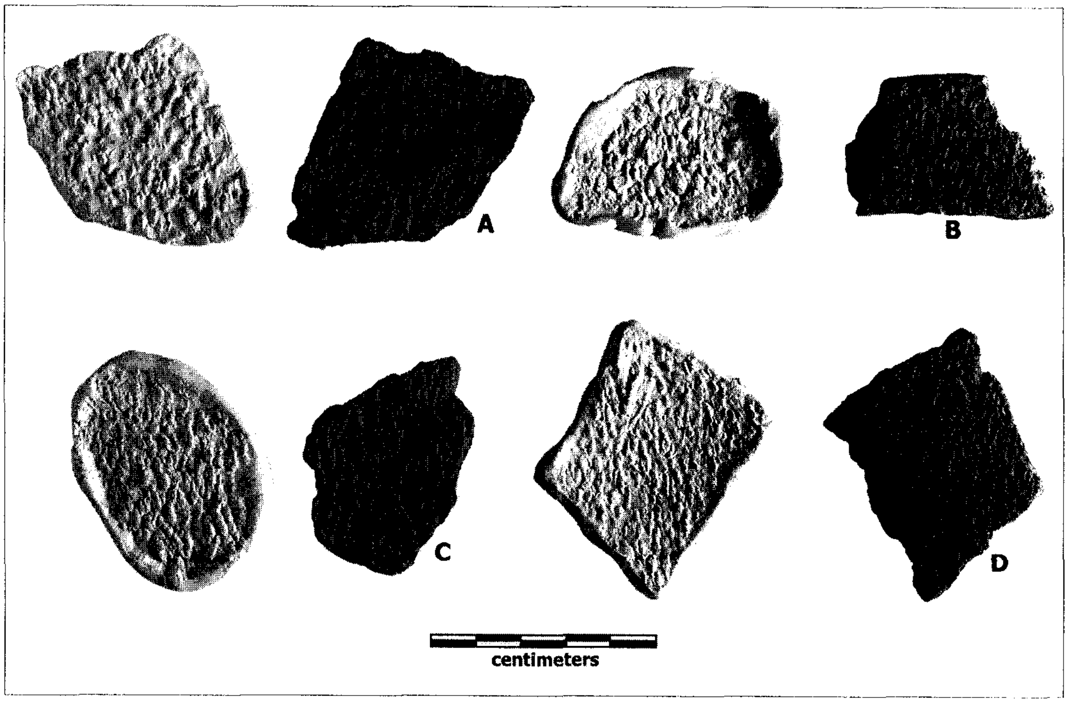

Figure 4.19. Mount Pleasant Fabric Impressed (flexible-warp). All specimens are from the Bandon midden: (A) Level 8; (B and C) Level 5; (D) Level 9.

Townsend series pottery occurred in the upper nine levels, mostly above Level 7 (Table 4.2, Figure 4.2). Most (58 %) of the Townsend ware was impressed with medium weft-faced, non-cordage warp fabric, and 25% was impressed with fine weft-faced, non-cordage warp fabric (Figure 4.20). A few simple-stamped Townsend series sherds were found in Level 5 (Figure 4.21). Inspection of the casts of the surfaces of simple-stamped sherds suggests that the structure of the implement used to create the surface texture was not a carved wooden paddle, but several reeds, or similar plant stem, arranged parallel to one another and used as a paddle. Two separate lines of evidence support this interpretation. First, the cast of one of the simple-stamped sherds (Figure 4.16 C) reveals the remnants of fine cordage interwoven in weft-faced fashion over a few millimeters of the central portion of the cast. Such interwoven cordage would serve well to bind several reeds into the shape of a flat-surfaced paddle. A second form of evidence for this interpretation is provided by several Mount Pleasant Fabric Impressed sherds that exhibit worn or widely spaced weft elements that reveal the non-cordage structure of the supporting warp (Figure 4.22). These examples leave little doubt that the warp foundation of much of the fabric used to impressed pottery in both the Middle Woodland Mount Pleasant and Late Woodland Townsend series traditions was not cordage, but a rigid plant stem similar to a reed.

The foregoing discussion has focused on the relative chronology derived from stratigraphic position of pottery from these sites. Another means for sequencing the ceramics from these middens is by analogy to similar ceramics that have been associated with radiocarbon-dated materials. The temporal sequencing, in absolute terms, of the pottery types from the Bandon, Cape Creek and Whalen middens, must be inferred from radiocarbon dates for organic materials associated with similar pottery found at other sites. Fortunately, there is a good radiocarbon database from other sites in the northern coastal area and, very recently, dates from excavations at the Cape Creek (Croatan) site have been obtained by David Phelps (personal communication 2000). For all areas of the coast, radiocarbon data are more abundant for the Late Woodland period (post A.D. 800) and the latter half of the Middle Woodland period (post A.D. 1) (Figure 4.23).

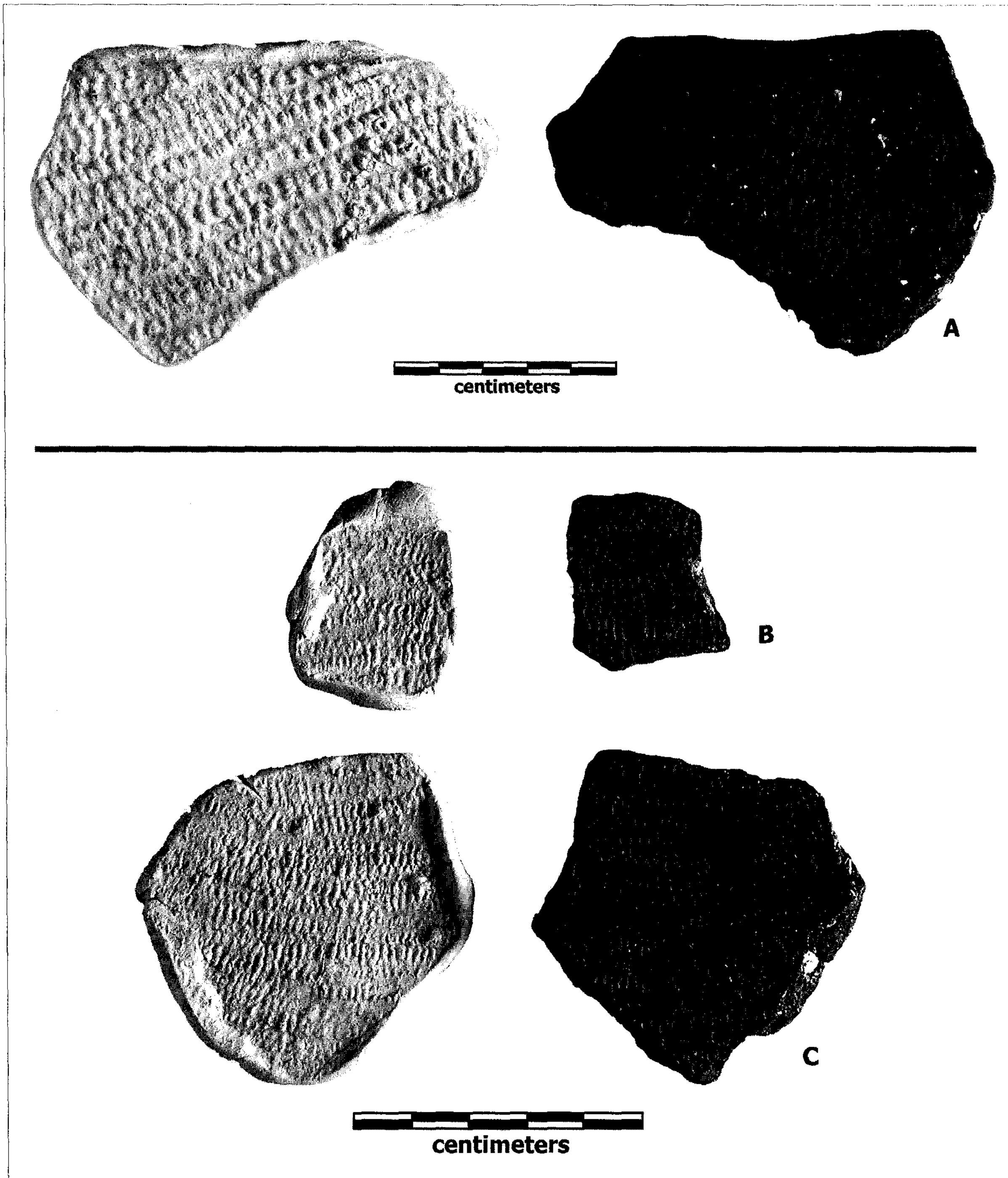

Figure 4.20. Townsend Fabric Impressed. Specimen A (medium-weft) is from the surface of site 31DR26, and specimens B and C (fine-weft) are from the Bandon midden, Level 5.

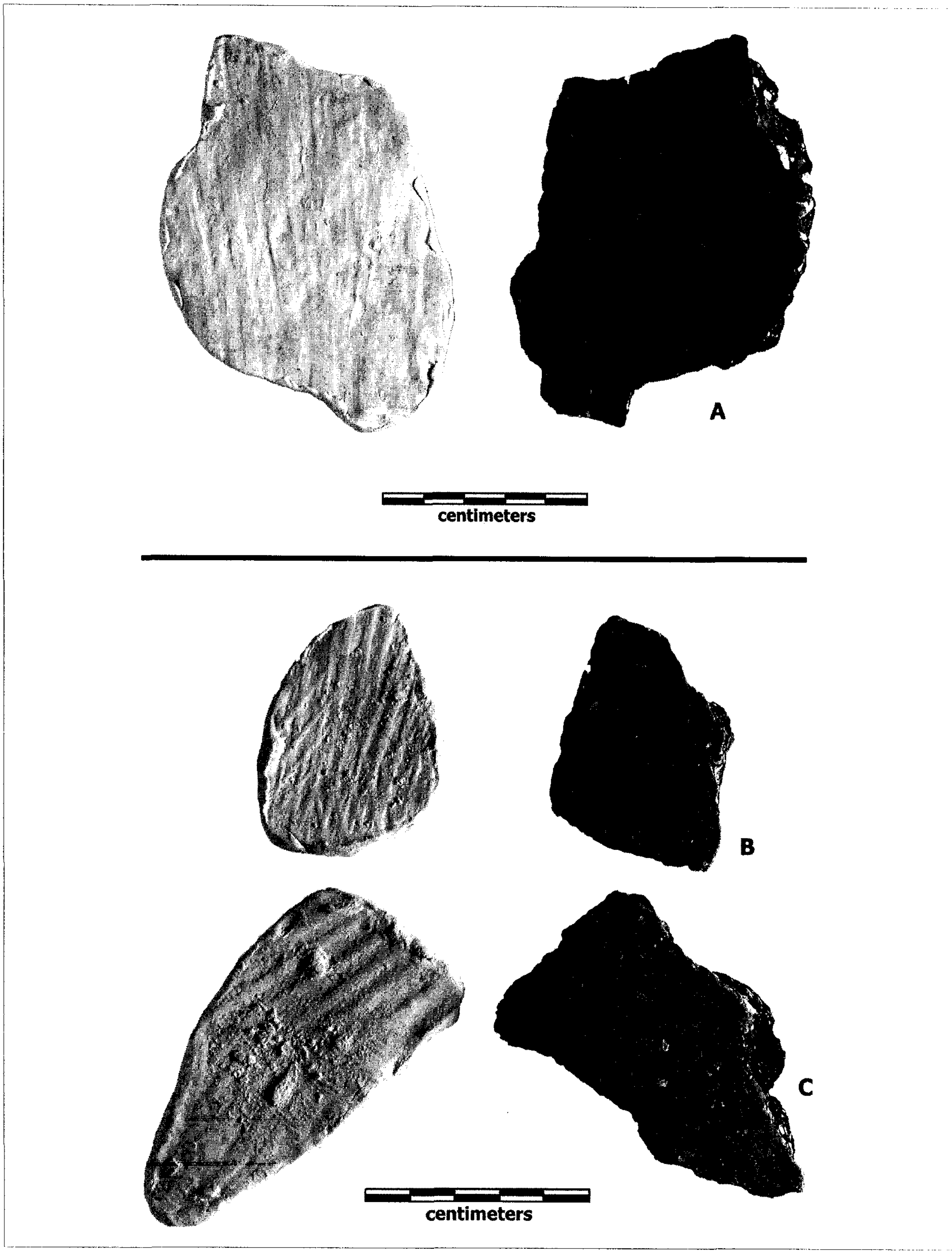

Figure 4.21. Townsend series Colington Simple Stamped. All specimens are from the Cape Creek site, Level 4. Notice the fine weft cordage apparently interwoven around simple-stamping elements in specimen C.

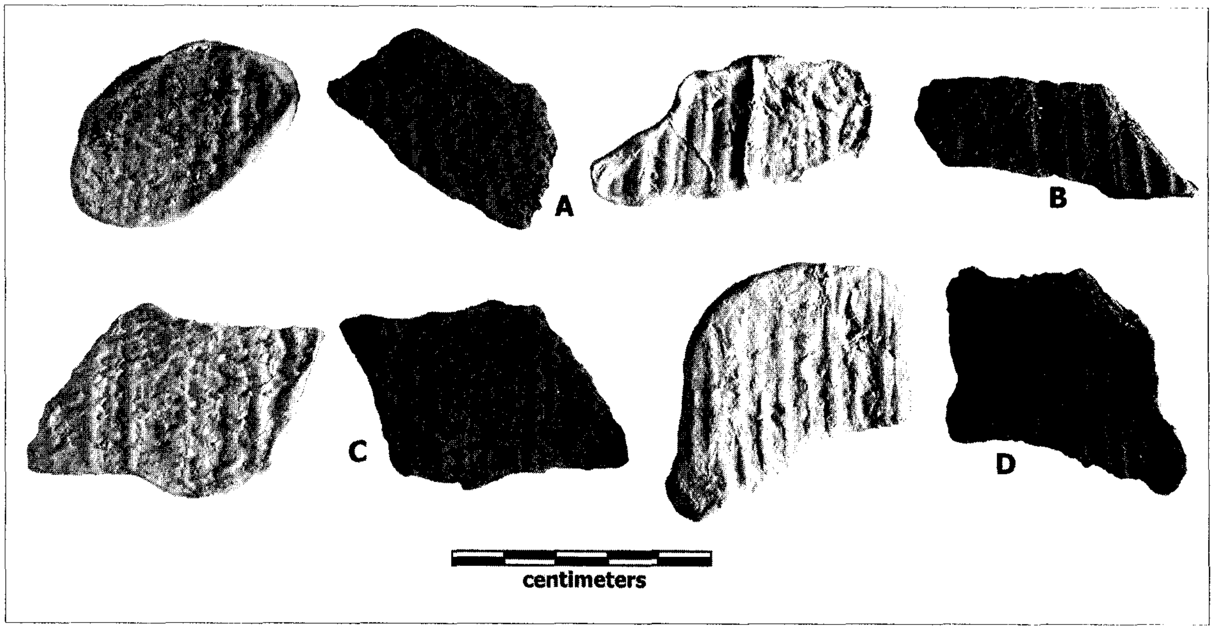

Figure 4.22. Mount Pleasant Fabric Impressed (medium-weft). All specimens are from the Bandon midden: (A) Level 6; (B) Level 12; (C and D) Level 10. Notice the rigid (non-cordage) structure of the warp elements exposed by worn or widely spaced weft elements.

Recent research at the Cape Creek site, however, adds radiocarbon data to the Townsend and Hanover phases. From the top of Zone IIIB within the midden, in Square M-E2, a radiocarbon date of A.D. 1250–1445 (cal, p=.95)[2] was obtained for wood charcoal found in association with Townsend series pottery. A second date of A.D. 870–1140 (cal, p=.95) was associated with Colingon pottery obtained from wood charcoal in Feature 5A, Square M-A10. This date is considered by Phelps to represent an early date for Townsend at the site. Three dates were obtained from Cape Creek that were thought to be associated with Hanover series pottery. The youngest, A.D. 670–970 (cal, p=.95) was for charcoal obtained from Feature 5B, Square M-A8. A second date, A.D. 555–775 (cal, p=.95), from the tip of the shell midden and a third, A.D. 510–775 (cal ,p=.95), from the bottom of the shell midden.

[2]The chronometric data presented in this discussion were provided by D.S. Phelps (2000), who is analyzing materials recently excavated from the Cape Creek site. As his analysis was still underway at the time of this writing and the information unpublished, these dates were not recalibrated for this study and are not included in the summary charts for radiometric data for the northern coast.

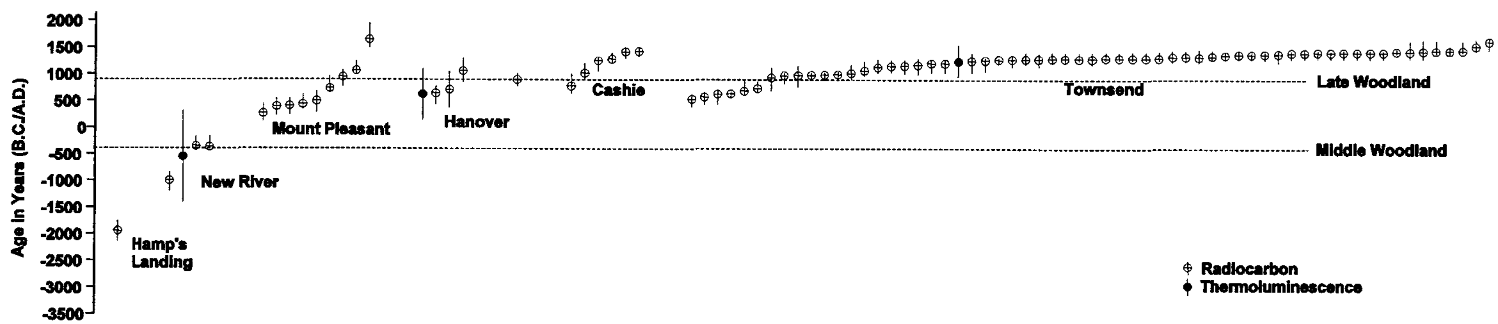

Figure 4.23. Selected radiocarbon and thermoluminescence dates associated with pottery from sites in the northern Coastal Plain of North Carolina. Error bars are two-sigma ranges.

Because the radiocarbon data for sites dating before A.D. 1 are so scarce in the northern region, it is difficult to estimate the age of the Mount Pleasant and New River pottery from deeper levels at the Bandon site. Whereas the chart (Figure 4.23) shows a significant gap between New River and Mount Pleasant, Phelps (1983) suggests the two series comprise a continuum. It seems likely that further research in the region will help to fill out the earlier portion of the chart.

In summary, the pottery from the Bandon, Cape Creek, and Whalen sites analyzed for this study suggest that primarily net impressed or cord marked, fine sand-tempered and fine sand-and-granule tempered wares are early in the sequence. These are primarily New River and early Mount Pleasant series. There is some indication from the Bandon site that the distinction of these two series, now solely dependent on the presence or absence of granule temper, can be refined as more becomes known about the variability in each of these series. Granule tempered net-impressed wares were among the earliest at the Bandon site, possibly prior to or part of the New River series. Granule-tempered ware was more common early in the sequence with coarse sand-tempered ware gaining dominance through the middle period of the sequence. There is also evidence that occasionally shell was also added as temper in a minority of cases. Early wares exhibiting mixtures of tempering materials including shell, sand and granule, grog, and even possibly bone are suggested from several sites in the northern coastal region including Long Point (Shumate and Shumate 2000), Currituck site (Painter1977), and White Oak Point (Waselkov 1982). The Hamp's Landing series was also represented in the lower levels Bandon midden by a few sherds containing leached limestone voids.

Fabric-impressed wares were most common in every part of the sequence, but the relative proportion of fabric-impressed wares was especially high in the middle portion of the sequence. Among fabric-impressed wares, there is some suggestion that textile stamps with flexible warps were used more often early in the sequence with rigid-warp textiles more commonly used later in the sequence. It is possible that the textile weaving technology may have changed in this way and that the impressions on clay vessels reflect this technological trend.

Perhaps the most intriguing aspect of the assemblage from the Bandon midden is the fact that shell-tempered Townsend series wares are a minority, the majority ware being sand-tempered. There is little doubt that this sand-tempered material is contemporary with the Townsend ware, suggesting the possibility of a Late Woodland sand-tempered ware as yet not defined in the northern coastal region. A careful inspection of the rims of sand-tempered vessels from every level of the Bandon midden assemblage indicates that rim treatments were plain in this series — no folded rims or special decorative elements occur, unlike Cashie series vessels and most Late Woodland and proto-historic period series throughout eastern North Carolina. The classification of the sand-tempered materials from the Bandon midden as Cape Fear series illustrates once again the difficulty that sand-tempered wares present to the ceramic taxonomist. The Cape Fear series in the southern coastal region appears to be related to the Refuge-Deptford tradition of the Early and Middle Woodland periods and TL dates obtained for Cape Fear sherds from the Riegelwood site and sites on Fort Bragg suggest an age range from about 400 B.C. to A.D. 400. At present, there appears to be somewhat of a hiatus in the sequence of dates for pottery from the northern coast from this period. As additional data come to light, it is possible that the classification of sand-tempered wares from the Middle and Late Woodland period in the northern region will be reconsidered.

Papanow and Pond Trail Sites

The Papanow (31Nh690) and Pond Trail (31Nh465) sites are two of three sites— the third being the Riegelwood site—chosen to represent the lower Cape Fear River region of the southern coast. Although stratified deposits bearing multiple ceramic components have not often been reported from this region, numerous pottery types have been defined based on attribute variation observed among surface-collected samples, as discussed in Chapter 2. The vertical distribution of ceramics in the soil column at the Papanow site, however, does provide some clues about sequential patterning. In order to strengthen chronological estimates of types based on surface-collected material, thermoluminescence (TL) dating was used to estimate the temporal positions of a sample of pottery specimens that represent some of the variation observed in the Papanow and Pond Trail assemblages. The samples submitted for TL dating comprised a pilot study of the efficacy and utility of the TL dating process on pottery from the North Carolina Coastal Plain (Herbert 1997). The results, found to be both effective and useful, are the focus of the following discussion.

The Papanow and Pond Trail sites were discovered during an archaeological survey of the proposed Wilmington bypass conducted by Greiner Engineering for the NC-DOT (Klein et al. 1994). The Papanow site is located on the edge of the flood plain about 1 km east of the Northeast Cape Fear River, near Castle Hayne in New Hanover County (Figure 4.24).

The Papanow site is situated on a slight rise or hammock surrounded by dense pocosin vegetation and longleaf pine forest. The Pond Trail site is about 1 km east of the Papanow site, lying on the shoulder of the terrace overlooking the floodplain escarpment. Neither site provided visual evidence of stratigraphy, but did yield evidence of vertical patterning indicating a sequential relationship of pottery types. Sites were defined based on the results of shovel testing at a 30-m interval.

Clusters of positive shovel tests (those yielding artifacts) were concentrated on the edge of the eastern terrace overlooking the broad floodplain, or within the floodplain on hammocks raised a few meters above the surrounding low-lying land (Figure 4.25). This spatial distribution of sites is typical of the lower Cape Fear region. Limited testing was conducted at the sites by the author and several volunteers in order to acquire pottery and soil samples suitable for analysis and TL dating. As the testing undertaken for this study followed the initial survey by only two years, many of the pin flags marking shovel-test pits (placed at 30-m intervals) were still in place. This allowed the relocation of

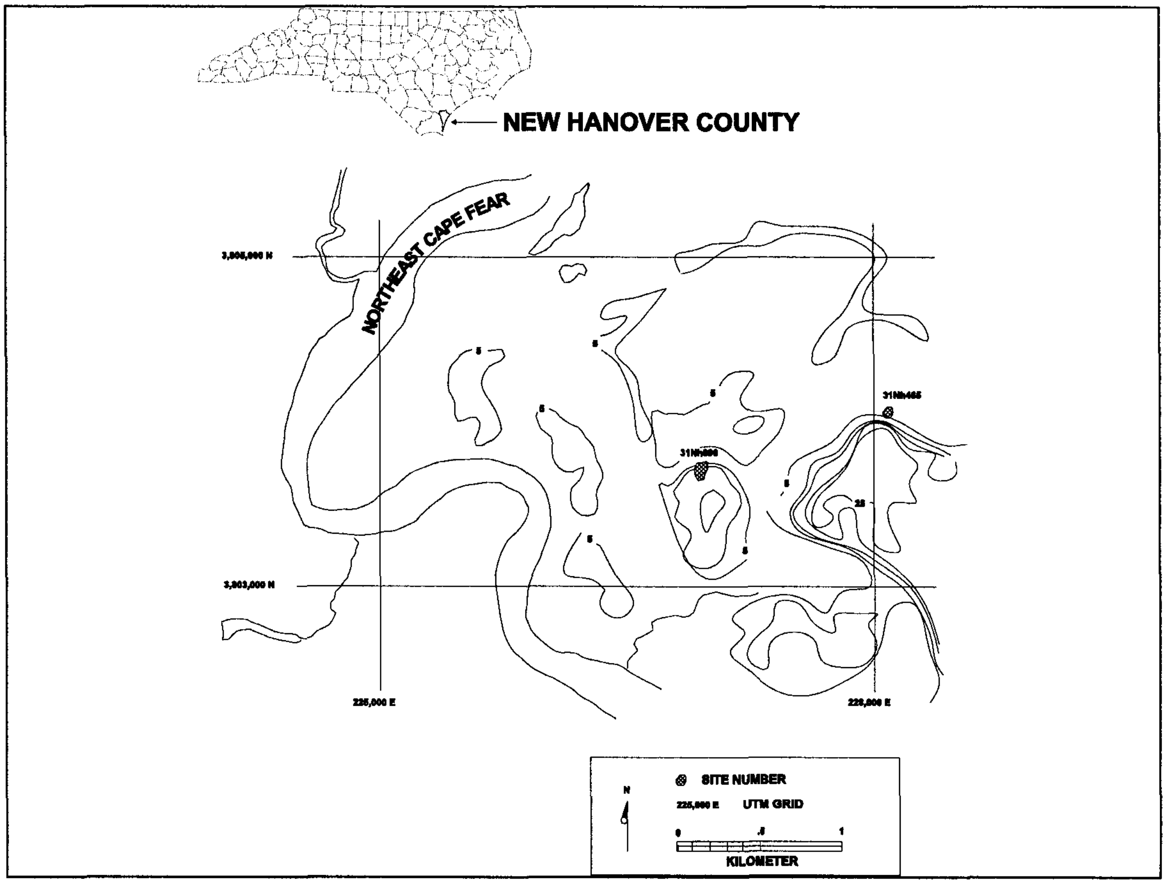

Figure 4.24. Location of the Papanow (31Nh690) and Pond Trail (31Nh465) sites in relation to the Northeast Cape Fear River.

the survey test pits and, based on the results of the survey, allowed excavations to focus on areas where pottery density was highest. A total of six 1-x-1-m units was excavated. Five of these (four adjacent units in one 2-x-2-m block and one additional 1-x-1-m unit) were excavated at the Papanow site, and a single 1-x-1-m unit was excavated at the Pond Trail site. Vertical provenience was maintained in 10-cm arbitrary levels. The location of larger sherds which were potentially classifiable as to series were mapped in situ and soil samples of approximately 50 ml were collected within a 30-cm radius of each datable sample.

At the Papanow site, the A horizon (0–10 cm) is composed of very dark gray fine sand and humus. The E horizon (10–30 cm) is composed of light-gray medium sand that is strongly acidic. The B1 horizon (30–60 cm) is in many locations across the site a hard, reddish-brown sand, massive, firm, weakly cemented, and strongly acidic. In the area excavated as part of this research, however, the B1 horizon was light yellowish unconsolidated sand. Prehistoric artifact deposits are occasionally found at depths of 50 cm on sites adjacent to the Papanow site (Klein et al. 1994), but were found in these excavations to be restricted to the A and E horizons extending no deeper than 40 cm in depth.

Pottery samples were selected for dating on the basis of the integrity of the context from which they were excavated and their ability to represent a range of pottery attributes characteristic of types described for this region. TL assays were obtained for four pottery specimens from the

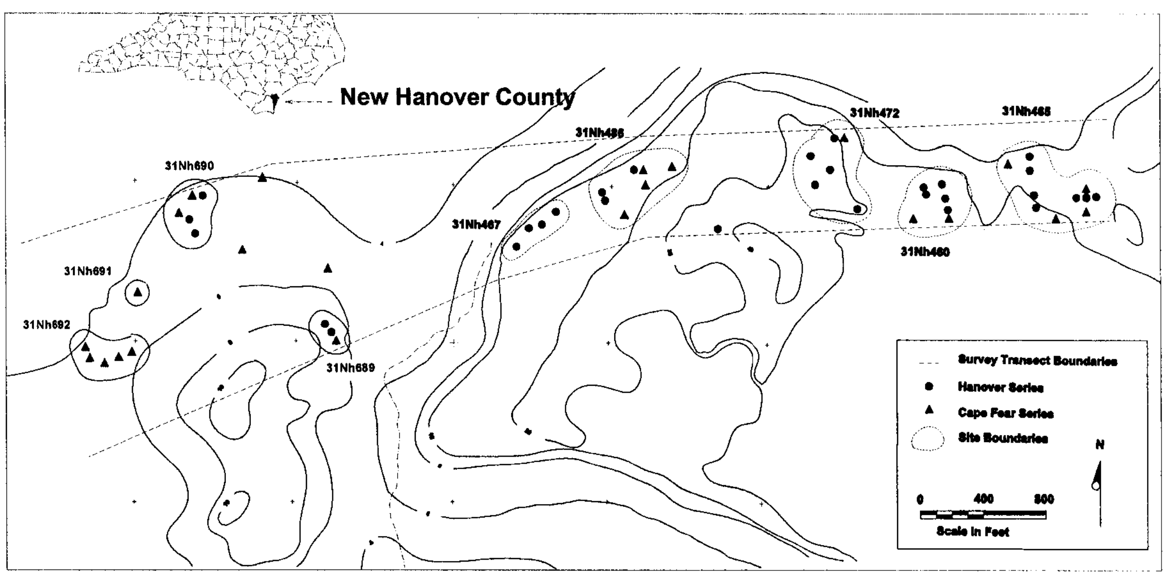

Figure 4.25. Location of Papanow (31Nh690) and Pond Trail (31Nh465) sites defined by positive shovel tests found within a survey corridor near Castle Hayne, North Carolina. Two ceramic series are depicted by symbols representing positive shovel tests.

Papanow site and one specimen from the Pond Trail site.

Results of Analysis and Dating of Pottery

Although the Papanow and Pond Trail sites were about a kilometer apart, their assemblages are combined here to increase the sample size. The justification for this lies in the fact that TL-dated pottery from both sites was found to be contemporaneous. Five temper classes were defined for the 290 sherds recovered from excavations at the Papanow and Pond Trail sites. The largest group (68 percent) was composed of specimens tempered with medium and coarse quartz sand with occasional granule size particles. This admixture of grain sizes is referred to as sand/grit for shorthand and it is characteristic of both the Cape Fear and New River series. Judging from the surface treatments, at least four vessels are represented in this temper class. Grog-tempered sherds from at least two vessels comprised the next most populous series (27 percent). Seven sherds from at least four vessels were found to be tempered with medium sand, and seven sherds from a single simple-stamped vessel were tempered with marl (Table 4.13).

Table 4.13. Crosstabulation of Temper and Surface Treatment in the Papanow and Pond Trail Assemblages.

	Temper					
Surface Treatment	None	Medium Sand	Sand/ Grit	Grog	Marl	Total
Simple Stamped, broad					6	6
Net Impressed, knotted		3				3
Cord Marked, parallel			1			1
Cord Marked, parallel (z-twist)			4			4
Cord Marked, perpendicular			1	3		4
Cord Marked, perpendicular (s-twist)		2				2
Cord marked, perpendicular (z-twist)			156	47	1	204
Fabric Impressed, medium weft				27		27
Fabric Impressed, fine weft		1				1
Fabric Impressed, flexible warp		1	23			24
Punctate, stick-bundle	1					1
Eroded			6	1		7
Eroded , stamped			6			6
Total	1	7	197	78	7	290

The vertical distribution of sherds of various temper classes appears to be patterned (Table 4.14). The majority of the grog-tempered sherds were found in Level 2 (10–20 cm below the surface [cmbs]). The majority of the sand/grit-tempered sherds were found in Level 3 (20–30 cmbs), and the marl-tempered sherds were found only in Levels 3 and 4 (20–40 cmbs). Medium sand-tempered sherds were recovered in Levels 2–4 (10–40 cmbs). Judging from these data alone, the sequence of temper types appears, from youngest to oldest, to be grog, sand/grit, and marl, with medium sand occurring somewhere in the middle of the sequence. Although the sample size is small and the potential for mixing is considerable, these patterns do suggest a sequence that warrants testing.

Table 4.14. Temper Types by Level from the Papanow and Pond Trail Sites.

Level	Temper					Total
	None	Medium Sand	Sand/ Grit	Grog	Marl	
1			7	1		8
2		3	29	35		67
3	1	3	141	29	6	180
4		1	20	13	1	35
Total	1	7	197	78	7	290

Stratigraphic patterning is also evident among the surface-treatment types from the two sites (Table 4.15). Excluding sherds with eroded or indistinct surface impressions, 177 specimens were classified according to surface treatment. The majority of the sherds impressed with fabric with medium weft diameter interwoven over non-pliable warp elements is found in Level 2. These appear to be the youngest of the sequence. Most sherds marked with a cordage-wrapped paddle and stamped in a perpendicular pattern were found in Level 3, in the middle of the sequence. Also in Level 3 were found the majority of the sherds whose surfaces were impressed with fabric constructed with pliable warp elements. Sherds with simple-stamped, net-impressed, and parallel cord-marked surfaces were restricted to Levels 3 and 4 and these appear to be the earliest in the sequence.

Table 4.15. Surface Treatment Types by Level from the Papanow and Pond Trail Sites.

Level	Surface Treatment								Total
	Simple-stamped	Net-impressed	Cord-marked, parallel	Cord-marked, perpendicular	Fabric-impressed, medium	Fabric-impressed, fine	Fabric-impressed, flexible	Simple-stamped	
1				7			1		8
2				35	21		9		65
3	5	2	2	142	5	1	11	1	169
4	1	1	1	28	1		3		35
Total	6	3	3	212	27	1	24	1	277

Absolute Dates for Representative Samples.

Five TL-dated samples range in mean age from 1221 B.C. to A.D. 1319 (Table 4.16). In general, TL dating results agree very nicely with the sequence suggested by the vertical arrangement of sherds. The parallel variety of cord-marking and flexible-warp fabric impressing are the earliest surface treatment styles, occurring in the Early Woodland and earliest portion of the Middle Woodland periods. This is followed in the Middle Woodland period by the perpendicular variety of cord marking and fabric made by interweaving weft cordage of medium width (1–2 mm) over non-pliable warp elements.

The oldest sample date (1221 ± 436 B.C.) was for a sand/grit-tempered sherd with cord-marked (parallel) surface treatment (Figure 4.26). Three similar sherds, classifiable as New River series and found in the lower levels (3–4) at the Papanow site are from the same vessel. The cordage used was 1-mm diameter 2-ply with final Z-twist direction. Cords were spaced 1–2 mm apart as they were wrapped around the paddle. The vessel was over-stamped with slightly oblique angles, more parallel than perpendicular. The thickness of the sherds (about 9 mm) and the density of the sand temper (estimated at 20–30 %) is characteristic of the New River Early Woodland series. The grain sizes of the quartz sand temper are 3–5% fine, 3–5% medium, 3–5% coarse and 1–3% very coarse. The grains are subrounded, indicating a sedimentary source, with no evidence that the material was prepared by crushing. Sponge spicules occur in 3% proportion, and phytoliths comprise <1%. The color and relative hardness of these sherds suggests that they were well oxidized and thoroughly fired. All the sherds were body wall fragments, yielding little information about vessel shape or size.

Table 4.16. Temper and Surface Treatment Attributes of TL-dated Pottery from the Papanow and Pond Trail Sites.

		Proportion of Temper Constituents (%)						Surface Treatment Characteristics				
Sample	Temper Type	Quartz vf-f[1]	Quartz m-vc	Other[2] vf-vc	Quartz/ other Total	Grog	Surface Treatment	Secondary	Tertiary	Twist	Ceramic Series	TL Date
P1[3]	grog	5	<1	2	8	1-3	fabric impressed	rigid warp	medium weft		Hanover	A.D. 680 145
P2	grog	5	1-3	2	8-10	1	cord marked	overstamped	perpendicular		Hanover	A.D. 173 + 228
P3	sand/grit-grog	3	7	2	12	1	cord marked	overstamped	perpendicular	Z	Hanover	A.D. 1319 + 192
P4	sand/grit	5	6-8	1	12-15		fabric impressed	flexible warp	medium weft		New River	434 + 250 B.C.
P5	sand/grit	3-5	7-13	2-4	9-17		cord marked	overstamped	parallel	Z	New River	1221 + 436 B.C.

[1] Key to size-grade abreviations: vf, very fine; f, fine; m, medium; vc, very coarse.

[2] Other minerals include polycrystaline quartz, microline, rock fragments, feldspar, and microperthite.

[3] University of Washington Luminescence Laboratory sample numbers: P1, UW222; P2 UW223; P3, UW224; P4, UW226; P5, UW225.

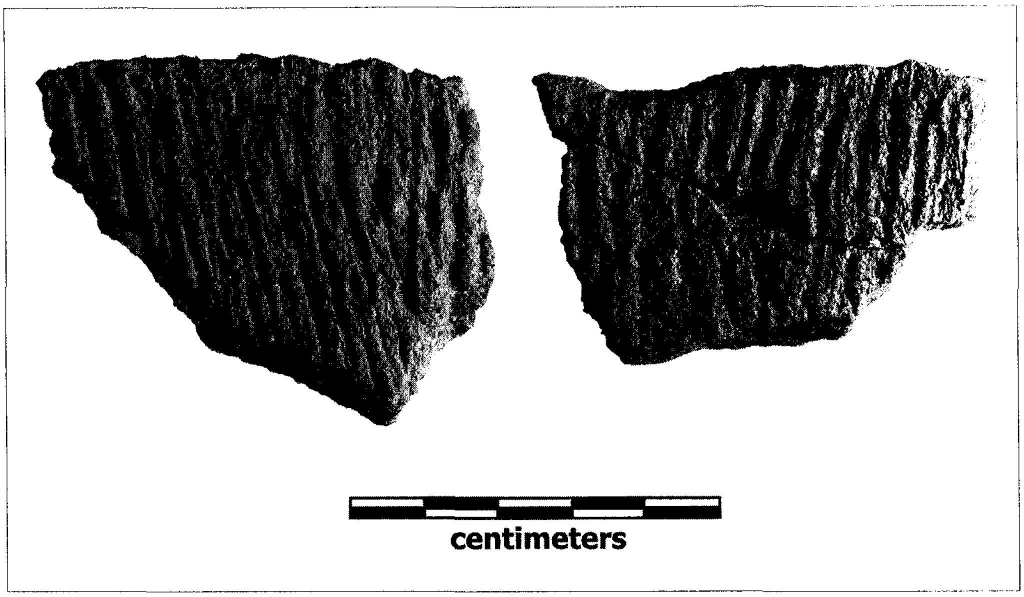

Figure 4.26. Sand/grit-tempered cord-marked (parallel) sherds (New River series) found in Levels 3 and 4 at the Papanow site. A similar sherd (P5) from this context and probably the same vessel was TL dated 1221 ± 436 B.C.

An Early Woodland TL date (434 ± 250 B.C.) was also obtained for a sand/grit-tempered, fabric-impressed (flexible warp) sherd from Papanow (Figure 4.27). This sherd and several others like it, appear to be fragments of an Early Woodland New River series vessel. The fact that sherds appearing to be from this same vessel were found in Levels 1–4 of this unit indicated the degree of vertical mixing in the unconsolidated sand that characterized cultural deposits in the E horizon at both the Papanow and Pond Trail sites. The material with which this vessel is tempered is quartz sand (5% fine, 3% medium, 3–5% coarse, and 1% very coarse). Grains are subrounded, indicating a sedimentary origin, with no evidence of preparation by crushing and little attempt at size sorting of grains less than 2 mm in size. The interior of the vessel was smoothed, but not floated, so that it remained quite rough. Fabric appeared to be a twined textile with warp and weft elements constructed of similar sized cordage (1–2 mm diameter). This sort of fabric is referred to as flexible warp and the elastic nature of the textile can be recognized by the absence of the linear arrangement of weft elements as seen in textiles where the weft is interwoven over non-pliable warp elements.

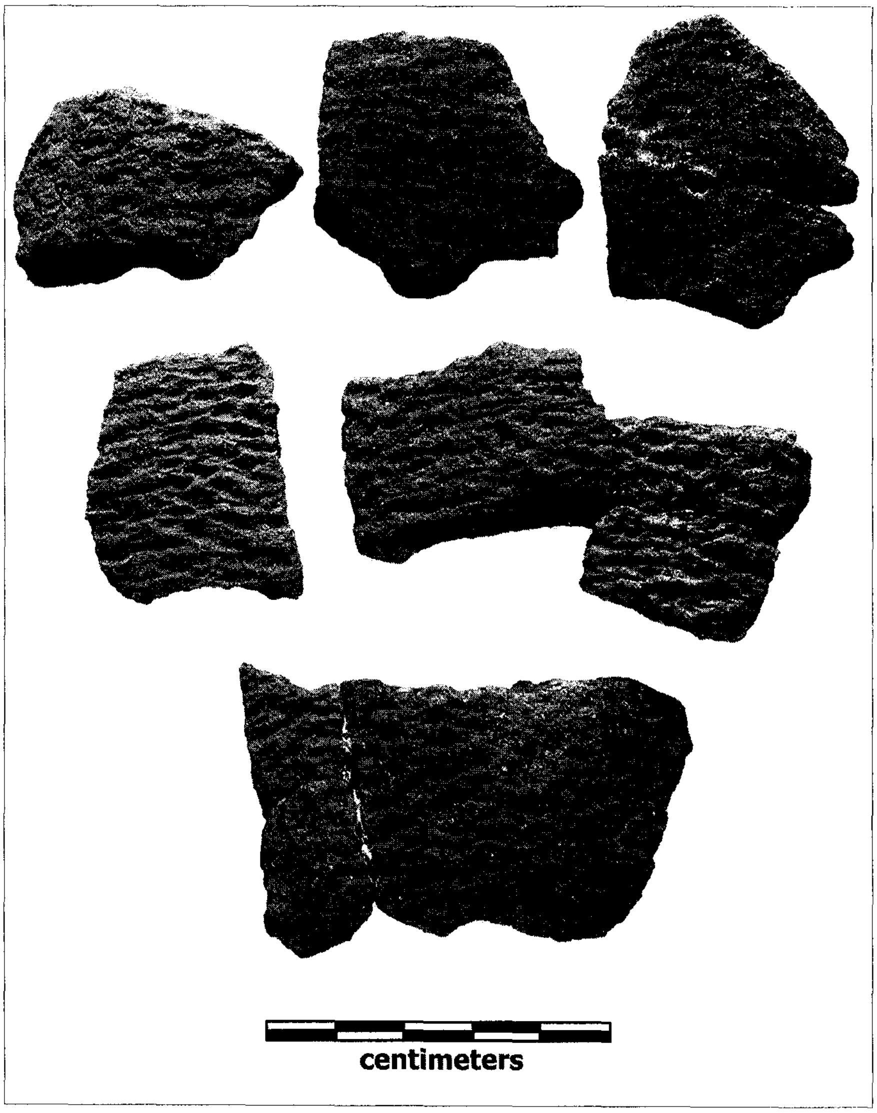

Figure 4.27. Sand/grit-tempered, fabric-impressed New River series sherds, found in Levels 1–4 at the Papanow site. A similar sherd (P4), probably from this vessel, was TL dated 434 ± 250 B.C.

A date of A.D. 173 ± 228 was obtained for a grog-tempered, cord-marked vessel (P2) from Papanow (Figure 4.28). The tempering material used in preparing this vessel was crushed pottery with fragments as large as 4 mm, as estimated from broken cross sections and lumps protruding from the interior of the vessel wall. Petrography established the presence of medium to very coarse grog in 1% proportion, most with the same paste as the matrix.

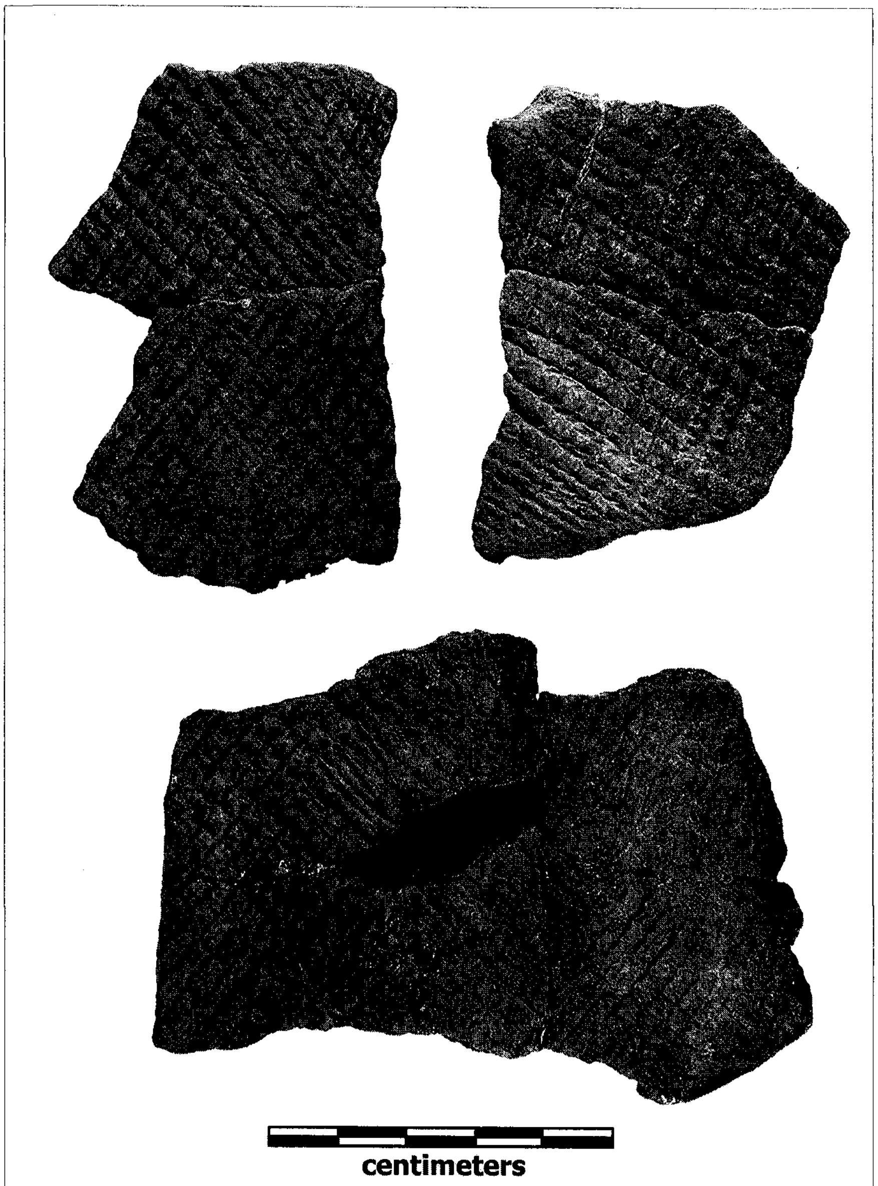

Figure 4.28. Grog-tempered, cord-marked Hanover series sherds found in Levels 1–4 at the Papanow site. This vessel (P2) was TL dated A.D. 173 ± 228. Perpendicular cord impressions were created by over-stamping at angles of nearly 90 degrees.

The surface of the vessel was stamped with a paddle wrapped with Z-twist cordage of 1 mm diameter. Cords were spaced about 2 mm and the vessel was carefully over-stamped at angles of nearly 90 degrees. Several fragments of this vessel were conjoined to reconstruct a section of the rim. Judging from this section, the upper vessel walls were 7–8 mm thick and nearly straight. The vessel lip was stamped with the same cord-wrapped paddle used on the vessel walls, creating a flattened and slightly rolled lip. The orifice was estimated by the template method to be 30–40 cm.

Several fragments conjoined to reconstruct the partial base of the vessel whose middle and upper portions are stamped differently (Figure 4.29). At first glance, the base appears to be fabric impressed, but the pattern was actually created by repeatedly over-stamping with the edge of the cord-wrapped paddle. Obliquely over-stamped cord impressions on the upper portion of the basal section are similar to sherds from the upper vessel walls.The youngest grog-tempered vessel (P1), represented by 27 pieces from Levels 1–4 at Pond Trail, was TL dated A.D. 680 ± 145 (Figure 4.30).

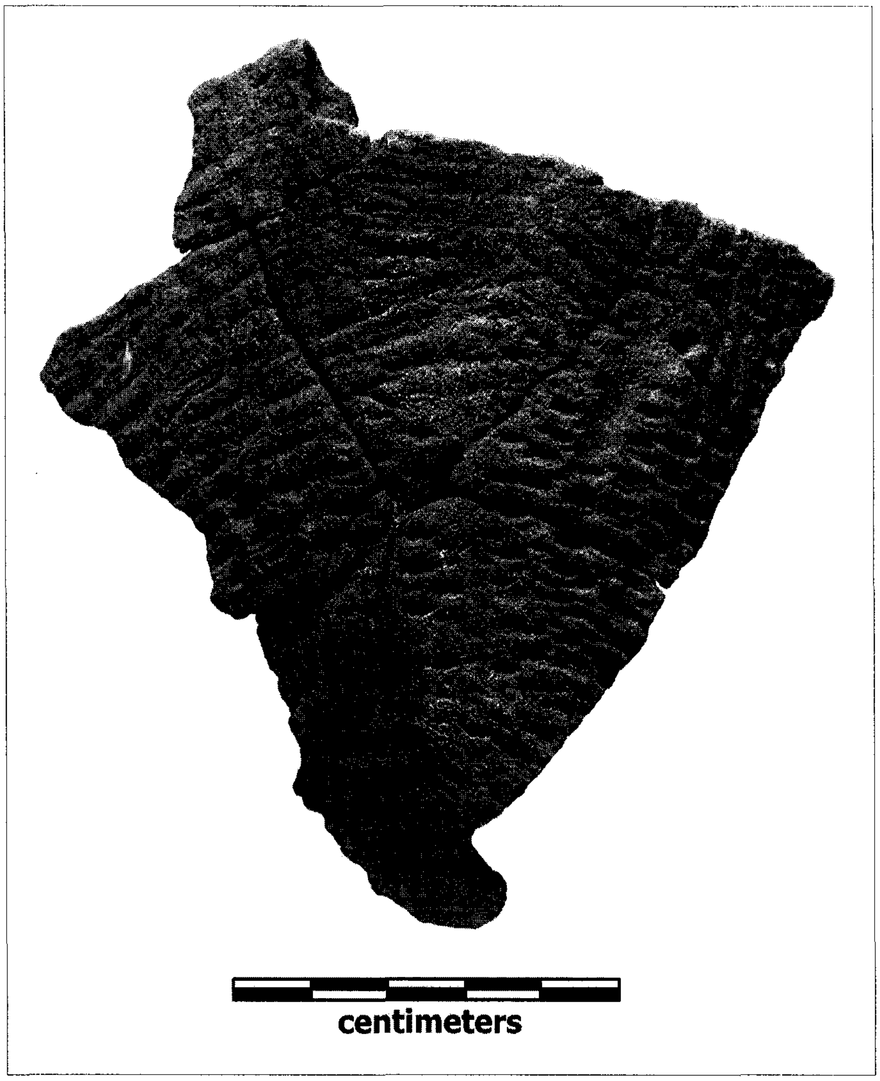

Figure 4.29. Hanover Cord Marked basal section of vessel P2(A.D. 173 ± 228). Over-stamping with cord-wrapped paddle edge mimics interwoven fabric.

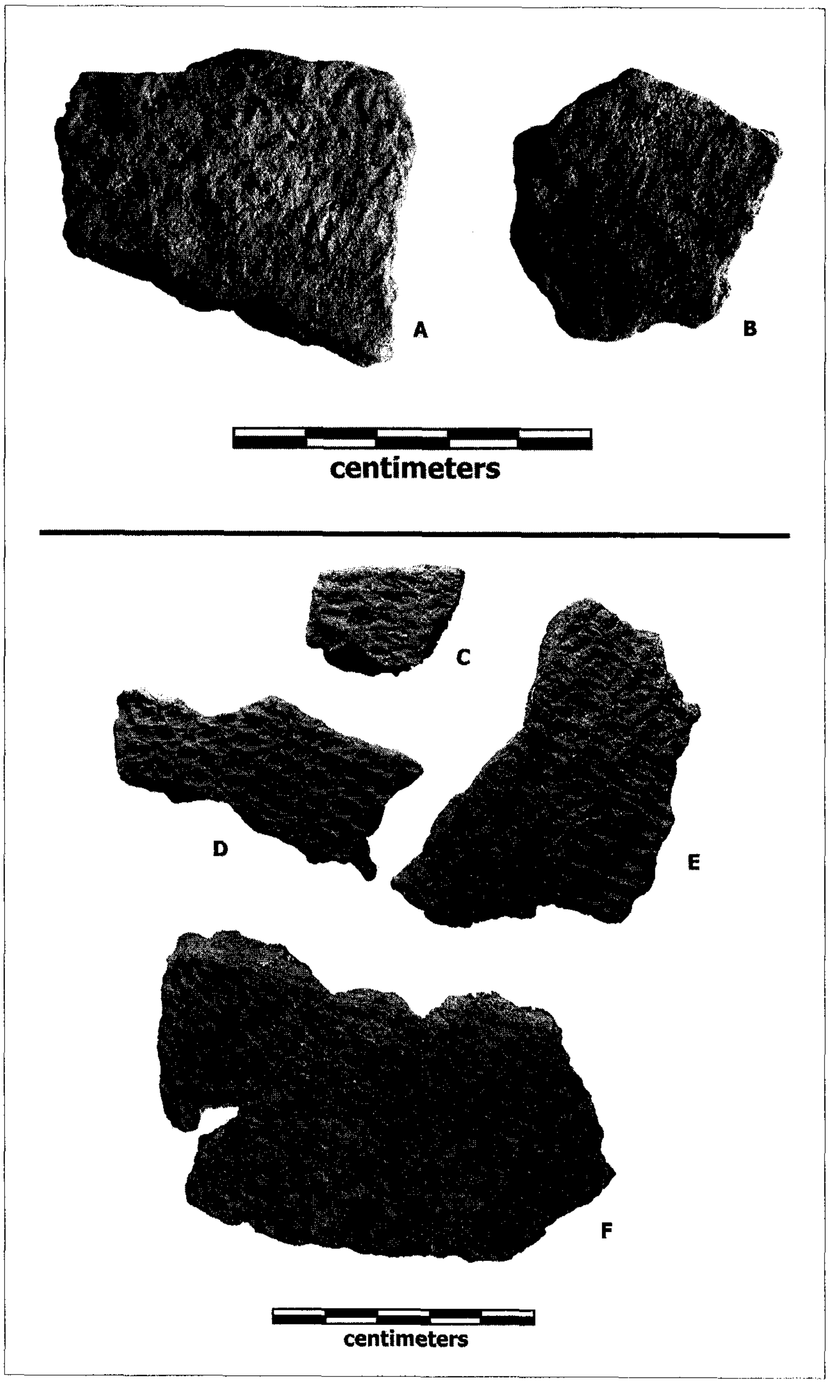

Figure 4.30. Grog-tempered, fabric-impressed, Hanover series sherds. Samples A–B from Pond Trail (P1) were dated A.D. 680 ± 145. Samples C–F, from sites in Brunswick County, are impressed with fabric consisting of 1–2 mm weft cordage interwoven or twined around non-cordage warps.

The largest grog particles in the Hanover Fabric Impressed vessel P1 were 3–4 mm, and they often created pronounced lumps on the interior. In thin section grog particles in 1–3% proportion were in the coarse to granule size. Vessel walls were 8–12 mm thick. One rim sherd suggested a straight-necked vessel with a rounded lip. Based on this four-percent sample of the rim, the vessel orifice was estimated to be about 38 cm in diameter. The fabric impressed on the surface was constructed of weft cordage, 1–2 mm in diameter, interwoven or twined around non-cordage warp elements of 2 mm diameter. Some over-stamping was apparent.

The youngest TL date (A.D. 1319 ± 192) for pottery from the Papanow site was obtained for a fragment of a sand/grog-tempered, cord-marked (perpendicular) Hanover series vessel (P3, Figure 4.31).

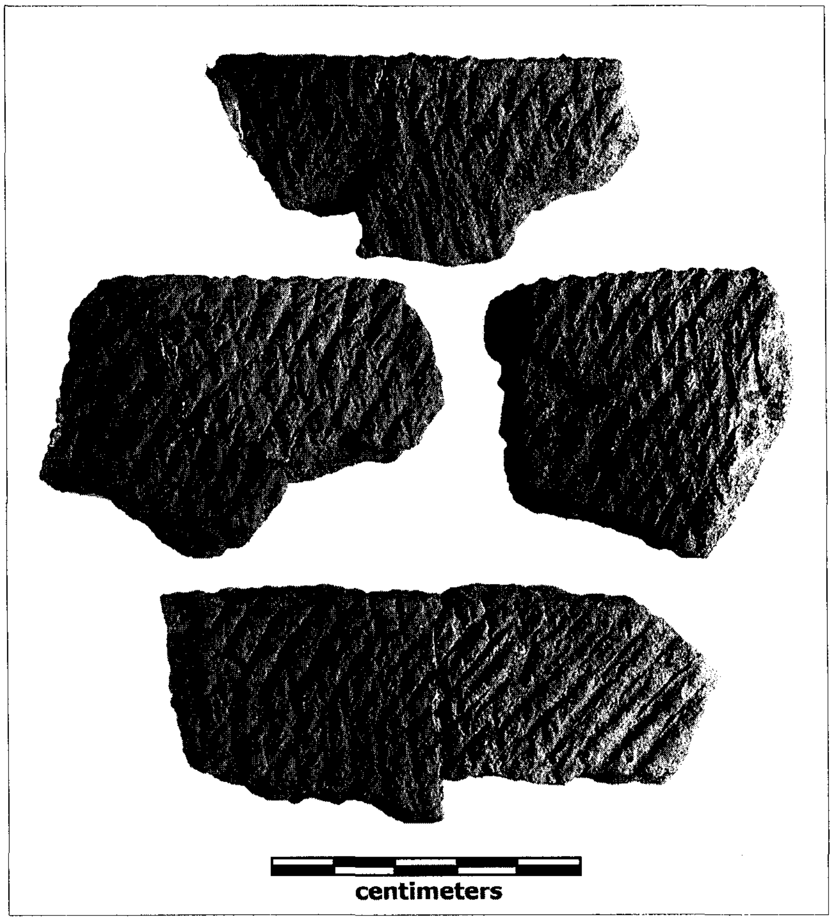

Figure 4.31. Sand/grog-tempered, Hanover Cord Marked vessel (P3) rims, TL dated A.D. 1319 ± 192.

The quartz sand temper was in 10% proportion with subrounded grains ranging from fine to very coarse size. Cord impressions were identical to the Hanover vessel dated A.D. 173 ± 228. Two-ply, Z-twist cordage of 1-mm diameter, spaced about 2 mm apart, was over-stamped at an angle of about 45 degrees. Several conjoinable rim sherds, averaging 9 mm thick, indicate a vessel with nearly straight neck and square lip, flattened by stamping with the cord-wrapped paddle. Vessel orifice was estimated at 28 cm using a 10% section of the rim.

The five TL-dated vessels represent five pottery classes comprising most of the sherds found at the sites. In addition, several vessels were represented by a few undated sherds. Two vessels reflecting Early Woodland occupations are represented by six marl-tempered sherds (Figure 4.32). The presence of marl temper is inferred from the blocky voids or pores that result from the dissolution of calcareous material, visible on the surface and in cross section.

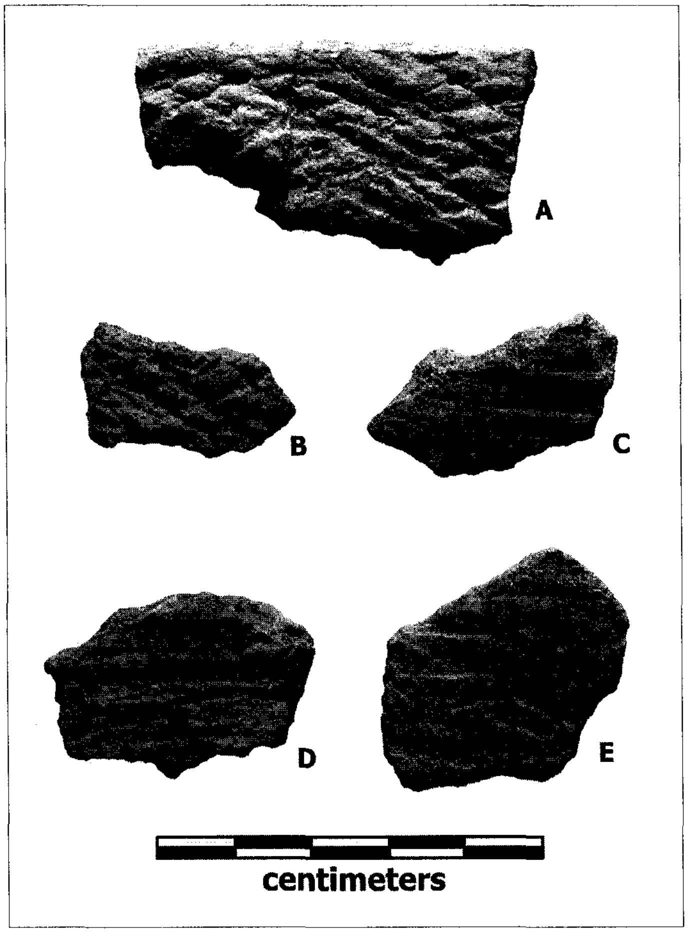

Figure 4.32. Marl-tempered Hamp's Landing Cord Marked (A and B) and Hamp's Landing Simple Stamped (C–E).

The identification of limestone or marl temper based on voids in the clay matrix is not a foolproof system. The presence of former limestone temper in the simple-stamped sherds illustrated in Figure 4.28 was easily identified by the size and shape of voids, but the voids in the cord-marked ware were much smaller. It is possible that voids created by the oxidation of non-calcareous organic material may be mistaken for marl voids. The identification of marl tempering in the cord-marked specimens is, therefore, less certain. In addition to the marl-tempered sherds, one simple-stamped sherd was noted to have no temper at all. The apparent absence of temper is common to some other Early Woodland series such as Thom's Creek.

Also represented in the Papanow assemblage was a small vessel tempered with medium sand and impressed with knotted net (Figure 4.33). The thin-walled (about 6 mm) slightly inverted rim section suggested a small bowl or jar with a rounded smoothed lip. The net was knotted and had relatively narrow mesh openings (about 4 mm). This probably represents an Early Woodland vessel.

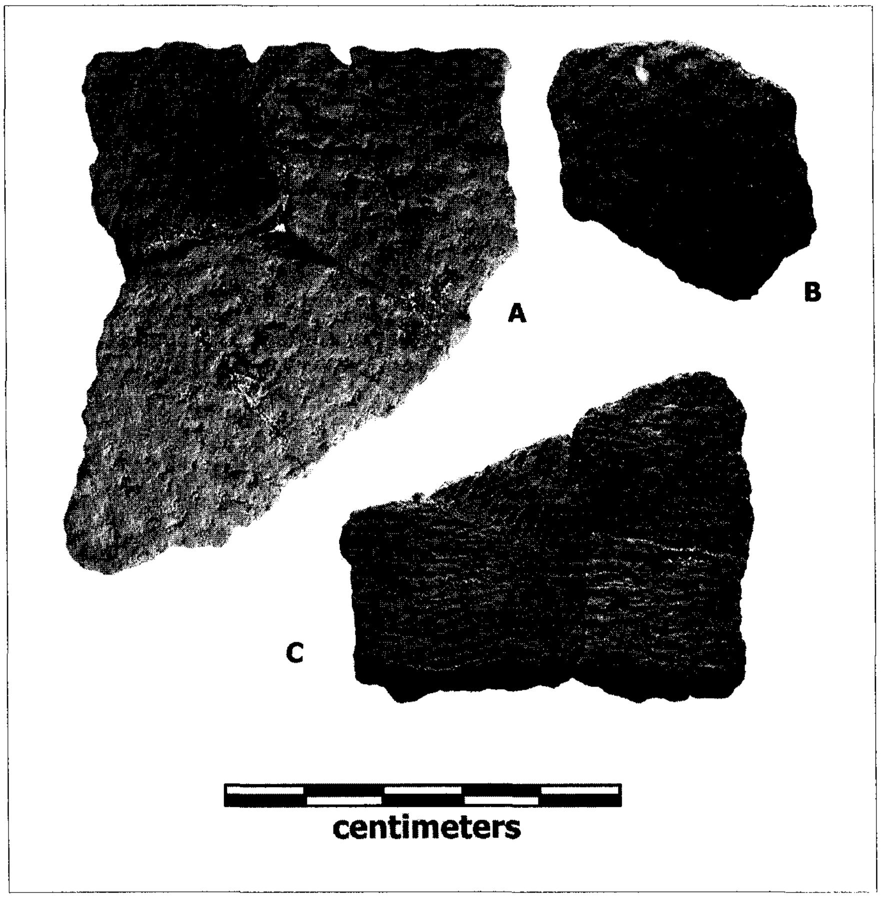

Figure 4.33. Medium sand-tempered, net-impressed, New River series (A and B) and medium sand-tempered, fabric-impressed (fine weft), Cape Fear series (C) from the Papanow site.

Also found in the Papanow excavation were remnants of a medium sand-tempered vessel stamped on the exterior with fabric constructed of fine weft (1 mm or less) interwoven over rigid warp elements of a wider dimension (3–4 mm). Over-stamping on this sherd prohibits the recognition of any larger section of fabric. Consequently, over-stamping with the edge of a cord-wrapped paddle cannot be ruled out. Very little research has been done on variation in fabric structure in this region.

Conclusion

Results of these assays provide an Early Woodland age (1221 ± 436 B.C.) for sand-tempered, cord-marked (parallel) ware classified as New River Cord Marked. A second sand-tempered specimen classified as New River Fabric Impressed, dates to 434 ± 250 B.C. These specimens confirm a sand-tempered Early Woodland tradition in the southern coastal region and suggest that the New River series may include an earlier thick-walled, coarse sand-tempered, cord-marked type and a later type that is less thick, tempered with medium sand, and impressed with fabric. Obviously, the sample is much too small to confirm this trend with any degree of assurance. The presence of an Early Woodland sand-tempered series in the southern coastal area is not surprising, but it is notable that none was provided in the sequence first advanced by South in 1960.

Results of dating from the Papanow and Pond Trail sites confirm the position of the Hanover grog-tempered series in the Middle Woodland period as anticipated by South (1960) and suggest that Hanover Cord Marked may, generally speaking, predate Hanover Fabric Impressed. Again, the data are much too sparse to raise this hypothesis to a level much greater than that of conjecture, but these dates do tend to agree with trends in surface treatment practices observed elsewhere on the coast.

A Late Woodland date (A.D. 1319 ± 192) obtained for the sand/grog-tempered, cord-marked (perpendicular) vessel, classified as Hanover, varies with the current understanding of the temporal placement of the Hanover series in the Middle Woodland period. The first and most obvious place to look for an explanation for this outlying date is with the dating process. The TL date obtained for this sherd was, in fact, problematic for several reasons and is best considered as a minimum age. The small size of the sherd sample submitted for dating limited the number of aliquots that could be made and therefore the number of measurements was insufficient to reduce the influence of outliers in the scatter of values. Consequently, the plateau was poorly defined and the scatter of values was high (Feathers, in Herbert 1997). This accounts for the larger than average error term.

Disequilibrium in the ^{238}U decay chain was also noted for this sample and gamma counts for the usually weak ^{230}Th peak suggested that the disequilibrium was between ^{234}U and ^{230}Th. This was apparently not a function of the type or quantity of temper material, but the extent of disequilibrium did correlate to some degree with porosity (as measured by absorption) when all five samples were considered. Although there are more uncertainties associated with this particular date, Jim Feathers, University of Washington Luminescence Laboratory, is certain of a post A.D. 800 age for this vessel. This estimate is less surprising than the A.D. 1300 age, suggesting that the grog tempering tradition extended into the Late Woodland period. As will be seen in the next sections of this chapter, additional evidence for the inclusion of grog in minor amounts in an otherwise sand-tempered paste seems to have commonplace in the Late Woodland period on the southern coast. It should be acknowledged that identifying grog in such a low proportion and small size is difficult macroscopically. In fact, grog was not identified in Papanow vessel P3 until the petrographic results were obtained.

McLean Mound

A unique feature of the North Carolina Sandhills and southern Coastal Plain Woodland period is the presence of sand burial mounds, most prevalent along the Upper Cape Fear River drainage, but also scattered across the southern coast (Irwin et al. 1999:59–86, Figure 1). Woodland period burial mounds are not found in Piedmont North Carolina, nor do they appear to be found south or west of the Pee Dee River, west of the Coastal Plain Sandhills, or north of the New River. It appears that they once existed throughout the interior southern Coastal Plain of North Carolina and at least one mound has been documented on the coast. Interpretation of these mounds is hindered by the fact that most were excavated during the late nineteenth and early twentieth centuries. Enough evidence remains, however, to suggest that they were part of a regionally restricted social complex that emerged during the late Middle Woodland period and flourished in the Cape Fear River valley in the early centuries of the Late Woodland Period (A.D. 900–1200).

The McLean Mound site (31Cd7) lies about 100 ft above sea level on an ancient levee of the Cape Fear River in Cumberland County (Figure 4.1). The mound is situated about .5 mi from the river adjacent to the Breece village site (31Cd8). The soil at the mound is unconsolidated sand and, at the time of excavation, the water table was within a meter of the surface. The mound was explored by amateur excavators during the early twentieth century, when it was described as being about six feet high and covered with trees. By the time it was excavated (1960–1962), the mound had been part of a cultivated field for many years and was substantially reduced in height (MacCord 1966). When excavated, the diameter of the mound's base was about 15-x-20 m, several meters larger than it must have been before the land was put into agricultural use. MacCord excavated 5-x-5-ft units in 4-in levels, but the stratigraphy was made exceedingly complex by the many superimposed reinterrments and the very poor condition of preservation of organic material in the sandy soil.

The disarticulated skeletal remains of 50 individuals were found in the plowzone and the remains of another 268 individuals were found buried within the mound in an area about six meters in diameter. Among the 268 burials were 25 cremations, a primary bundle, and 242 secondary bundles (MacCord 1966:11). Found accompanying burials were shell and bone beads, stone and clay pipes (stone pipes were both platform and tubular and a single clay pipe was tubular), triangular projectile points, and pottery. Most of the pottery did not appear to be associated with the burials, but is assumed to be contemporary.

Although pottery was found in almost all of the burial mounds on the southern Coastal Plain, in most cases the number of sherds recovered have been but a handful. In the McLean Mound excavations, about 200 sherds were found and from the Buie Mound about 600 were found. Although these two assemblages cannot be considered representative of all the mounds of the southern coast of North Carolina, they provide some perspective of temporal or geographic trends. The McLean Mound assemblage, curated at the Research Laboratories of Archaeology, University of North Carolina, was reanalyzed for this study and are compared to Wetmore's (1978) descriptions of Buie Mound ceramics.

The McLean Mound pottery sample exhibits enough homogeneity in paste, surface treatment and vessel form to constitute a contemporaneous assemblage. However, although some of the pottery appears to be intentionally included with burials, accidental inclusions from earlier site occupations cannot be entirely ruled out. Consisting of a few pieces from many vessels, the mound assemblage contrasts sharply with the more typical domestic vessel cluster found on Sandhills Woodland sites. As such, the mound assemblage represents a unique opportunity to examine the range, albeit quite limited, of technological and stylistic variability within a Sandhills region, Late Woodland ceramic tradition.

The predominant temper in the McLean assemblage is a combination of sand and grog. Of 202 sherds with identifiable temper inclusions, approximately 75 percent are tempered with some mixture of grog or clay and sand; the remaining 25 percent are tempered with quartzose sand, of various sizes and angularity. Among 50 sand-tempered sherds, 82 percent include grains in the medium size range, 14 percent are coarse and 4 percent are granule-size. Most grains are uncrushed, either subrounded or subangular in shape, although one rim sherd of a fabric-impressed jar is tempered with angular quartz. Fifteen sherds are tempered with grog or crushed pottery. One sand-tempered, net-impressed specimen exhibits voids in the paste suggesting some marl inclusions.

Fabric impressing is the primary surface treatment, with some notable minority treatments occurring as well. Among 183 specimens with identifiable surface treatments, 86 percent are fabric-impressed, 11 percent are smoothed or smoothed-over stamped, 2 percent are net-impressed and 1 percent are burnished (Table 4.17). Among the fabric-impressed specimens, most appear to have been impressed with weft-faced, interlaced or plaited textile. The structure of most of the fabric suggests non-fiber warp elements of 3–4 mm diameters and two-ply cordage weft elements of 1–2 mm diameters, apparently corresponding with MacCord's (1966:33) dominant "coarser weave." Seven specimens exhibit weft cordage diameters less than 1 mm and warp diameters of 2–3 mm.

Both S- and Z-twist weft cordage are represented. About one-third of the fabric-impressed specimens exhibit a variety of impressions created with the narrow (4–5 mm) edge of a fabric- or cord-wrapped or composite paddle. The pattern characterizing this variety of fabric impression is similar to that created by interlaced or plaited fabric, except that the warps are not parallel and integrated into a weft-faced textile, but overlap sometimes at nearly perpendicular angles much like over-stamped, perpendicular cord-marked wares. This variety of fabric impression is familiar to analysts working in the southern coastal region of North Carolina and has often been illustrated in plates depicting fabric-impressed specimens (South 1976: Figure 9B; Ward and Wilson 1980: Figures 8B, 8C, 9A, 11A; Wetmore 1978: Figure 8A). It is not common, however, in Middle or Late Woodland assemblages from the northern coastal region (viz., in Mount Pleasant, Townsend, Colington or Cashie series wares) and, with further study, may prove to be characteristic of a southern coastal tradition. The net-impressed specimens are vague and the net structure is unclear, but suggests knotted net, perhaps bunched or over-stamped. The smoothed and burnished specimens represent a continuum from smoothed-over stamped to slightly burnished. No specimens exhibit the highly burnished finishes characteristic of the Brunswick series or historic Catawba wares.

Table 4.17. Frequency of Surface-treatment and Temper Attributes of Pottery from the McLean Mound Assemblage.

Surface Treatment	Temper					Total
	Medium Sand	Coarse Sand	Granule	Clay/ Sand	Grog/ Sand	
Smoothed	9			6	2	17
Smoothed-over Stamped				3		3
Net-Impressed	1	2				3
Fabric Paddle-Edge	12		2	44		58
Fabric-Impressed	10	5		73	12	100
Burnished	2					2
Total	34	7	2	126	14	183

Cross tabulation of temper and surface-treatment illustrates that both sand and grog/sand series are represented among most surface-treatment classes (Table 4.17). Exceptions to this are the three net-impressed and two burnished specimens that are exclusively sand-tempered. The net-impressed specimens may represent redeposited Early Woodland New River sherds incidentally included in the mound. Those with burnished surfaces are more likely to be contemporary, but are not usually found in Hanover assemblages.

Comparison of rim sherds suggests a minimum of 33 vessels. Irwin et al (1999) grouped these into five categories based on form, decoration, and/or temper and found bowls to be the most frequent form. Seventeen Hanover vessels were small bowls and cups with fabric-impressed surfaces (Figure 4.34). Two of these are miniature pinch pots and two (including one of the miniatures) have a pair of opposing suspension holes just below the lip. Three small, open Hanover bowls are well smoothed and decorated with a row of split-reed punctations just below the lip (Figure 4.35).

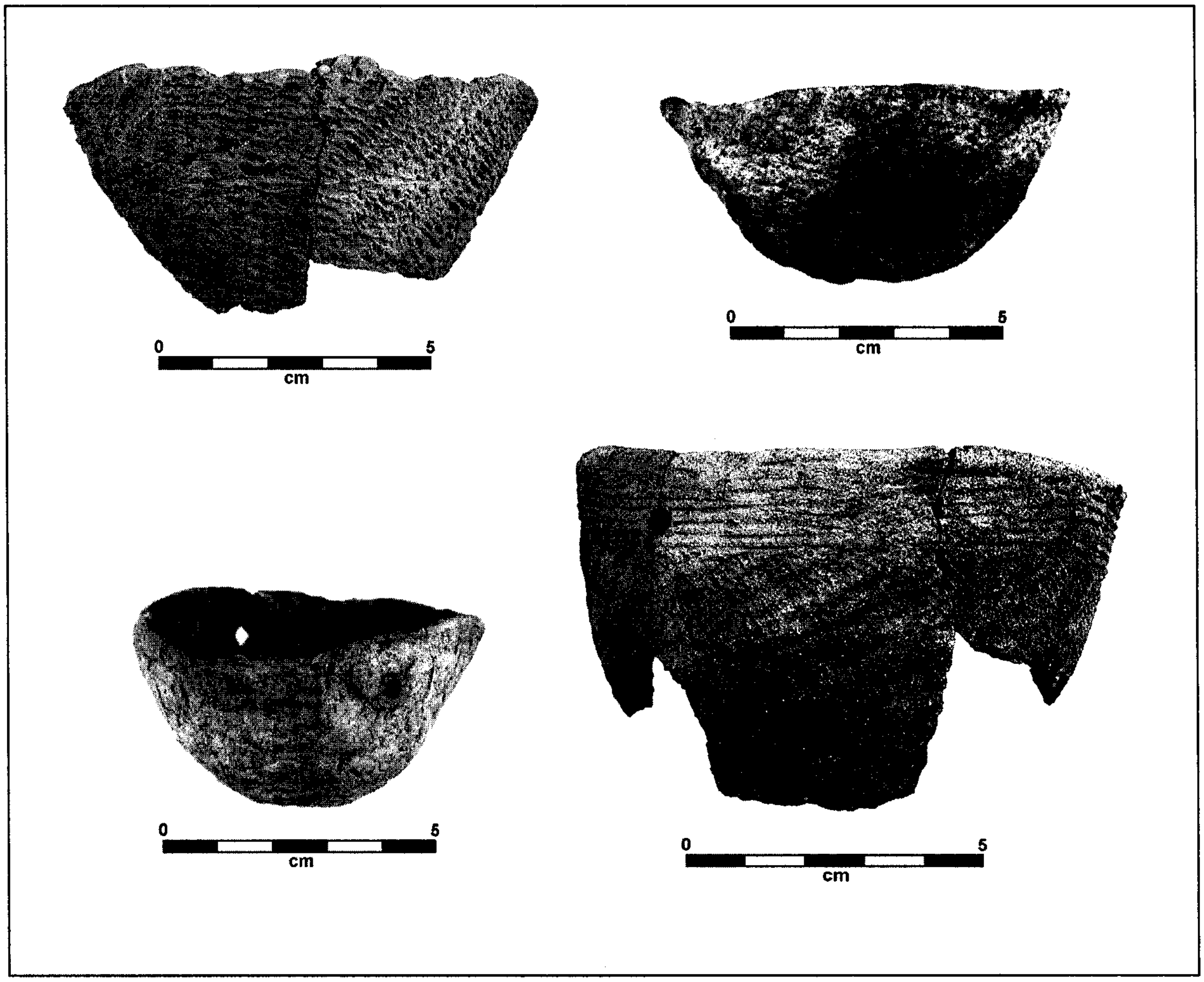

Figure 4.34. Hanover cups and bowls with straight or slightly incurvate rims and rounded or flattened lips. Orifice diameters range from 7–17 cm. One vessel (at bottom right) is decorated with a series of horizontally incised lines just below the lip.

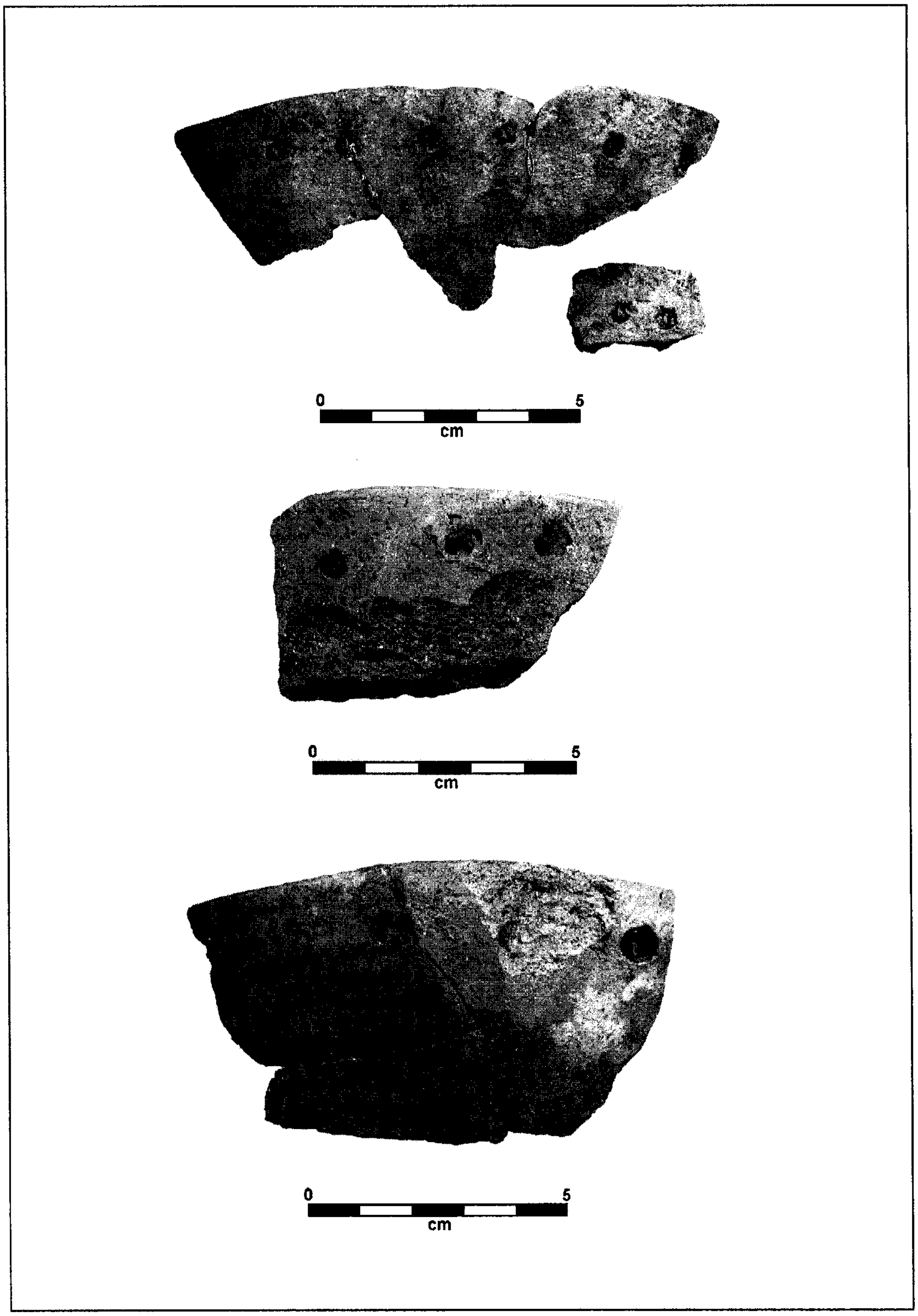

Figure 4.35. Hanover bowls with smoothed surfaces decorated with a linear series of circular reed punctations arranged horizontally around the rim just below the lip. Rims are slightly incurvate and lips are rounded or flattened. Orifice diameters range from 12–20 cm.

Three sherds representing two bowls are sand-tempered, slightly burnished and decorated with a row of square-reed punctations below a flattened lip (Figure 4.36). They are also uniquely large, with estimated orifice diameters of 22 and 32 cm. Nine other clay/sand or grog/sand bowls or cups vary only in rim form, having flared or everted rims and rounded or rolled lips (Figure 4.37). Only four jars are assumed to be cooking or storage containers (Figure 4.38).

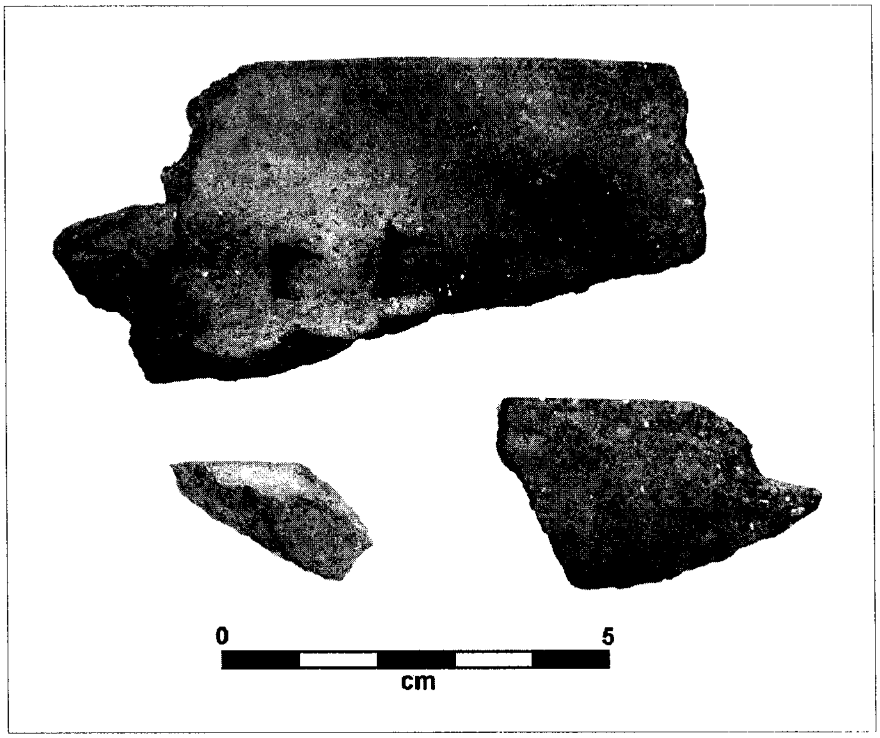

Figure 4.36. Two sand-tempered bowls represented by three rim sherds. Vessels are tempered with medium and coarse, subangular quartz sand. All specimens are slightly burnished. A square stylus was used to decorate one vessel with a single row of drag-and-jab punctations horizontally arranged about 2.5 cm below the cleanly fashioned, flattened lip. Rims are slightly incurvate, and orifice diameters range from 22–32 cm.

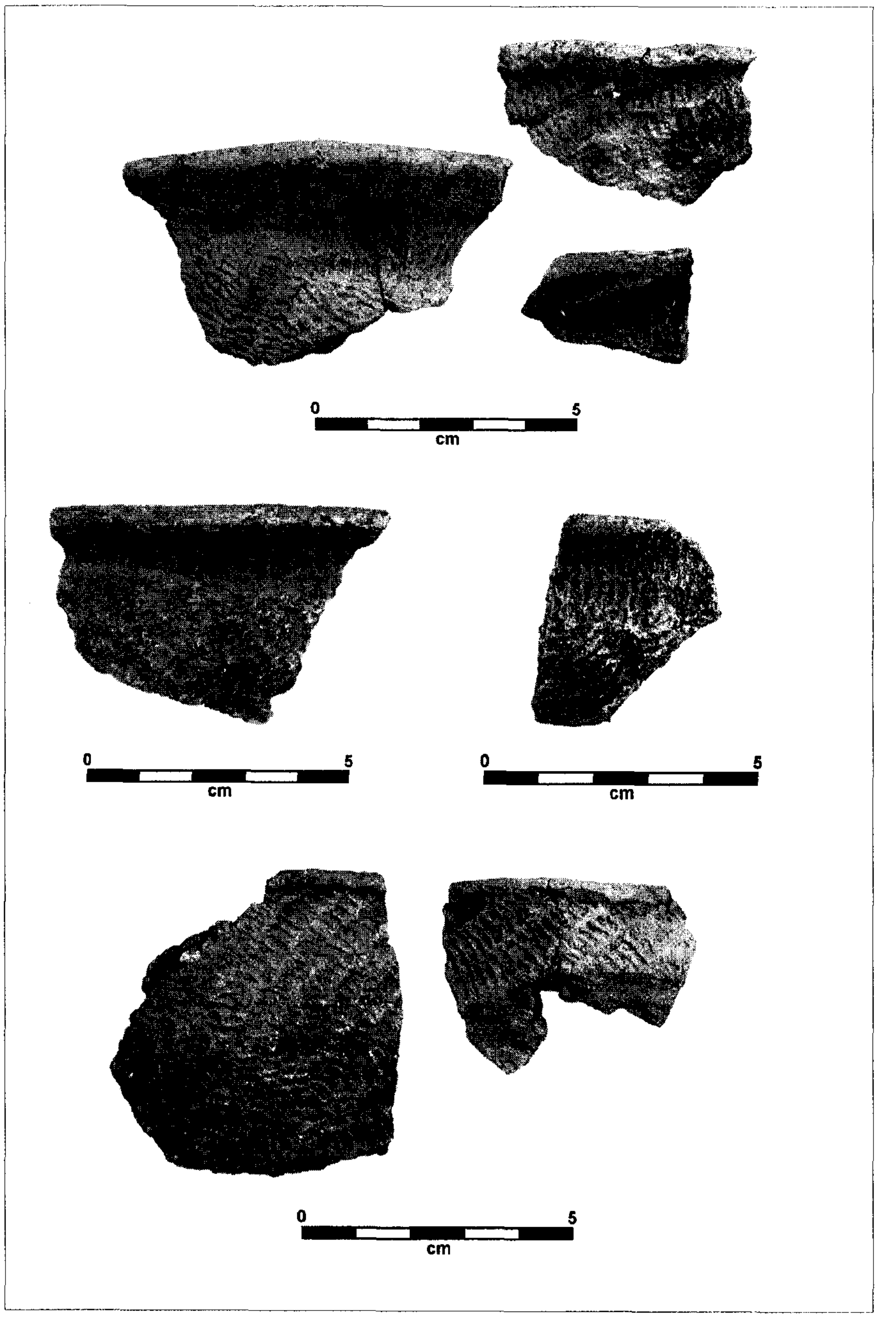

Figure 4.37. Small Hanover bowls with rims that include flared, everted, and rolled forms. Orifice diameters range from 9–16 cm.

A wide range of temper types is represented among the jars including medium sand, granule-sized crushed quartz (angular grains), and clay/sand. All are fabric-impressed. Several conical-base fragments were represented in the assemblage, suggesting that the jars were likely of this form. When orifice diameters are compared, a bimodal distribution is observed:one mode having orifices

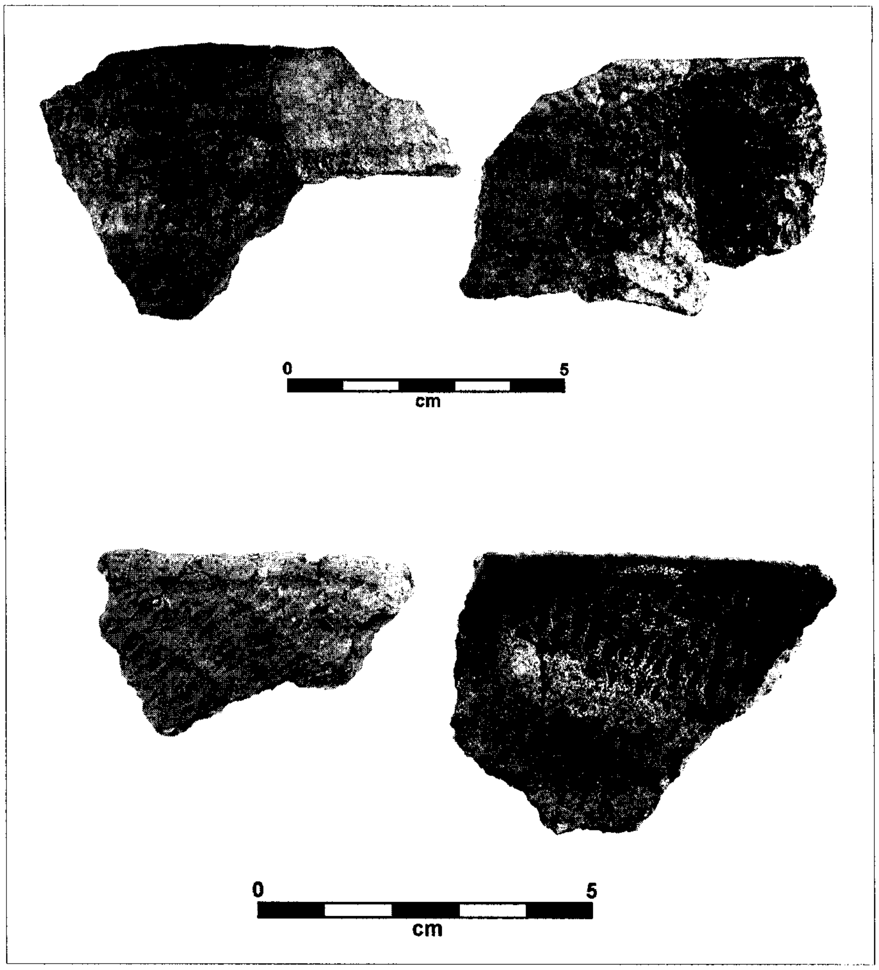

Figure 4.38. Jars of three temper series: sand, granule-sized crushed quartz (angular grains), and clay/sand. Five sherds, including two with slightly flaring rims, one with a slightly incurvate rim, and one with a straight rim, represent variation in vessel form. Surfaces are fabric impressed with one rim stamped down the interior about 1.5 cm. Orifice circumferences range from 28–33 cm.

less than 13 cm and the other with orifices greater than 13 cm. These modes suggest the presence of two size categories, cups and bowls.

With regard to the question of chronology, the majority of the pottery from the McLean Mound can be classified as Hanover. Seventy-five percent of the assemblage consists of clay/sand- or grog/sand-tempered, fabric-impressed specimens. The presence of a background of medium sand in the paste (and complete absence of sherds tempered exclusively with clay or grog), however, distinguishes these specimens from Hanover series specimens typical in assemblages from the lower Cape Fear region.

Although the majority of the specimens may be classified as Hanover (tempered with clay or grog), there is some warrant for considering them as a subset of the series, perhaps occupying a position on the margins of the temporal range for this tradition. This raises the question of the relationship of the sand-tempered materials. The sand-tempered fabric-impressed sherds are classifiable as Middle Woodland Cape Fear series according to South's (1976) typology for the lower Cape Fear. Indeed, South (1966:60) considers the six fabric-impressed, sand-tempered sherds from the McFayden Mound to be Cape Fear.

Cord-marking, the dominant surface treatment in the Cape Fear series, is completely absent from the McLean assemblage. The Hanover series pottery in the sample is composed of similar proportions of fabric-impressed and smoothed surface treatment types. Rather than considering the presence of two tempering traditions as two disparate cultural components, the evidence seems to suggest a homologous relationship between the sand-tempered and clay- or grog-tempered wares of minimal, if any, temporal or cultural distance. The three medium and coarse sand-tempered net-impressed sherds, on the other hand, could be classified as Early Woodland New River series (Loftfield 1976:151-152; Phelps 1983:29-31; Figure 1.6B) and may, in fact, represent a second component in the assemblage, likely in secondary context.

Conclusion

The majority of the McLean Mound pottery assemblage (excepting the net-impressed specimens) seems to be a late expression of the Hanover tradition. The placement of the clay or grog-tempered pottery from McLean at the end of the Hanover tradition is logical with regard to the presence of several traits not common to Hanover assemblages elsewhere in the southern coastal region. These include punctate decoration and everted rim forms which are characteristic of later traditions. The circular- and flat-reed punctate bowls suggest some affinity with Pee Dee (Coe 1995:176, 187, Figures 9.18 and 9.35), but other decorative features of Pee Dee pottery (e.g., appliquéd nodes or rosettes and rim notching) are not evident in the McLean assemblage. Circular reed-punctate decorations noted on sand-tempered plain ware from the lower Cape Fear were suspected by South (1976:42) to represent a relationship with Lamar period traditions. Very similar fine sand-tempered burnished sherds with reed punctations were found at the Buck Hall site on the central South Carolina coast, where they were idendified as Mississippian Plain (Poplin et al. 1993:180, Figure 65). The reed-punctate decorated bowls from the McLean Mound are also similar to those found at the Buie Mound (Wetmore 1978:45, Figure 7D). Despite these similarities, however, the Buie Mound pottery assemblage is otherwise quite different from the McLean Mound.

Wetmore (1978:44, Table 3) classified most (79 percent) of the sherds from Buie as Sand Tempered Burnished Plain (clay or grog-tempered sherds comprising only 12 percent of the assemblage). These proportions are reversed at McLean with 75 percent clay- or grog-tempered and 24 percent sand-tempered. Fabric-impressing appears as a minority type (about 10 percent) at the Buie mound, but is the most common surface treatment (86 percent) among the McLean Mound sherds. These several indicators suggest that the McLean Mound assemblage may be somewhat earlier than the Buie mound, although similarly exhibiting some association with the Mississippian Pee Dee and Savannah traditions to the west and south.

Based on these data, Irwin et al. (1999:71) postulated that the date secured by MacCord (1966:17) for the McLean mound, 980 ± 110 B.P. (cal A.D. 815–1270 [p=.95]), did not represent the late portion of the temporal range for interments to the mound which, judging from the characteristics of the pottery assemblage, may have extended several hundred years after this date. In order to test this hypothesis, three carbon samples from the McLean Mound were subsequently submitted for radiocarbon assay. Two were obtained from charcoal from burial context, and a third from soot on a sherd from general mound context (Herbert et al. 2002). The first consisted of fine grains of charred plant remains extracted from a sample of sandy soil reportedly removed from the interior of one of the pipes that was associated with a burial. The recovery context of the pipe, the condition of its contents at the time of removal, and the manner in which the material was removed were not recorded. This sample returned a modern date, considered erroneous. The second sample submitted was a single, large chunk of wood charcoal reportedly found with a cremation. This sample returned a date of 760 ±100 B.P. (cal A.D. 1030–1410 [p=.95]) (Beta 145510). The third sample, consisting of soot scraped from the exterior of a clay/sand-tempered, fabric-impressed potsherd found in general mound context, returned an AMS date of 1250 ± 40 B.P. (cal A.D. 675–880 [p=.95]) (Beta 143709). Taking the best possible spin on the difference between the lower range of error for the youngest date (1030 B.P.) and the upper range of the error for the oldest date (880 B.P.) yields a period of 150 years; a rather long a time for a culture group to reuse a ceremonial burial mound from the perspective of the Mississippian culture, but not out of the question for a Late Woodland repository of secondary burials. Based on a figure of 40 years per generation, this period represents about four generations of reuse of the mound. Even with this minimum estimate for the period of interment, the span of time and burial mound context assure a rather eclectic mix of pottery, perhaps from a rather broad geographic area.

Fort Bragg Sites

Whereas in other areas of the coast prior research has established stylistic types for which the temporal ranges are reasonably well understood, the Sandhills present a less studied area. In contract reports, pottery has typically been described and classified by analogy to more thoroughly studied types from adjacent environmental regions. While these associations may well prove appropriate, they have not been demonstrated by absolute dates or contextual provenience. This is not to say that the quality of archaeology in the region has been anything less than adequate; on the contrary, very thorough descriptive analyses have been conducted and a few dates from the North and South Carolina Sandhills have been obtained for events thought to be associated with diagnostic ceramics. Perhaps the most serious impediment to developing a regional ceramic sequence are environmental conditions that work against the formation of stratified or datable deposits. In the absence of stratified or datable deposits, a pilot study was designed to test the use of TL dating to sequence several different sorts of pottery from the lower Cape Fear River valley (Herbert 1997). Having demonstrated the feasibility of the technique at the Papanow and Pond Trail sites, described in this chapter, the Fort Bragg study was devised to sequence ceramics from the adjacent Sandhills region.

Fort Bragg is located in the northernmost portion of the Sandhills, an environmental sub-province occupying the upper Coastal Plain (west of the Coats Scarp) immediately east of the Piedmont province (Daniels et al. 1978) (Figure 4.39). The dominant climax forest ecosystem in the Sandhills is a longleaf pine-wiregrass community (Braun 1950). A recent model of the pre-settlement geographic range of longleaf-pine forest estimates a range of some 92 million acres, an area close to the size of California, stretching from southeastern Virginia south to Lake Okeechobee, Florida and west to eastern Texas, broken only by the Mississippi River floodplain (Noss 1989) (Figure 4.40). The range of the Longleaf Pine Ecosystem is precisely the area of the U.S. that

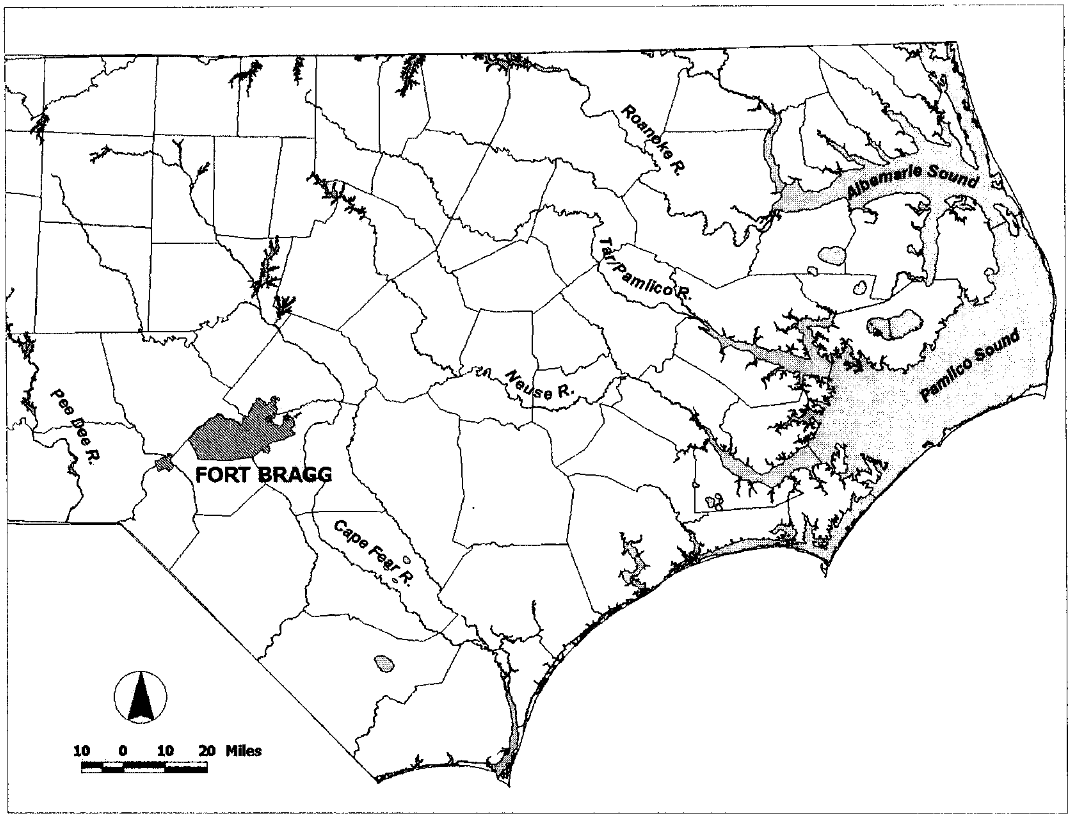

Figure 4.39. Location of Fort Bragg on the upper Coastal Plain of North Carolina.

receives the most lightning strikes
annually and coincidentally, the dominant ground-cover plant species (in the heath family) are especially inflammable, due to the presence of volatile oils in their tissue (Russo et al. 1993). Consequently, the flora of the Sandhills has been dramatically shaped by wildfire, or purposeful burning (Delcourt and Delcourt 1997), estimated by some authors to have occurred in pre-contact times at a rate of one to three years on xeric interfluvial uplands (Ware et al. 1993). Consequently, it must be assumed that charcoal has been naturally introduced into the soil on a regular basis throughout the Holocene. This fact makes it difficult to argue that charred material obtained through flotation of sediment is necessarily associated with artifacts or cultural events.

Soils of the Sandhills are composed of loose, coarse- and medium-sized sand that is typically several meters deep. This rapidly permeable, highly acidic, sand is unusually low in bacteria and other organic material and is, consequently, nutrient-poor. Rapid oxidation of organic matter in the soil quickly reduces and eventually eliminates the visibility of cultural features. Upland settings are

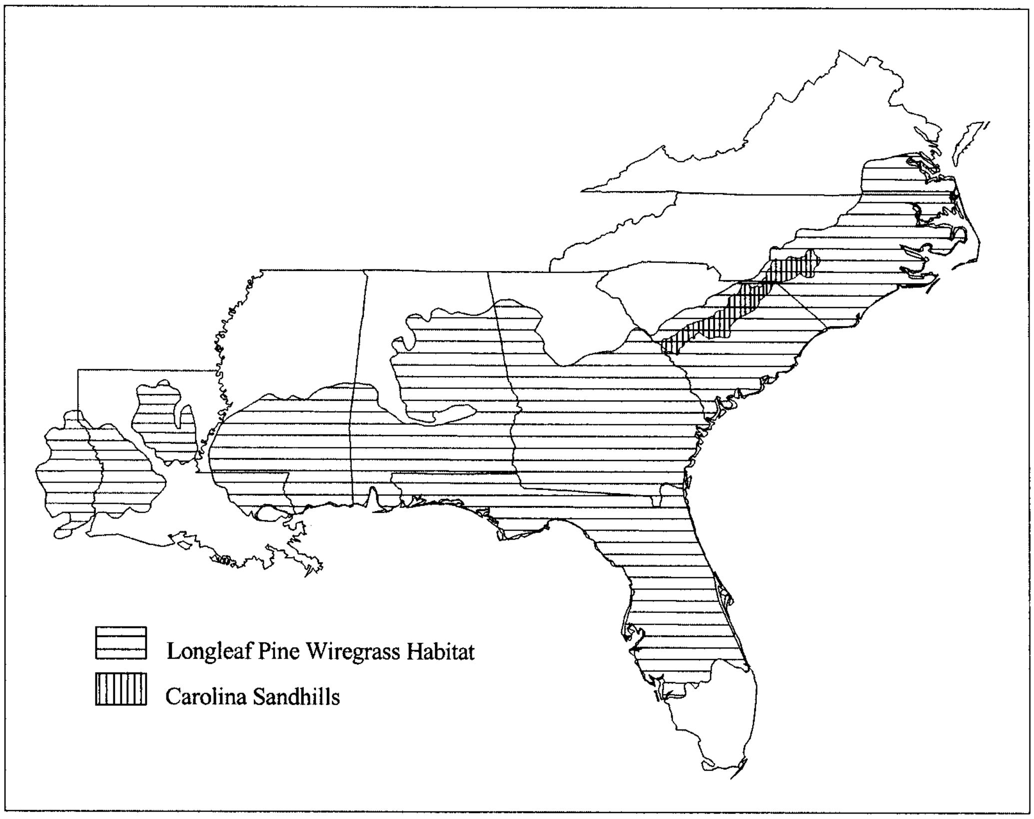

Figure 4.40. Pre-settlement range of the longleaf pine ecosystem (after Frost 1993).

xeric

and many plant species exhibit deep root systems that increase the chances that buried cultural deposits will be disturbed (Wells and Shunk 1931). Competition for scarce nutrients in the soil also results in

patchy distribution of plants interspersed with bare sand subject to aeolian activity and pedoturbation that may rework cultural deposits. These conditions together increase the chance that cultural features are invisible and cultural deposits mixed. For these reasons the age of the pottery from Fort Bragg sites used in this study was determined by TL dating.

Sampling Strategy

Pottery samples were selected to reflect the diversity of temper and surface-treatment attributes observed in the pottery from the Sandhills region. This sample selection process relied exclusively on temper and surface-treatment attributes. The widest ranges of temper types and surface treatments among the sherds that fit size and contextual criteria were included in the sample. Sherd size was critical because smaller sherds provide less datable material and so yield more scatter in results and greater error in age estimates. Regarding context, sherds were selected only from excavated assemblages where soil samples were taken from an area within a 30-cm radius of the location where the sherd was recovered. A total of 20 samples was selected from excavated assemblages and a thin section was made of each sample.

The analysis considered three types of aplastic constituents as temper (material added to the clay paste by the potter). These three constituents are sand, crushed rock, and grog. Sand can occur naturally in clay deposits from the region and no claim is made that all of the sand observed in the samples was added by the potters. It is assumed, however, that sand grains in the fine and larger Wentworth grain-size grades may have affected the performance characteristics of the clay and the ceramic vessels and therefore are more likely to represent a tempering agent. Very fine- and silt-size particles are not assumed to have been purposefully manipulated by the potters and are not considered as temper.

In the Fort Bragg samples, grog-tempered sherds were also found to have some amount of sand in the paste. Depending on which was the greater proportion, classes were defined for sand/grog- and grog/sand-tempered sherds. Four temper classes were formed from the three temper types: sand/grit, sand/grog, grog/sand, and crushed rock. The dates for the sherds in each of these classes are presented below.

Results of TL Dating

A detailed description of methods and consideration of results of TL dating sherds from Fort Bragg are discussed elsewhere (Herbert et al. 2002). Significant anomalous fading after one-week storage was detected for two samples (18 and 28), although in both cases the scatter left some question in this conclusion. Ages determined for samples 18 and 28 should be considered minimum values. Sample 11 had exceptionally high scatter and a rather poor plateau, making its age the least reliable of the lot. For Sample 20, results from the multi-aliquot slide, and SARA techniques agree, but for Samples 21 and 23 the results from the slide method are significantly less scattered. Even though the fit was much better with SARA, partly as a function of the limited number of aliquots available for multi-aliquot analysis, there are no other data to suggest one is more accurate than the other. The difference for Sample 23 is not great (insignificant at the 2-sigma level), but this is not the case for Sample 21.

Worth noting is the exceptionally high environmental radiation at site 31Ht392. Changes in dose rates through time were not considered, as the earlier analysis of similar samples from the coastal region found only minor disequilibrium (Herbert 1997). In this earlier study, five sherds from a similar environment were used to explore the state of equilibrium in the U and Th decay series using high-resolution gamma spectroscopy. If leaching or some similar process had removed or added radionuclides through time, this would likely have been detectable in states of disequilibrium. Three of the sherds in this study exhibited minor disequilibrium, but the magnitude of difference in assuming current disequilibrium conditions as constant through time, versus other scenarios where the dose rate changed through time, did not significantly affect age estimates for the samples.
The mean and median percent error for age estimates are 16.2 ± 6.4 and 14.8 respectively. These errors are higher than usual. Southwest ceramics dated since 1996 using the same techniques at the University of Washington laboratory have mean and median errors of 10.7 ± 4.6 and 9.5 (Feathers 2000b). The lower precision for these North Carolina sherds is due to higher scatter in the growth curves. This may partially be due to the lower sensitivity to TL than is observed in Southwestern pottery, meaning, everything else being equal, a lower signal-to-noise ratio and smaller increases in signal with equal increments of dose. This can be shown by comparing the slopes of linear fits to additive dose curves, normalized by the plateau temperature range. The range in these values (counts/Gy/°C) for the North Carolina sherds is 11.4 to 740, with a median value of 44.4. The range for a group of recently dated sherds from central Arizona (n=7, median percent error of 9.4) is 102 to 593, with a median of 234. Four of the five lowest-precision sherds from North Carolina had values less than 30. This does not explain the entire increase in scatter in the North Carolina growth curves. Some high-precision sherds had low sensitivity and vice versa. Another possible source of error is variation in signal arising from differences among aliquots, due to greater heterogeneity and coarseness in the North Carolina pottery fabrics, that affect the distribution (and hence, relative contribution) of grains responsible for the signal.

Sequence of Temper Attributes

The range of the TL dates for the pottery from Fort Bragg spans 2,846 years from 1171 B.C. to A.D. 1675. This range of age estimates are correlated with clusters of petrographic attributes revealing four classes of temper: sand/grit, crushed rock, sand/grog and grog/sand (Table 4.18). The petrographic bases for these classes are presented in the methods section.

The seven sherds classified as sand/grit tempered incorporate quartz sand grains in several sizes including very fine (vf, .0625–.125 mm) through very coarse (vc, 1-2 mm). A box plot of the distribution of the mean TL dates indicates an extensive age range for this group from 1171 B.C to A.D. 997, but with five of the dates (about 71 percent) falling between 400 B.C. and about A.D. 400 (Figure 4.41). Although ratios of sand- (very fine–fine) to grit-size (medium–very coarse) grains do not appear to be temporally patterned, the proportion of the total amount of sand, grit, or crushed-rock temper in the ceramic matrix is temporally patterned. Among sand/grit-tempered sherds, the oldest have the highest proportion of sand, grit, or rock temper and the youngest sherds the lowest (Figure 4.42).

Three sherds tempered with crushed rock range in age from 963 B.C. to A.D. 121 (Table 4.18). The mean age (average of the three TL-date means) for this temper group is 224 B.C. As previously described, the crushed rock temper in these sherds appears to be granite. The range of dates for these sherds also falls within the range of dates for the sand/grit-tempered samples.

Seven sherds tempered with sand and grog range in age from A.D. 435 to 1675 (Table 4.18). The principal component of the temper in these sherds is sand. Grog in the coarse and very coarse size range is included in the matrix in proportions between one and five percent. The classification of three of the samples as sand-grog tempered sherds was made only after grog was identified in the petrographic analysis.

Three sherds tempered with grog and sand range in age from A.D. 1084 through 1503 (Table 4.18). Very coarse and granule-size grog particles are included as the principal component of the temper in these samples ranging in proportion from five to nine percent. Medium-sized quartz sand was also included at proportions between two and three percent.

Table 4.18. Temper and Surface Treatment Attributes, TL Dates, and Series Nomenclature.

		Proportion of Constituents (%)						Surface Treatment Characteristics				
Sample	Temper	Quartz vf-f	Quartz m-vc	Other vf-vc	Quartz Total	Grog	Surface	Secondary	Tertiary	Twist	Ceramic Series	TL Date
18	sand/grog	5	3-5		8-10	1-3	fabric-impressed	rigid warp	fine weft		Hanover I	AD 1675 ± 59
11	grog/sand	1-3	2	1	4-6	7-9	fabric-impressed	rigid warp	medium weft	Z	Hanover II	AD 1503 ± 156
20	grog/sand	5-10	3		8-13	2-7	fabric-impressed	rigid warp	medium weft		Hanover II	AD1481 ± 58
25	sand/grog	5-10	1-3		6-13	4-5	fabric-impressed	rigid warp	medium weft	S	Hanover I	AD 1219 ± 256
22	grog/sand	1	1		2	4	fabric-impressed	broad warp	medium weft	S	Hanover II	AD 1084 ± 124
23	sand/grit	2	3	1-2	6-7		cord-marked	overstamped	perpendicular	S	Cape Fear III	AD 997 ± 123
15	sand/grog	3-5	3-5		6-10	1	fabric-impressed	rigid warp	coarse weft		Hanover I	AD 946 ± 233
3	sand/grog	5-10	3		8-13	1-3	fabric-impressed	rigid warp	fine weft		Hanover I	AD 864 ± 160
28	sand/grog	5-10	3-5		8-15	2	check-stamped	square	rhombohedral		Hanover I	AD 706 ± 174
14	sand/grog	3-5	1-3		4-8	1-3	fabric-impressed	broad warp	medium weft		Hanover I	AD 483 ± 173
2	sand/grog	5	3-5		8-10	1-3	cord-marked	overstamped	perpendicular	Z	Hanover I	AD 435 ± 314
12	sand/grit	5	5	1	11		net-impressed	knotted	closed		New River	AD 405 ± 272
16	crushed rock	1	4	11	15		net-impressed	eroded			Yadkin I	AD 121 ± 290
10	sand/grit	5	3-5	1-2	9-12		cord-marked	overstamped	parallel		Cape Fear I	AD 118 ± 229
13	crushed rock	3-5		11-15	11-15		net-impressed	knotted	open		Yadkin I	AD 118 ± 233
19	sand/grit	5	3-5	4	10-14		cord-marked	overstamped	parallel	S	Cape Fear I	82 ± 196 BC
9	sand/grit	3	3	1	7		cord-marked	overstamped	parallel	S	Cape Fear I	278 ± 370 BC
26	sand/grit	5-10	5	3-5	13-20		cord-marked	overstamped	parallel	S	New River	374 ± 259 BC
17	crushed rock		3-5	9-15	12-20		net-impressed	eroded			Yadkin I	963 ± 356 BC
21	sand/grit	5-10	3-5	8	16-23		net-impressed	knotted	closed		New River	1171 ± 541 BC

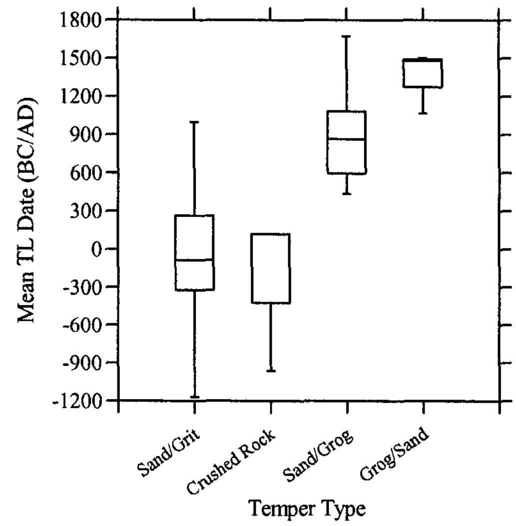

Figure 4.41. Boxplots illustrating the median and spreads of mean TL dates for each of four temper types recognized among the 20 sherd sample from Fort Bragg.

Sequence of Surface-treatment Attributes

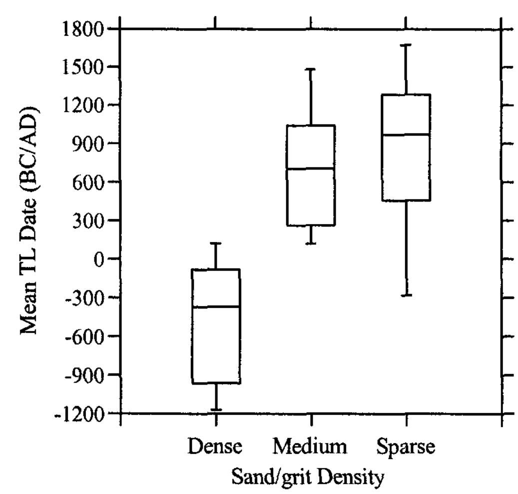

Figure 4.42. Boxplot illustrating the density of sand /grit or crushed-rock temper in ten sherds from Fort Bragg. Density is defined as: dense, > 15%; medium, 10–15%; sparse, < 10%.

Four surface treatment classes are represented: net-impressed, cord-marked, fabric-impressed and check-stamped. Five net-impressed sherds range in age from 1171 B.C. to A.D. 405 (Table 4.18). Some variation exists in net construction, but most samples appear to be made by knotting multi-ply cordage of about 1-mm diameter with knots spaced about .5 cm apart. Final twist direction was not observable on the net-impressed specimens.

Six sherds are from vessels stamped with a cord-wrapped paddle (Figure 4.43). The cord-marked sherds range in age from 374 B.C. to A.D. 997 (Table 4.18). The three oldest samples with parallel cord impressions exhibited S-twist cordage and the younger cord-marked sherd with perpendicular over-stamped impressions was marked with Z-twist cordage.

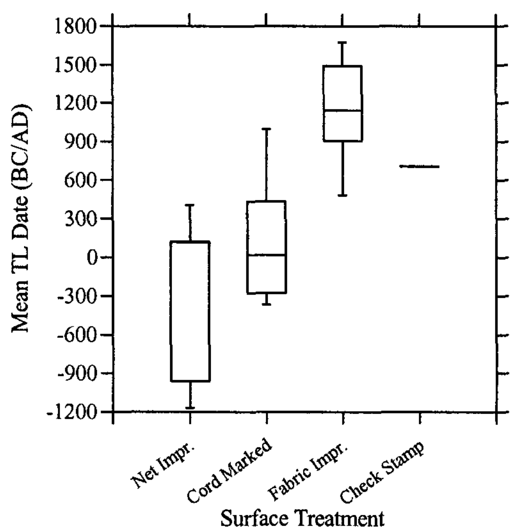

Figure 4.43. Boxplot illustrating the median and spread of mean TL dates for sherds in four surface-treatment classes among the sample of 20 from Fort Bragg.

Eight fabric-impressed sherds range in age from A.D. 483 to A.D. 1675. Some variation exists in fabric construction, but most samples appear to be twined-cordage wefts, about one millimeter in diameter, interwoven or possibly twined over non-cordage warps, two to four millimeters in diameter. This is the most common type of textile impressed on Late Woodland ceramics from the coastal region.

The single check-stamped sherd was dated A.D. 706 ± 174. As with temper types, the dates for surface treatment types exhibit a sequential pattern with overlapping ranges. The youngest date in the cord-marked class was derived by the SARA method and could be slightly less reliable than other dates in the class. The very young date for the fine fabric-impressed sherd exhibited significant fading and is the least reliable of all the dates.

Discussion

The 20 TL dates for pottery from Fort Bragg provide a model for the development of a sequence of ceramic classes for the Sandhills region. Trends in tempering techniques and methods of treating vessel surfaces have been presented independently as a means of developing evolutionary histories for each technological tradition. Factors concerning the function of various tempering techniques and surface-treatment styles and their effects on vessel performance characteristics are, no doubt, potentially important, but are not the focus of this study. It remains, however, to examine trends in these two attribute categories simultaneously. As temper and surface-treatment are the principal attributes used to distinguish pottery series and types in this region, the following discussion considers trends in the context of what is known of regional ceramic sequences. By doing so, it is shown that Sandhills traditions, as represented in the Fort Bragg sample, are in reasonable accord with series descriptions for pottery from surrounding regions. The Fort Bragg sherds also provide a source of data revealing potential trends not observed in the southern Coastal Plain or southern Piedmont, that may yet inform research in those regions as additional archaeology provides the means for securing dates for comparable pottery.

A schematic chart illustrating the temporal relationships of the major classes of temper and surface-treatment type provides a means of visualizing the trends in these traditions over the Woodland era (Figure 4.44). Sand appears to have been added to clay as a tempering agent from

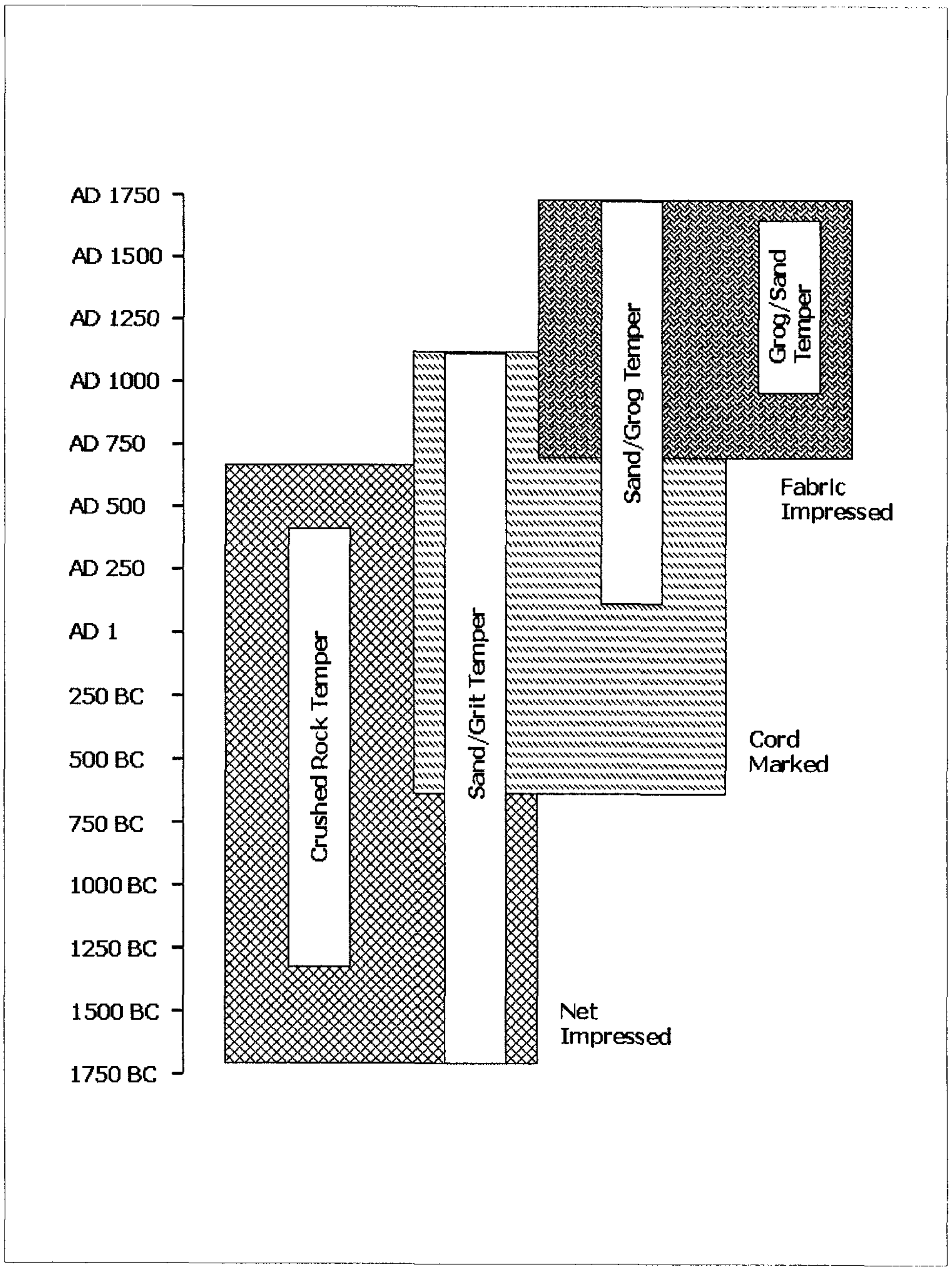

Figure 4.44. Chart showing the temporal relationships of temper and surface-treatment attributes of Fort Bragg sherds.

1200 B.C. up to historic times, although occurring mostly in combination with grog after A.D. 400. Despite its ubiquitous presence, there is no clear evidence that preferences for sand-grain sizes are expressed in this sample.

Sherds tempered with quartz sand grains in the very coarse and granule sizes are, so far as this sample shows, most common in the period from about 400 B.C. to A.D. 400, but grains of this size were nevertheless included as temper throughout most of the Woodland era. Although grain size has not proven especially useful as a means of discovering temporal trends in the sand-tempered ware in this study, the amount of sand added as temper, estimated as a proportion of the matrix by comparing thin sections to Rice's (1987:349, Figure 12.2) comparison chart, does seem to be temporally patterned.

Judging from the range of TL dates associated with sherds of various temper densities (Figure 4.42), it appears that the sherds with the highest density (>15 %) of sand/grit or crushed rock are among the earliest (in this sample, predating A.D. 200). It has also been demonstrated that among the Fort Bragg sample, net-impressed and cord-marked vessels over-stamped in parallel fashion are among the earliest, all dating prior to A.D. 400. These findings were used to assign sherds to taxonomic series.

New River series sherds exhibit sand/grit temper and net-impressed surfaces, and combine dense, sand/grit temper and parallel, over-stamped, cord-marked surfaces. The record from Fort Bragg provides some support for an Early Woodland placement of the New River series sherds, but the majority of TL dates indicate that vessels of this description were made primarily during the Middle Woodland period (Figure 4.45). The youngest of three TL dates for New River series sherds from Fort Bragg is for a net-impressed specimen with about 11 percent sand/grit temper. Grain size proved insufficient for distinguishing these series in the Fort Bragg sample and without the use of thin section analysis grain size is likely to remain an imprecise diagnostic feature. Nevertheless, grain size has been a principal descriptive factor distinguishing Deep Creek (New River) and Mount Pleasant series (Phelps 1983), and these series on the South Carolina Coast have apparently been distinguished by grain size (Trinkley 1980). As an exploratory tactic, the distinction between New River and Cape Fear is here made on the basis of temper density and surface treatment characteristics. So defined, Cape Fear series sherds are tempered with a low or moderate proportion (< 15 %) of sand/grit and with regard to surface treatment, the series is subdivided into three phases: Cape Fear I, characterized by the parallel variety of cord marking; Cape Fear II, recognized by impressions of weft-faced fabric consisting of weft cordage interwoven over non-pliable warp elements, and: Cape Fear III, identified by perpendicular, over-stamped, cord marking.

The Cape Fear series has been associated with very few radiocarbon dates and suffers from a similarly impoverished record with regard to sites where stratigraphic contexts might illustrate its provenience with respect to other pottery series. South (1976:28, Figure 12) considers the Cape Fear

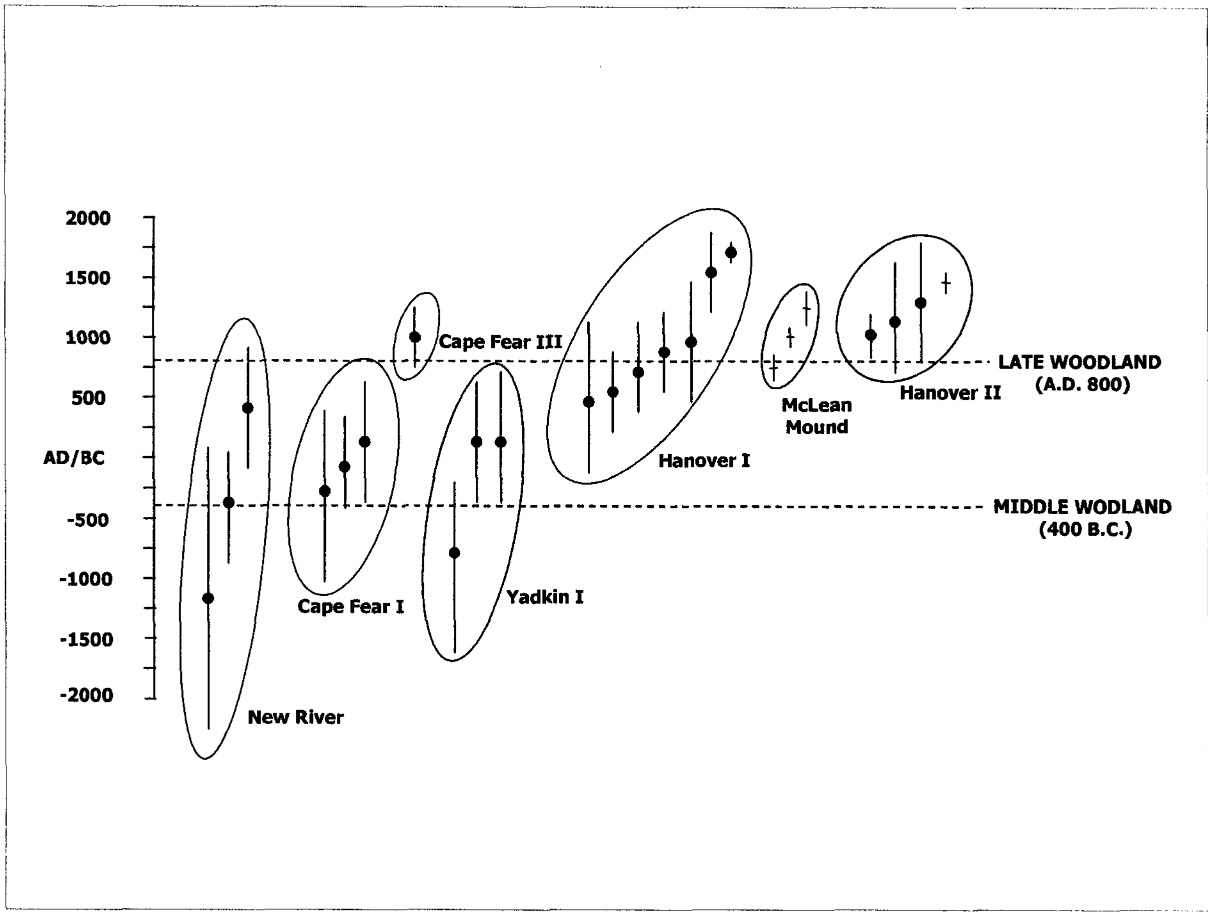

Figure 4.45. Chart presenting all dates (^{14}C and TL) associated with pottery from the Sandhills. TL dates are shown as filled circles and radiocarbon dates are horizontal lines. Whiskers are two-sigma error ranges, and the names appearing beside each group are the ceramic series.

series to follow the Wilmington series (similar to Hanover), emerging at about A.D. 400 and extending to around A.D. 1300.

Comparing the dates for sand-tempered New River series sherds to the sand-and-grit tempered Cape Fear series in the Sandhills it is evident that the New River series precedes the Cape Fear and that the emergence of the Cape Fear series is somewhat earlier than first thought. From a Sandhills perspective, Cape Fear I ranges in time from the latter portion of the Early Woodland period (about 400 B.C.) through the first half of the Middle Woodland period (until about A.D. 400). Cord-marked surface treatment of the parallel sort is the most common Cape Fear I surface treatment. Cape Fear II is assumed to occupy the latter half of the Middle Woodland period and be characterized by fabric-impressed surface treatment. Cape Fear III is a Late Woodland component, characterized by perpendicular over-stamped cord marking. Although this simplified model appears to provide a means for sorting temporal components of the sand/grit-tempered New River and Cape Fear series, there is no doubt that the data will prove to be much more complex as additional chronological data are obtained. The New River and Cape Fear series appear to represent a single long tradition of sand tempering, characterized by subtle changes in the amount of temper added to the clay. The choice of netting, cordage or textile, and the manner in which they were applied to vessel surfaces, also shifts slowly over somewhat shorter periods, with considerable overlap, suggesting that several surface-treatment techniques may have been used concurrently in the region at any time.

Pottery tempered with crushed-quartz in very high density (40–50 percent), was first defined as the Yadkin series (Coe 1964), and is considered common in the Middle Woodland period from the immediately adjacent southern Piedmont of North Carolina (Ward and Davis 1999:83–86). Since Coe's initial description of the Yadkin series, a wider variety of wares variously tempered with sand (including granule and pebble sizes), crushed feldspar, and grog have been classified to this series (Anderson et al.1982; Blanton et al. 1986; Claggett and Cable 1982; Coe 1964; 1995). The position taken in this analysis is that the use of crushed rock as temper is a distinctive technological tradition and that the Yadkin series should not be merged with other series characterized by temper types including sand or grog, unless these temper types are found in combination with crushed rock. The use of crushed quartz temper continues into the Late Woodland period in the Piedmont as the Uwharrie series, with net impressing, interior scraping, and attributes of vessel form distinguishing these later vessels from their Yadkin series predecessors. Crushed granite temper has been recognized in assemblages from southern Chatham County, but here is subsumed in the Yadkin series.

Judging from the Fort Bragg data, crushed rock was added as temper beginning about 1000 B.C. and remained in use until about A.D. 200. It is important to note that grain angularity and, more importantly, rock type — not grain size — are the key diagnostic attributes distinguishing the sand-grit (Cape Fear) from crushed-rock (Yadkin) series. Although the dated samples presented in this study were tempered with crushed granite or feldspar, other yet unidentified minerals have also been observed in sherds from surface collections at Fort Bragg. Two Yadkin series sherds were found to date to the second century A.D. These dates agree nicely with the expected age range of the Yadkin series (Coe 1964; Ward and Davis 1999). The oldest Fort Bragg date for crushed rock-tempered pottery (963–356 B.C.) seems a bit too early even considering the range of dates for Yadkin-like pottery from coastal South Carolina (Blanton et al. 1986:12, Figure 4). Comprehending this, the early sample was scrutinized for any potential problem that could have resulted in an erroneous date. No problems associated with the TL assay were found. Consequently, the classification of these sherds as Yadkin requires expanding the breadth of variability expected in the series to include crushed-granite tempering at a much earlier period. For this reason, the Fort Bragg sherds are classified as Yadkin I, foreshadowing the eventuality that crushed quartz-tempered sherds from the Sandhills or Piedmont may be confirmed through absolute dating, stratigraphic context, or seriation to be of Middle Woodland age (and thus Yadkin II).

The fact that all of the crushed rock-tempered sherds in the Fort Bragg sample were net impressed also warranted a separate classification, as Coe's (1964) definition did not specify a net-impressed type in the Yadkin series. Since no metamorphic rock occurs naturally in the Sandhills, it is assumed that the temper, or the pottery itself, originated in the Piedmont. This provides a clue as to the temporal co-occurrence of New River and Cape Fear pottery along with Yadkin. It may be that these distinctive tempering traditions reflect cultures from different regions: the practice of using sand/grit arriving from the Coastal Plain and the practice of using crushed rock from the Piedmont.

Although South's (1960) original type description for the Hanover series included only sherd-tempered ware, regional researchers have independently concluded that merging the Hanover and Carteret series seems reasonable (Herbert and Mathis 1996; Loftfield 1976; Phelps 1983), the latter being tempered with either crushed sherds or low-fired clay. On the south Carolina coast, researchers have argued variously for subsuming Hanover as a variety of the grog-tempered Wilmington series (Anderson et al. 1982) or distinguishing the two series on the basis of grog size (Poplin et al. 1993:29). In the latter system, Hanover is characterized by larger grog particles and is thought to date to the period from 180 B.C. to A.D. 250, with Wilmington having finer sized grog dated to the period from A.D. 400 to 1000. Currently there are seven radiocarbon dates potentially associated with, and three TL dates for, Hanover sherds from southern coastal North Carolina. These range in age from A.D. 65 to 1407, with four dates falling on or after A.D. 1200. Although most of the sherds associated with these dates seem to be characterized by large grog particles as described in South's original definition, most of the Hanover sherds from Fort Bragg differ by including finely crushed pottery in low proportions mixed together with sand.

Based on the dated sample from Fort Bragg, the following interpretation is offered for the northern Sandhills. During the period from A.D. 400 to 1000 a small amount of finely crushed grog was sometimes added to a primarily sand-tempered paste. The resulting pottery type is referred to as Hanover I. Cord marking, over-stamped in a perpendicular pattern, is interpreted as a minority surface treatment in the Hanover I series, possibly occurring early in the sequence. Check stamping also appears to be a minority surface treatment variant in the Hanover I series from the Sandhills. The most common surface treatment style is fabric impressing, with textiles typically made by interweaving or twining cordage of various diameters with non-pliable warp elements.

From A.D. 900 on (Hanover II), grog became the most common tempering agent, but with most vessels also including some sand in the paste. All three TL-dated examples of grog/sand-tempered pottery from Fort Bragg are fabric impressed. Textiles in all three cases are weft-faced interwoven fabrics consisting of weft cordage of medium diameter (1–2 mm) interwoven or twined with non-pliable warp elements of similar diameter.

Conclusion

Now that the data have been presented and their application to the local pottery sequence described, let me consider some of the problems and anomalies that remain to be solved. Although great care was taken in the thin-section analysis to distinguish between intentionally added temper and incidental matrix inclusions, this distinction cannot be made with certainty, especially when the constituents are known to occur naturally in the region where the pottery is assumed to have been made. Thin-section analysis was an invaluable aid in understanding temper composition, but inconsistencies were noted between petrographic and macroscopic, or low-powered microscopic, results. Small amounts of grog, for example, were sometimes overlooked in hand samples and at low magnification. I simply assume that sorting based on low-powered microscopy can replicate, within an acceptable range of error, classes derived from the results of petrographic analysis. Studies evaluating differences in the identification of aplastic constituents resulting from petrographic versus low-powered microscopic analyses should be conducted to help resolve this problem. In addition, systematic sampling and analysis of local clays and replication experiments could resolve several ambiguities regarding inclusions found in prehistoric ceramics.

The dating process itself imposes another sort of limitation. TL dating can yield age estimates with error ranges that are quite large, relative to regional ceramic sequences. Comparable analyses of sherds from sites in the Southwest typically yield narrower error ranges (Dykeman et al. 2002), a difference in results that may in part be related to the heterogeneity of the paste. Research targeting the error incorporated in age estimates of coarse-tempered wares from the Eastern Woodlands could help refine TL dating in this region. In addition, the establishment of independent chronometric data, similar to tree-ring data in the Southwest, could provide a more comprehensive chronology. Perhaps AMS radiocarbon dates from organic residues on sherds would be possible, but sooty sherds are not often found in Sandhills contexts and the sources of the residues, regardless of context, are not unambiguous. Radiocarbon and TL dating methods address different events and comparisons must take this into consideration, although used in concert they can provide a more comprehensive chronology than either method alone. Another concern is the potential effects of post-depositional firing events. Data are needed regarding soil temperatures attained during controlled burning conducted in conjunction with wildfire-management programs in managed areas of longleaf pine-wiregrass community typical of the pre-contact period Sandhills environment.

The sequence model for prehistoric pottery developed in this study is provisional. The range of attributes observed in this small sample of TL-dated pottery is not considered representative of the richness or diversity of prehistoric pottery types in the Carolina Sandhills or adjacent regions. As additional data are obtained, the sequence will undoubtedly become more complex. Nevertheless, this study does provide pertinent regional information and an example of how TL dating may be used for refining ceramic sequences elsewhere in the Southeast. Identification of sub-sets within the three broad temper groups (sand/grit, crushed rock, and grog) provides an indication of the complexity that lies ahead. Within the sand/grit group, two series (Early Woodland New River and Middle Woodland Cape Fear) are distinguished by differences in temper density and surface treatment. The crushed-rock group is interpreted as a variety of the Middle Woodland Yadkin series, distinguished by different rock types, but its relationship to the crushed quartz-tempered variety is unclear. Among the grog-tempered group is the Middle Woodland Hanover I series and the Late Woodland Hanover II series, distinguished by differences in grog density and surface treatment. But these distinctions are as yet based on very limited data observed primarily in thin section. The sequence of surface treatment types, including (in approximate order) net impressing, cord marking (parallel over-stamped), fabric impressing (fiber warp textile), cord marking (perpendicular over-stamped), and fabric impressing (non-fiber warp textile) provide the basis for defining types within the four series (New River, Yadkin, Cape Fear and Hanover). Future studies, however, may suggest more effective ways of arranging typological classes. It may be preferable, for example, to classify the grog and sand-tempered pottery of the Sandhills as a new series distinct from the Hanover series ware found on the coast. The crushed rock-tempered ware of the Sandhills may prove to be temporally or geographically distinct from the Yadkin series as more information is obtained on the range of attributes and dates for the Piedmont Yadkin series.

Riegelwood Site

The Riegelwood site (31CD114) encompasses some 24,000 m^2 on a broad terrace lying about 3 m above sea level on the bank of the Cape Fear River in Columbus County. The location is just east of the confluence of Livingston Creek, a first-order tributary near Pridgeon's Landing, found on the Acme North Carolina 7.5' series U.S.G.S. quadrangle (Figure 4.46). This location, on the bank of the embayed lower reach of the Cape Fear River, provides a pottery sample representing the ceramic industries of the lower Cape Fear valley through much of the Woodland era.

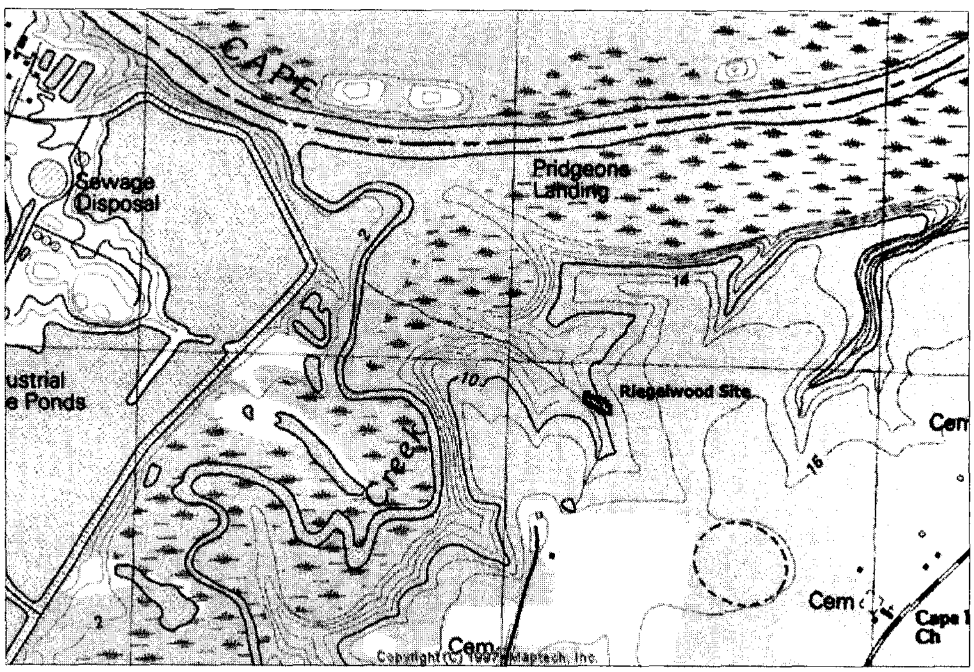

Figure 4.46. Location of the Riegelwood site on the Lower Cape Fear River. This map is found on the Acme North Carolina 7.5' series U.S.G.S. quadrangle.

Survey and testing were conducted by Coastal Carolina Research (Lautzenheiser et al. 1995; Lautezenheiser et al. 1997) to evaluate the potential effects of the proposed installation of a waste-water facility at International paper's Riegelwood Operations. Following testing, site 31Cb114 was determined eligible for nomination to the National Register of Historic Places. The data-recovery phase of investigations at the site was conducted by New South Associates (Abbott et al. 1999). It was during these recovery efforts that the features and associated pottery described in this section were found.

Sampling Strategy

Data-recovery procedures at Riegelwood consisted of the mechanical removal of the topsoil to expose prehistoric features and the excavation of the locations where artifacts were observed (Abbott et al. 1999). In most cases, features were identifiable only by the presence of artifacts, the organic residues of prehistoric activities having long since been leached from the sandy soil. Among the many features so exposed, five yielded eighteen pottery samples selected for TL dating (Table 4.19). Each pottery sample was collected with an associated soil sample, from between 20–50 cm below the pre-excavation surface within the context thought to be within the feature. Each context is described below.

Table 4.19. Radiocarbon Dates from Features at the Riegelwood Site.

	Context	Target Pottery	Minimum (Mean) Maximum[1]
B-115425	Feature 1	New River, Hamp's Landing, Hanover, and Cape Fear series	-787 (-757, -695, -541) -405
B-115428	Feature 7	Thom's Creek Cord Marked?	-2198 (-2012, -2000, -1978) -1773
B-115427	Feature 6	Hamp's Landing Simple Stamped	-2273 (-2129, -2082, -2043) -1943
B-115429	Feature 10	Hamp's Landing Simple Stamped and Cord Marked	-2200 (-2129, -2082, -2043) -1957
B-115426	Feature 3	New River series	-3018 (-2898) -2764

[1] Minimum, mean and maximum dates are 2-sigma intercepts calibrated with the Calib 4.3 program using the atmospheric decadal data set (Stuiver and Reimer 1993). Date ranges are shown with ages B.C. shown as negative numbers.

Results of TL Dating

Feature 1. Feature 1 was originally recorded by Lautzenheiser et al. (1997) and described as a the remains of a single Hamp's Landing series vessel, the fragments of which were dispersed in a 56-cm semi-circular pattern along with bone fragments. Excavation of this feature by Abbott et al. (1999:58) exposed a variety of pottery including Cape Fear Fabric Impressed, Hanover Cord Marked, New River Fabric Impressed, New River Cord Marked, and Hamp's Landing Simple Stamped, Hamp's Landing Cord Marked, and Hamp's Landing Fabric Impressed types (Abbott el al. 1999:131). Also found was human bone over an area of about 1.5 m in diameter extending about 35 cm beneath the surface. Charred plant remains derived from the fine fraction debris recovered from the flotation of sediment from the feature produced a ^{14}C date of 2470 ± 40 B.P. (787–405 cal B.C.

[p=.05]) (Table 4.20). Based on current radiocarbon evidence for the Early Woodland period in this region (see Chapter 2), it is likely that this radiocarbon date is associated with the New River and Hamp's Landing pottery. There is no certainty of this association, however, as several pottery series were recovered with the carbonized plant remains floated from sediments in this context. As part of this study, a Hamp's Landing Cord Marked sherd (Sample R10, Vessel 1) from Feature 1 was TL dated 221 ± 249 B.C. (709 B.C.–267 A.D. [p=.05], UW-654) (Table 4.20).

Features 4 and 5. Features 4 and 5 were located in Unit N296 E138 and consisted o the partial remains of two prehistoric ceramic vessels (Abbot et al. 1999:56, Figure 6-4). Feature 4 consisted of the remains of a Hanover Cord Marked vessel spread over the 2-x-2-m excavation unit. Also within this area were the partial remains of a Hanover Fabric Impressed vessel identified as Feature 5 (Abbott et al. 1999:56, Figure 6-4). One sherd (Sample R7, Vessel 2) from the Hanover Cord Marked vessel, the fragments of which were designated Feature 4, was TL dated A.D. 675 ± 172 A.D. (338–1012 A.D. [p=.05], UW-651) (Table 4.20).

Feature 7. Feature 7 consisted of the fragments of a partially conjoinable vessel classified as Thom's Creek Cord Marked (Table 4.21). The sherds were dispersed over a 1.3-x-.9-m area in Unit N228 E164 (Abbott 1999:58, Figure 6-7). Also found in this location were fragments of Hanover Cord Marked, Cape Fear Fabric Impressed and sand-tempered net-impressed ware. Although the sand-tempered net-impressed ware was classified by New South as Cape Fear, by the system employed in this study it should be classified as New River series. Found in association with this pottery were three cremations (Features 1,3, and 6) and a hearth (Feature 10). Carbonized plant remains recovered from the flotation of sediments where the pottery was most dense were radiocarbon dated to 3630 ± 70 B.P. (cal 2198–1773 B.C. [p = .05]).

Table 4.20. Temper and Surface Treatment, TL Dates and Ceramic Series for the Riegelwood Samples.

		Proportion of Temper Constituents (%)						Surface Treatment Characteristics				
Sample	Temper Type	Quartz vf-f[1]	Quartz m-vc	Other[2] vf-vc	Quartz/ other Total	Grog	Surface Treatment	Secondary	Tertiary	Twist	Ceramic Series	TL Date
R1 (UW-645)[3]	limestone	3	1-3	5-7 (3-5 % voids)	9-13		punctate	bundled drag-and-jab	left-to-right		Refuge	AD 634 ± 393
R2 (UW-646)	medium sand	3	6-9	3-5	12-17		fabric-impressed	flexible warp	medim weft		New River	No TL signal
R3 (UW-647)	sand/grog	3-5	2-4	1-2	6-11	3	cord-marked	overstamped	parallel	Z	Hanover I	AD 701 ± 311
R4 (UW-648)[4]	sand/grog	3-5	6-7	2	11-14	3	cord-marked	overstamped	perpendiclar	Z	Hanover I	AD 184 ± 241
R5 (UW-649)	sand/grog	3-5	4-7	3-6	10-18	3	cord-marked	overstamped	perpendicular	Z	Hanover I	AD 462 ± 148
R6 (UW-650)	sand/grit	3	9-13	5-8	17-24		cord-marked	overstamped	perpendicular		Cape Fear	AD 5 ± 206
R7 (UW-651)	sand/grog	3-5	4-5	3-7	10-17	3	cord-marked	overstamped	perpendicular	Z	Hanover I	AD 675 ± 172
R8 (UW-652)	fine/medium sand	10	6	6-8	22-24		cord-marked	overstamped	perpendicular	Z	Cape Fear	199 ± 185 BC
R9 (UW-653)	fine/medium sand	10	6-8	6-10	22-28		cord-marked	overstamped	perpendicular	Z	Cape Fear	1000 ± 819 BC
R10 (UW-654)	limestone	10	4-5	4-6 (3 % voids)	18-21		cord-marked	overstamped	parallel	Z	Hamp's Landing	221 ± 249 BC
R11 (UW-655)	fine/medium sand	10	8	6-8	24-26		cord-marked	overstamped	perpendicular	Z	Cape Fear	AD 4 ± 184
R12 (UW-656)	sand/grog	3	4	2	9	3-5	fabric-impressed	rigid warp	fine weft		Hanover I	AD 931 ± 154
R13 (UW-657)	limestone	5	3-6	8 (5 % voids)	16-18		simple-stamped	wide, flat	round-edged		Hamp's Landing	3056 ± 2598 BC
R14 (UW-658)	fine/medium sand	5-10	6-9	6-8	17-27		cord-marked	overstamped	perpendicular		Cape Fear	1247 ± 329 BC
R15 (UW-659)	sand/grog	5-10	3-4	6	14-20	3	fabric-impressed	rigid warp	medium weft		Hanover I	AD 528 ± 301
R16 (UW-660)	sand/grit	3	7-9	2	12-14		cord-marked	overstamped	parallel		New River	1385 ± 569 BC
R17 (UW-661)	fine/medium sand	5	8	6-9	19-22		cord-marked	overstamped	perpendicular		Cape Fear	168 ± 186 BC
R18 (UW-662)	sand/grit	5	9-14	5	19-24		cord-marked	overstamped	perpendicular	Z	New River	1765 ± 714 BC

[1] Key to size-grade abreviations: vf, very fine; f, fine; m, medium; vc, very coarse.

[2] Other minerals include polycrystaline quartz, microline, rock fragments, feldspar, and microperthite.

[3] Samples R1 and R15 exhibited intorlerably high scatter in the growth curves and thus, high error. Consequently, their age estimates are unreliable.

[4] Sample R4, R9 and R13 showed significant anomaous fading. Although corrected for fading, high scatter reduced precision dramatically.

Table 4.21. Petrographic Data for TL-dated Vessels from Feature 7.

Samp. No.	Ves. No.	Proportion of Constituents (%) Fine Sand[1]	Medium Sand	Coarse Sand	Grog	Sponge spicules	Phytoliths	Muscovite mica	TL Date	Ceramic Series
R12	3	3	3	1	3-5			1	AD 931 +/- 154	Hanover I
R6	4	3	3-5	5		<1	<1	3	AD 5 +/- 206	Cape Fear
R11	5	10	5	3		5	3	3	AD 4 +/- 184	Cape Fear
R8	6	10	5	1		3-5	1	3 (w/ biotite)	199 +/- 185 BC	Cape Fear (?)
R9	6	10	5	1-3		3-5	1	3 (w/ biotite)	1000 +/- 819 BC[2]	Cape Fear (?)
R14	7	5-10	5	1-3		3-5	1	1-3 (w/ biotite)	1247 +/- 329 BC	Cape Fear (?)

[1] These values are for quartz sand only.

[2] The age estimate of R9 is unreliable due to anomalous fading.

Six TL dates were obtained for pottery from Feature 7 (Tables 4.20 and 4.21). Petrographic data suggest that among the six TL-dated samples from the area near Feature 7 there are a minimum of four vessels with five possible. The youngest sample (R12) was from a Hanover Cord Marked vessel (Vessel 3) dated A.D. 931 ± 154. Although Samples R6 and R11 (Vessels 4 and 5) are both classified as Cape Fear Cord Marked, and have very similar ages (A.D. 5 ± 206 and A.D. 4 ± 184, respectively), their constituents differ enough to warrant their assignment to different vessels (Table 4.22). Sample R8 and R9 are almost certainly from the same vessel (Vessel 6). This is the vessel that was identified by Abbott et al. (1999:58, Figure 6-7) as Thom's Creek Cord Marked. The difference in the dates for samples R8 (A.D. 199 ± 185) and R9 (1000 ± 819 B.C.) may be due to the fact that R9 exhibited significant anomalous fading. Although the age estimate for R9 was corrected, the date for R8 is probably the better estimate of the age of Vessel 6. Sample R14 is interpreted as Vessel 7, despite the fact that it's constituents are very similar to those of Vessel 6 (R8 and R9), because it's surface treatment differed slightly. Vessel 7 (R14) was originally classified as Thom's Creek Cord Marked, but is re-classified in this study as Cape Fear Cord Marked.

Feature 10. Feature 10 consisted of the fragments of a conjoinable Hamp's Landing Simple Stamped vessel and a fire hearth found in unit N150 E206 (Abbott et al. 1999:61, Figure 6-9). Hamps Landing sherds were dispersed over a 1-x-1-m area and were associated with a fire-cracked-rock hearth. Also found in association, or near, the hearth and remains of the Hamp's Landing vessel were fragments of Hanover Cord Marked, Refuge Punctate, *variety Allendale*, New River Fabric Impressed and New River Cord Marked type vessels. A radiocarbon date was obtained from carbonized plant remains recovered from a flotation sample taken from the area near the Hamp's

Landing vessel and rock hearth. The age of this sample was 3700 ± 40 B.P. (cal 2200–1957 B.C. (P=.05]) (Table 4.20). Seven TL dates were obtained for pottery associated with Feature 10 (Table 4.22).

Table 4.22. Petrographic Data for TL-dated Vessels from Feature 10.

		Proportion of Constituents (%)								
Ves. No.	Samp. No.	Fine Sand[1]	Medium Sand	Coarse Sand	Grog	Sponge spicules	Phytoliths	Muscovite mica	TL Date	Ceramic Series
8	R2	5	1-3	<1	1	5	<1	1-3	No TL signal	New River
9	R3	3	3	3	1			5 (w/ biotite)	AD 701+/- 311	Hanover I
10	R1	5	<1		1-3		<1	1-3 (w/ biotite)	AD 634 +/- 393[2]	Refuge
11	R5	3-5	3-5	3-5		3	<1	1-3 (w/ biotite)	AD 462 +/- 148	Hanover I
11	R4	5	3	3-5	<1			1-3 (w/ biotite)	AD 184 +/- 241[3]	Hanover I
12	R16	3	3-5	3				1	1385 +/- 569 BC	New River
13	R13	5	3-5	<1				1-3	3056 +/- 2598 BC[3]	Hamp's Landing

[1] These values for quartz sand only.

[2] The age estimate of R1 is unreliable due to high scatter in the growth curves.

[3] The age estimates of R4 and R13 are unreliable due to anomalous fading.

Among the seven sherds that were TL dated from the area in and around Feature 10, six vessels are represented. A New River Fabric Impressed sherd (Vessel 8, Sample R2) was found to be undatable by the TL method. Sample R3 was a Hanover I Cord Marked jar (Vessel 9, A.S. 701 ± 311) represented by a rim sherd. The surface was stamped with parallel vertical cord marks. The vessel rim was straight and the lip was flattened with the cord-wrapped paddle. Vessel 10 was represented by a rim sherd (Sample R1) of a Refuge Allendale Punctate jar. The surface treatment is described as bundled drag-and-jab, the neck of the jar was straight, the rim slightly everted and the lip rounded. Unfortunately, this sample exhibited high scatter in growth curves so that its date (A.D. 634 ± 393) is unreliable. Vessel 11 was represented by two rim sherds (Sample R4 and R5). This jar was finished with by over-stamping with a cord-wrapped paddle. The vessel neck was slightly incurvate, the rim slightly excurvate and the lip flattened by the cord-wrapped paddle. The orifice of the vessel was 24–26 cm. The difference in the dates for samples R4 and R5 (A.D. 184 ± 241 and A.D. 462 ± 148, respectively) is possibly due to the fact that Sample R4 exhibited anomalous fading rendering its age estimate less reliable. There is some suggestion from the petrographic data, however, that samples R4 and R5 may have been from distinct vessels, although their appearance macroscopically suggested they were from the same vessel. A very small proportion (<1 %) of green pleochroic mineral and chert were found in R4, while none was found in R5. Small amounts (1 % or less) of plagioclase and feldspar were found in Sample R5, but not in R4. Sample R16 represented a New River Cord Marked vessel (12) dated 1385 ± 569 B.C. Sample R13 represented a Hamp's Landing Simple Stamped jar (Vessel 13). Simple-stamped impressions on this vessel were not very deep (<1 mm) and individual impressions were about 2 mm wide and flat. The Unfortunately, the TL date for this sample (3056 ± 2598 B.C.) is unreliable due to anomalous fading.

Samples not Associated with Features. Two samples (R17 and R18) not associated with features were TL dated. Sample R17 was a Cape Fear Cord Marked (perpendicular over-stamped) vessel dated 168 ± 186 B.C. Sample R18 was a New River Cord Marked (parallel to oblique over-stamped) vessel dated 1765 ± 714 B.C.

Sequence of Temper Attributes

The range of the 12 mean TL dates (excluding unreliable dates) for the pottery from the Riegelwood site spans 2,696 years from 1765 B.C. to A.D. 931. This range of age estimates may be parsed into four segments based on petrographic data that reveal four classes of temper: sand/grit, crushed limestone, fine/medium sand, and sand/grog (Table 4.20).

The three sherds (R6, R16, and R18) classified as sand/grit tempered incorporate quartz sand grains in several sizes including very fine (vf, .0625–.125 mm) through very coarse (vc, 1-2 mm). The threshold for inclusion in this class is the presence of at least 1 percent very coarse sand (and no grog). A box plot of the distribution of the mean TL dates indicates an extensive age range for this group from 1765 B.C to A.D. 5 (Figure 4.47). In contrast to results obtained from the Fort Bragg samples, ratios of sand- (very fine–fine) to grit-size (medium–very coarse) grains do appear to be temporally patterned, such that the proportion of the grit (very coarse and larger grains) included as temper in the ceramic matrix tends to be lower (<1 %) in younger samples (in the Cape Fear series, typically post 400 B.C.). Among sand/grit-tempered sherds, the oldest have the highest proportion of sand, grit, or rock temper and the youngest sherds the lowest (Figure 4.47).

Of three sherds tempered with crushed limestone (R1, R10, and R13), only one (R10) produced a TL date that was reliable, 221 ± 249 B.C. (Table 4.20). Sample R1, a Refuge Allendale Punctate sherd with 3–5 percent limestone voids, exhibited intolerably high scatter. This is partially explained by difficulties in sample preparation. Additional effort to obtain more datable material from this sherd is being undertaken in an attempt to produce better data. Meanwhile, the age estimate from this sample is not considered reliable. Sample R13, a Hamp's Landing Simple Stamped sherd with 5 percent limestone voids, showed significant decay, or anomalous fading, after one week. Although the age estimate of this sherd was corrected for fading, the data were highly scattered, thereby reducing the precision so dramatically that the estimate is not considered reliable.

Six sherds were tempered with varying proportions of fine, medium and coarse sand, but less than 1 percent very coarse sand (samples R2, R8, R9, R11, R14, and R17). These were classified as fine/medium sand tempered (Table 4.20). Sample R2 produced no measurable natural luminescence signal and did not respond with a measurable signal to dose. The sensitivity of this sample was extremely low, preventing any reasonable dating. Sample R9 was classified as Cape Fear Cord Marked. This sample showed significant anomalous fading after one week and although corrected for fading, the highly scattered data reduced the precision so dramatically that the estimate is not considered reliable. Although the range of mean TL dates for this temper group is again quite broad, 1251 years (1247 B.C. to A.D. 4), the median age of this group is A.D. 184.

Six sherds tempered with sand and grog were submitted for TL dating (R3, R4, R5, R7, R12, and R15). Of these, five produced reliable age estimates ranging in mean age from A.D. 184 to 931, with the median age being A.D. 675 (Table 4.20, Figure 4.47). Sample R4 showed significant anomalous fading after one week of storage. A correction for this was applied and, because the data were less highly scattered, the precision was better than other samples that faded (Sample R4 exhibited 13 percent error, while Samples R9 and R13 had 27.3 and 51.2 percent error, respectively). Therefore the age estimate for Sample R 4 (A.D. 184 ± 241) was considered acceptable, while R9 and R13 are not included in the summary statistics. Sample R15 also is not included as it exhibited intolerably high scatter. Difficulties in sample preparation may have accounted for this problem and an effort is being made to obtain more datable material from this sherd in an attempt to produce better data. In the mean time, the age estimate from this sample is not considered reliable.

The principal component of the temper in the sand/grog-tempered sherds is sand. Grog in fine to granular size ranges was found in the matrix in proportions between three and five percent. Sherds with three percent grog were the mode and all were also classified as Hanover series in the original analysis based on macroscopic, not petrographic, data (Abbot et al. 1999). No sherds were found to have a higher proportion of grog than sand.

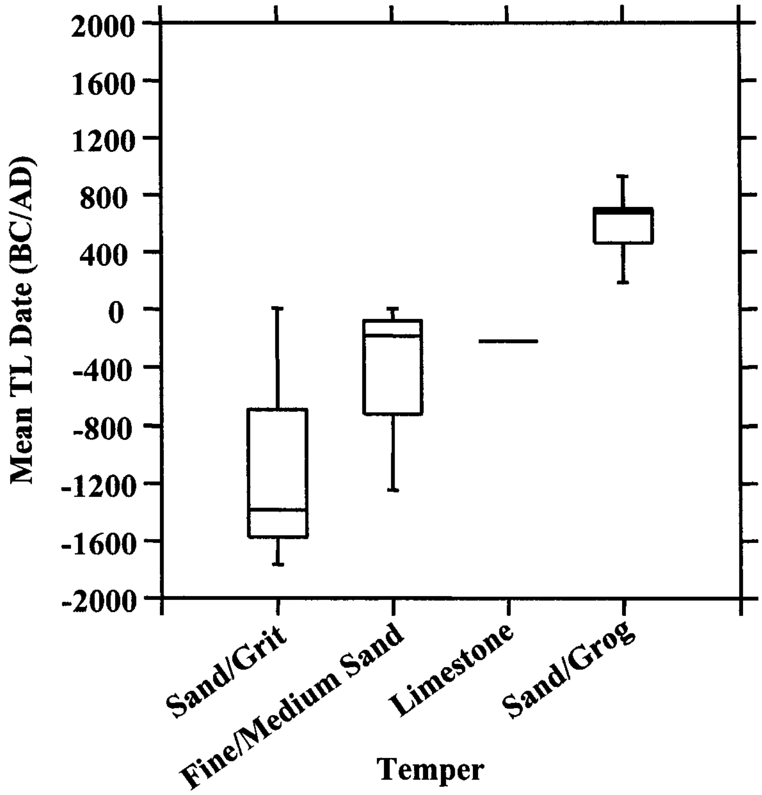

Figure 4.47. Box plot of median and spread of mean TL dates for each of four temper types in the Riegelwood sample.

Sequence of Surface-Treatment Attributes

Three surface treatment classes are represented among the TL-dated samples from Riegelwood: cord-marked (over-stamped parallel), cord-marked (over-stamped perpendicular), and fabric-impressed (Figure 4.48). Three sherds are from vessels over-stamped with a cord-wrapped paddle producing a parallel pattern of cord impressions. This group of cord-marked sherds range in mean age from 1385 B.C. to A.D. 701 with a median value of 221 B.C. (Table 4.20). All samples, whether having parallel or perpendicular cord impressions, exhibit Z-twist cordage.

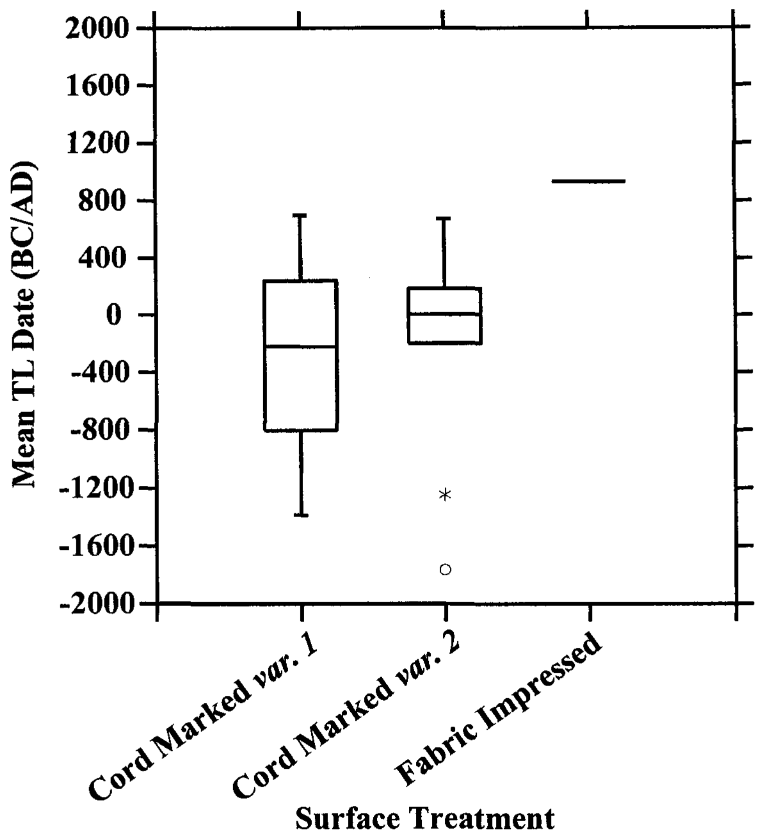

Figure 4.48. Box plot of the median and spread of mean TL dates for each of three suface treatment types in the Riegelwood sample.

The youngest sample in this group (R3) is a sand/grog-tempered rim sherd. Found associated with this rim were many perpendicular cord-marked sherds that were thought to be associated with this rim. Parallel (vertical) cord marking is sometimes found on vessels whose body walls are stamped with perpendicular cord marking. As the vessel was not reconstructed, it could be determined with certainty that this parallel cord-marked rim conjoined perpendicular-stamped body sherds, therefore, Sample R3 is included in the parallel-stamped group. If such a determination had been made and R3 not included in this group, the range of dates for the parallel-stamped cord-marked samples would have been 1385 to 221 B.C. with a median value of 803 B.C.

Seven perpendicular cord-marked sherds range in age from 1247 B.C. to 675 A.D., with a median age of A.D. 4 (Figure 4.45). In the Fort Bragg sample perpendicular cord marking appeared to date to the Middle Woodland and is used in the classification scheme to sort New River Cord Marked from Cape Fear Cord Marked. The considerably older range of age estimates for the perpendicular over-stamped sherds from Riegelwood suggest two possible explanations: (1) differences could exist between the southern coast and the Sandhills, or (2) the differences may be due to sampling error. The 20 samples from Fort Bragg represent 18 sites over a 200 mi^2 area, whereas all the Riegelwood sherds are from the same site. A lack of precision in distinguishing parallel and perpendicular patterns due to erosion on the sherd surface may also have played a role in the difference among Fort Bragg and Riegelwood samples.

Only one fabric-impressed sherd, with a mean TL date of A.D. 931, is included in this sample. The textile impressed on the surface of this sherd was weft-faced, interwoven fabric with weft cordage diameter of less than 1 mm and non-cordage warp diameter of about 2 mm.

Conclusion

Determining the temporal relationships of temper and surface-treatment types at Riegelwood provides a means of exploring the trends in these technological traditions over the Woodland era in the southern coastal region of North Carolina. It also provides the basis for ceramic series classification. Four ceramic series were identified among the 18-sherd sample selected for TL dating from the Riegelwood site. Series include the New River, Hamp's Landing, Cape Fear, and Hanover I series (Figure 4.49). As was found in the Sandhills sample, sand appears to have been included as a tempering agent in every period from 1200 B.C. up to the Late Woodland (A.D. 900), although occurring mostly in combination with grog after A.D. 400. In contrast to the 20-sherd sample from the Sandhills, there is some evidence of changing preferences for sand-grain sizes expressed in this sample.

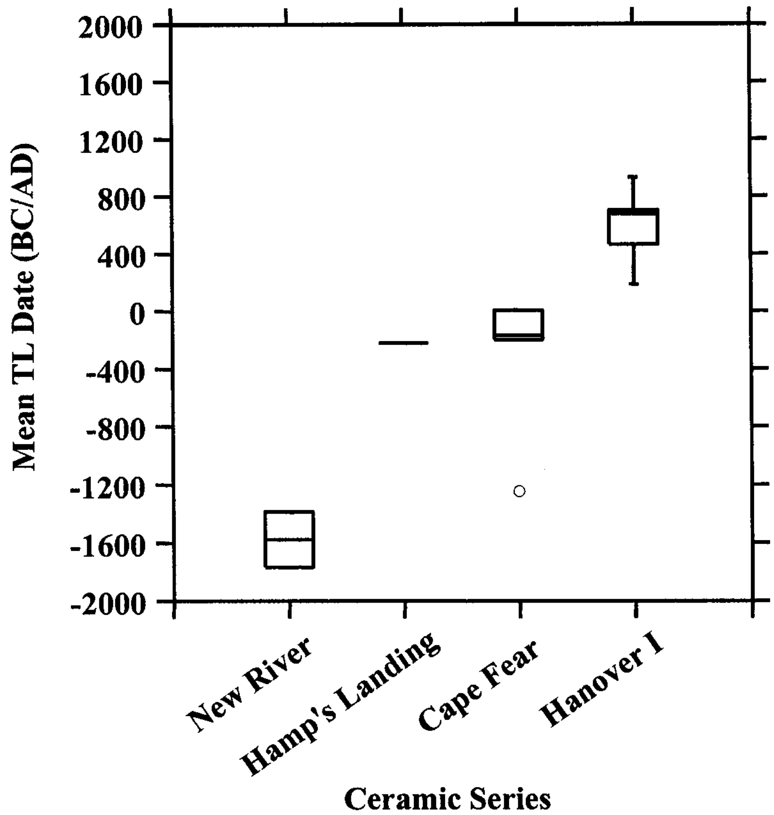

Figure 4.49. Box plot illustrating the temporal relationships of ceramic series from 13 TL-dated sherds from Riegelwood.

Two of the three sherds including one percent or more of quartz sand grains (and no grog) in the very coarse and granule sizes are classified as New River series. The range of mean TL dates for these sherds (1765–3185 B.C.) indicate an Early Woodland placement, but very coarse grains commonly appear in very low proportion throughout most of the Woodland era, including sherds with grog temper. As has been shown, while grain size alone has not proven an especially powerful indicator of temporal trends in technological traditions in the region, sand size may be a valuable indicator in combination with other attributes such as the proportion of sand, and surface treatment type. It should also be noted that one of the sherds (R18) classified as New River Cord Marked seemed to be over-stamped in a perpendicular fashion (a technique that is suspected to be more frequent in the Middle Woodland than is parallel over-stamping). This distinction is, in fact, one of the attributes used to distinguish Middle Woodland Cape Fear from Early Woodland New River series sherds. In the Riegelwood assemblage, however, over-stamping seemed to prevail in every period. In part difficulties in classifying surface-treatment types among the Riegelwood sherds is due to the degree of erosion, which was considerable, and the fact that most stamping seemed to be shallow (perhaps on a partially dry vessel) and rather haphazard.

Of three limestone-tempered samples submitted for TL dating from the Riegelwood site, only one Hamp's Landing Cord Marked sherd produced a reliable date (R10, 221 ± 249 B.C.). This date is significantly younger than three radiocarbon dates currently thought to be associated with Hamp's Landing sherds from other sites in the southern coastal region. The calibrated intercepts of these three ^{14}C dates range in age from 2025–1890 B.C., suggesting a much earlier placement of the Hamp's Landing series in the ceramic sequence than is indicated by the Riegelwood TL date (Figure 4.50). It is very important, however, to consider the context of the radiocarbon dates when evaluating this information. Two of the three ^{14}C dates were obtained for charred wood derived from flotation samples taken from Features 6 and 10 at the Riegelwood site. Feature 6 was a human cremation found in a shallow pit containing charcoal and bone. Fifteen fragments of pottery were recovered in the excavation units in which the feature was found. Six sherds were classified as Hamp's Landing, two as New River, and four as Thom's Creek series. Abbott et al. (1999) associate the date of the cremation with the Hamp's Landing sherds, but the basis on which the other pottery types are disassociated is not explained.

Similarly, Feature 10 is described as "a concentration of grog tempered (Hanover) ware" under which was found a partial Hamp's Landing vessel and a hearth remnant (Abbott et al. 1999:61, Figure 6-9). No pottery was found in the hearth feature itself, but sherds recovered from the excavation unit in which the hearth was located included 35 Hanover (including smoothed, cord-marked, and fabric-impressed types), two Cape Fear Cord Marked, four New River series, and 57 Hamp's Landing Simple Stamped — no fewer than six vessels represented (Abbot et al. 1999:133, Table 8-12). Stratigraphic assessments were difficult, but the excavators interpreted the Hanover ware as intrusive and associated the date derived from carbon in the hearth area with the Hamp's Landing vessel.

Although these radiocarbon dates may indeed be associated with Hamp's Landing pottery, the complexity of the contexts of associations leaves in doubt the discrepancy between the early Middle Woodland TL date for Hamp's Landing and the very early Early Woodland radiocarbon dates for that series that have thus far been secured.

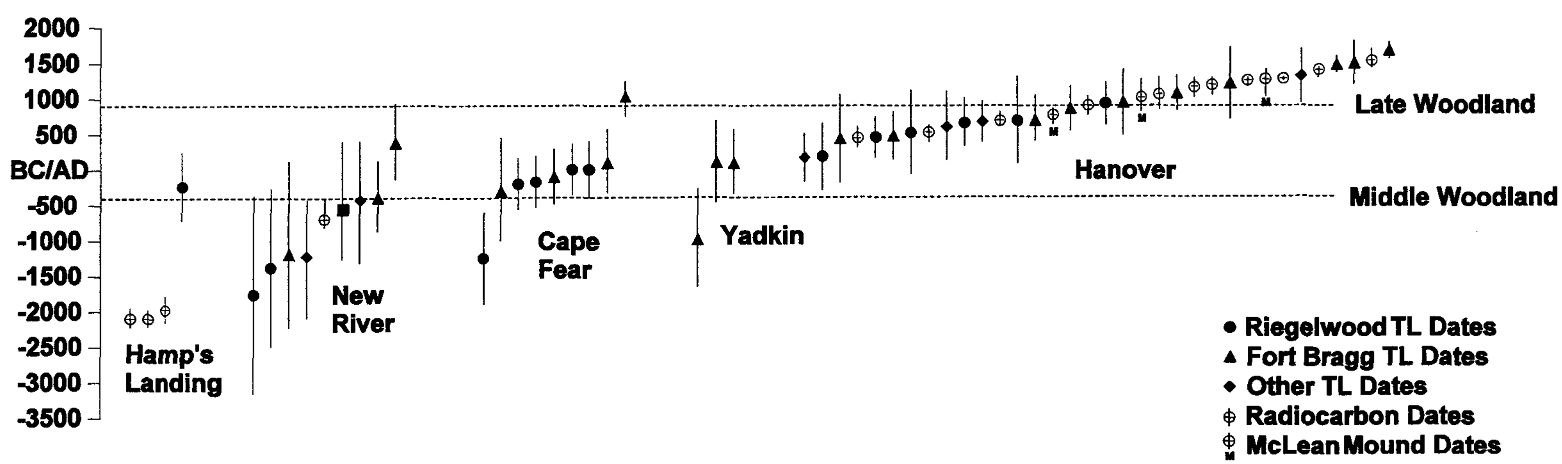

Figure 4.50. Selected thermoluminescence and radiocarbon dates from the southern coast of North Carolina.

The classificatory distinction between New River and Cape Fear sherds from the Riegelwood site was particularly challenging. The distinguishing attributes of sand/grit temper density, and cord impression orientation, found to be effective elsewhere, were not particularly satisfying in establishing mutually exclusive classes in the Riegelwood assemblage. This was due to the fact that no significant differences in temper density were noted, and cord orientation tended to be oblique (neither precisely parallel nor perpendicular) in many samples. Three TL dates for New River pottery obtained from sherds from the Riegelwood site range in mean age from 1765–1247 B.C. (Table 4.20, Figure 4.50). Several other TL-dated New River sherds from Fort Bragg sites and the Papanow site extend that range to about 400 B.C. (374 ± 259 B.C.) and there is even one date as young as A.D 405 ± 272, although this is considered to be an outlier.

There are also two radiocarbon dates from the Riegelwood site associated with Features 3 and 1, where New River pottery was found. Feature 3 was a human cremation from which charred wood recovered from flotation was dated 2470 ± 40 B.P. (cal 785–410 B.C., p=.05). As with other features from the Riegelwood site, Feature 3 was contextually complex. Fifty-seven sherds were found in the excavation unit in which the cremation was observed. These represent no fewer than 12 vessels including Hamp's Landing, New River, Cape Fear and Hanover series. Stratigraphic analysis provides little means of sorting out the problem of association — 15 sherds were found on the surface after plowzone removal, three sherds were found in Level 1, and the remaining 39, including all four series, were found in Level 3 (Abbott et al. 1999:132, Table 8-11).

On the basis of contextual information observed in the field, analysts originally associated the ^{14}C date with the Hanover pottery. The calibrated intercept for the Feature 1 charcoal date (695 B.C.), however, is 868 years older than the oldest mean TL date for Hanover series sherd (A.D. 173). Therefore, it seems more likely that the date may be associated with the New River or Hamp's Landing ceramic components.

The Cape Fear series holds the distinction, temporary though it may be, of being the only pottery series in North Carolina (or probably the Southeast in general) whose chronological placement in the Woodland era relies solely on thermoluminescence dates. The range of six mean TL dates for Cape Fear series pottery from the Riegelwood site is 1247 B.C. to A.D. 4 (Table 4.20, Figure 4.50). With the addition of four TL dates from sites on Fort Bragg, this range may be extended to A.D. 997. The oldest and youngest dates in this group appear to be outliers from a core cluster that ranges in mean age from 278 B.C. to A.D. 118, placing the series confidently in the first half of the Middle Woodland period (400 B.C. to A.D. 900) prior to the development of grog tempering technology.

As mentioned above, the distinction between New River and Cape Fear series pottery is based on the imposition of classificatory definitions derived from small samples, and thus may prove less effective as the database expands. Some indication of this is foreshadowed in the Riegelwood assemblage in which these two series proved difficult to sort, and in the array of dates for the two series which overlap to some degree and, if combined, form a smooth continuum. Furthermore, it should be remembered that the process of sorting the TL-dated sherds presented in this study was aided by the analysis of petrographic data. The determination of the proportion of sand/grit temper, upon which the New River-Cape Fear distinction is based, is apt to be less accurate when relying on macroscopic data alone. Likewise, it is likely that without petrographic data a few of the sherds here classified as Hanover would, on the basis of macroscopic data alone, have been classified as Cape Fear.

Six Hanover series sherds from the Riegelwood site were TL dated. The range of mean dates for this group is A.D. 184–931 (Table 4.20, Figure 4.50). Including all sites from the southern coastal region and sandhills, there are about 32 dates for Hanover series pottery ranging in mean age from A.D. 173–1675. As might be expected, given the age of the Hanover specimens from Riegelwood, most are cord marked, although two are fabric impressed. Although the TL dates for Hanover series pottery from Riegelwood are Middle Woodland in age, it is quite clear from dates derived elsewhere on the southern coast that the Hanover series ware is well represented in the Late Woodland period. If the Riegelwood, Fort Bragg and Papanow assemblages are taken as representative of the series, it is also apparent that grog was often added in quite small amounts to an otherwise sand-tempered paste.

CHAPTER 5

WOODLAND CERAMIC SEQUENCE FOR EASTERN NORTH CAROLINA

In previous chapters a ceramic typology was described for the pottery of the coastal region along with the results of chronological research at several key sites. This chapter expands upon those results to present a ceramic sequence for the region. The types discussed are those described in the typology with the addition of relevant data from several sites (Figure 5.1).

Early Woodland Period Pottery Series (2200–400 B.C.)

Stallings

As mentioned in Chapter 3, Stallings series pottery (2500–1100 B.C.) has been reported in low frequency from sites scattered across the upper Coastal Plain of North Carolina from the Chowan to the Cape Fear basins. Most of this material is plainware, having undecorated, smoothed exterior surfaces. There may be some evidence for a shift from fiber-tempering to sand-tempering traditions in the Sandhills and Sea Island section of the coast. In these regions sand-tempered sherds with plain surfaces are occasionally found to include some Spanish moss fiber in the paste. This is far from clear however, as many Coastal Plain sites on the lower Savannah with Stallings components that are not especially late also seem to have a high proportion of sand-and-fiber combinations used as temper (Sassaman 1993). At present, the number of Stallings sherds from coastal North Carolina is relatively low. Preservation of this low-fired, inherently porous ware is typically poor and sherds tend to be small. As a result, little progress has been made in determining the variety of vessel forms represented.

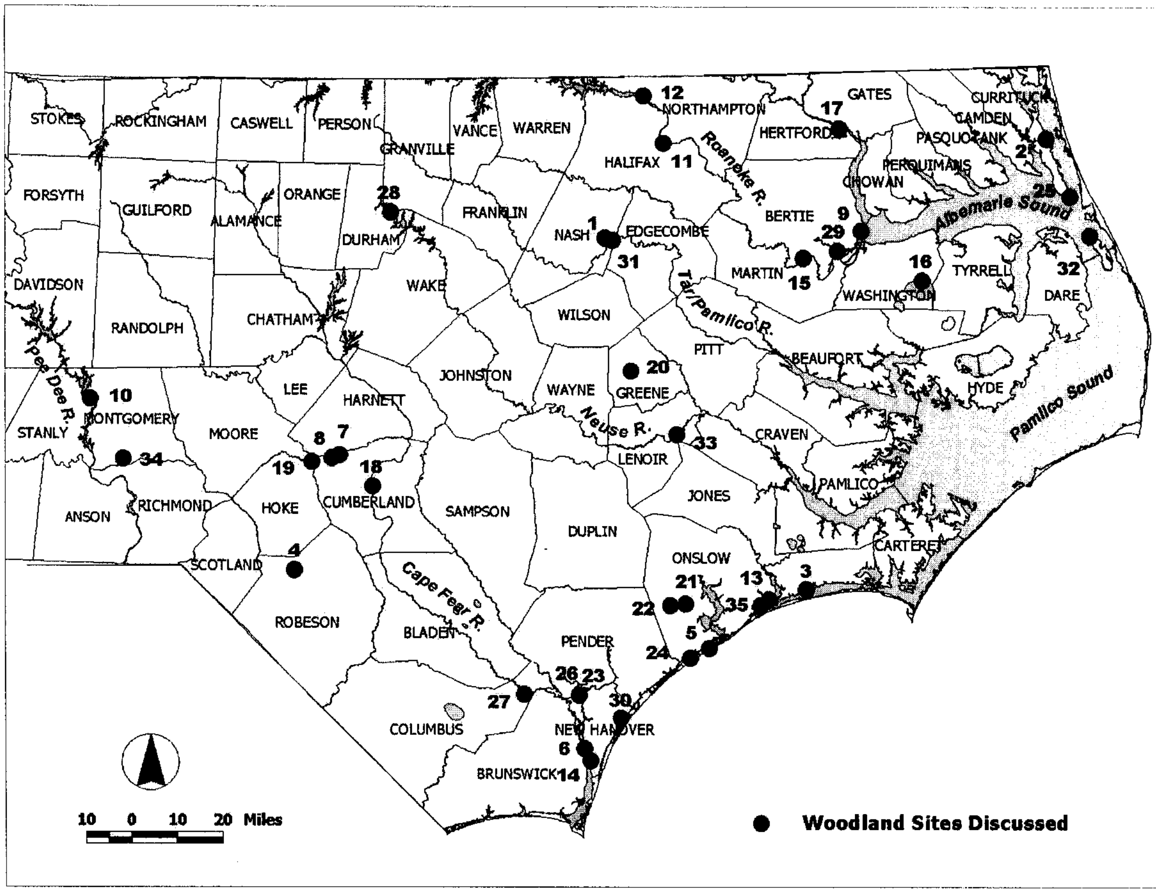

Figure 5.1. Locations of sites mentioned in the text and tables: (1) Battle Park; (2) Baum; (3) Broad Reach; (4) Buie Mound; (5) Cape Island; (6) Cold Morning; (7) 31Cd551;(8) 31Cd622; (9) Davenport; (10) Doerschuk; (11) Fishing Creek; (12) Gaston; (13) Hammock's Beach West; (14) Hamp's Landing;(15) Jordan's Landing; (16) Lake Phelps Canoe; (17) Liberty Hill; (18) McLean Mound; (19) 31Mr93; (20) Neoheroka Fort; (21) 31On542; (22) 31On596; (23) Papanow; (24) Permuda Island; (25) Point Harbor; (26) Pond Trail; (27) Riegelwood; (28) Rush Point; (29) Sans Souci; (30) Sidney Brook; (31) Thorpe; (32) Tillet; (33) Tower Hill; (34) Town Creek; (35) Uniflyte.

Marcey Creek and Croaker Landing

Soapstone-tempered Marcey Creek series (1200–800 B.C.) pottery is occasionally found in the northern part of the coast, and a few sherds of this type have been recognized in the lower Cape Fear basin. Apparently contemporary with the Marcey Creek series is the clay and grog-tempered Croaker Landing series (Egloff and Potter 1982; Egloff et al. 1988; Evans 1955; Pullins et al. 1996). Croaker Landing specimens are well represented at the Davenport site (Figure 5.1), on the Chowan

River in Bertie County, and other sites in the northern area of the Coastal Plain, but have not been found south of Albemarle Sound (Byrd 1999).

Hamp's Landing

A recently identified, limestone or marl-tempered series, Hamp's Landing (Hargrove 1993; Hargrove and Eastman 1997, 1998; Herbert and Mathis 1996; Mathis 1999), has been proposed as an Early or early Middle Woodland type. At the type-site, Hamp's Landing series pottery (Hargrove 1993) was found in stratigraphic context between, and overlapping with, Thom's Creek and Middle Woodland period Hanover types (Figure 5.2). Three subsequent radiocarbon dates for Hamp's Landing sherds suggest that this series is earlier than first thought.

A feature containing nearly 66 fragments of a partially reconstructable Hamp's Landing Fabric Impressed vessel was found in a refuse-filled pit at the Cape Island site, in Onslow County, and radiocarbon dated to 3610 ± 70 B.P. (2145–1760 cal B.C. [p=.05]) (Jones et al. 1997) (Table 5.1). This was "dismissed as a spurious date" by Jones et al. (1997:38). It is in fact very similar to the two ^{14}C dates secured from features containing Hamp's Landing series sherds at the Riegelwood site, in Columbus County (Abbott et al. 1999) and seems acceptable if Hamp's Landing is assumed contemporaneous with the Thom's Creek phase.

As mentioned in the discussion of the Riegelwood site (Chapter 4), only one Hamp's Landing Cord Marked sherd submitted for TL dating from that site produced a reliable date (221 ± 249 B.C.). This date is significantly younger than three radiocarbon dates with calibrated intercepts ranging from 2025–1890 B.C. Upon a close examination of the contexts from which the radiocarbon dated materials were derived, in each case the association of the date with Hamp's Landing sherds was not beyond reasonable doubt. This places the range of dates thus far associated with Hamp's Landing series sherds on a somewhat less certain footing than would be desired. Also contributing to the dubiousness of the current date range of this series is the fact that sherds tempered with marl or limestone, classifiable as Hamp's Landing, are found exhibiting almost every type of surface treatment (Chapter 3). Particularly disconcerting is the presence of check-stamped, perpendicular cord-marked, and non-flexible fabric-impressed surface treatment styles typically associated with Middle Woodland. The dates for Hamp's Landing should therefore be considered preliminary.

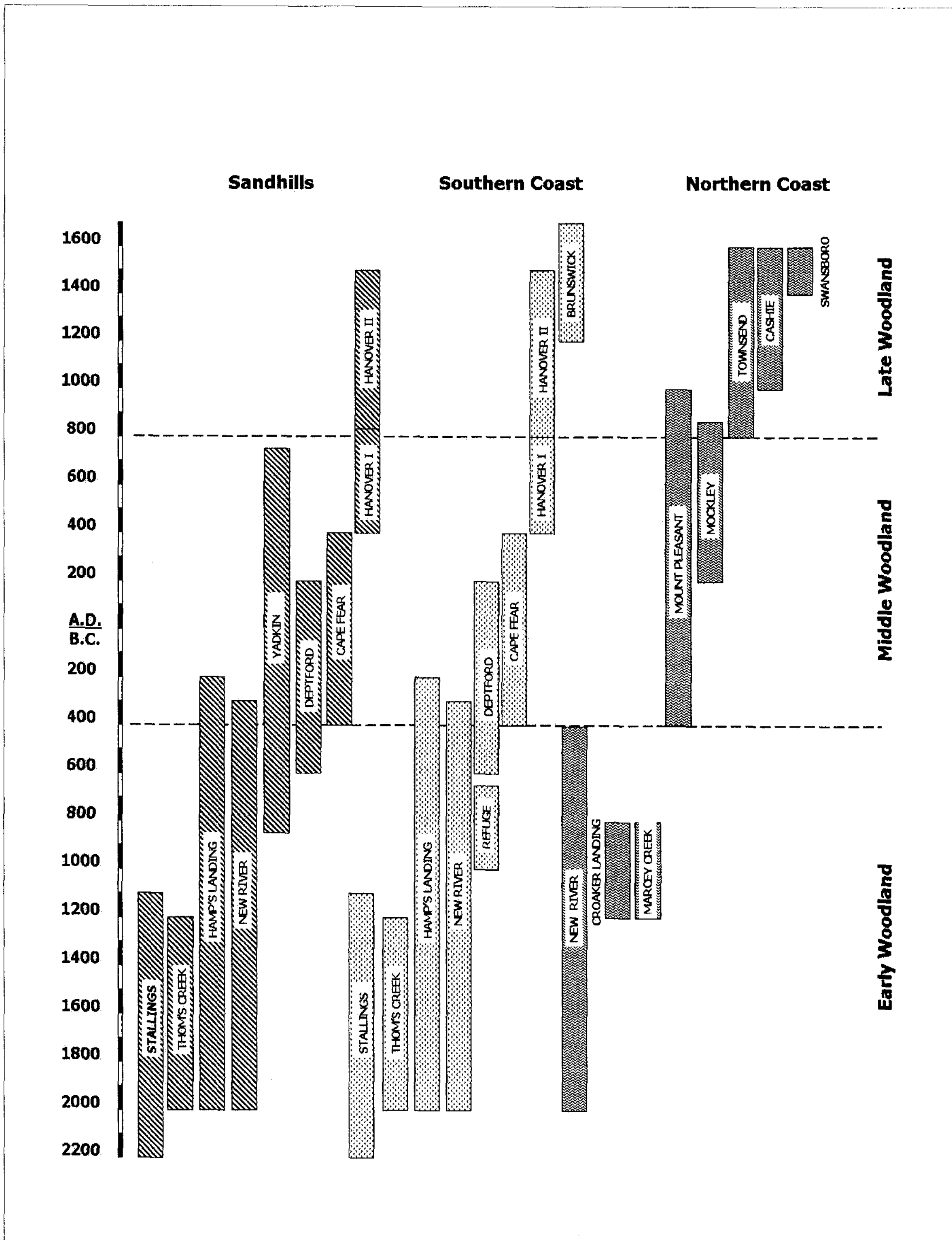

Figure 5.2. Regional ceramic sequences of the Coastal Plain and eastern Piedmont of North Carolina.

Table 5.1. Early Woodland Dates Associated with Pottery from Eastern North Carolina.

Sample[A]	Site Name	Target Pottery[B]	Minimum (Mean) Maximum[C]
UW-226	Papanow	New River Fabric Impressed	-1285 (-434) 417
UW-?	31On542	New River Plain	-1410 (-546) 318
UGA-2551	Uniflite	White Oak ? (possibly Hamp's Landing)	-781 (-645) -396
B-115425	Riegelwood	New River, Hamp's Landing, and Hanover series	-785 (-750, -695, -540) -410
B-107426b	Fairway	New River Plain and Fabric Impressed	-885 (-767) -534
B-130061	Long Point	New River, Hanover, and Mockley series	-930 (-820) -785
UW-400	31Ht347	Yadkin I, Smoothed-over Net Impressed	-1660 (-963) -265
UW-653	Riegelwood	Cape Fear Cord Marked (?)	-2605 (-1000) 605
B-16675	Lake Phelps	Deep Creek Net Impressed	-1205 (-1000) -845
UW-402	31Ht392	New River Net Impressed	-2231 (-1171) 111
UW-224	Papanow	New River Cord Marked	-2076 (-1221) -419
UW-658	Riegelwood	Thom's Creek Cord Marked	-1892 (-1247) -602
UW-660	Riegelwood	New River Cord Marked	-2500 (-1385) -270
UW-662	Riegelwood	New River Cord Marked	-3164 (-1765) -366
B-115428	Riegelwood	Thom's Creek Cord Marked?	-2195 (-1975) -1770
B-104165	Cape Island	Hamp's Landing Fabric Impressed and Refuge Allendale Punctate	-2145 (-1955) -1760
B-115427	Riegelwood	Hamp's Landing Simple Stamped	-2210 (-2120, -2085, -2050) -1945
B-115429	Riegelwood	Hamp's Landing Simple Stamped and Cord Marked	-220 (-2120, -2085, -2050) -1965
B-115426	Riegelwood	New River	-3010 (-2900) -2870
UW-657	Riegelwood	Hamp's Landing Simple Stamped	-8148 (-3056) 2036

[A] UW, University of Washington Luminescence Laboratory (TL dates); B, Beta Analytic Radiocarbon Dating Laboratory; UGA, University of Georgia.

[B] TL dates the pottery itself; radiocarbon dates organic material associated with the pottery.

[C] Minimum, mean and maximum dates are 2-σ calibrated intercepts for ^{14}C samples, and mean and 2-σ errors for TL samples. Negative numbers are ages B.C. positive are ages A.D.

Thom's Creek

Early Woodland Thom's Creek series pottery (2000–1200 B.C.), more common on the lower Savannah River and South Carolina coast (Griffin 1945; Phelps 1968; Sassaman 1993; Stoltman 1974; Trinkley 1980, 1989), is also occasionally found in collections from the southern coast of North Carolina (Phelps 1983; South 1976). In general, the Thom's Creek material that is found in assemblages from southern coastal North Carolina consists primarily of plain or reed-punctate varieties thought to be among the earlier (2000–1000 B.C.) surface-treatment types in South Carolina (Cable et al. 1998:306, Figure 113; Trinkley 1980, 1990).

There are no dates for Thom's Creek series pottery from the North Carolina coast. The narrow range of surface treatment styles, including mostly plain and random punctate styles, seen on Thom's Creek pottery in this area suggest either dilution of the decorative tradition at the periphery of its geographic range (see Chapter 6), or perhaps the representation of only a portion of the 800-year temporal range — the latest portion. Given these factors, it seems likely that the Thom's Creek pottery found on the North Carolina coast would occur at least a few hundred years later than the date at which it made its first appearance on the South Carolina coast.

Refuge

The Refuge series material found on the southern coast of North Carolina consists, so far as is currently known, exclusively of the Allendale Punctate type, originally defined by Stoltman (1974:276–277) for material from the lower Savannah River, South Carolina. Allendale Punctate is thought to date to a relatively short time period (1000–800 B.C.), coeval with Thom's Creek, occurring stratigraphically below Refuge Dentate Stamped, thus occupying an early position in the Refuge series (Anderson et al. 1996:224). In the current study, the few specimens exhibiting Allendale were uniformly characterized by Thom's Creek series paste and vessel attributes.

New River

In the central coastal region, the Early Woodland sand-tempered New River series was defined as having coarse sand in high proportions and, in lesser amounts, granule and pebble-sized particles (Loftfield 1976). Surface treatment types included cord-marked, fabric-impressed, plain, simple-stamped and net-impressed (in apparent descending order of frequency). In the coastal area north of the Neuse River, Phelps (1981a, 1983) defined the Early Woodland, coarse sand-tempered, Deep Creek series from collections north of the Neuse River. Phelps (1983:31) proposed three sub-phases within Deep Creek phase (2000–300 B.C.) characterized by trends in the popularity of various surface treatments. The earliest component is characterized by a predominance of cord marking, the middle component by a rise in the popularity of simple stamping, and the latest component by a decline in the popularity of simple stamping. In this study, pottery of this sort is defined as New River series. Crawford's (1966) Lenoir series is also considered equivalent to the New River series (Eastman et al. 1997). Trinkley (1980, 1990) has also classified coarse, sand-tempered ware from the northern coast of South Carolina to the Deep Creek series, which is equivalent to the New River series.

New River series sherds have been found to date from about 1750 to 400 B.C. (Herbert 1999a; Herbert and Mathis 1996; Loftfield 1976, see also Chapter 4). Two ^{14}C dates, possibly associated with New River series sherds, were secured from the Riegelwood site (Table 5.1) (Abbott et al. 1999; Sanborn and Abbott 1999). The earlier of the two dates is questionable, as it predates the earliest Stallings dates by about 500 years (Herbert 1999a). Two TL dates for New River sherds from the Papanow site and one from site 31On542 indicate a date range for the series from about 1200 to 400 B.C. (Herbert 1997, 1999; Reid and Simpson 1996). Three TL dates for New River pottery obtained from sherds from the Riegelwood site discussed in Chapter 4 extend the early end of the range to 1765–1247 B.C. On the late end, there is even one date as young as A.D 405 ± 272, although this is considered to be an outlier. Given the dates associated with pottery of this series from sites on the south coast, (see Chapter 4, Figure 4.50), it seems reasonable to suggest a date range for the series of about 1200–400 B.C.

Most previous analyses of collections from the southern coast did not distinguish between New River and early Cape Fear (e.g., South 1976; Wilde-Ramsing 1978), and on a sherd by sherd basis the distinction may often be impossible. As a consequence, the frequency of the occurrence of Early Woodland coarse sand-tempered sherds in most collections from the southern region is not known, but it is likely that some of the material previously identified as Middle Woodland is actually Early Woodland. Crawford's (1966) Lenoir series is also considered equivalent to the New River and Deep Creek series (Eastman et al. 1997), and Trinkley (1980, 1990) has classified coarse, sand-tempered ware from the northern coast of South Carolina as Deep Creek. It must also be added that the New River series would seem to be related to the Early Woodland Vincent series first described for materials found on Piedmont sites in the Roanoke River valley (Coe 1964).

Yadkin

Yadkin series pottery has traditionally been considered to be a Middle Woodland series, but has not been dated at either the Doerschuk or Town Creek sites. On the lower Haw River, the radiocarbon date 2190 ± 95 B.P. (cal 405 B.C.–A.D. 20 [p=.05]) was associated with Yadkin pottery at site 31Ch8 (Claggett and Cable 1982:248; Eastman 1994b:6). At the E. Davis site a date for charcoal, 2170 ± 80 B.P. (Cal 396 B.C.–A.D. 14 [p=.05]), is associated with pottery thought to be in the Yadkin series (Eastman 1994b:43). In the Sandhills of South Carolina, Yadkin pottery was found in two features at site 38SU83 (Blanton et al. 1986). Feature 11 was a concentration of 156 sherds from one Yadkin Fine Cord Marked vessel. Charcoal removed from the soil around the pottery dated 2130 ± 70 B.P. (cal 379 B.C.–A.D. 56 [p=.05]) (Blanton et al. 1986:59, Table 45; Eastman 1994b:84). One of the sherds from Feature 11 was also thermoluminescence dated 1220 ± 120 B.P. (A.D. 541–1011 [p=.05]). A second feature (17), determined to be a burned tree stump, was ^{14}C dated 2330 ± 80 B.P. (cal 762–186 B.C. [p=.05]). Yadkin Check Stamped, Yadkin Simple Stamped, and Pee Dee Complicated Stamped sherds were recovered from the fill of Feature 17 (Blanton et al. 1986:61, 146–47, Table 45). Blanton et al. (1986). Most subsequent reviewers (Eastman 1994a, 1994b; Ward and Davis 1999:86), have chosen to accept the ^{14}C dates as reliable Yadkin dates, ignoring contextual problems, and rejecting the TL date. In fact, Feature 11 exhibited no pit boundaries distinguishable by contrasting soil color, and Feature 17 was determined to be a natural disturbance with both Middle and Late Woodland ceramic components represented. On the other hand, no warrant for excluding a TL date of A.D. 766 ± 120 from the expected range for the Yadkin series is offered other than that it differs from the radiocarbon dates from the same context. Further studies of Yadkin assemblages and absolute dates may help to refine the chronology.

As the data in the previous chapter suggests, the Piedmont Yadkin series is expanded in this study to include the crushed-stone tempered, net impressed and cord-marked ware of the Sandhills based on several factors. Evidence for crushed-stone tempering east of the Sandhills is very limited, and the type of rock used as temper in Sandhills wares are stone types procured in the Piedmont. At Fort Bragg, one net-impressed specimen tempered with crushed granitic rock has been TL dated to the Early Woodland (Tables 5.1) and two specimens were TL dated to the Middle Woodland period (Table 5.3). Evidence from other sites on Fort Bragg include vessels tempered with crushed soapstone and possibly chlorite schist, suggesting a relation to the Early Woodland period Marcey Creek series. There may also be some relation to the New Hope feldspar-tempered series defined for materials found in the lower Haw River valley, although at present this is thought to be a Late Woodland tradition (Claggett and Cable 1982; McCormick 1969). Consequently it must be concluded that the grounds for determining the temporal range for Yadkin series pottery are still inadequate. It is possible that sequences may differ regionally with Yadkin occurring earlier in the Sandhills and later in the eastern Piedmont, but chronometric data are too sparse at this time to make this determination with confidence.

Middle Woodland Period Pottery Series (400 B.C.–A.D. 800)

Deptford

The sand-tempered Deptford series (Caldwell and Waring 1939) has its origin in the Early Woodland, about 650 B.C. (Anderson et al. 1982; Trinkley 1980, 1990), contemporary with the later portion of the Early Woodland Deep Creek phase. Cable et al. (1998:286–297, 322–324, Table 91) suggest a taxonomic sequence for the northern coast of South Carolina that merges the Deptford and Cape Fear series, recognizing three phases, each distinguished by slightly different paste characteristics and relative frequency of surface-treatment types (Table 5.2). Results suggest a trend toward softer pastes with smaller sand grains at lower proportions. Trends in surface treatment indicate a predominance of cord marking in all three phases, decreasing proportions of carved-paddle stamping (check-, simple-, and complicated-stamped) and increasing proportion of fabric impressing at the expense of cord marking. A similar trend toward higher relative frequency of fabric impressing with a decline in simple stamping and cord marking is noted by Phelps (1983:29–32) through Deep Creek phases I–III (1000–200 B.C.) and in the Sandhills Cape Fear series. A check-stamped and sand-tempered ware was represented in very low frequency in South's (1976) survey of Brunswick and New Hanover counties and in norther south Carolina (Cable et al. 1998), but check stamping does not appear again until about A.D. 1600 in the Piedmont as Fredricks Check Stamped (Dickens et al. 1987:189–203; Ward and Davis 1993:408).

The trends observed in paste and temper for coastal South Carolina and the North Carolina Sandhills appear to be corroborated in the central and northern coast. Crawford's (1966) data for the middle Neuse River drainage, however, do indicate higher relative frequencies of sherds with smaller sand-grain sizes in the Tower Hill series, the later of the two sand-tempered series from that area. Possibly reversing an earlier observation of "a trend toward larger clastic temper" among Deep Creek and Mount Pleasant series assemblages (Phelps 1983:33), a fine sand-tempered ware, the Middle Town series, has recently been proposed for the terminal Middle Woodland period in the central and northern coastal regions (David S. Phelps, personal communication, 1999). In the central outer coast, Loftfield (1976) identified a fine sand-tempered ware as Adams Creek. Initially thought to be a Late Woodland series based on seriation, Loftfield (1987) later suggested it could actually be Middle Woodland and contemporaneous with either the Mount Pleasant or, more likely, Cape Fear.

Occasionally sand-tempered, check-stamped sherds are found on southern coastal and Sandhills sites in North Carolina, and these are presumed to be related to the Deptford series. As mentioned above, check stamping also is known to occur in relatively low frequency in the Yadkin series. Cable et al. (1998) observed sand-tempered check- and simple-stamped sherds together with cord- and fabric-impressed types in Horry County, South Carolina, and suggest lumping all of these types under a single Cape Fear I series. Similarly, check and simple stamping is found on grog- or clay-tempered Hanover series sherds in that region (Cable et al. 1998). Check stamping is rare among sand-tempered sherds from southern North Carolina and virtually nonexistent in the Hanover and Mount Pleasant series. This suggests that the northern extent of the Middle Woodland carved-paddle stamping tradition is found in the southernmost counties of North Carolina. Considering its association with Deptford materials, carved-paddle stamping also signals the earlier portion of the Cape Fear and Hanover series, coeval with Deptford I and II (ca. 600 B.C.–A.D. 200).

Cape Fear

Also present in the Middle Woodland period in the Sandhills and elsewhere in the southern coastal region is a long-enduring, sand-tempering tradition — the Cape Fear series — that appears to be related to a number of series from adjacent areas. The sand-and-grit tempered Cape Fear series (where grit denotes particle size greater than 1 mm) appears to have an age range from about 400 B.C. to A.D. 400 based on TL dates from Fort Bragg (see Chapter 4). In the Sandhills and on the southern coast, where the series was first defined by South (1960), cord marking is the predominant surface treatment found in the Cape Fear series. Cable and others (1998) divided the Cape Fear series into three phases corresponding to classes exhibiting varying proportions of sand, sand size, and relative frequency of surface-treatment characteristics (Table 5.2). It is possible that such a tripartite division will prove useful in identifying temporal components within the sand-tempered wares from the Sandhills and southern coast, but the distinctions that have been drawn thus far among the three classes are quite subtle, requiring large sample sizes and well-controlled contexts to test (or accurately identify) the presence of one or the other phases.

Table 5.2. Cape Fear and Associated Phases, Pottery Paste, Temper, and Surface Treatments in Northern South Carolina (adapted from Cable et al. 1998).

Associated Phases	Estimated Age	Paste and Temper	Cord-Marked	Fabric-Impressed	Carved-Paddle Stamped
Cape Fear III, Hanover I	A.D. 200– 800	soft to compact paste, sparse fine sand	47%	39%	14%
Cape Fear II, Late Deptford, Deep Creek III	200 B.C.–A.D. 200	compact paste, moderately abundant medium sand	56%	22%	22%
Cape Fear I, Early Deptford, Deep Creek II	600 –200 B.C.	very hard paste, abundant medium and coarse sand	50%	23%	27%

As such, Cape Fear I coincides with early Deptford and late New River. There appears to be some temporal trends in paste characteristics over the period such that a very hard pasted ware with abundant medium and coarse sand shifts to a compactly pasted ware with moderately abundant medium sand (Cable et al. 1998). Anderson and others (1982) approach the resolution of Middle Woodland sand-tempered wares into mutually exclusive classes through the use of the type-variety system. Whereas Cable and others interpret the Cape Fear from Horry County South Carolina as part of a Deptford continuum (200 B.C.–A.D. 200), Anderson and others (1982:293–299) identify similar sand-tempered, fabric-impressed ware from Berkeley County South Carolina as Cape Fear *variety St. Stephens,* a late Middle Woodland (A.D. 500–700) type. They recognize relatedness among the sand-tempered, fabric-impressed ware found at the Mattasee Lakes sites and South's (1960) Cape Fear series, Phelps' (1981) Deep Creek, and Mount Pleasant series, and Loftfield's (1976) New River series and suggest subsuming all of them as varieties of Cape Fear (Anderson et al. 1982:299).

Mount Pleasant

The Middle Woodland Mount Pleasant ceramic series, found on the northern coast of North Carolina, is thought to be contemporary with the Hanover series of the south coast. The latest Mount Pleasant date, 1060 ± 80 B.P. (cal A.D. 903–1292 [p=.05]), was derived from shell found in the midden at Rush Point. Exception is taken to the outlying date, 270 ± 50 B.P. (cal A.D. 1477–1954 [p=.05]), from Feature 1 at site 31Wl170 until further assays demonstrate continuity in this series of dates (Table 5.3). The relationship of the Mount Pleasant and Cape Fear series is not well understood. Phelps (1983:35) has equated the two, suggesting they form a single series. Haag (1958) described a grit-tempered series, similar or equivalent to Mount Pleasant for the interior Coastal Plain, that may have subsumed specimens classifiable as Cape Fear. Mount Pleasant series sherds also resemble Middle Woodland Vincent series (Coe 1964:101–102) of the Roanoke Rapids area of Piedmont North Carolina, and Evans' (1955) Stoney Creek series from the Potomac River valley in Virginia.

Very few Mount Pleasant series sherds where identified in the surface collection used in this study, although this was the principal type recognized from the Bandon site midden. Results of the analysis of sherds from the Bandon midden raise some questions regarding the taxonomy and sequencing of Mount Pleasant series pottery. The Middle Woodland shift from coarse sand to granule tempering that was expected, based on published information, was not found. Instead, the frequency of granule-tempered sherds was greater at the base of the midden, with temper grain size decreasing in the middle and upper levels. This reversal of the expected trend did not appear to be the result of post-depositional disturbance, but suggests that systematic analyses of sand-tempered assemblages of Middle Woodland components found on sites are needed to refine definitions and sequences.

Hanover

Following Coe (1952:306) and Haag (1958:108), South (1976:40) concluded that fabric impressing was an earlier technology than cord marking and surmised that the Hanover series was associated with an earlier culture phase than the Cape Fear series. As is demonstrated in the Bandon Midden and among dated materials from the southern coast and Sandhills, however, fabric impressing is without question more frequent later in the sequence than cord marking. Based on radiocarbon dates from South and North Carolina, a conservative estimate for the temporal range of the Hanover series, is 200 B.C. to A.D. 650. Several recent radiocarbon assays suggest that the Hanover series dates well into the Late Woodland period, possibly as late as A.D. 1400 (Mathis 1999; Hargrove personal communication, 1998; Herbert et al. 2002). Irwin and others (1999) have recently re-analyzed the

Table 5.3. Middle Woodland Dates Associated with Pottery from Eastern North Carolina.

Sample[A]	Site Name	Target Pottery[B]	Minimum (Mean) Maximum[C]
B-43628	Tower Hill	Cashie Fabric Impressed and Plain	635 (780) 1005
UGa-2549	Uniflite	White Oak series	655 (725, 735, 765) 895
UGa-3144	Thorpe	Mount Pleasant Cord Marked	645 (725, 735, 765) 960
B-130059	Long Point	none noted	670 (770) 890
UW-449	31Mr241	Hanover I Check Stamped	365 (706) 1047
UW-647	Riegelwood	Hanover II Cord Marked	91 (701) 1311
B-107427	Fairway	Hanover Fabric Impressed	610 (695) 815
B-127355	Hammocks Beach West	Hanover Cord-Marked and Fabric-Impressed; White Oak series	630 (690) 885
UW-222	Pond Trail	Hanover Fabric Impressed	396 (680) 964
UW-651	Riegelwood	Hanover II Cord Marked	338 (675) 1012
B-127367	Hammocks Beach West	none noted	615 (670) 785
B-119389	Hammocks Beach East	none noted	550 (650) 705
B-58941	Broad Reach	Hanover Fabric Impressed	430 (643) 777
B-127358	Hammocks Beach West	White Oak Fabric-Impressed; Mockley Cord-Marked and Net-Impressed	545 (635) 675
UW-645	Riegelwood	Hamp's Landing Allendale Punctate	-136 (634) 1404
B-11941	Permuda Island	White Oak series	430 (625) 700
UW-?	31On596	Hanover series	139 (621) 1103
UGa-2547	Uniflite	White Oak series	425 (575) 660
UGa-2548	Uniflite	White Oak series	390 (535) 640
B-7011	Sidney Brook	Hanover series	390 (530) 630
UW-659	Riegelwood	Hanover I Fabric Impressed	-62 (528) 1118
UGa-3435	Tillet	Mount Pleasant series	280 (499) 673
UW-443	31Ht344	Hanover I Fabric Impressed	144 (483) 822
B-130904	Long Point	Hamp's Landing, New River, Hanover, and Mockley series	385 (465, 480, 520) 625
UW-649	Riegelwood	Hanover I Cord Marked	172 (462) 752
B-107422	Fairway	Hanover Fabric Impressed	315 (445) 608
UGa-1085	Baum	Mount Pleasant series	340 (440) 615
UW-450	31Mr93	Hanover I Cord Marked	-180 (435) 1050
UW-442	31Cd622	New River Net-Impressed	-128 (405) 938
B-48970	Point Harbor	Mount Pleasant series	240 (400) 535
B-73744	Liberty Hill	Mount Pleasant series	225 (390) 540
UGa-1088	Rush Point	Mount Pleasant series	111 (264) 434
UW-648	Riegelwood	Hanover I Cord Marked	-288 (184) 656
UW-223	Papanow	Hanover Cord Marked	166 (173) 512
B-11942	Permuda Island	none noted	55 (155) 340
UW-399	31Ht347	Yadkin Net Impressed	-447 (121) 689
UW-396	31Cd551	Cape Fear I Cord-Marked	-331 (118) 567
UW-395	31Ht269	Yadkin Net Impressed	-337 (118) 573
B-131574	Goose Creek (Bogue)	Hanover and White Oak	-115 (65) 245
UW-655	Riegelwood	Cape Fear Cord Marked	-357 (4) 365
UW-650	Riegelwood	Cape Fear Cord Marked	-399 (5) 409
UW-446	31Ht355	Cape Fear I Cord-Marked	-466 (-82) 302
UW-661	Riegelwood	Cape Fear Cord Marked	-533 (-168) 197
UW-652	Riegelwood	Cape Fear Cord Marked	-562 (-199) 164

Table 5.3 (continued).

Sample	*Site Name*	*Target Pottery*	*Minimum (Mean) Maximum*
UW-654	Riegelwood	Hamp's Landing Cord Marked,	-709 (-221) 267
UW-393	31Cd486	Cape Fear I Cord-Marked	-1003 (-278) 447
B-73732	Little Cedar Island	Deep Creek series	-421 (-347) -162
B-73743	Liberty Hill	Mount Pleasant series	-400 (-365) -165
UW-394	31Ht471	New River Cord Marked	-134 (-374) 882

[A] UW, University of Washington Luminescence Laboratory (TL dates); B, Beta Analytic Radiocarbon Dating Laboratory; UGA, University of Georgia.
[B] TL dates the pottery itself; radiocarbon dates organic material associated with the pottery.
[C] Minimum, mean and maximum dates are 2-σ calibrated intercepts for ^{14}C samples, and mean and 2-σ errors for TL samples. Negative numbers are ages B.C., positive are ages A.D.

ceramics from the McLean Mound and found them tempered with sand-and-grog rather than sand as originally thought, therefore suggesting that these materials are Hanover series rather than Cape Fear. Recently, the author submitted a sample of soot from the surface of a sand-and-grit-tempered fabric-impressed sherd from the McLean Mound for radiocarbon dating. The AMS assay returned a date of 980 ± 110 B.P. (cal A.D. 821–1282 [p=.05]), somewhat earlier than expected for the mound, but in the expected range for Hanover series pottery. Some researchers subsume Hanover as a variety of the Wilmington series (Anderson et al. 1982:272; Trinkley 1990:17–18). The grog-tempered Wilmington and St. Catherine's series (Caldwell 1952; DePratter 1979; Waring and Holder 1968) from the Georgia Sea Islands and south coast of South Carolina dates from ca. 200 B.C.–A.D. 1150 and, hence, is contemporary with part of the Hanover phase. Although these series include an array of surface-treatments not seen on Hanover ceramics from North Carolina (e.g., simple stamping, check stamping, and linear check stamping), the tempering technique and geographic proximity suggest some relatedness.

Based on TL dates and petrographic analysis of pottery from the Sandhills, two temporal phases for the grog-tempered Hanover series have been proposed (Herbert et al. 2002). A late Middle Woodland phase, Hanover I (A.D. 400–800), is characterized by pottery tempered principally with sand to which a minor amount of finely crushed grog was added. Surface treatments in this variety include cord marking, check stamping and fabric impressing. A Late Woodland variety, Hanover II (A.D. 800 through 1500), is tempered mostly with grog with a small amount of sand included in the paste and is represented by mostly fabric-impressed sherds. The distinctions based on thin-section analysis of a limited number of dated sherds, however, may not be easily translated into sorting criteria for the macroscopic analysis of hand samples. Further work will be necessary to determine the validity of these propositions.

Mockley

The Mockley series, defined by Robert Stephenson and others (1963:105–109), dates to the latter half of the Middle Woodland period. Dates for Mockley series pottery range from about A.D. 200 to A.D. 880 (Artusy 1976:9; Barka and McCarry 1997:43; Gardner and McNett 1971:29; Opperman 1980:4; Potter 1982:121; Waselkov 1982). In the coastal North Carolina region, Mockley ware is characterized as having thick vessel walls, coarse shell temper, cord-marked or net-impressed surfaces, and simple conical jar forms with direct rims, wide mouths, and semiconical or rounded bottoms (Potter 1982:124). Potter (1982:124) suggested that among Mockley materials from the Northern Neck of Virginia, cord marking was more common in the earlier part of the phase, and net impressing more common in the later part. This sequence appears to be reversed in southern Maryland (Herbert 1995:20) and on the coast of North Carolina, where net impressing is the more common of the two surface-treatment styles early in the sequence, with cord marking more popular in the later part of the period, persisting into the earliest portion of the Late Woodland (A.D. 800–900).

The Late Woodland Period Pottery Series (A.D. 800–1600)

One of the most significant recent developments in understanding the Late Woodland in the southern coastal region has been the recognition of potential for confusion regarding the distinction between shell-tempered Late Woodland ware (formerly, Oak Island series) and Early Woodland limestone-tempered Hamp's Landing series sherds. A recent reappraisal suggested that previously analyzed "shell-tempered" assemblages from several southern coastal sites may have included a number of limestone or marl-tempered specimens (Herbert and Mathis 1996). A subsequent study designed to assess this problem by reanalyzing a portion of the collection that South (1960) used to define the Oak Island series, found that among a sample of 112 sherds (45 percent of South's original collection) none could be positively identified as shell-tempered (Mathis 1999). As researchers began to realize that much of what had been identified as Late Woodland shell-tempered Oak Island was actually Early Woodland Hamp's Landing series, some of the perplexity regarding surface treatments vanished. Net-impressed and cord-marked surface treatments occurring in the Late Woodland period — problematic with regard to our current understanding of the sequence of surface-treatment traditions for the coast — made much more sense in an Early Woodland context. Mockley-like pottery with cord-marked and net-impressed surface-treatments has been found at the Long Point site in the central coastal area (Shumate and Shumate 2000). Similar material has been found in the area north of the Albemarle and from a few sites on the central coast where it occurs in relatively low frequency. These ceramics are classified as Mockley in the current study.

The undoing of Oak Island also has ramifications for interpretation of the age of the Cold Morning ossuary. Two pottery types, Cape Fear Fabric Impressed and Hamp's Landing Plain, are associated with the Cold Morning ossuary burials, dated 1000 ± 80 B.P. (cal A.D. 778–1163 [p=.05]) (Eastman 1994b:10; Ward and Wilson 1980). The sherds found in the Cold Morning ossuary, originally classified as Oak Island, have been reclassified as Hamp's Landing (Mathis 1999). The provenience reported for these specimens does not allow discrimination of temporal priority for one or the other series (cf.. Ward and Wilson 1980:27). Present data suggest that it is the sand-tempered component in the ossuary that dates to the early Late Woodland period.

Hanover II

A second development that holds promise for the Late Woodland chronology on the southern coast pertains to filling of the gap left by the retirement of the shell-tempered Oak Island series. The pottery from the McLean and Buie Mounds furnish a line of evidence regarding Late Woodland pottery series. Seventy-five percent of the McLean Mound pottery is fabric-impressed and tempered with sand and grog (Herbert 1999a; Irwin et al. 1999). The presence of medium sand along with clay or grog, and the complete absence of sherds tempered exclusively with clay or grog without sand, distinguishes these specimens as a late variety of the Hanover series. Sand-tempered, smoothed and fabric-impressed ware is also observed in the McLean Mound assemblage. Although the sand-tempered material is classified as Middle Woodland Cape Fear, the total absence of cord marking—the dominant surface treatment in the Cape Fear series—is notable, suggesting either an unusually late position in the Cape Fear sequence, or the existence of a Late Woodland sand-tempered series that has not yet been defined. In combination, these data suggest that both the sand-tempered and clay- or grog-tempered wares represent an early Late Woodland tradition, ca. A.D. 700 to 1200 (Table 5.4). The Buie Mound pottery assemblage includes mostly (79 %) sand-tempered, burnished plain ware with some (12 %) clay or grog-tempered sherds (Wetmore 1979:44, Table 3). Fabric impressing is the minority type (about 10 %) at the Buie Mound, but comprises 86 percent of the McLean Mound sherds. This suggests that the McLean Mound assemblage may be somewhat earlier than the Buie mound (Irwin et al. 1999).

Chronometric data from Fort Bragg indicate that grog-tempered pottery appeared in the region by at least A.D. 400 and through the ensuing centuries displaced sand-and-grit tempering (Herbert 2000; Herbert et al. 2002; see also Chapter 4). This is evident as the declining relative frequency of sand-and-grit tempered sherds and decreasing proportions of sand included in the paste of grog-tempered vessels. By A.D. 1000, the temper is predominantly grog, with only a background (1–3%) of medium sand in the paste. Also during the transition from Middle to Late Woodland (A.D. 400–800) cord marking is displaced by fabric impressing. For convenience, the period from A.D. 400 to 1000 may be referred to as the Hanover I phase, and the period following A.D. 800 the Hanover II phase.

Townsend

The Late Woodland period in Tidewater North Carolina is considered synonymous with shell-tempered ceramics. The Colington series was defined by Phelps (1983) for shell-tempered ware found along the coast in the northern region, and the White Oak series was defined by Loftfield (1976) for shell-tempered ware found in the central coastal region. Both areas are the traditional territory of the Carolina Algonkians and are consequently, related to the Townsend series in coastal Virginia and southern Maryland (Egloff and Potter 1982:107–108; Griffith 1980; Potter 1993: 114–119; Stephenson et al. 1963; Wright 1973). Few significant differences appear to exist between the pottery defined as White Oak and that defined as Colington, but some differences do exist (Herbert and Mathis 1996; Marshall 1999).

Table 5.4. Late Woodland Dates Associated with Pottery from Eastern North Carolina.

Site	Site Name	Sample[A]	Target Pottery[B]	Minimum (Mean) Maximum[C]
31Hy43	Amity	B-31110	Colington Simple Stamped	1530 (1665) 1950
31Ht355		UW-445	Hanover I Fabric Impressed	1559 (1675) 1791
31Wl170		B-48782	Mount Pleasant series	1490 (1645) 1945
31Cr53	Shelly Point	B-69590	Townsend series	1477 (1630) 1697
31Hf30b	Liberty Hill	B-8134	Rappahannock Fabric Impressed	1455 (1530, 1545, 1635) 1665
38HR243	Little River Neck	B-96114	Hanover I series	1431 (1533) 1691
31Cd594		UW-397	Hanover II Fabric Impressed	1197 (1503) 1808
44Kg3	Deshazo	SI-137	Rappahannock Fabric Impressed	1325 (1500) 1950
31Ht392		UW-447	Hanover II Fabric Impressed	1367 (1481) 1595
31Cr53	Shelly Point	B-69588	fabric-impressed	1408 (1476) 1626
31Cr14	Piggott	B-73741	Townsend series	1420 (1455) 1635
31On665	Hammocks Beach West	B-127369	Rappahannock Fabric Impressed	1382 (1452) 1538
31Cr218	Broad Reach	B-58943	Townsend series	1405 (1452) 1645
31Hy43	Amity	B- 17507	Colington Simple Stamped	1300 (1440) 1650
31Hy43	Amity,	B-34062	Colington Simple Stamped	1305 (1430) 1630
31Cr218	Broad Reach	B-52529	Townsend series	1400 (1430) 1480
	Ellis	B-76688	Cashie series	1326 (1426) 1473
31Cr218	Broad Reach	B-58947		1325 (1425) 1460
44Wm119	White Oak Point	DIC-1766	Townsend series	1400 (1425) 1460
31Br7	Jordan's Landing	UGa-1086	Cashie series	1295 (1415) 1475
31Cr218	Broad Reach	B-58946	Rappahannock Fabric Impressed	1295 (1405) 1435
31On665	Hammocks Beach West	B-127364	none noted	1295 (1410) 1445
31On665	Hammocks Beach West	B-127360	Hanover Fabric-Impressed; Rappannock Fabric Impressed and Plain	1290 (1410) 1455
31On665	Hammocks Beach West	B-127359	Hanover Cord-Marked; Mockley Net-Impressed; Rappannock Fabric Impressed	1305 (1410) 1445
31On33	Uniflite	UGa-2550	Townsend series	1295 (1410) 1450
31Nh331	Eagle Point	B-128620	Hanover series	1300 (1405) 1435
31On305	Flynt, Ossuary	B-30209	Townsend series	1295 (1403) 1443
31Bf25	Archbell Point	B-31Bf25	Colington Simple Stamped	1291 (1396) 1462
31On665	Hammocks Beach West	B-127366	Rappahannock Fabric Impressed	1285 (1395) 1435

Table 5.4 (continued).

Site	Site Name	Sample	Target Pottery	Minimum (Mean) Maximum
31Ck9	Baum	B-73735	Townsend series	1220 (1299, 1375, 1375) 1427
31Ck9	Baum	B-73734	Townsend series	1266 (1301, 1372, 1378) 1413
31On309	Jarretts Point	UGA-5467		1264 (1318, 1368, 1387) 1430
31On665	Hammocks Beach West	B-127357	Rappahannock Fabric Impressed	1280 (1310, 1365, 1380) 1415
31Br1	Shipyard Landing	B-4394	Rappahannock Fabric Impressed	1275 (1310, 1365, 1380) 1420
31On624	Jarman Point	B-112272	Hanover series; Cape Fear series (?)	1275 (1315, 1345, 1390) 1435
31Cr218	Broad Reach	B-58944	Townsend series	1285 (1315, 1350, 1390) 1420
44WM119	White Oak Point	DIC-1768	Townsend series; Currioman series	1285 (1315, 1350, 1390) 1425
31On665	Hammocks Beach West	B-127361	Hanover Fabric-Impressed; Rappahannock Fabric Impressed and Plain	1263 (1334) 1443
31On624	Jarman Point	B-112271	none noted	1235 (1300) 1425
31Dr14	Kitty Hawk Bay	UGa-3847	Townsend series	1213 (1323) 1450
31Cr53	Shelly Point	B-69589	Townsend series; Cape Fear series	1245 (1323) 1433
31Ck9	Baum	UGa-1089	Townsend series	1224 (1320) 1440
31Nh690	Papanow	UW-225	Cape Fear Cord Marked	943 (1319) 1695
44Wm 119	White Oak Point	DIC-1764	Townsend series	1275 (1305) 1410
38Hr243	Little River Neck	B-96112	Hanover Fabric Impressed	1275 (1300) 1410
31On196	Permuda Island	B-11939	Rappahannock Fabric Impressed	1275 (1300) 1410
31Hy43	Amltv	B-30866	Colington	1270 (1300) 1405
31On190	Cape Island	B-104465	New River Simple Stamped; Rappahannock Plain	1265 (1300) 1415
31Br1	Shipyard Landing	B-4395	Rappahannock Fabric Impressed	1260 (1300) 1410
31On665	Hammocks Beach West	B-127363	New River series (?); Hanover Fabric Impressed; Rappahannock Fabric Impressed	1255 (1300) 1420
31Cr218	Broad Reach	B-53075	Hanover series; Townsend series	1218 (1297) 1422
	Jordan's Landing	B-73742	Cashie series	1210 (1285) 1395
31On665	Hammocks Beach West	B-127362	Hanover Fabric Impressed; Rappahannock Fabric Impressed and Plain	1177 (1290) 1395
31On665	Hammocks Beach West	B-127368	Rappahannock Fabric Impressed	1210 (1290) 1405
31On665	Hammocks Beach West	B-127365	Hanover Fabric Impressed; Townsend series	1250 (1290) 1395
31Dr38	Hatteras Village	B-77128	Townsend series	1214 (1290) 1404
31Cr218	Broad Reach	B-58945	Townsend series	1185 (1280) 1395

Table 5.4 (continued).

Site	Site Name	Sample	Target Pottery	Minimum (Mean) Maximum
31Dr33	White Court	UGa-1087	Rappahannock Fabric Impressed	138 (1280) 1387
31Nh330		B-	Hanover Fabric Impressed and Simple Stamped; Cape Fear Fabric Impressed	1255 (1280) 1295
31Bf58	Midgette Point	B-31Bf58	Townsend series	1137 (1273) 1338
31Ck9	Baum	B-77127	Townsend series	1194 (1271) 1295
31On190	Cape Island	B-104169		1020 (1270) 1420
31On235	Pelican Point	B-842464	Rappahannock Fabric Impressed; Hanover Fabric Impressed; Cape Fear Fabric Impressed	1055 (1260) 1305
38HR243	Little River Neck	B-96113	Hanover I series	1170 (1255) 1290
31On82	Hammocks Beach	B-11937	Rappahannock Fabric Impressed	1025 (1250) 1385
31Ns3b	Thorpe	UGa-3143	Cashie Simple Stamped and Fabric Impressed	1050 (1250) 1295
31JN2	Long Point	UW- 451	Townsend series	957 (1249) 1541
31On190	Cape Island	B-104167		1085 (1240) 1315
31On624	Jarman Point	B-112275		175 (1260) 1295
44Nb147	Blue Fish Beach	SI-4230	Rappahannock Incised and Fabric Impressed	1035 (1220) 1290
31Ht450		UW-448	Hanover I Fabric Impressed	719 (1219) 1721
31On305	Flynt	B-12815	Onslow series; Rappahannock Fabric Impressed	1030 (1205) 1280
31On305	Flynt	B-12816	Townsend series	1030 (1205) 1280
31Nh331	Eagle Point	B-122725	Hanover series	1050 (1200) 1295
31On305	Flynt	B-12353	none noted	1025 (1175) 1260
31On235	Pelican Point	B-79500	Rappahannock Fabric Impressed; Hanover Fabric Impressed	990 (1170) 1285
31Nh142	Hamp's Landing	B-63184	Hanover series	1020 (1170) 1290
31On196	Permuda Island	B-11940	Rappahannock Fabric Impressed; Hanover Fabric Impressed	1010 (1160) 1260
38Hr258	Fairway	B-107425	Plain and fabric-impressed	1005 (1159) 1289
44Pg4	Irwin	SI-138	Rappahannock Fabric Impressed	1040 (1155) 1185
31On33	Uniflite	UGa-2552	Townsend series; Hanover series	1027 (1154) 1265
31Jn2	Long Point	UW-452	Townsend series	947 (1141) 1335
31Nh28	Cold Morning	B-1285	Cape Fear series; Hamp's Landing series	980 (1123, 1141, 1152) 1280
31Cr53	Shelly Point	B-136918	Townsend series	1012 (1132) 1274
31On624	Jarman Point	B-112273	Cape Fear series; Hanover series; Townsend series	1000 (1040) 1251

Table 5.4 (continued).

Site	Site Name	Sample	Target Pottery	Minimum (Mean) Maximum
31Ht392		UW-398	Hanover II Fabric Impressed	841 (1084) 1327
	Little Cedar Island	B-73731	Mount Pleasant series	982 (1067) 1231
31Fr14	Kitty Hawk Bay	UGa-1090	Rappahannock Fabric Impressed	966 (1063) 1237
31Cr305	Goose Creek	B-131575	Hanover Cord Marked; Townsend series	848 (1059) 1297
31Jn2	Long Point	B-130060	Cape Fear series; Hanover series; Townsend series	995 (1040) 1225
31On536			Hanover series; Townsend series	1040
44Wm119	White Oak Point	SI-4374	Rappahannock Fabric Impressed	980 (1040) 1245
31Cd7	McClean Mound	M-1354	Cape Fear series; Hanover series	815 (1025) 1270
31Ns3b	Thorpe	UGa-3142	Cashie series	895 (1020) 1195
31Cr53	Shelly Point	B-131572	Townsend series	900 (1015) 1170
31Ht402		UW-401	Cape Fear III Cord Marked	756 (997) 1238
31Cr53	Shelly Point	B-131573	Townsend series	875 (995) 1040
38Hr258	Fairway	B-107426a		839 (995) 1087
31On305	Flynt	B-9381	New River series; Hanover series; Onslow series; Rappahannock series	880 (990) 1030
31On665	Hammocks Beach West	B-127356	Hanover Cord Marked and Fabric Impressed; Rappahannock Fabric Impressed, Plain; Mockley Cord Marked and Net Impressed	875 (980) 1025
31Dr35	Tillett	UGa-3433	Townsend series	765 (980) 1150
31On305	Flynt	B-9382	New River series; Hanover sreies; Onslow series; Rappahannock series	815 (970) 1020
31Dr15	Rush Point	UGa-3849	Mount Pleasant series	765 (950) 1070
31Ht344		UW-444	Hanover I Fabric Impressed	489 (946) 1403
31On624	Jarman Point	B-112278		865 (975) 1020
31Cb114	Riegelwood	UW-656	Hanover II Fabric Impressed	629 (931) 1233
31Hf20	Mount Pleasant	UGa-4011	Townsend series	685 (905, 930, 945) 1115
31On305	Flynt	B-12817	Cape Fear series	765 (895) 1010
38Hr258	Fairway	B-107423	Hanover Fabric Impressed	772 (906) 1034
31Cr218	Broad Reach	B-58942	Townsend series	888
44He470	Alvis	UGa-4818	Rappahannock Fabric Impressed	680 (875) 1005
31Cd750		UW-441	Hanover I, Fabric-Impressed	550 (864) 1178

Table 5.4 (continued).

Site	Site Name	Sample	Target Pottery	Minimum (Mean) Maximum
31Jn2	Long Point	B-130905	Cape Fear series; Hanover series; Townsend series	690 (815, 840, 855) 970

[A] UW, University of Washington Luminescence Laboratory (TL dates); B, Beta Analytic Radiocarbon Dating Laboratory; UGA, University of Georgia; SI, Smithsonian Institution; M, University of Michigan
[B] TL dates the pottery itself; radiocarbon dates organic material associated with the pottery.
[C] Minimum, mean and maximum dates are 2-σ calibrated intercepts for ^{14}C samples, and mean and 2-σ errors for TL samples. Negative numbers are ages B.C., positive are ages A.D.

They are contemporary, shell-tempered series that include fabric-impressed and plain or smoothed types, however, simple-stamping and incised decorations have not been confirmed in White Oak assemblages, while these surface treatment types are common in the Colington series. Burnishing is occasionally seen in the White Oak series while not found in the Colington series. A recent study also suggests that statistically significant differences exist in the length and frequency of paddle-edge impressions left on the interior of vessel necks among the sample populations measured (Marshall 1999). While there is some suggestion that there may be some regional differences, the contemporaneity and overall similarity of these wares has led to the combination of these types into one broad ceramic series referred to as the Townsend series composed of Colington and White Oak types.

There is at this time a sufficient number of radiocarbon dates for anthropogenic features with associated pottery to conclude that the shell-tempered Townsend series dates to the period from about A.D. 800 to at least 1600 (Table 5.4, and Chapter 4, Figure 4.23). There is some suggestion that Colington Simple Stamped was more frequent later in the sequence, with Townsend Fabric Impressed occurring throughout the Late Woodland period. Data that might substantiate or refute this, however, have yet to be developed.

Cashie

The Cashie phase and pottery series was first described by Phelps (1983) and recently revised (Phelps and Heath 1998), based on data recovered from the Jordan's Landing (3Lbr7), Neoheroka Fort (31Gr4), Sans Souci (31Br5), Thorpe (31Ns3), Battle Park (31Ns19) and Fishing Creek (31Hx61). The Cashie series, dating from ca. A.D. 800–1715, is considered contemporary with the Townsend series and, similarly, includes fabric-impressed, simple-stamped, incised, and plain types. Cashie is tempered with granule and pebble-sized quartz particles, occasionally crushed, which often protrude simultaneously through the interior and exterior surfaces of the vessel walls. In addition, Phelps and Heath (1998) note that "perhaps as significant as any observed exterior treatment of Cashie vessels, is the dominant addition of an interior finishing treatment that is regionally unique to the series ... floated and/or slipped interiors."

Cashie simple-stamped is thought also to be equivalent to Gaston simple-stamped (Coe 1964) from the Roanoke Rapids area, and in Virginia, to the Branchville series (Binford 1964) and the Sturgeon Head series (Smith 1971) in the Meherrin and Nottoway River basins. Minority surface-treatment types found in the Gaston and related series (e.g., cord-marked, cob-marked and check-stamped) have not been observed in the Cashie series. The earliest dates associated with Cashie pottery are from the Thorpe site, a seasonally occupied site near the Tar River fall line, are 1000 ± 70 B.P. (cal A.D. 889–1220 [p=.05]) and 800 ± 65 B.P. (cal A.D. 1043–1370 [p=.05]) (Table 5.4). The Jordans Landing site, a permanently occupied, palisaded village on the Roanoke River, produced two radiocarbon dates from feature context,670 ± 60 B.P. (cal A.D. 1260–1408 [p=.05]) and cal 525 ± 70 B.P. (cal A.D. 1297–1610 [p=.05]) (Byrd and Heath 1997). With the additional date obtained from the Ellis site 500 ± 50 B.P. (Cal A.D. 1326–1474 [p=.05]), the range of calibrated intercepts for radiocarbon dates associated with Cashie series pottery is A.D. 1022–1418.

The extensive and unique ceramic assemblage from the Neoheroka Fort site and the Contentnea Creek survey (Byrd 1996, Byrd and Heath 1997), provide an exceptional example of pottery from the final decades of the Cashie phase. The fort, built by the Tuscarora to defend their homeland in the Tuscarora War of 1713, was occupied but one winter when it was besieged by Barnwell's Colonial militia, its defenders destroyed, and all structures burned to the ground. This briefly occupied and precisely dated site provides a uniquely encapsulated sample of Cashie phase material culture. The Neoheroka Fort assemblage, along with those from the several other sites mentioned, have allowed Phelps and Heath (1998) to discriminate two periods within the Cashie pottery series comprised of four vessel forms. Vessel forms include large conoidal-based jars, differing only in degree of rim constriction, small, thin-walled jars, bowls (comprising deep, flat-based, shallow simple, hemispherical, and double-ended "pouring" types), and dippers.

Large and small jars are primarily simple-stamped while bowls and pouring vessels are mostly fabric impressed. Decoration, usually restricted to the rim and neck, generally consists of punctated patterns including solid and hollow circles, solid semicircles and ovoid shapes. Incising is also common, especially on the small jar forms. Paste, temper and construction methods do not change significantly between Cashie I (A.D. 800–1650), and Cashie II (A.D. 1650–1715). No new surface treatments or vessel forms were added, rather, predominant variants disappear, leaving a less rich array of vessel types in the Colonial period.

Swansboro

The Swansboro series is thought to date to the latest portion of the Late Woodland period and the Contact period. This ware may be related to the Yeocomico series found on the Virginia coast (Potter 1982; Waselkov 1982) and to the Warekeck series (Binford 1965), a Colono-ware found on sites in southeastern Virginia (principally Southampton County). Taxonomically, it is not included in the Townsend series, but it appears to be a late manifestation of the shell-tempering tradition and future researchers may choose to classify it as a component type in the Townsend series.

Brunswick

Brunswick is a Proto-Historic and Historic period (A.D. 1400–1700) series. The series was first defined by South (1960) to describe Colono-Indian ware found at Brunswick Town and Bath, North Carolina, that included burnished and plain types. In this analysis the series is expanded to three types: (1) burnished, (2) corncob-marked, or (3) bushed, expanding the potential temporal range to include the centuries just prior to European contact.

Conclusion

Having reviewed the chronological arrangement of pottery types from the coast, it is useful to think again about the nature of this information as reflecting the social behaviors that lie behind the technological traditions. Each pottery type represents a specific suite of behaviors that must be replicated with certain fidelity to reproduce the characteristics of each vessel classified to a type. One striking feature of the data is the length of the periods that types occupy; most series occupy periods of more than 500 years. The social and cultural implications of this striking feature are explored in Chapter 7.

The foregoing review of the chronolgical data (summarized in Figure 5.2), brings broad patterns into perspective and allows us to contrast sequences between areas. For example, on the southern coast we see the potential for the coexistence of Stallings, Thom's Creek, Hamp's Landing, and New River series traditions to coexist from the very earliest period (about 2000 B.C.). In contrast, on the northern coast, the New River series appears to stand alone for a thousand years before the appearance of Croaker Landing and Marcey Creek. This apparent discrepancy may be due in part to a lack of chronological data for Croaker Landing and Marcey Creek series that, when found, will probably push back these stylistic horizons several hundred years, but there may also reflect an actual lag in the diversification of Early Woodland period series in the northern region.

Contrasting the sequence of Late Woodland series from the northern and southern coasts we find that whereas on north coast there are three coeval series (Townsend, Cashie, and Swansboro), on the southern coast only the Hanover series is represented by very few dates. This apparent lack of Late Woodland pottery on the southern coast may also be suspected as an artifact of the sample and the lack of opportuntities for dating. The very lack of opportunities itself may be an important indicator of social conditions in the unembayed southern coastal region in the period following A.D. 900.

The following chapter explores the historical continuities reflected in the spatial distribution of technological traditons by assessing the regional distribution of the pottery types discussed in this chapter.

CHAPTER 6
SPATIAL PATTERNS

Inasmuch as pottery series, types and varieties correspond to sociocultural phenomena that occupy specific periods of time, they are also spatially patterned. It is relatively common for archaeologists to use ethnohistoric information about the geographic arrangement of linguistic or ethnic groups to interpret the spatial distribution of pottery types. It is less common, however, to see this logic worked in reverse, to identify social boundaries (e.g., Algonkian and Tuscarora tribal areas) based on regional ceramic distributions. Although this study proceeds under the logic of the latter approach, the vast majority of the ceramic data presented here reflects remote periods of prehistory for which no ethnohistoric information about any particular linguistic or ethnic group exists. Neither does the geographic scale of the data lend itself well to identifying band territories, which would require a different sampling strategy (e.g., see Sampson 1988). Rather, the purpose to which these data are most appropriate, and the goal of this part of the study, is to explore historical continuities reflected in the spatial distribution of technological traditions. In some cases the ceramic-stylistic areas and boundaries may in fact relate to ancient social territories. In most, however, it appears that prehistoric technological traditions or styles encompassed many potential tribal regions and persisted over vast stretches of time. Certainly, the geographic ranges of most of the ceramic traditions observed here comprise much larger areas than a single band's territory. Likewise, the temporal ranges for traditions reflect styles that persist through the lifetimes of 20 or more generations of potters. Interpretation of temporal and spatial patterns, whether as a result of the position or displacement of populations or the ebb and flow of information and custom, are the subject of Chapter 7.

As the focus in this chapter is traditions of technological style consisting of sets of traits or attributes, typological classes are the units of measure. In the discussion that follows, therefore, I review the spatial patterns observed among the typological classes described in the foregoing chapters. In his discussion of temper types on the Carolina Coast, Bill Haag (1958:69) noted that, "In pottery analysis only those features that show reasonable spatial distribution may be used in comparative studies. Thus changes in temper that may not be correlated with a definite geographical distribution must be disregarded within limits." If we begin with the assumption that differences in spatial distribution of pottery attributes reflect the co-participation in a community of practice that shared similar information and pottery making styles, then tempering traditions might be considered especially useful for identifying social change and stability and social group boundaries.

Sherds tempered with fiber, soapstone or marl are classified to Stallings, Marcey Creek, or Hamp's Landing series, respectively, by no other attribute than temper. Clay or grog is associated with both the Early Woodland Croaker Landing and Middle Woodland Hanover series, however, no Croaker Landing sherds were identified in this study. Shell tempering is associated with either the Middle Woodland Mockley series or the Late Woodland Townsend series, distinguished on the basis of surface treatment. Granule or pebble temper is characteristic of the Middle Woodland Mount Pleasant series. Sand tempering appears to have been used throughout the Woodland era, including the Early Woodland Thom's Creek, Refuge, and New River series, the Middle Woodland Deptford and Cape Fear series, each series distinguishable by surface-treatment styles. There is also some suggestion that a Late Woodland sand-tempered series may exist in the central coastal area (Mathis, personal communication, 2001), but so far, the data adequate to verify this have not been reported.

Early Woodland Traditions

Stallings Series

Fiber-tempered sherds from this region are typically considered to be in the Stallings tradition, or related to the Stallings phase (2500–1100 B.C.), and are therefore classified as Stallings series ware (Griffin 1943; Sassaman 1993; Stoltman 1972, 1974). The Stallings ware in this study includes 53 sherds classified as having fiber as the principal tempering agent and 13 having fiber in combination with medium and coarse quartz sand. In addition, a small number (13) from Brunswick and Beaufort Counties were observed to have principally sand temper with some fiber in the paste. As the fiber in these specimens appeared to be potentially incidental, they were not classified as Stallings. This determination was judgmental of course, but it was felt that the classification of these sherds as fiber-tempered pushed the class definition too far. Most of the sherds that fell into the incidental-fiber category were classified as New River series based on temper and surface characteristics, but one sherd from 31BW227 tempered with marl and fiber was classified as Hamp's Landing. Three sand-and-fiber-tempered examples from 31HK191 also push the definition, as their surfaces are treated with parallel cord marking. These are thought to represent the Early Woodland period, but their numbers are far too thin to warrant interpreting them as witness to a broad-scale transition from fiber to sand or marl tempering. One sand-and-fiber-tempered from 31HK204 has check-stamped surface treatment. This surface-treatment type is typically associated with the Deptford phase which has its inception in the Early Woodland period, but extends well into the Middle Woodland.

The greatest number of sites with fiber-tempered ware were found in Hoke County (n = 4), in the Sandhills (Figure 6.1). Site 31HK154 yielded 46 fiber-tempered sherds, the majority ware at that site, although all sherds were very small and perhaps belonged to a single vessel. One site each in Columbus and New Hanover Counties comprise this group, with one sherd from Beaufort County.

The fact that many fiber-tempered sherds were found in the Sandhills suggests that the

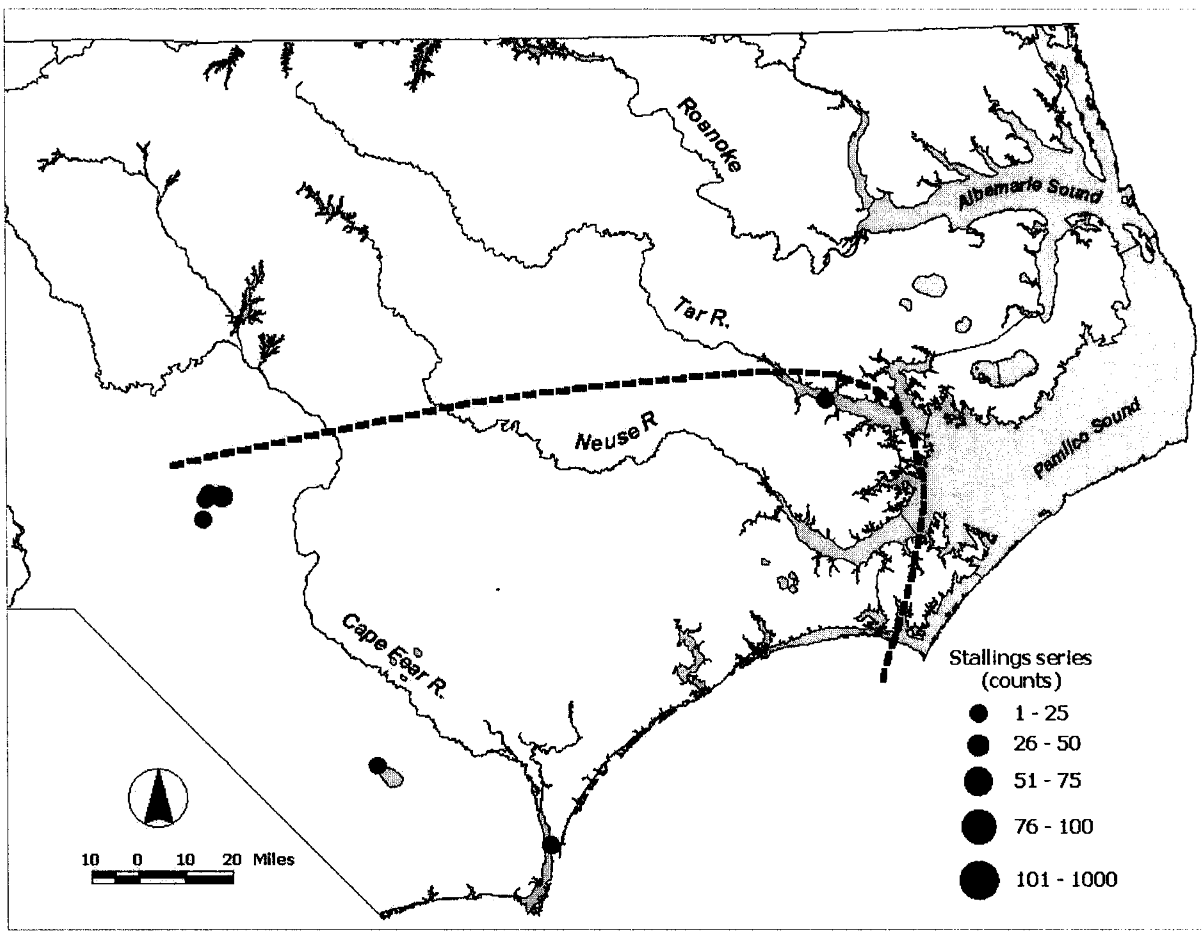

Figure 6.1. Frequency (counts) of Stallings series sherds from sites analyzed in this study.

distribution in southern North Carolina may mirror the distribution in South Carolina where Stallings series pottery is frequently found at sites on the interior Coastal Plain as well as on the coast. The distribution observed in this study supports the contention that the fiber-tempering tradition is related to the Stallings Island culture emanating from the Savannah River area of south Carolina. To the collection used in this study may be added some 38 sites with fiber-tempered plain ware from surveys conducted in the coastal region (Loftfield 1979a, 1979b; Phelps 1975a, 1975b, 1976b, 1983; South 1976; Wilde-Ramsing 1978). These site locations greatly expand the distribution of fiber-tempered pottery, indicating that while the preponderance of sites with Stallings plain ware are found below the Neuse, sites with fiber-tempered sherds are found as far north as Gates County (Figure 6.2). Adding these sites illustrates that the boundary is not an abrupt, but a very diffuse margin.

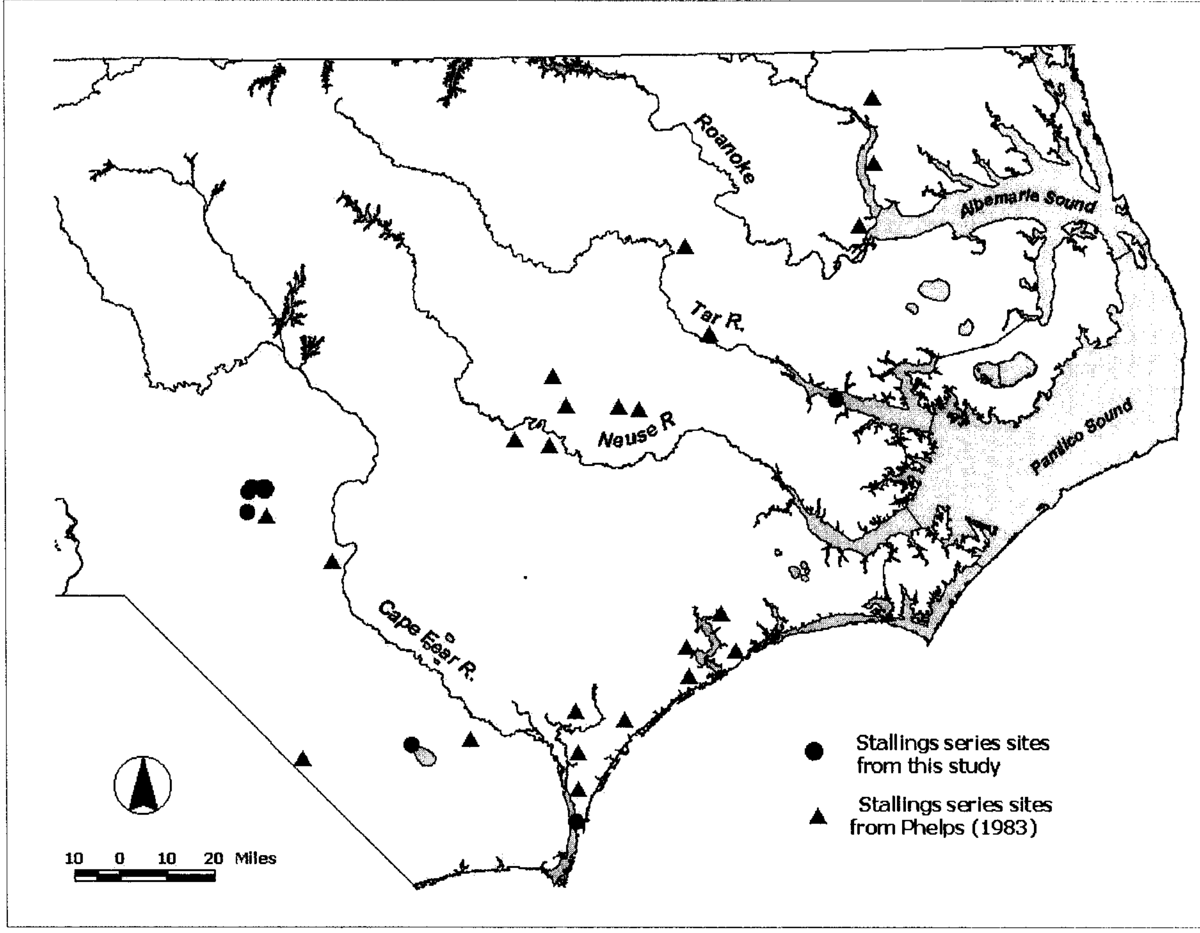

Figure 6.2. Distribution of all known sites with fiber-tempered sherds. Those reported by Phelps (1983, Figure 1.4) are shown as filled triangles.

Marcey Creek Series

In this study, sherds with soapstone temper were classified as Marcey Creek series. Specimens of soapstone-tempered ware were found at two sites, 31CK1 and 31DR16 (Figure 6.3). Sherd assemblages at both of these sites were quite variable and suggested the presence of significant Early Woodland components. These soapstone-tempered sherds are classified as Early Woodland Marcey Creek series (1200–800 B.C.) found primarily in the Potomac River basin (Egloff and Potter 1982; Evans 1955; Griffin 1952:357; Manson 1948). As was seen with the distribution of fiber-tempered sherds, the distribution of soapstone-tempered sherds from the current study may be expanded considerably from other sources.

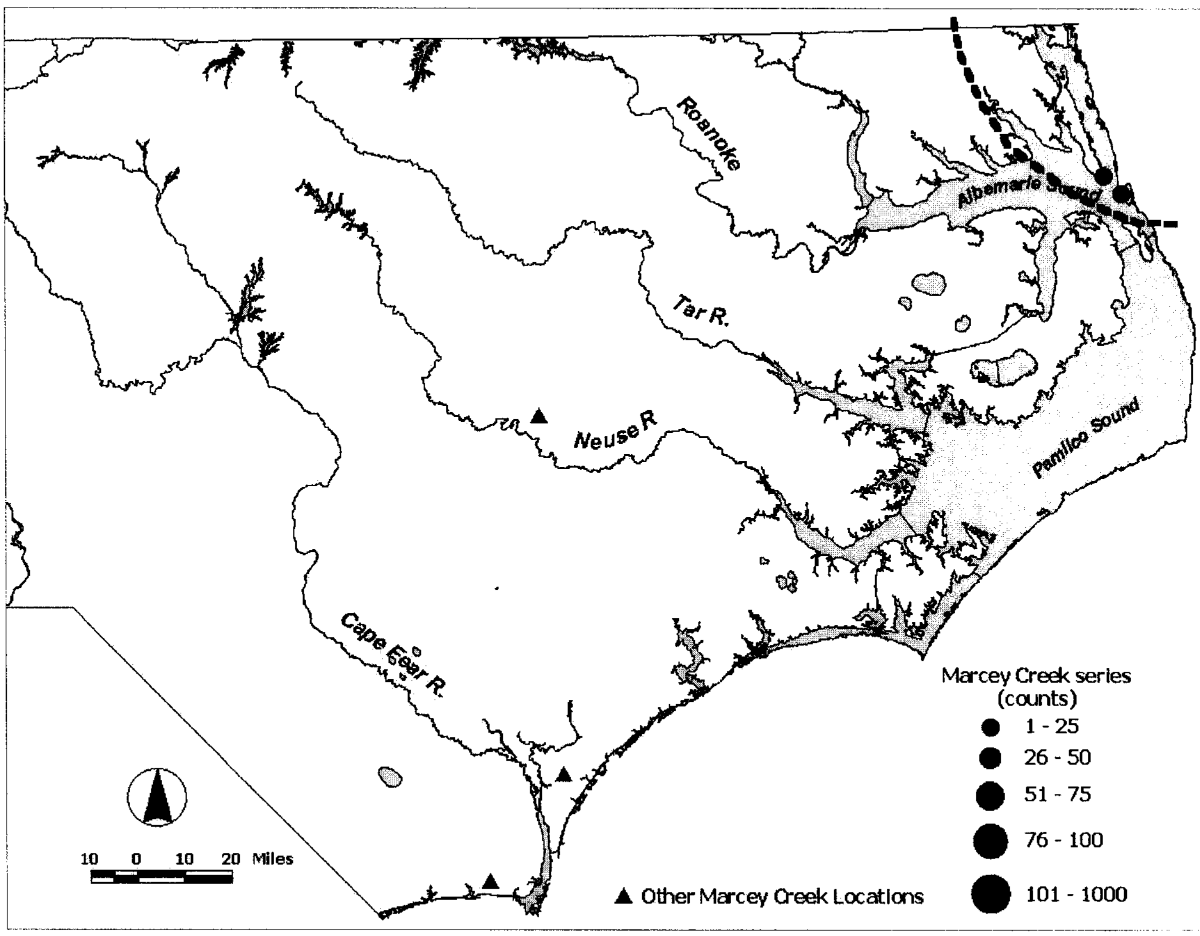

Figure 6.3. Distribution (counts) of soapstone-tempered Marcey Creek series sherds.

South (1976:40, 46, Table 1), for example, found a single sherd in his survey from a site in New Hanover County (31NH4). Also in New Hanover County, Wilde-Ramsing (1978:50) reported finding five steatite-tempered sherds, although the site locations are not specified. In the Neuse drainage, Phelps' survey of the Stoney Creek watershed in Wayne County yielded four sites, each with a sherd or two of soapstone-tempered ware (1981:120, Table III). Phelps also reported finding four steatite-tempered sherds from three sites in Edgecomb County (Phelps 1981a:97, Table 2).

These finds testify to the fact that Marcey Creek-like sherds may occasionally be found in the Neuse basin and on southern coastal sites. The fact that no soapstone-tempered sherds were recognized by Loftfield (1976) in his survey of Onslow County sites or in Crawford's (1966) survey of a section of the Neuse in Pitt, Lenoir and Wayne Counties, suggests that soapstone-tempered sherds are rather rare outside of the extreme northern coastal area. Obviously, the presence anywhere on the coast of soapstone is a clear indication of communication with the interior, as soapstone is a metamorphic lithic material not found in any primary context on the Coastal Plain.

Hamp's Landing Series.

Sherds tempered with marl are classified as Hamp's Landing series. In the following discussion the term "marl" is used as shorthand for a group of calcareous materials potentially including fossiliferous sand, fossiliferous clay, marl, calcarenite, and molluscan-mold and bryzoan-echinoid skeletal limestones, found in the Tertiary deposits of the Coastal Plain including the Waccamaw, Yorktown, Belgrade, River Bend, Castle Hayne and Beaufort Formations (North Carolina Geological Survey 1985). Since the calcareous material used as temper has not yet been specifically linked to any of these sources, the single term marl is here used as a convenience to denote them all.

As has been described, the identification of marl-tempered pottery is a relatively recent phenomenon on the Carolina coast (Adams and Trinkley 1993; Hargrove 1993; Hargrove and Eastman 1997, 1998). Earlier studies are suspected of having misidentified marl-tempered pottery as shell-tempered (Mathis 1998, 1999). The potential for confusing the two is understandable as most of the limestone and marl found in the coastal deposits is fossiliferous. Since Hargrove's (1993) marl-tempered Hamp's Landing series first appeared in print, a handful of dates now suggest marl tempering to be an Early Woodland tradition that may have persisted into the earliest portion of the Middle Woodland period (see Chapter and 2 and 3). The data used in this study are not adequate to comment on the distribution of marl-tempered pottery into the interior Coastal Plain, but the northernmost boundary appears to be in the lower Pamlico and Pungo River basins (Figure 6.4).

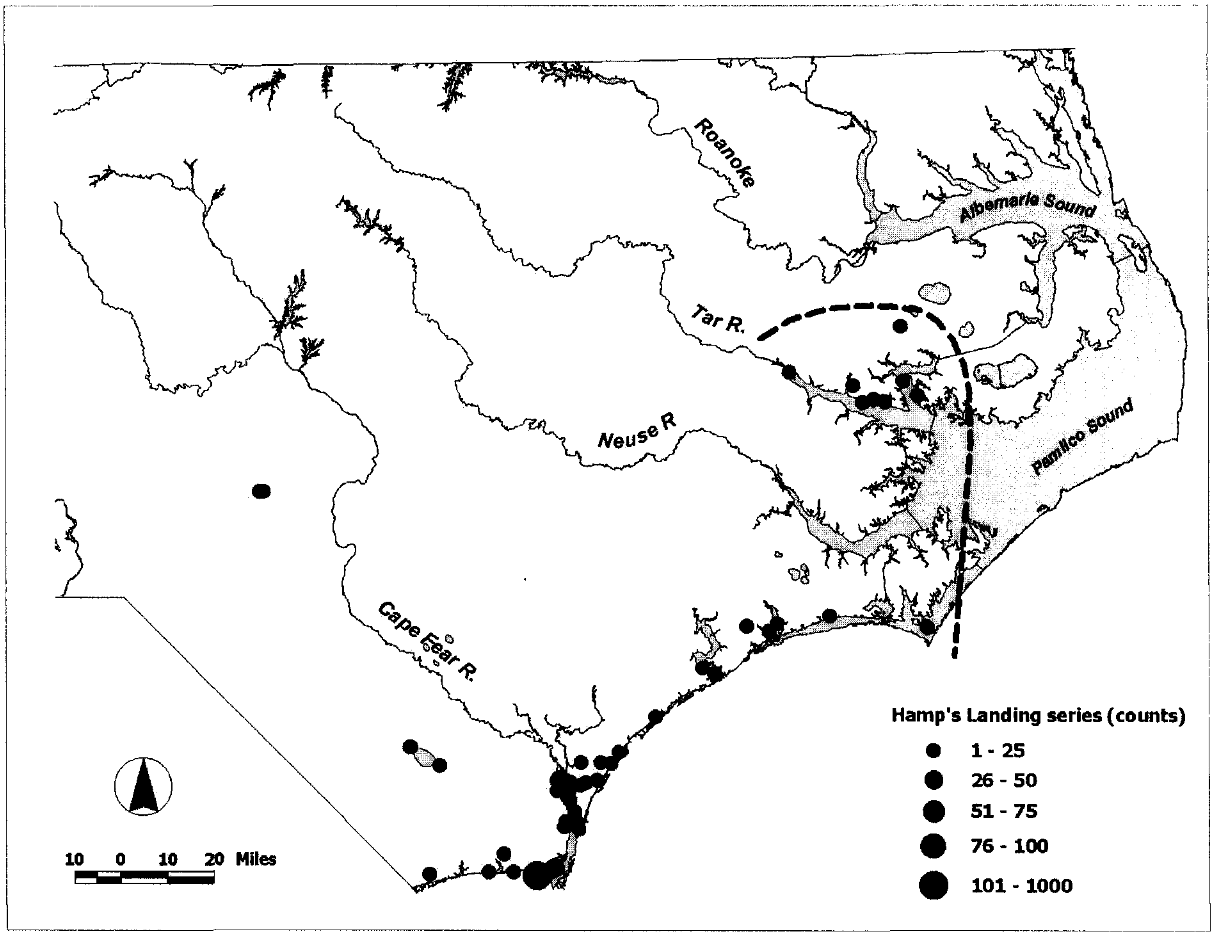

Figure 6.4. Distribution and frequency (counts) of limestone-tempered Hamp's Landing series sherds.

The geographic range of marl-tempered Hamp's Landing series sherds, as reflected in the Haag collection, is greater than might be expected given the limited area in which they have been recognized and reported thus far in the literature. Prior to this study, marl-tempered sherds had only been found in Horry County, South Carolina, Columbus, New Hanover and Onslow Counties, North Carolina (Abbott et al. 1999; Adams and Trinkley 1993; Hargrove 1993; Jones et al. 1997; Sanborn and Abbott 1999; Terrell et al. 2000). This may be due, in part, to the difficulty of distinguishing marl from shell temper and the fact that the series is relatively new.

At present, little is known about the specific locations of exposed calcareous deposits that may have been used by prehistoric potters, but it is evident that the distribution of marl-tempered sherds mirrors the distribution of marl. There appears to be no justification at present for assuming that the marl-tempering tradition originated outside of southern coastal North Carolina. Based on raw counts, the tradition appears to centered in the lower Cape Fear valley, but with a surprisingly strong presence in the lower Pamlico drainage. If the idea for tempering with marl spread, expanding the geographic range of Hamp's Landing sherds through the latter part of the Early Woodland period, it might be assumed to occur later on the boundaries of the distribution.

Hamp's Landing Cord Marked is found to be restricted to the southern coast (Figure 6.5). If parallel cord marking is indeed an Early Woodland trait, the restriction of Hamp's Landing Cord Marked to the southern coast suggests that the marl-tempered material found in the Pamlico basin may in fact relate to a Middle Woodland or later component.

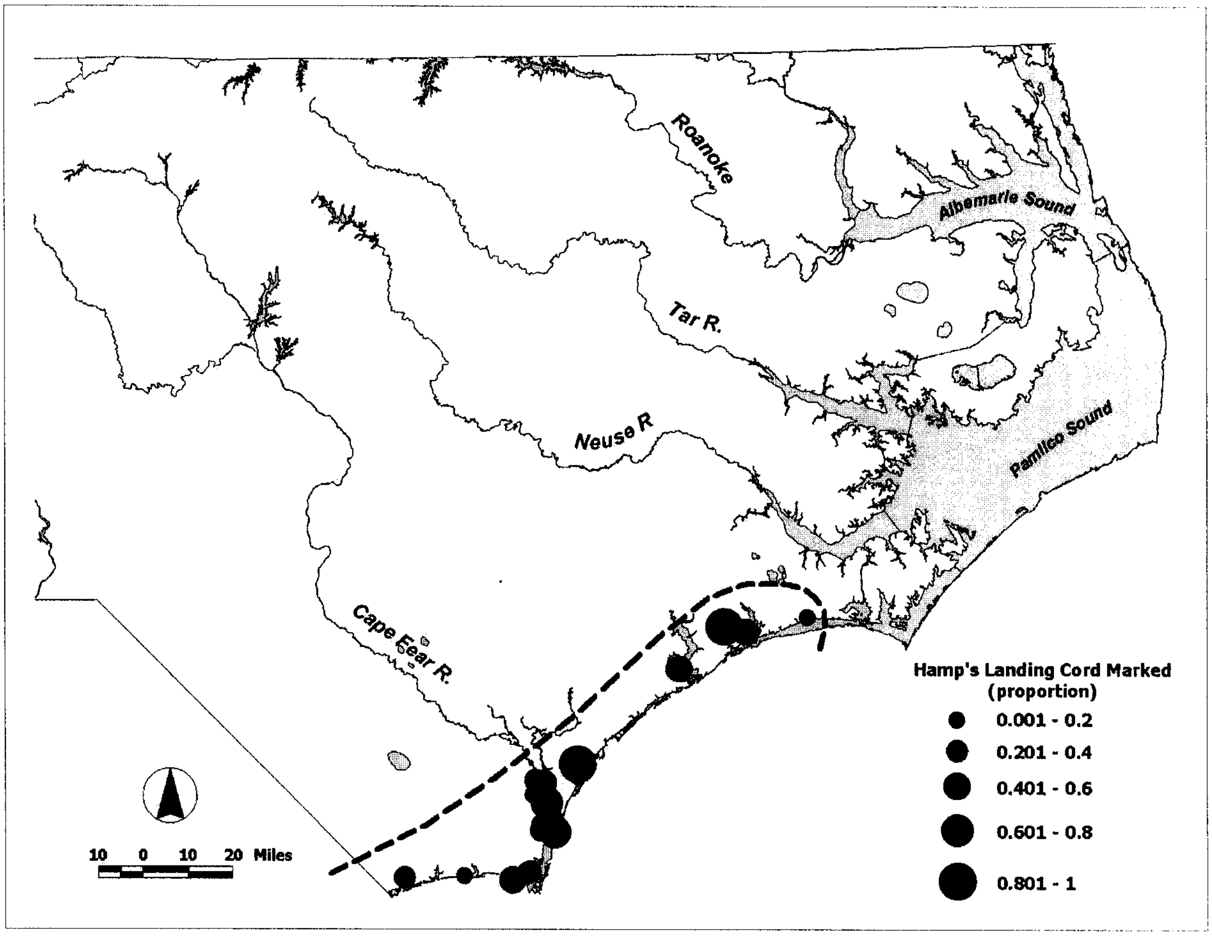

Figure 6.5. Distribution and frequency (proportion) of Early Woodland Hamp's Landing Cord Marked.

Hamp's Landing Fabric Impressed was found to be restricted largely to the lower Cape Fear and Pamlico River basins with little found on the coastal margin between these rivers (Figure 6.6). The frequency of Hamp's Landing Fabric Impressed appears to be greater in the lower Pamlico basin than in the Cape Fear. This is contrasted with the distribution of Hamp's Landing Cord Marked that was found to be most frequent in sites from the lower Cape Fear and central coastal margin (lower New and White Oak River basins), but not found at all in the Pamlico basin. This evidence, that parallel cord-marking and flexible-warp fabric impressing have different geographic distributions, suggests the possibility that these traditions may be of slightly different age.

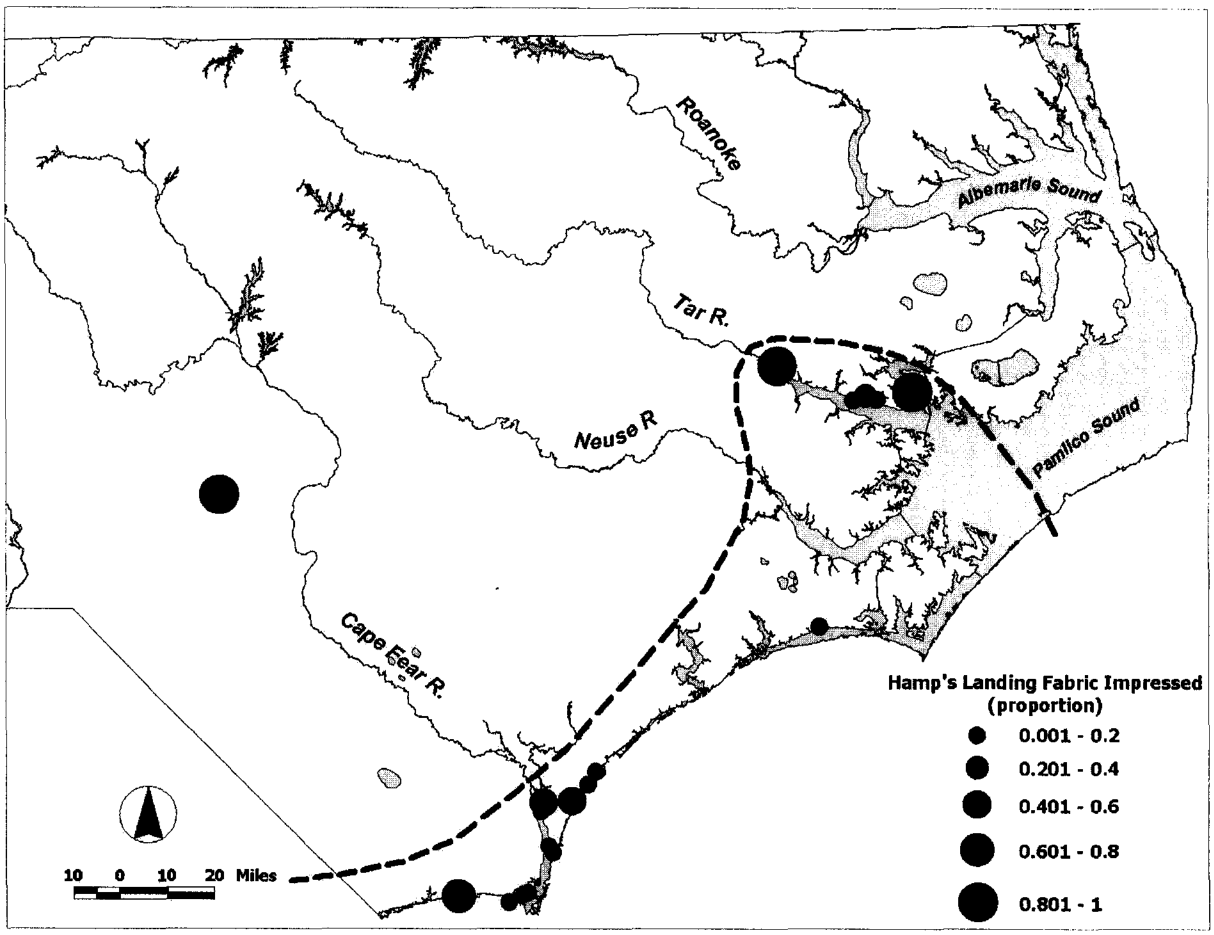

Figure 6.6. Distribution and frequency (proportion) of Hamp's Landing Fabric Impressed.

Hamp's Landing and New River Simple Stamped was found to be common in the Pamlico valley, occasionally along the southern and central coasts and in the northern Sandhills, and rarely on the Outer Banks and coastline of Albemarle Sound (Figure 6.7). In sample collections, Hamp's

Landing Simple Stamped sherds occur in low proportions on sites along the lower Cape Fear (two sites in New Hanover and two in Brunswick Counties), on one site in Pender County, and two sites on the Pamlico River in Beaufort County.

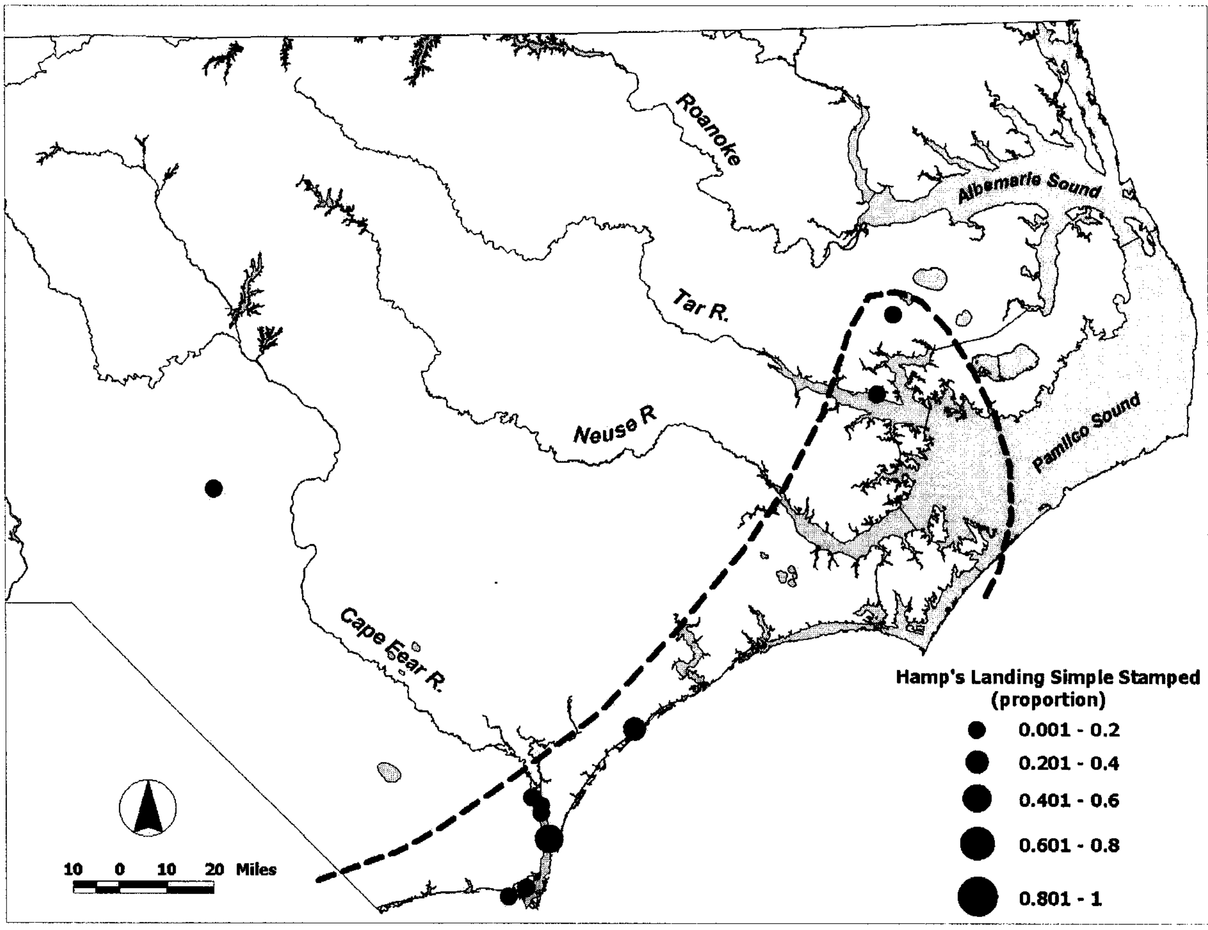

Figure 6.7. Distribution and frequency (proportion) of Hamp's Landing Simple Stamped.

Hamp's Landing Paddle-edge Stamped pottery was found only at two sites near the mouth of the Cape Fear River in Brunswick County (Figure 6.8). The balance of the Early Woodland data for this surface treatment type is made up of New River Paddle-edge Stamped sherds.

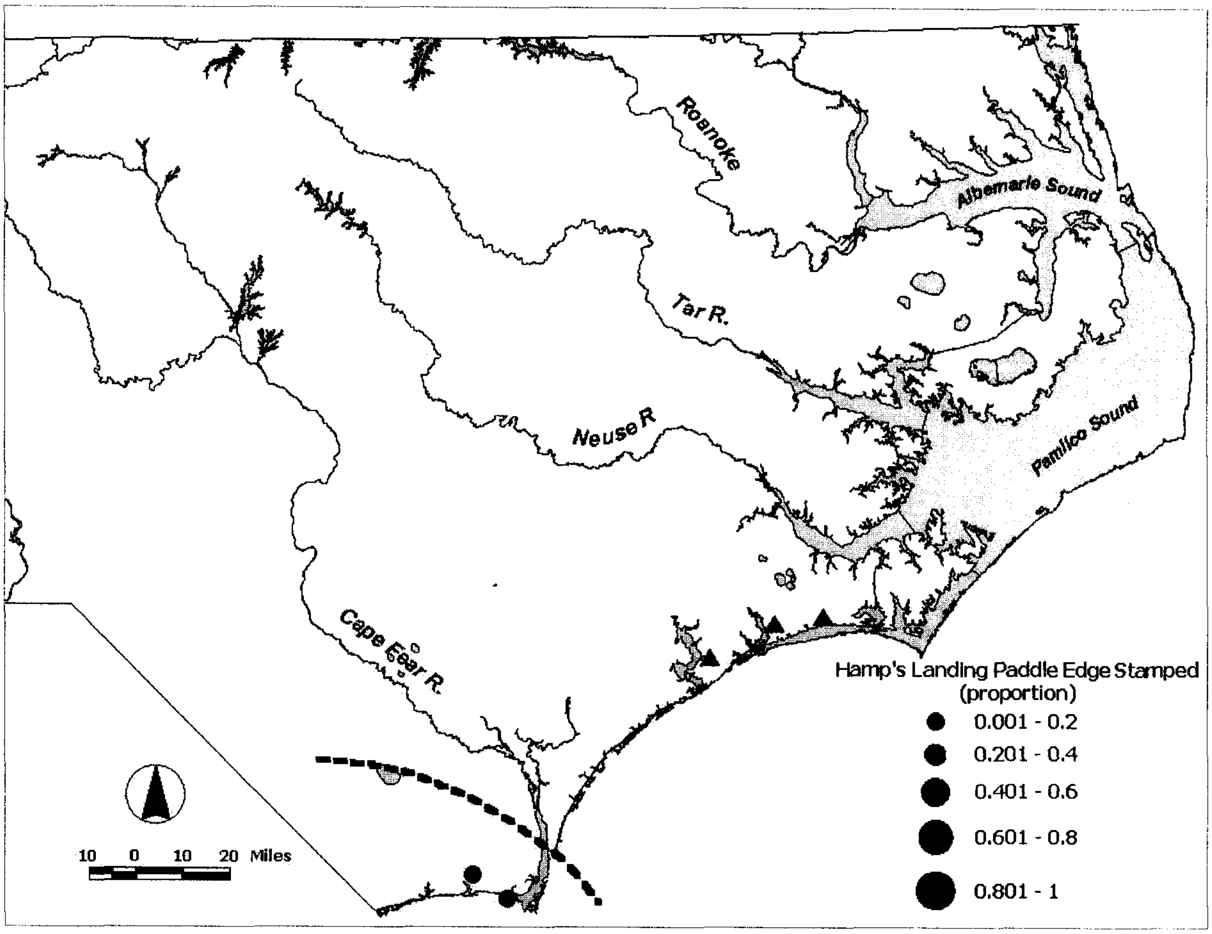

Figure 6.8. Distribution and frequency (proportions) of Hamp's Landing Paddle Edge Stamped.

Thom's Creek Punctate

The distribution of punctate Early Woodland wares is limited to sites in the lower Cape Fear valley, on the coast of Brunswick County, and near Lake Wacamaw, Columbus County. This group is composed primarily of Thom's Creek Punctate (Figure 6.9) and Refuge Allendale Punctate (Figure 6.10). The Thom's Creek Punctate found in the Haag assemblages was mostly the separate-reed punctate variety (see Anderson 1996: 253–254).

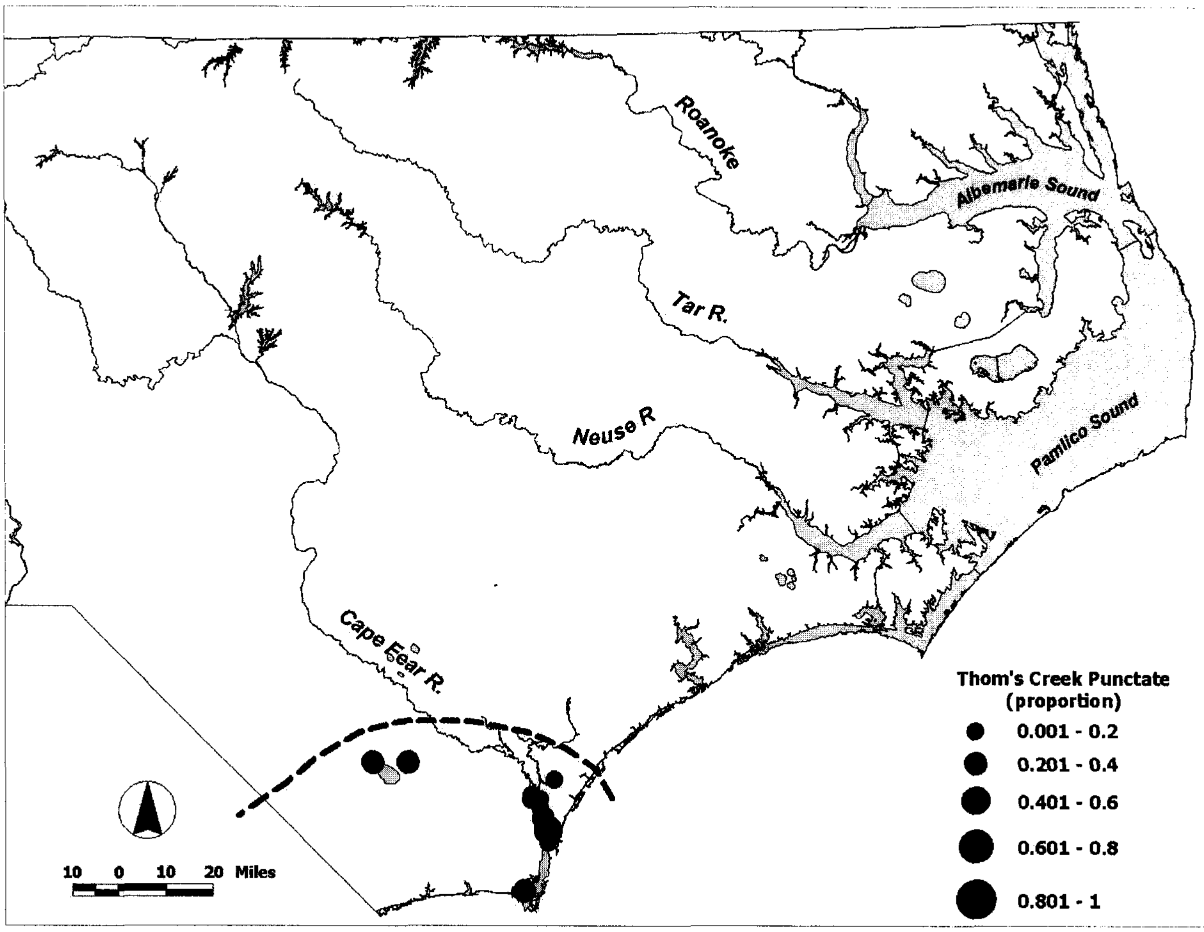

Figure 6.9. Distribution and frequency (proportion) of Thom's Creek Punctate.

Refuge Allendale Punctate

The surface treatment diagnostic of the Refuge Allendale type (Anderson 1996:224–225) has been described as "closely spaced, randomly oriented punctations that must have been made by a composite instrument rather than one impression at a time—a handful of straw or twigs?" (Stoltman 1974:276). Examples of this type of surface treatment from the southern North Carolina coast may in fact be made by rouletting the surface of a leather-hard vessel with a pine cone. The Refuge Allendale Punctate and the Thom's Creek Punctate components of the distribution are very similar (Figure 6.10). Although no examples of either punctate ware were found further north than the Cape Fear in this study, these types are known from sites on the lower New and White Oak Rivers, at Hammocks Beach, and at the Broad Reach site (Mathis personal communication, 2001). The range, therefore, extends north to at least Bogue Sound in Carteret County.

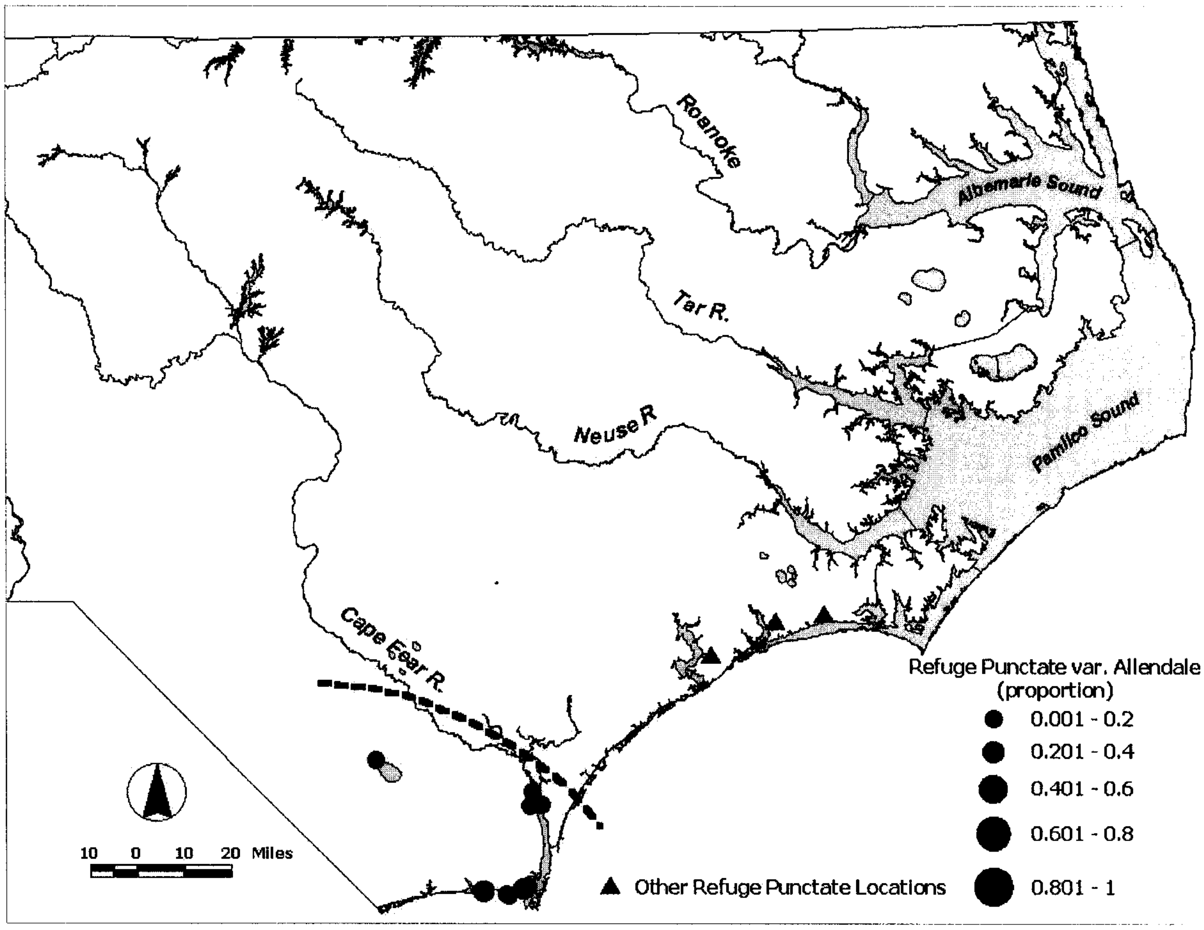

Figure 6.10. Distribution and frequency (proportion) of Refuge Allendale Punctate.

New River Series

New River Cord Marked sherds exhibit coast-wide distribution. The fact that New River Cord Marked is found over the entire study are suggests that this taxonomic class (sand-tempered ware with parallel cord marking) may actually include both Early and Middle or Late Woodland wares. This idea is explored further in the Middle and Late Woodland sections to follow (Figure 6.11).

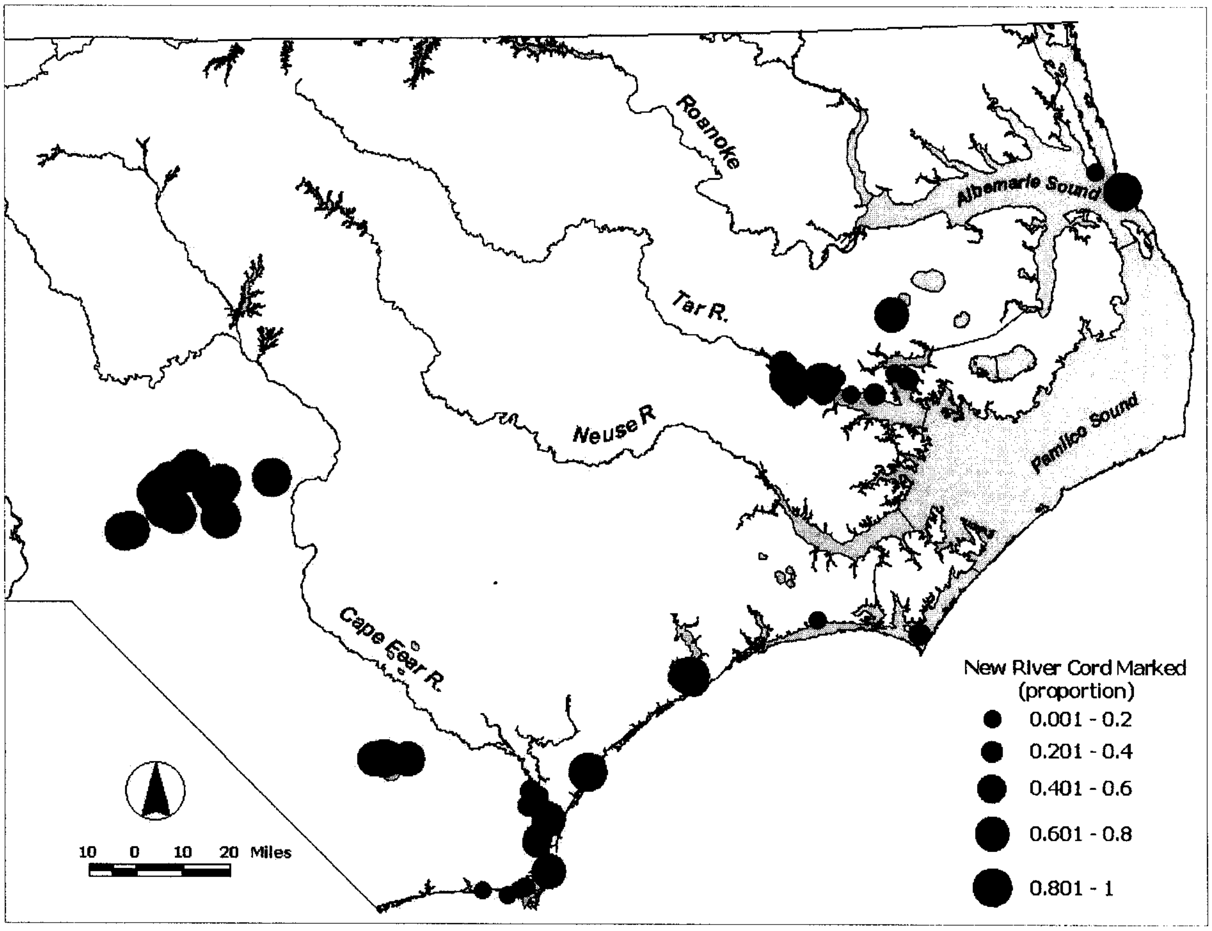

Figure 6.11. Distribution and frequency (proportions) of New River Cord Marked.

The spatial distribution of New River Fabric Impressed (fiber-warp textile impressed) suggests a weak boundary at, or just north of the Pamlico River with only a few sites occurring north of this in Currituck County (Figure 6.12). The proportion of flexible-warp fabric impressions in assemblages from the Currituck County sites is less than 20 percent. Many sites in the northern Sandhills and southern coast, in contrast, have proportions greater than 60 percent. This results in part from the smaller size of site samples in the Loftfield collection, but nevertheless may signal higher proportions along the southern coast.

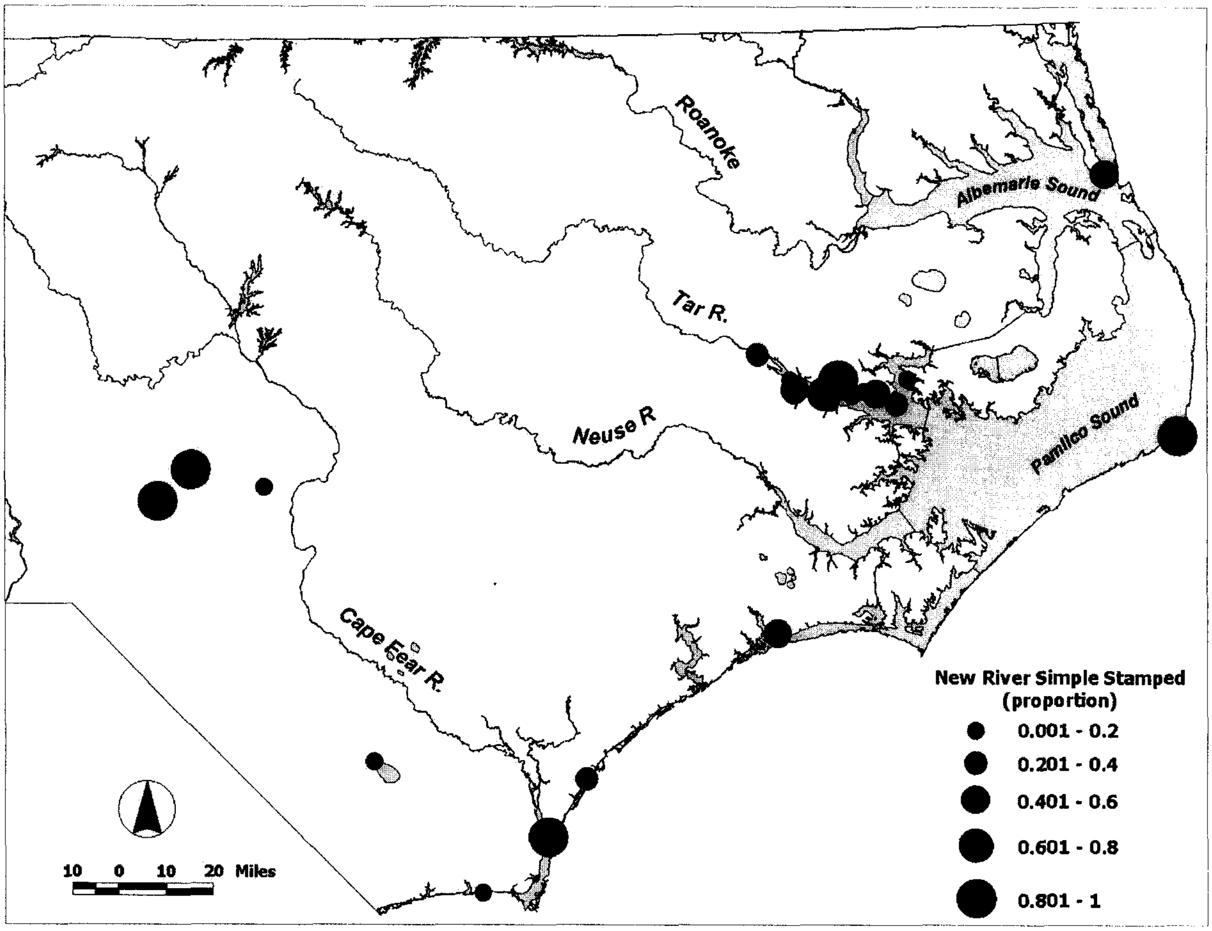

Figure 6.12. Distribution and proportion of New River Simple Stamped. Proportions are relative frequencies among Early Woodland types from each site.

New River Simple Stamped exhibit their greatest concentration on the Pamlico River with 12 sites (59 sherds) scattered relatively evenly from the upper to lower portions of the embayed lower reaches of the river (our 40-mile transect) (Figure 6.12). Sites with a few sand-tempered simple-stamped sherds were also found in the lower Cape Fear valley, the Sandhills, and on the Outer Banks (31DR26). An especially large number of sand-tempered simple-stamped sherds was also found in the assemblage from 31CK1 in Currituck County.

As described in Chapter 2, the creation of paddle-edge stamped types is an exploratory procedure. Paddle-edge stamped types were defined for both Hamp's Landing and New River series. The distribution of New River Paddle Edge includes Brunswick County, the northern Sandhills and the Cape Fear valley (Figure 6.13). Two sites with proportions less than 20 percent occur on the

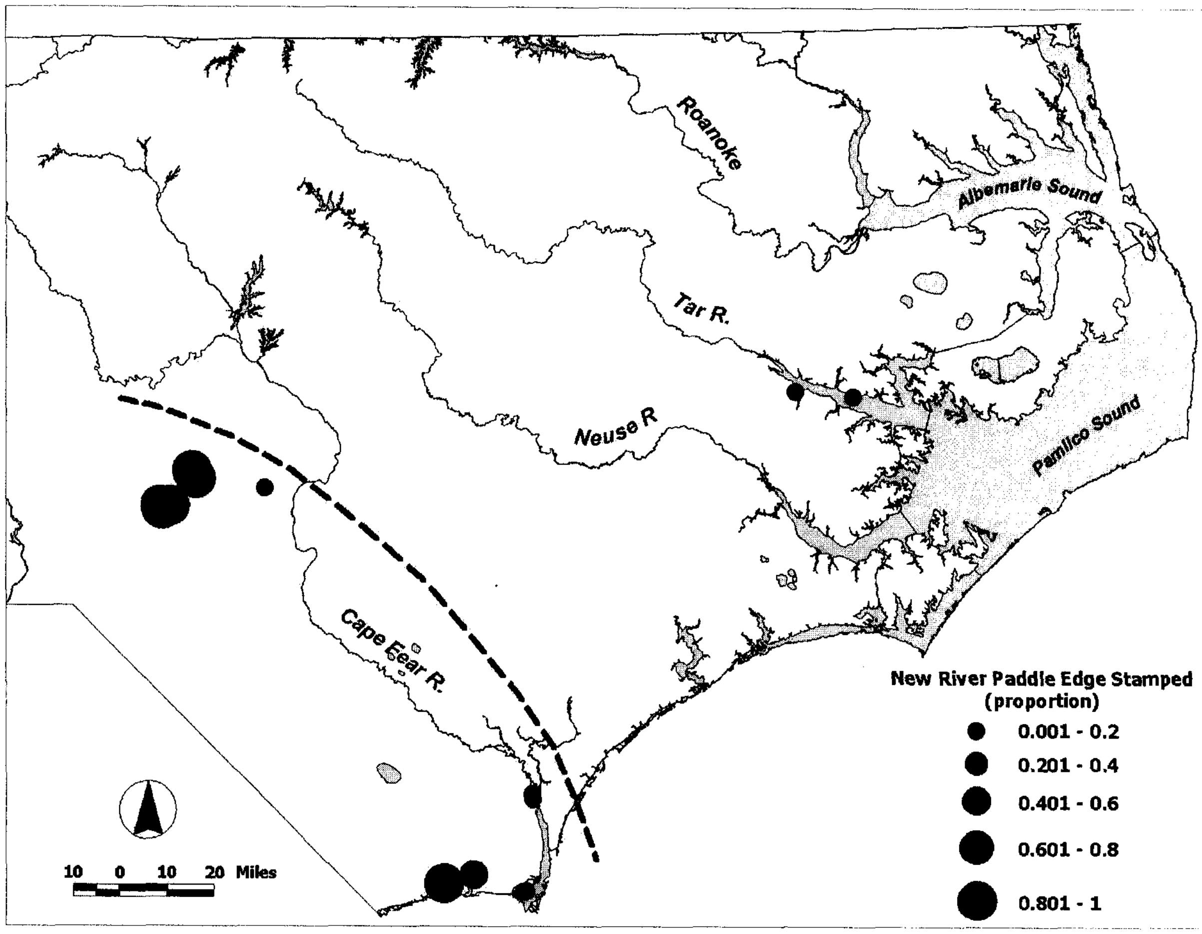

Figure 6.13. Distribution and frequency (proportion) of New River Paddle Edge Stamped.

lower Pamlico River. The suggested boundary for this trait among Early Woodland ware is just northeast of the Cape Fear River in New Hanover County.

Yadkin Series

The geographic distribution of sherds tempered with crushed rock occupy two distinct regions (Figure 6.14). The first is represented by 63 sites in the Sandhills. The second is represented by two sites (five sherds tempered with crushed quartz) found on Bogue Sound in Carteret County.

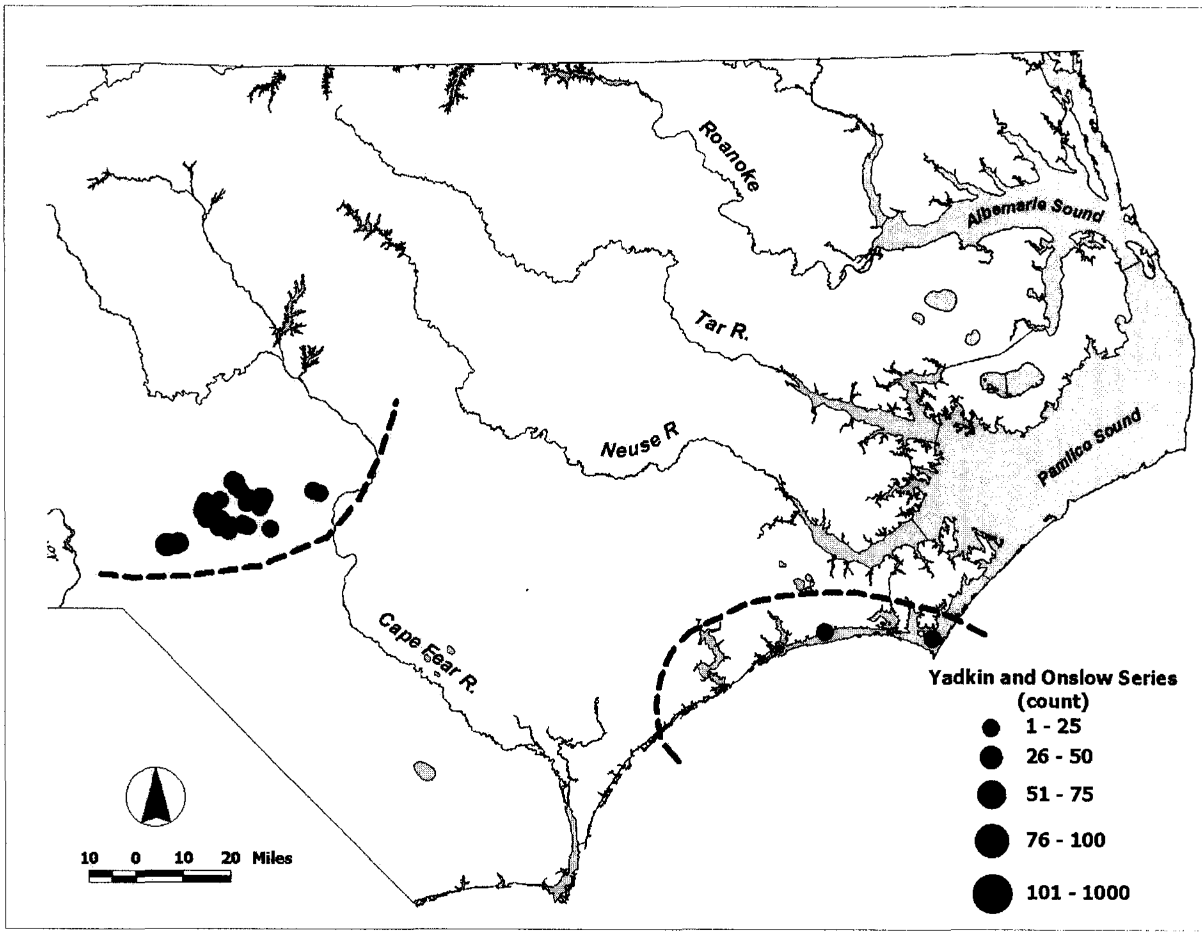

Figure 6.14. Distribution and frequency (count) of crushed rock-tempered, Yadkin (Sandhills) and Onslow (coastal) series sherds.

The regional boundaries between these two groups is justified not only by the two sites in this study, but also by the crushed-quartz-tempered sherds found on six sites by Loftfield (1976) for which he defined the Onslow series, and also by crushed-rock-tempered sherds reported from the Long Point site on the lower White Oak River in Jones County (Shumate and Shumate 2000:28–30). Although only very scarcely represented in this study by the two sites in Carteret County, the absence of such sherds at other inland sites suggest that crushed quartz-tempered sherds probably represent a tradition distinct from Yadkin. Although the technique of preparing rock temper by crushing is usually associated with the Early and early Middle Woodland periods (prior to A.D. 400) in the Sandhills, crushed rock temper predominates the Middle and Late Woodland series (e.g., Yadkin and Uwharrie) in the eastern Piedmont. There is some suggestion that the tradition may also be characteristic of the Late Woodland Onslow series on the Coastal Plain. Loftfield (1976:166) defined the Onslow series on the central coast based on a group of specimens that exhibited "paste tempered with crushed quartz which showed sharp angular edges of newly crushed stone ... The temper was gravel size and was very much in evidence in the broken edges of the sherds." In the seriation model constructed for Loftfield's central coastal ware groups, the Onslow series follows the Middle Woodland Carteret (Hanover) series in time, placing it at the end of the Middle and beginning of the Late Woodland period (Loftfield 1976:187).

Only two sites in the Haag collection (31Cr2 and 31Cr11) in Carteret County were found to have crushed quartz-tempered sherds. In this location, they could be classified as Cashie series if they were interpreted as vessels whose sources were inland Tuscarora villages. As we have seen, sites along the Neuse River in Lenoir County (about 40 miles inland of the Long Point site and 55 miles from 31Cr2 and 31Cr11) also include a crushed-quartz-tempered component that bears some resemblance to the Cashie series. Among the 60 crushed-quartz-tempered Onslow series sherds from sites 31On31 and 31On37, the surfaces of 47 (or 78 percent) were treated with the broad variety of simple stamping (Loftfield's thong-marked). In his survey of Lenoir County, Crawford (1968) specifically mentions that crushed-quartz tempering was more common in the simple-stamped wares in his collection. This suggests that Loftfield's (1979) Onslow Thong Impressed type and Crawford's Lenoir or Tower Hill Simple Stamped type may represent one series. It should be noted, however, that Crawford's simple stamping is described as "Stamped with a wrapped paddle ... Grooves are 1 to 2 mm wide with lands about half as wide as grooves" (Crawford 1966:52–53). This description does not appear to be exactly on par with that given for Onslow Thong Impressed, "malleated with a thong-wrapped paddle the thongs of which were flat with a cross section either square or rectangular in appearance ... [t]hey average 1 mm in width with very little deviation from that width" (Loftfield 1976:168).

It is also possible, although not very likely, that these sherds (and those few reported by others in the region) represent Middle Woodland Yadkin phase vessels that originated in the Sandhills or southeastern Piedmont. (Sherds containing a significant amount of mica were found at the Long Point site [Shumate and Shumate 2000:6.30–6.31], suggesting the presence of vessels on the coast made from clays originating in the Piedmont.) While either of these explanations is possible, it may be more parsimonious to explain the very limited amount of crushed-quartz-tempered pottery found along the coast in Carteret, Jones and Onslow Counties as a local tempering tradition that did not last very long or obtain very broad geographic distribution. In this case, the classification of these sherds to the Onslow series seems reasonable, but of very little benefit in terms of understanding their chronological position. The temporal placement of the Onslow series in the late Middle Woodland or early Late Woodland is, thus far, based on Loftfield's seriation model that included 53 Onslow sherds from 31On31 and seven Onslow sherds from 31On37 (Loftfield 1976:175).

Of 193 Yadkin series sherds, surface treatment was clearly distinguishable on only 159 specimens (Table 6.1). Fabric impressed, cord marked, and plain surface-treatment types were found associated with sherds tempered with crushed rock. Fabric impressed sherds were the most frequently observed type and the flexible warp variety was the most frequent variety (60 percent). Sherds tempered with crushed rock were found exclusively in the Loftfield Collection representing sites in the Sandhills. The area of distribution of Yadkin Fabric Impressed sherds encompasses the same areas of distribution of the crushed-rock tempered Yadkin series (Figure 6.15).

Table 6.1. Surface Treatment Types among Varieties of Yadkin Series Sherds.

	Surface Treatment								
	Cord Marked			Fabric Impressed					
Temper	Parallel	Perpendicular	Paddle-edge	Fine	Medium	Flexible	Smoothed	Plain	Total
Granite	5	2	10		1	44	5	11	78
Feldspar	3	4			1	33		3	44
Quartz	7	2	3	4	1	18		2	37
Total	15	8	13	4	3	95	5	16	159

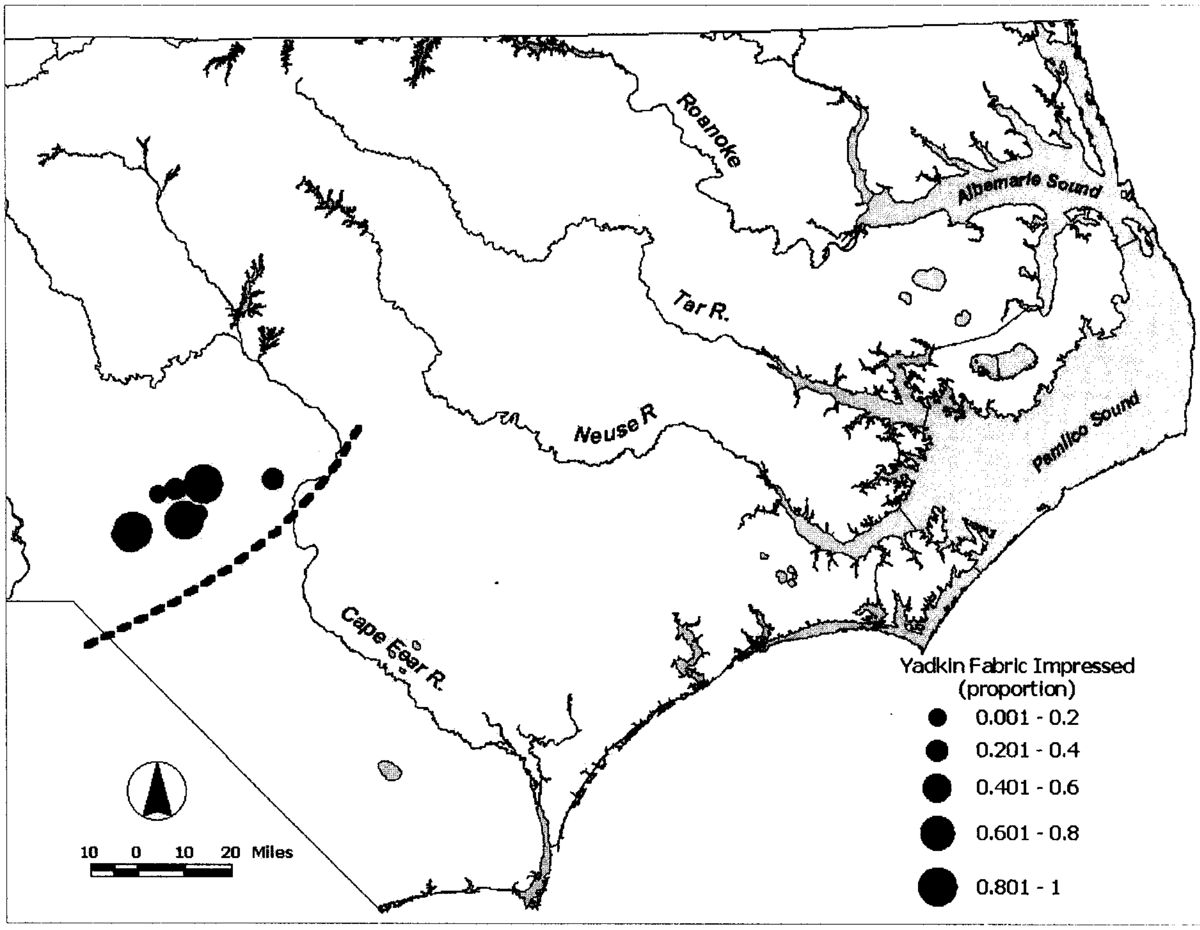

Figure 6.15. Distribution and frequency (proportion) of Yadkin Fabric Impressed.

Middle Woodland Traditions

As described in Chapter 3, there are five pottery series that are currently identified for the Middle Woodland period (400 B.C.–A.D.800) in Coastal Plain North Carolina. These include Mount Pleasant, Yadkin, Hanover, Cape Fear, and Mockley. To some extent, each series is characterized by different temper constituents, although most share temper characteristics with a series dating to another period. Mount Pleasant, as here defined, is tempered with granule and pebble size quartz sediment (not angular in shape). Angular quartz of the same size is interpreted as crushed quartz, which characterizes the Yadkin and Onslow series and is assumed to represent a very different process of temper preparation. These series in turn may share this tempering characteristic with a portion of the Late Woodland Cashie series (Phelps and Heath 1998), but surface treatment styles, vessel forms and interior vessel treatment differ between these series (the Cashie series has no net-impressed or cord-marked component, is characterized by a wide array of vessel forms and is typically very well smoothed or "floated" on the interior). The Hanover series is tempered with grog which serves to distinguish it from every other series except the Early Woodland Croaker Landing series that occurs within the study area, but was not recognized in this analysis. The Middle Woodland Cape Fear series shares the characteristic of sand tempering with Early Woodland New River and Late Woodland Brunswick types, although surface treatments mutually exclude these three classes. The Middle Woodland Mockley series is shell tempered, and differs from its Late Woodland shell-tempered descendant, Townsend, by comprising only net- and cord-marked types.

Whereas the classificatory approach taken here identifies series in large part on the basis of size, shape, and type of temper, these classes may not be analogous to the prehistoric potter's categories. Haag was perhaps the first to confront with this problem with the tempering characteristics of the pottery of the Carolina coast and he cautioned those who might follow, "If pottery types were erected for the Banks area and variation in temper were considered sufficient justification for a new type, the number of types within this limited area would be great. It is probable that they would also be useless for comparative studies" (1958:69). Without doubt, the sand (< 1 mm) and "grit" (1–2 mm) tempered wares of the Coastal Plain are the most problematic. As was shown in Chapter 3, the TL-dated sherd sample (n=20) from Fort Bragg exhibited no temporal trend in temper size, but did suggest differences in the proportion of sand/grit added at various periods in prehistory.

Cape Fear Series

This discussion of the distribution of the sand-tempered Cape Fear series is presented in the context of the Middle Woodland period; however, sand-tempered wares are not restricted to the Middle Woodland period. Sand-tempering traditions that began in the Early Woodland period are assumed to persist into the Middle Woodland. The ceramic series from the central coast of South Carolina is a particularly striking example of this. In that region the Deptford, Oemler, McClellanville, Santee, and Savannah series represent sand-tempered wares ranging in time from the Early Woodland to Mississippian periods (Poplin et al.1993). It is becoming increasingly evident on the North Carolina coast that sand-tempering traditions found in the Middle Woodland period also persisted into the Late Woodland period. Under such circumstances series may be distinguished on the basis of other variables such as the size or proportion of sand, wall thickness or other aspects of vessel form, and surface treatment. But many surface treatment types appear to be very long lived. With the data at hand, classification becomes more of an exploratory process, partitioning the range of sand-tempered sherds into subsets based on surface treatment that are hypothesized to reflect temporal units designed to be tested.

The distribution of Cape Fear Cord Marked sherds indicates that such sherds are present in assemblages from every part of the coast (Figure 6.16). Sites with sand-tempered, perpendicular cord-marked sherds are found in Currituck County and the Outer Banks, along the central coast and especially in the Pamlico drainage, in addition to their currently defined range in the lower Cape Fear Valley and Sandhills. Proportions within site assemblages from every part of the coast are often over 60 percent.

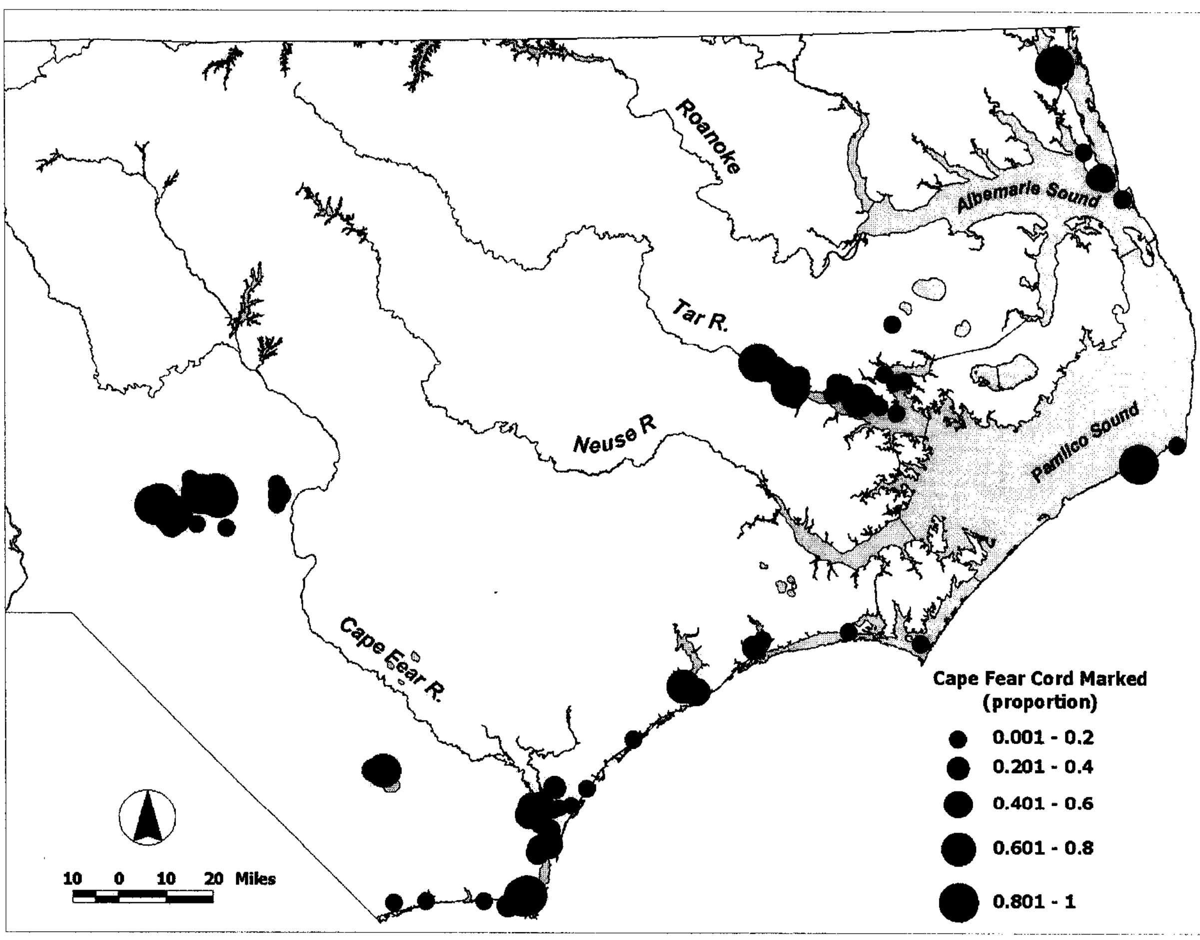

Figure 6.16. Distribution and frequency (proportion) of Cape Fear Cord Marked sherds.

Cape Fear Fabric Impressed sherds are also distributed widely over the study area (Figure 6.17). In this case, however, proportions suggest an area of particularly intensive occurrence in the central part of the coast, in Carteret County, the lower Pamlico in Beaufort and Hyde Counties, and Outer Banks. This is a very surprising fact, since the Cape Fear series was defined from sherds in assemblages from sites on the lower Cape Fear River and sand-tempered, fabric-impressed sherds do not appear to figure prominently in descriptions of assemblages from the central coastal region.

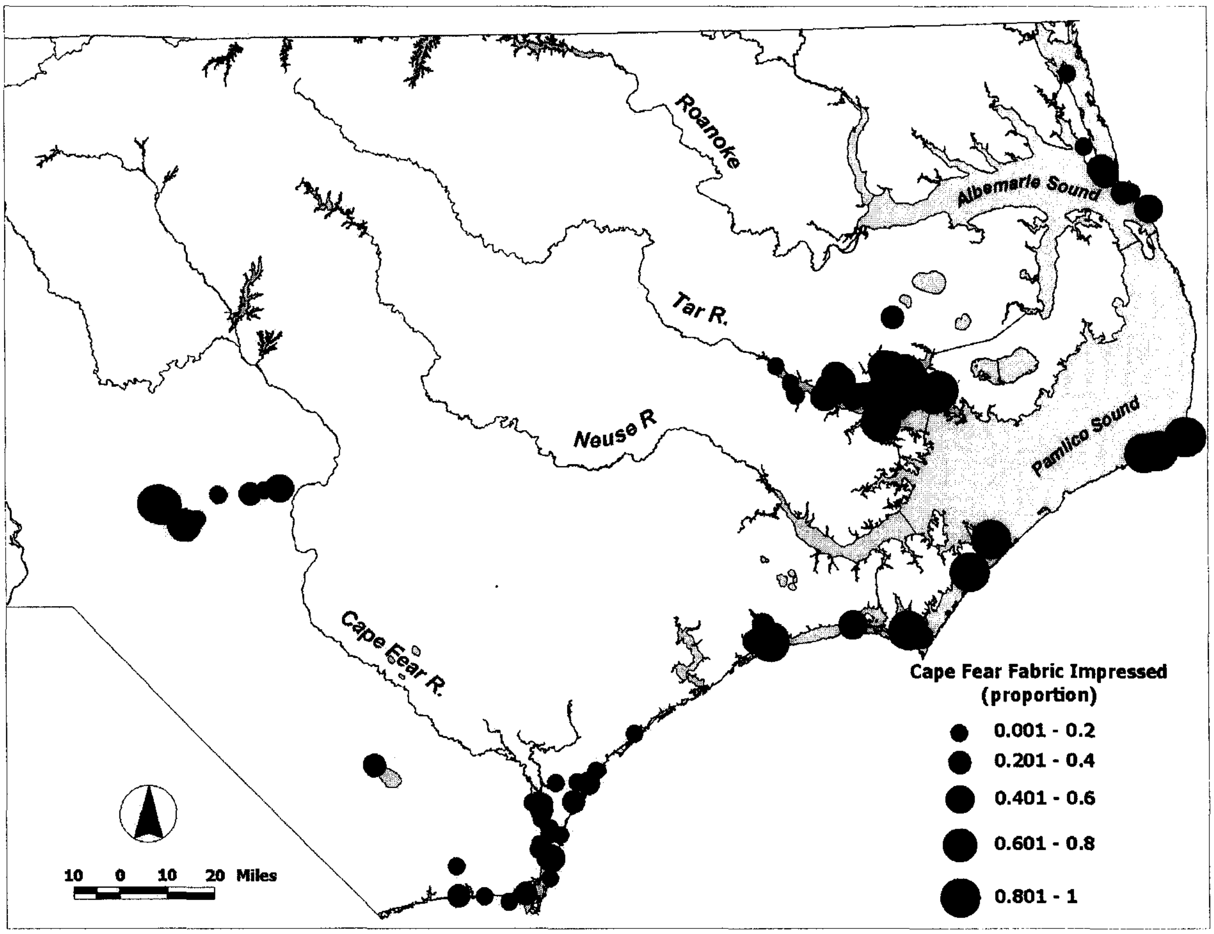

Figure 6.17. Distribution and frequency (proportion) of Cape Fear Fabric Impressed sherds.

There are several possible explanations for this surprising concentration of sand-tempered, fabric-impressed sherds in the central outer coast. First, it must be recalled that the proportions of Cape Fear sherds has been calculated among all Middle Woodland series sherds. If the Late Woodland shell-tempered White Oak series were included, they would certainly have overshadowed percentages of Cape Fear sherds. Looking only at sherds thought to date to the Middle Woodland, sand-tempered, fabric-impressed and cord-marked sherds account for almost 30 percent of Middle Woodland sherds and distributions among these two sand-tempered types appear to be quite distinctive; Cape Fear Cord Marked sherds occurred in higher proportions on sites in the *upper* portion of the embayed Pamlico River, the inner or mainland portion of Currituck County, and in relatively high proportions in the lower Cape Fear Valley and on Fort Bragg. Cape Fear Cord Marked sherds did not often appear on the central coast in Carteret County and when present were in low proportions. Cape Fear Fabric Impressed sherds, on the other hand, occurred in very high proportion on sites in the *lower* embayed portion of the Pamlico, and in high proportion at sites on the Outer Banks in Currituck and Dare Counties and on sites in Carteret and Onslow Counties, occurring in much lower proportion on sites in the Cape Fear drainage in New Hanover and Brunswick Counties. Overall, the difference in distribution between Cape Fear Cord Marked and Fabric Impressed types seems to reflect a shift from sites focused primarily in the southern part of the coast and interior margins of the sounds, to one focused on sites on the lower Pamlico, Outer Banks and coastal margins in the central coastal region. This suggests a possible temporal difference between these two types. Another way to explore the variation is by comparing distributions of sherds in sand size-grade classes and surface-treatment varieties (Table 6.2).

Table 6.2. Frequency of Cape Fear Series Sherds in Surface-treatment and Sand Grain-size Classes.

	Temper			
Surface Treatment	Fine Sand	Medium Sand	Coarse Sand	Total
Fabric Impressed Fine	116	94	42	252
Fabric Impressed Medium	523	462	92	1077
Fabric Impressed Coarse	57	32	6	95
Cord Marked Perpendicular	144	286	122	552
Total	849	878	266	1976

A test of independence indicates that the null hypothesis, that surface treatment and temper are independent, may be rejected (the observed χ^2 value of 120.876 far exceeds the tabled value of $\chi^2_{0.001} = 22.458$). The trend in these data are easily recognized by lumping surface-treatment varieties into two major types and observing the proportion of sherds in each sand size-grade class (Tables 6.3 and 6.4).

Table 6.3. Proportion of Sand Size-grade Classes in each Major Surface-treatment Type.

	Sand Size Grade			
Surface Treatment	Fine %	Medium %	Coarse %	Total (%)
Fabric Impressed	696 (.83)	588 (.67)	140 (.54)	1424 (.72)
Cord Marked	144 (.17)	286 (.33)	122 (.46)	552 (.28)
Total	849 (1.0)	878 (1.0)	266 (1.0)	1976 (1.0)

Table 6.4. Proportion of Major Surface-treatment Types in each Sand Size-grade Class.

	Sand Size Grade			
Surface Treatment	Fine (%)	Medium (%)	Coarse (%)	Total (%)
Fabric Impressed	696 (.49)	588(.41)	140 (.10)	1424 (1.0)
Cord Marked	144 (.26)	286 (.52)	122 (.22)	552 (1.0)
Total	849(.43)	878 (.44)	266 (.13)	1976 (1.0)

These tables illustrate the fact that there tends to be a higher proportion of fine sand rather than coarse sand in the fabric-impressed class, and higher proportion of coarse sand in the cord-marked class. Similarly, there tends to be more fabric impressed sherds in the class of sherds tempered with fine sand, but more cord marked sherds than fabric impressed in the medium and coarse sand classes. These trends provide a secondary line of evidence suggesting that sand-tempered cord-marked and fabric-impressed sherds may reflect different cultural (geographic) traditions, or are expressions of the same tradition occurring at different points in time. Although we have no chronometric data to bring to bear on this, the sequence of surface-treatment types elsewhere on the coast suggests that the fabric-impressed component in the later of the two.

Mount Pleasant Series

The distribution based on counts indicates that sites with Mount Pleasant series sherds occur across the entire study area (Figure 6.18). The frequency of sites, however, appears to be greatest in the Pamlico River basin (17 sites). Not only site frequency, but the frequency of granule/pebble-tempered sherds were typically higher on the lower Pamlico. A few sites with such sherds were found as far north as Currituck County, with four sites on Colington Island (including 31Dr16 with 208 examples). Four sites were also found in the Hatteras area of the Outer Banks, two sites on the mainland side of the Core Sound in Cateret County, five sites on the lower Cape Fear River, and quite a number of sites (18) with very low frequency of sherds scattered across the Sandhills.

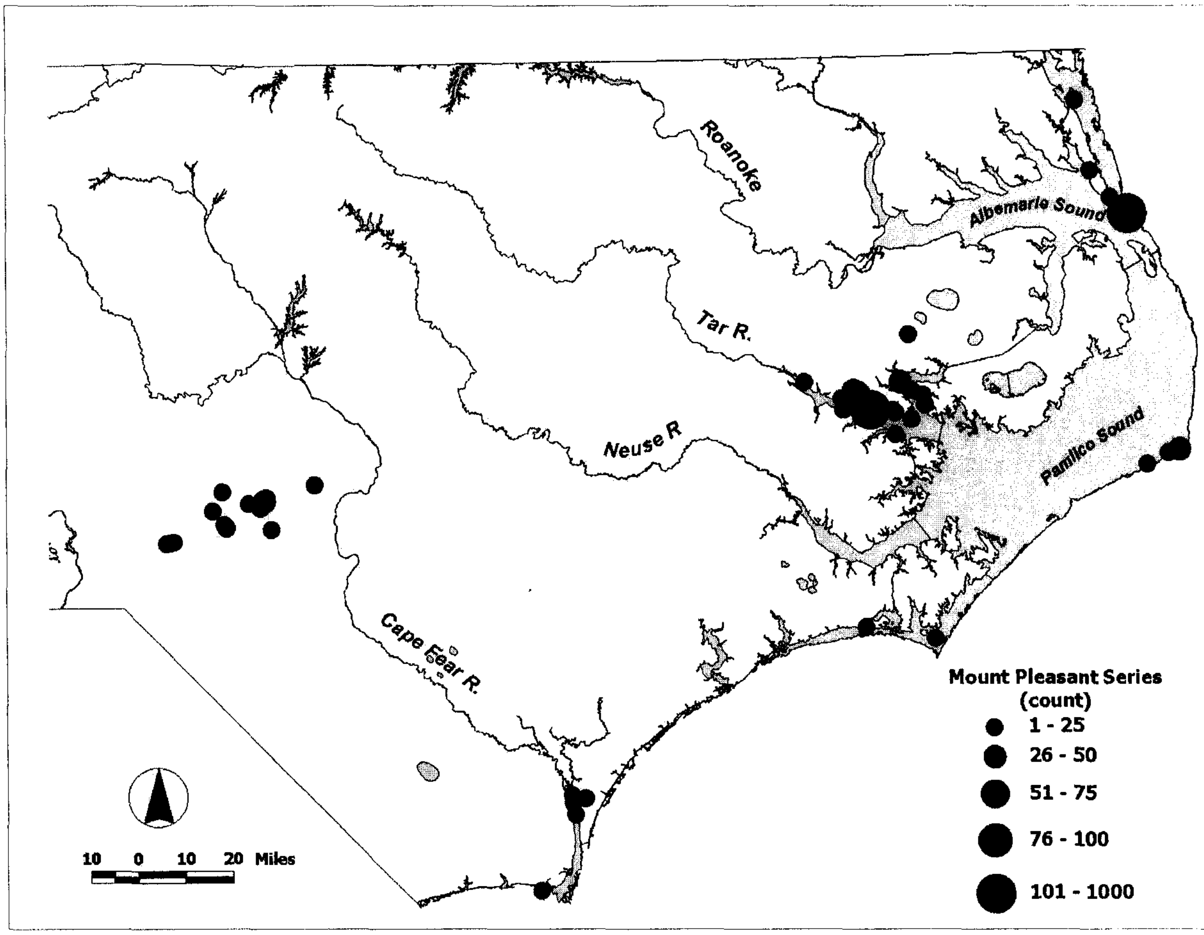

Figure 6.18. Distribution and frequency (counts) of granule/pebble-tempered Mount Pleasant series sherds.

The density and frequency of sites on the Pamlico suggest a possible trajectory of dissemination of this tempering trait from the Pamlico basin north and south. An alternative explanation is suggested by the absence of sites with granule/pebble-tempered sherds on the central coast. This gap suggests the possibility that the series may be more frequently represented at sites in the interior northern and central Coastal Plain, areas not sampled in this study.

Mount Pleasant Fabric Impressed and Mount Pleasant Plain types are distributed in essentially the same way as granule/pebble-tempered ware as a whole. Although the Mount Pleasant series definition includes no net-impressed type, granule/pebble-tempered, net-impressed sherds, classifiable to the Mount Pleasant series, are found on sites in the lower Pamlico and Pungo Rivers, on Currituck sound, and on Colington Island (Figure 6.19). No granule/pebble-tempered, net-impressed ware was found on the Outer Banks, the central coast, the Cape Fear Valley, or in the Sandhills.

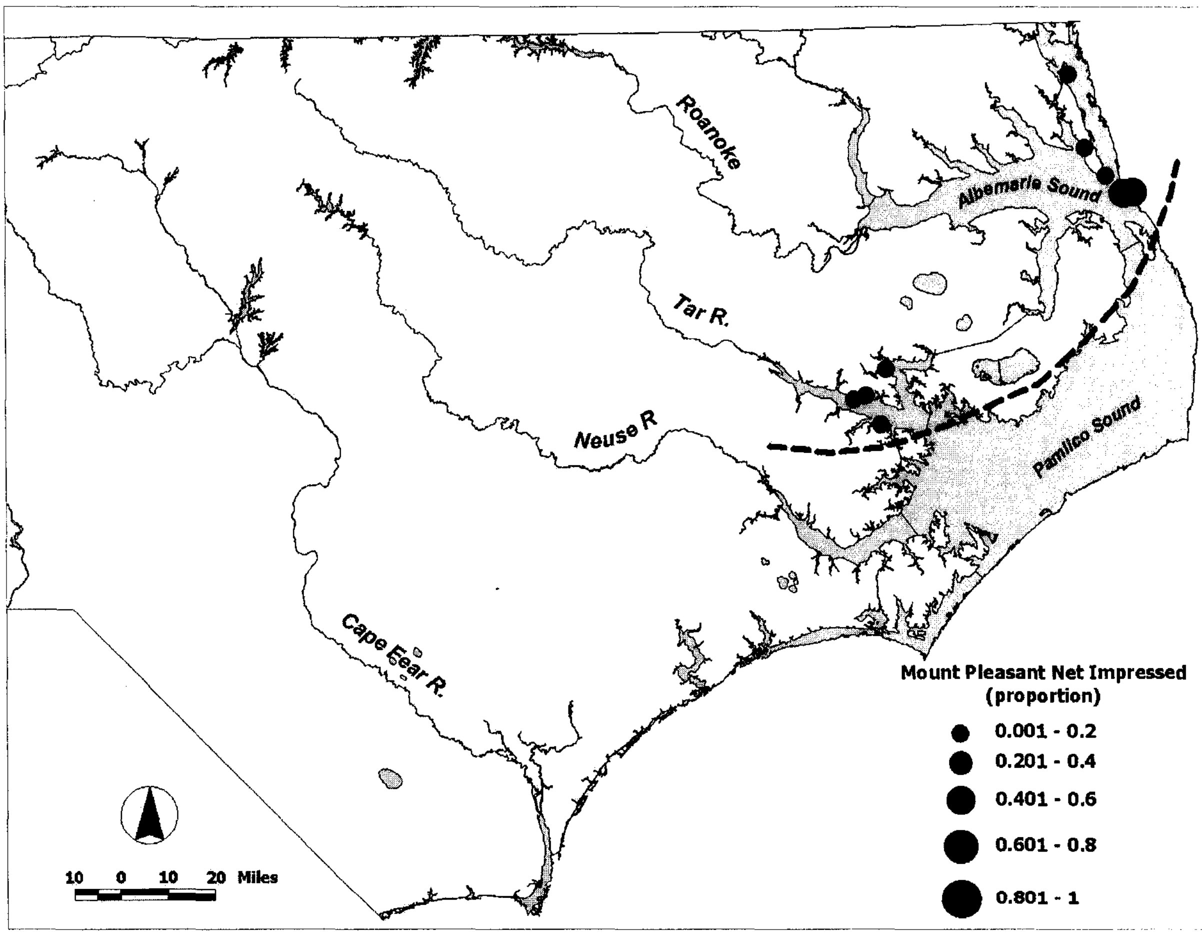

Figure 6.19. Distribution and frequency (proportion) of Mount Pleasant Net Impressed pottery.

Mount Pleasant Cord Marked is similarly distributed with this type being absent from sites on the lower Cape Fear River and central coast (Carteret County). This pattern is also evident in the distribution of Mount Pleasant Simple Stamped (another type not originally included in the definition of the Mount Pleasant series). Granule/pebble-tempered, net-impressed and simple-stamped types occupy a smaller, more northerly range than the fabric impressed, cord-marked, and plain types of the Mount Pleasant series (Figure 6. 20).

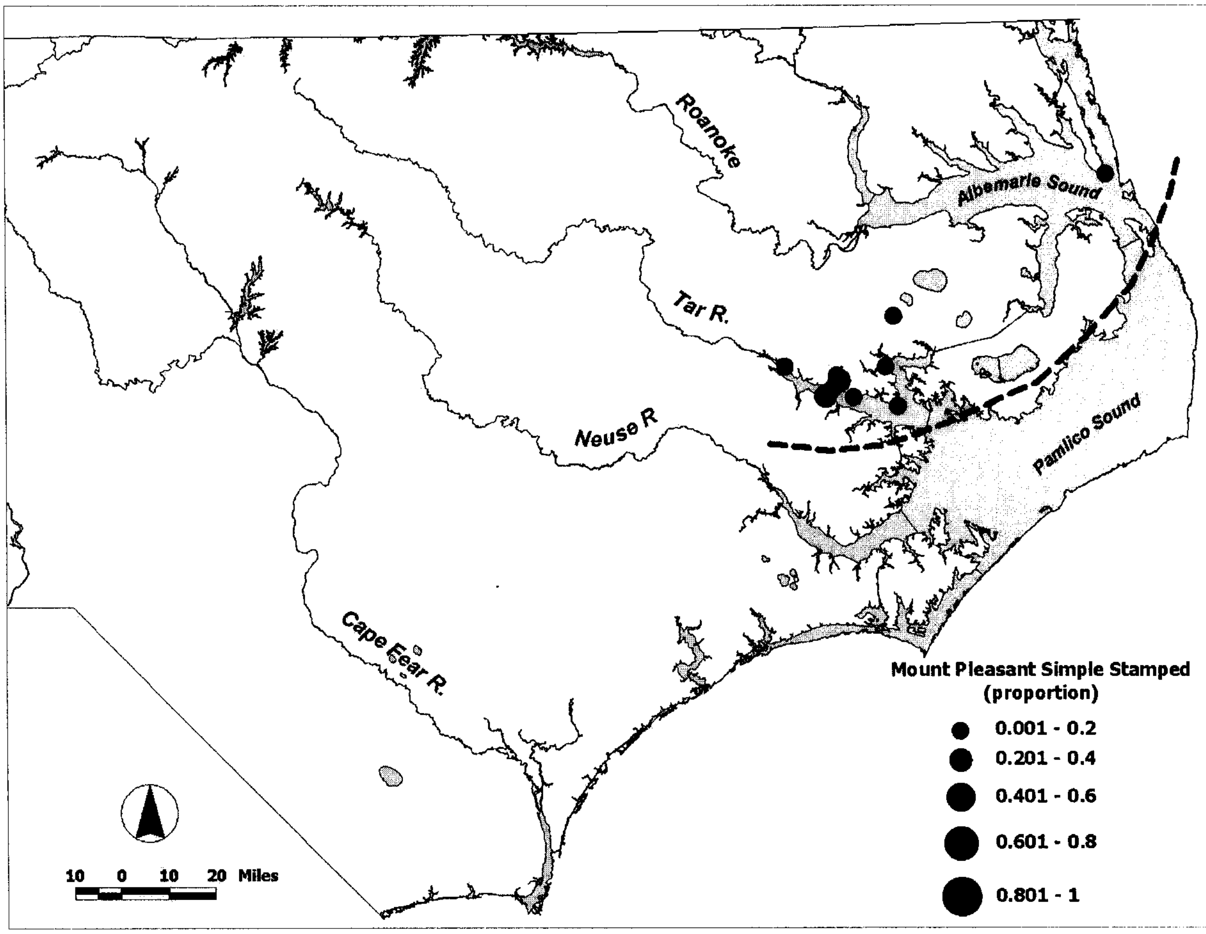

Figure 6.20. Distribution and density of Mount Pleasant Simple Stamped pottery.

Since it is evident from the stratigraphic and chronological data presented in Chapter 3 that net-impressing is early in the sequence, this suggests that the differences in distribution of net-impressed wares may be a function of their early position in the sequence. Simple stamping, known to occur in the Early Woodland Deep Creek series, may also hold an earlier position in the Mount Pleasant sequence. The similarity of the geographic ranges for Mount Pleasant Net Impressed and

Simple Stamped types, however, suggests that they occupy nearly contemporary positions in the sequence regardless of their taxonomic classification.

The lack of chronological data makes it difficult to determine if the net impressed and simple stamped components of the Mount Pleasant series are part of a Middle Woodland tradition. The patterns described for the Bandon site midden (Chapter 3) seem to suggest an early context for at least the net-impressed type. Ultimately, the question of the classification of granule/pebble-tempered fabric-impressed, cord-marked, and plain wares found on the central coast, in the Cape Fear basin and Sandhills, to the Mount Pleasant series may be unanswerable with these data. Certainly, Haag's (1958:71) first impression was that "the sherds with gravel inclusions seem to convey very rarely the idea that the gravel was deliberately sized. Rather it is likely that the gravels simply were not removed from the [native clay] mixture." This is a perpetual problem with sherds containing natural sediments such as quartz sand, granules or pebbles and even, possibly, clay lumps. It seems unlikely that a potter would select clay that included a considerable amount of coarse sand, granules or pebbles unless, of course, these inclusions were found to have no adverse effects on, or perhaps enhanced, the workability of the clay or performance of the vessel. Their inclusion in the paste might then be considered temper, since the decision was made not to remove them, but the spatial distribution of this temper type would necessarily correspond to the locations where the clay resources contained sand and granules. Bearing this in mind, surface treatment attributes may well be the more reliable data for determining temporal placement of types within the sequence. The net-impressed and simple-stamped types may well be within the range of variation that Phelps (1983) described for the Deep Creek series. This would seem a logical conclusion considering their uniquely restricted geographic distribution.

Hanover Series

The definition of clay or grog tempering and their use in identifying Middle Woodland Hanover series sherds is discussed in foregoing chapters. Important distinctions may exist between grog (crushed potsherds) and clay (crushed fired clay) temper, although in many cases the distinction between the two is difficult. For an initial look at spatial modeling, the most inclusive definition (encompassing both clay and grog) is used. The distribution of all sites having some clay/grog-tempered sherds encompasses every portion of the study area (Figure 6.21). Judging from the frequency of clay/grog-tempered sherds along the coast, it appears that sites on the Currituck Sound may represent, or be near, the northernmost boundary of the Hanover series distribution.

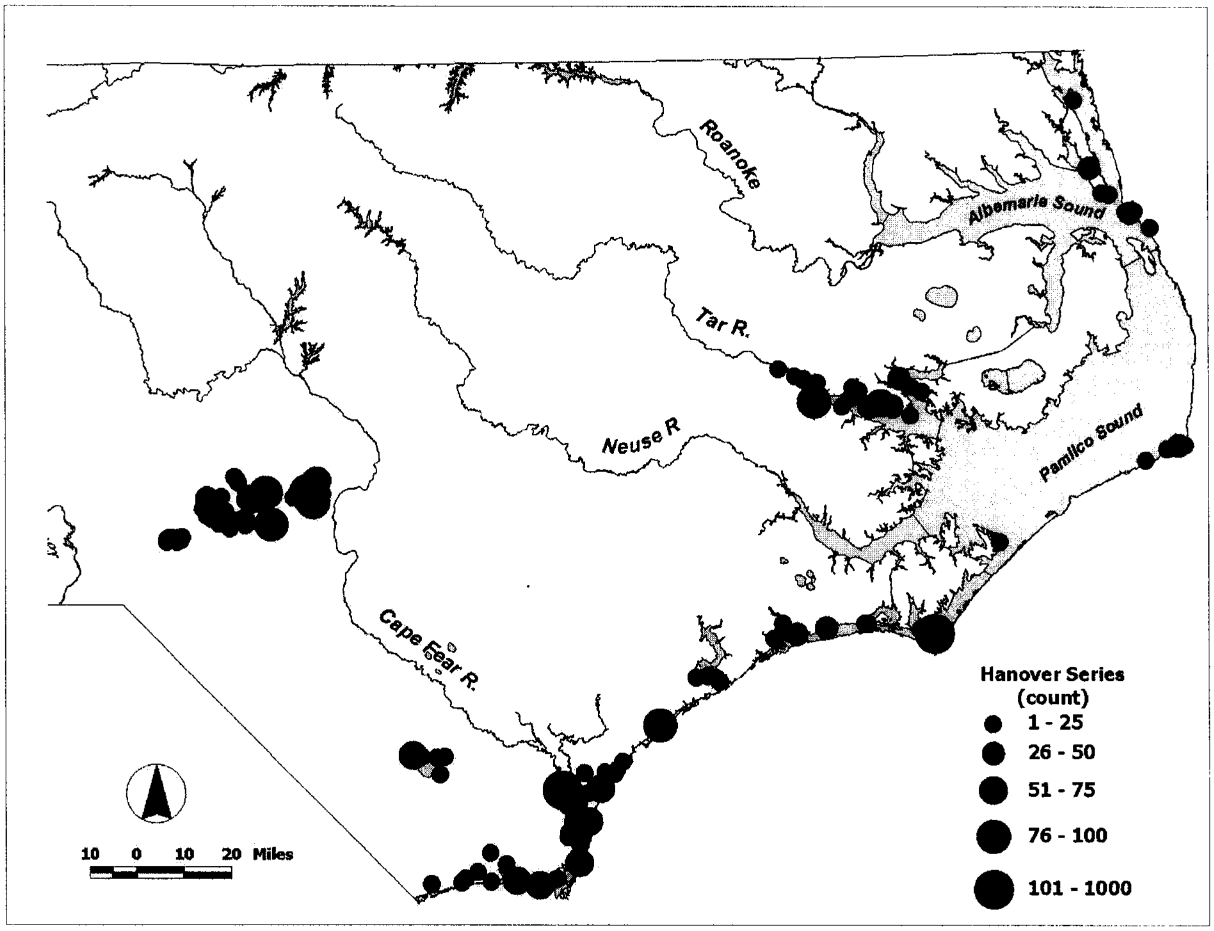

Figure 6.21. Distribution and frequency (counts) of clay/grog-tempered Hanover series sherds.

Collections made along the western scarp of the Dismal Swamp of Virginia consist mostly of ceramics that tend to be early, as the swamp began to fill in about 500 B.C. The majority of the clay-tempered pottery from that area is thick walled, with plain (smoothed) surfaces and lug handles (Early Woodland Croaker Landing series). Some sherds of this description are lightly cord marked and over-stamped, but none appear clearly fabric impressed (Keith Egloff, personal communication, 2001). As Middle Woodland clay and grog-tempered Wilmington and St. Catherines series wares are common on the South Carolina coast, and as the distribution is continuous into southern North Carolina, it can be assumed that the trajectory of dissemination of this tradition, at least on the northern coast of North Carolina, is from south to north.

At the Doerschuk site in Montgomery County, clay temper was included with crushed quartz in sherds classified as Yadkin series (Coe 1964:30). This represents the westernmost extent of the coastal clay/grog-tempering tradition. The presence of clay/grog-tempered ware west of Fort Bragg in Moore, Richmond and Harnett Counties is not known but, judging from the regularity of its occurrence on sites at Fort Bragg (139, or 62 percent, of 227 site assemblages comprising the Fort Bragg database include some clay/grog-tempered sherds), it would not be surprising to find it there. Along the central coast, Loftfield (1976) identified sherds of the Carteret series (also clay/grog tempered) on several sites in the New River basin. Crawford's (1966) survey of the Neuse River valley in portions of Craven, Pitt, Lenoir, and Wayne Counties attests to the presence of clay/grog-tempered ware (Crawford's Grifton series) in the interior central region.

Drawing a distinction between clay lumps and grog (crushed sherds) is difficult, if not impossible without the use of thin sections. As described in Chapter 2, the distinction was made in this analysis only when the identification of crushed sherds seemed conclusive. In many more sherds the distinction was inconclusive, and the sherd was classified as clay tempered. A total of 2251 sherds in the Loftfield and Hagg Collections were found to be tempered with either clay or grog. Grog was positively identified in only 17 percent (390) with the remaining 83 percent (1861) being identified as clay tempered. Sand was identified as a secondary tempering agent in 35–47 percent of both groups. Because of the difficulties of positive identification, the sub-class of grog-tempered sherds is perhaps best thought of as a minimum number rather than an absolute figure. With this qualification in mind, there appear to be considerable differences in the spatial distribution of these two sub-groups of temper. Based on raw frequency, the distribution of clay-tempered sherds is similar to the distribution of all sites; clay-tempered sherds are well represented in every region of the study area (Figure 6.22).

By comparison, grog-tempered sherds were found predominantly in the lower Cape Fear basin, coincidently the region where the Hanover series was first defined by South (1960) as "sherd-tempered" ware (Figure 6.23). Although there were a few grog-tempered sherds found on one site (31Ck1) on the Currituck Sound, one site on the Pamlico River, and three sites in the Sandhills, these numbers stand in distinct contrast to the number of sites with clay-tempered sherds in these same areas. This can also be seen in the differences in the proportions of clay-tempered and grog-tempered sherds comprising the Haag collection (including sites from the entire coastal margin) as compared to the Loftfield collection (including only sites in the Sandhills) (Table 6.5).

Table 6.5. Comparison of the Clay-tempered and Grog-tempered Components of the Haag and Loftfield Collections.

	Proportion Clay or Grog Tempered		
Collection	Clay n (%)	Grog n (%)	Total n (%)
Haag (n=14,204)	1698 (.12)	486 (.03)	2184 (.15)
Loftfield (n=2987)	1400 (.47)	134 (.04)	1534 (.51)
Total (n=17,191)	3098 (.18)	620 (.04)	3718 (.22)

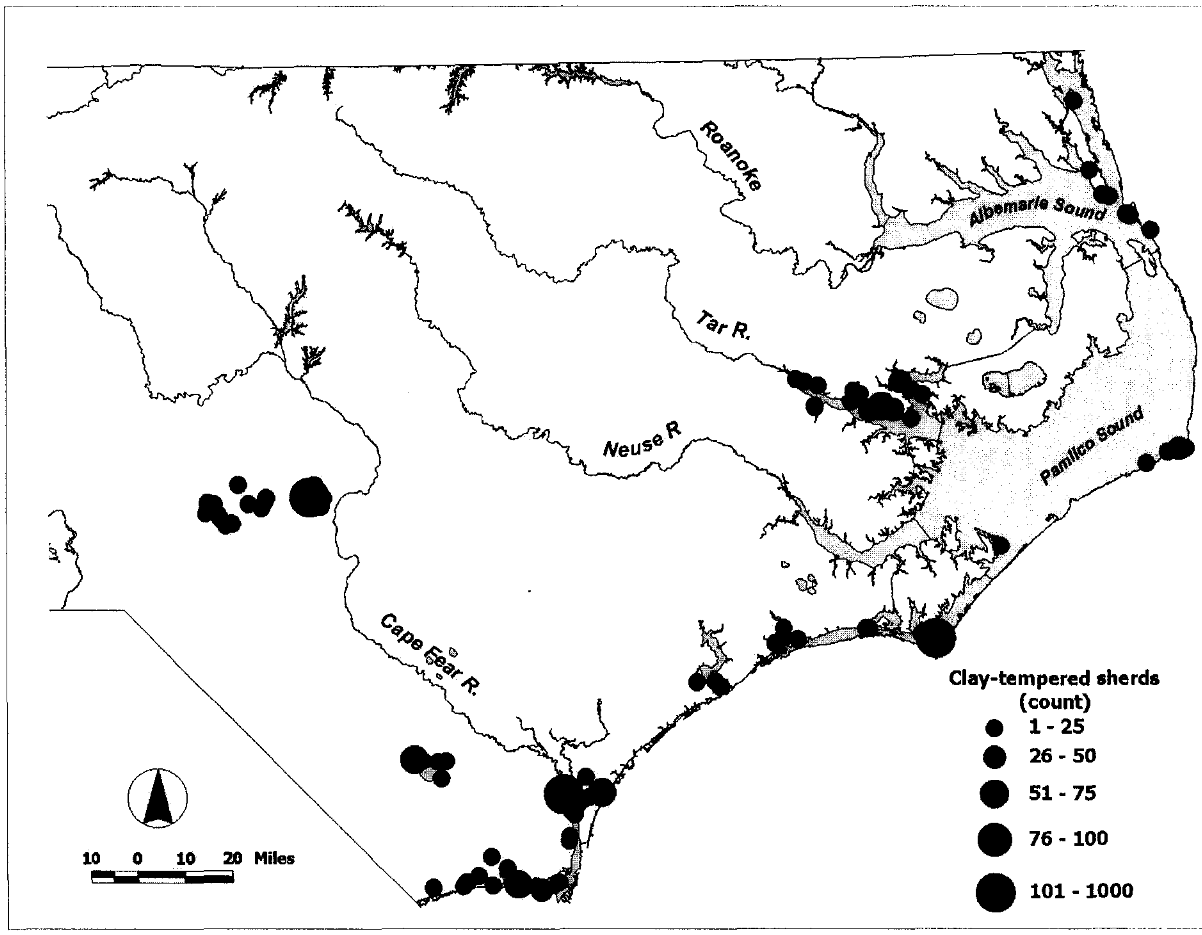

Figure 6.22. Distribution and frequency (count) of clay-tempered sherds, including those with both clay and sand.

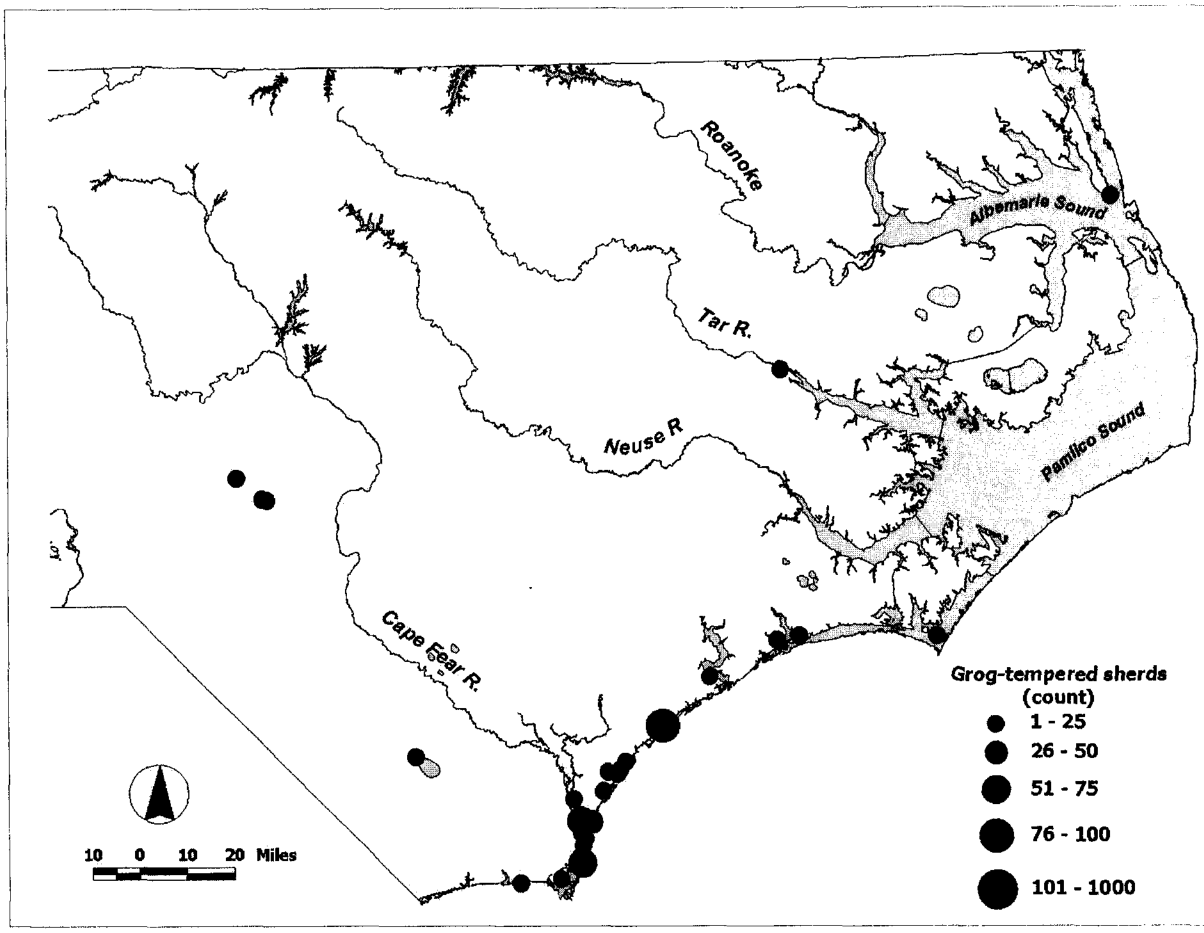

Figure 6.23. Distribution and frequency (count) of grog-tempered sherds, including those with both grog and sand.

The differences in the proportions of clay-tempered versus grog-tempered sherds comprising assemblages from sites in the lower Cape Fear valley, as opposed to sites located elsewhere in the study area, is intriguing. Might this indicate differences in temper-preparation traditions in these areas? Perhaps, but the answer to this question depends on a clear understanding of the nature of clay tempering. This distribution may also hint at the possibility that the inclusion of clay lumps in prehistoric pottery from the coastal region may reveal more about the characteristics of coastal clays than prehistoric pot-making practices. This possibility is further suggested by the relatively frequent appearance of clay lumps in pottery otherwise tempered with marl, crushed quartz, rounded granules or shell. More experimentation with coastal clay will be necessary to resolve some of the problems surrounding the nature of this type of tempering material.

Hanover series sherds accounted for one of the largest groups in the study. Numerous surface treatment types were identified on grog- or clay-tempered sherds (Table 6.6).

Table 6.6. Surface Treatment Types among Grog and Clay Tempered Sherds.

	Temper				
Surface Treatment	Grog	Grog/Sand	Clay	Clay/Sand	Total
Check Stamped, Square				13	13
Cord Marked, Parallel	11	2	82	48	143
Cord Marked, Perpendicular	66	22	254	92	434
Cord-wrapped Paddle Edge	6	2	177	80	265
Fabric Impressed			7	2	9
Fabric Impressed, Coarse	1	2	38	5	46
Fabric Impressed, Medium	57	132	349	59	597
Fabric Impressed, Fine	33	7	95	70	205
Fabric Impressed, Flexible	22	8	138	231	399
Net Impressed, Knotted			24	2	26
Plain, Smoothed	6	6	25	17	54
Punctate		2		2	4
Punctate, Random Straw Bundle			1		1
Simple Stamped, Broad				1	1
Simple Stamped, Narrow			1	1	2
Smoothed-over Cord Marked			12	8	20
Smoothed-over Fabric Impressed			5	14	19
Smoothed-over Scraped				1	1
Smoothed-over Simple Stamped	4		1		5
Smoothed-over Stamped	1			6	7
Total	207	183	1209	652	2251

The proportion of fabric-impressed sherds (57%) and cord marking (27%) among the grog and clay tempered ware resembles that reported from South's (1976) survey of Hanover series sherds from New Hanover and Brunswick Counties (about 1:3 cord marked to fabric impressed).

Among the grog and clay-tempered sherds in the Haag and Loftfield collections were many surface treatment types not usually associated with the Hanover series. South (1976:15) identified only cord-marked and fabric-impressed surfaces among the Hanover sherds in his collection. Check-stamped wares in this region are typically assumed to be associated with the Deptford series, although grog-tempered, check-stamped sherds have been observed in low frequency in assemblages from the central coast of South Carolina where they have been classified as Wilmington Check

Stamped (Anderson et al. 1982:276). Other surface treatment types among the clay and grog tempered sherds include net impressing, punctation, and simple stamping. Although the very low frequency of these examples does not warrant a wholesale reconsideration of the Hanover series, their presence suggests that the tradition of tempering with grog or clay may have begun in the Early Woodland period (pre-400 B.C.). As dated examples of grog-tempered ware from Fort Bragg and elsewhere on the coast has indicated, this tradition may also have continued well into the Late Woodland period (post A.D. 900).

The distributions of Hanover Fabric Impressed and Hanover Cord Marked sherds are very similar, found in higher frequencies on sites in the Sandhills, central, and southern coast than in the northern part of the coast (Figures 6.24 and 6.25). The geographic distribution of Hanover Net Impressed and Hanover Plain (smoothed) sherds is similar to Hanover Fabric Impressed and Cord Marked types, but assemblage percentages indicate low proportions (< 20%) of net-impressed and plain types at most sites.

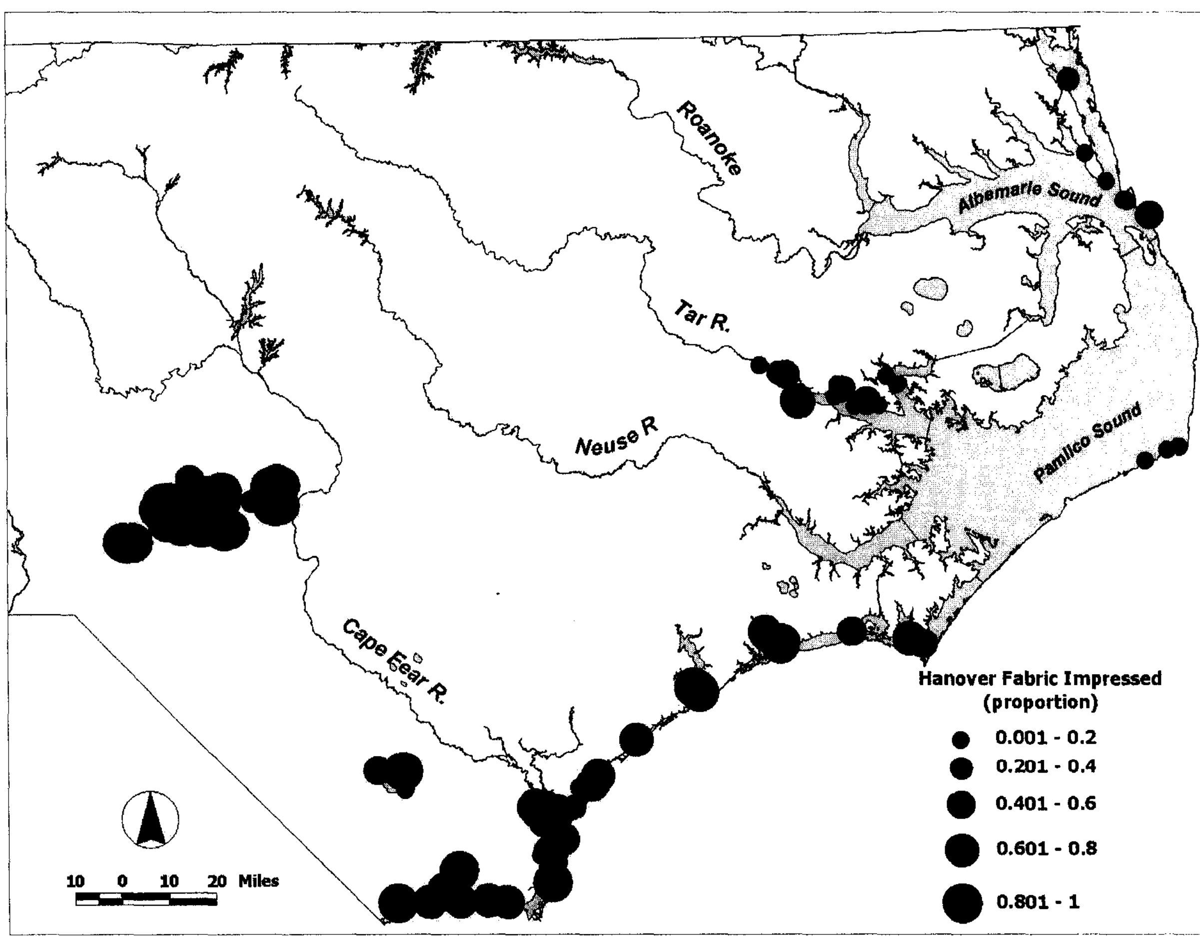

Figure 6.24. Distribution and frequency (proportion) of Hanover Fabric Impressed.

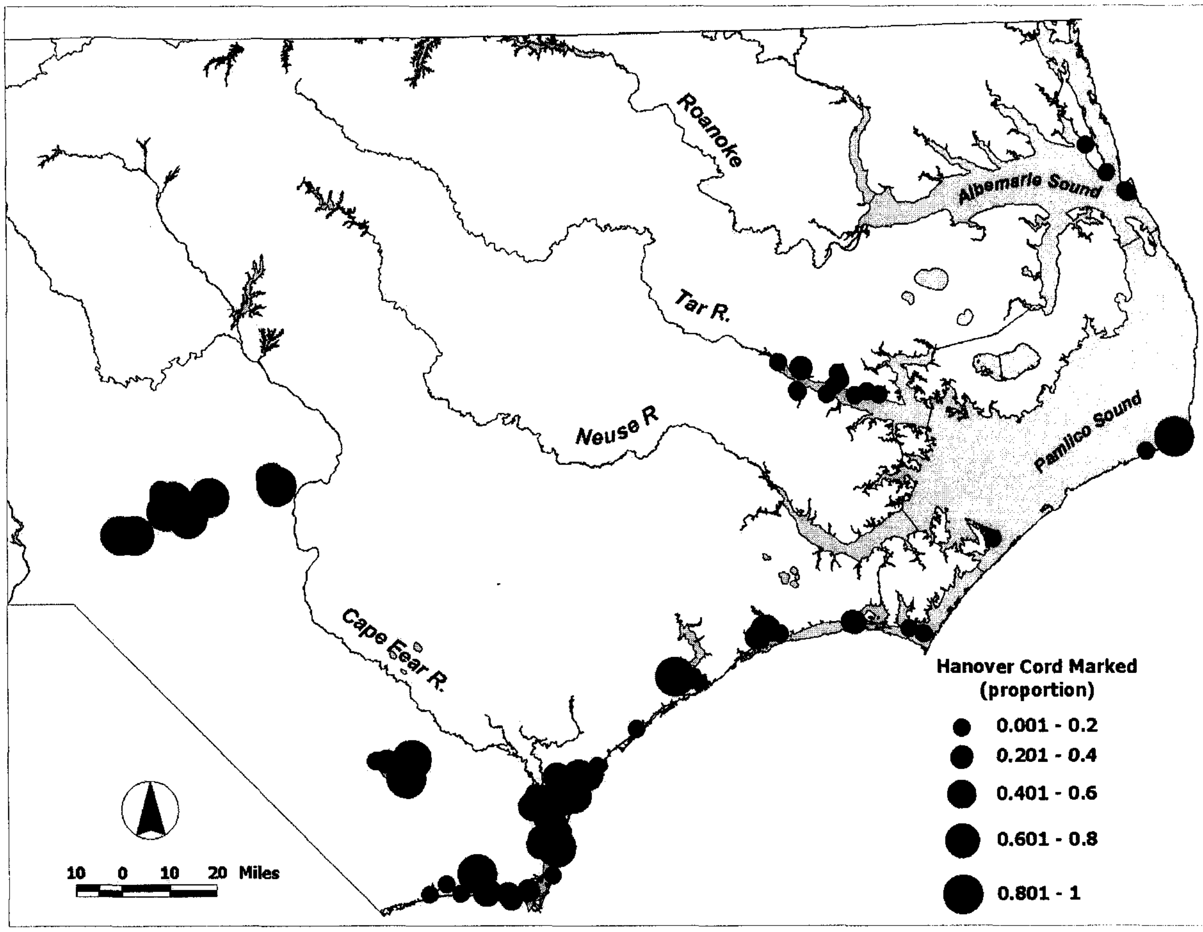

Figure 6.25. Distribution and frequency (proportion) of Hanover Cord Marked.

Hanover Paddle-edge Marked sherds occur in relatively high percentages at several sites restricted to the lower Cape Fear River valley and on Fort Bragg (Figure 6.26). This distribution suggests an association with the Refuge series found principally on the South Carolina coast. A similar pattern is observed among Hanover Check Stamped sherds, although they are restricted to sites on Fort Bragg. Hanover Simple Stamped sherds are found on five sites, two on Fort Bragg and one each in Brunswick, Beaufort, and Currituck Counties. These surface-treatment types are possibly related to the Deptford series and, as with paddle-edge stamped, probably represent the early portion of the Hanover series.

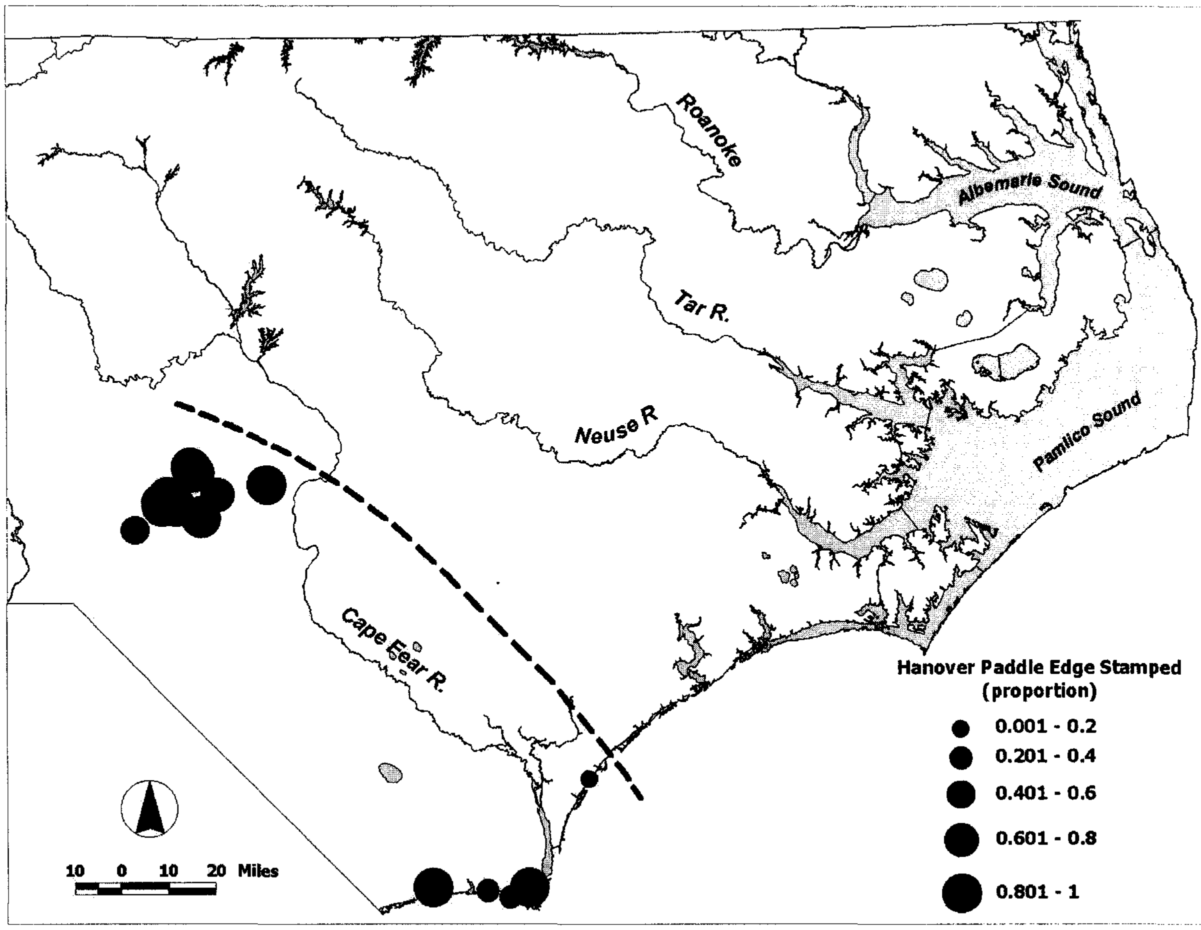

Figure 6.26. Distribution, frequency (proportion), and apparent boundary of Hanover Paddle-edge Stamped.

Mockley Series

Raw frequencies at sites where Mockley ware is found on the Carolina coast are typically less than 25 sherds. For both the Net Impressed and Cord Marked types, sites are clustered on the mainland side of the Currituck Sound and on the Pungo River (Figures 6.27 and 6.28).

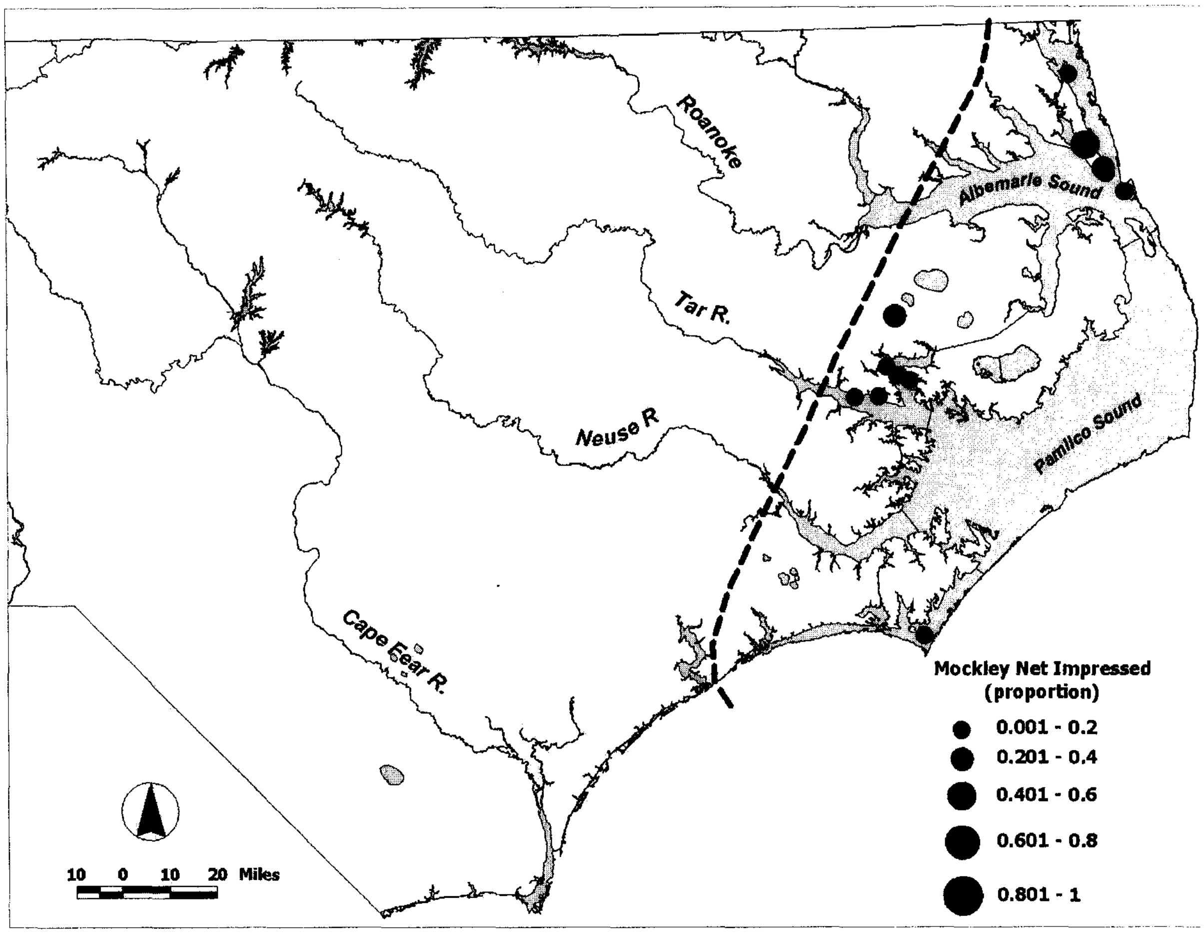

Figure 6.27. Distribution and frequency (proportion) of Mockley Net Impressed sherds.

In addition to sites on the Pungo and Currituck, one site in on the mainland side of the Core Sound in Carteret County (31Cr2) yielded two Mockley Cord Marked and one Mockley Net Impressed sherds. One occurrence of Mockley Cord Marked ware was noted at site 31Nh61 on the upper reeaches of the embayed portion of the Cape Fear River in New Hanover County. Mockley sherds have also been found at several sites on or near the White Oak River, including the Long Point site (Shumate and Shumate 2000), the Hammocks Beach West site (Daniel 1999:126–127), and the Broad Reach site (Mathis, personal communication 2001).

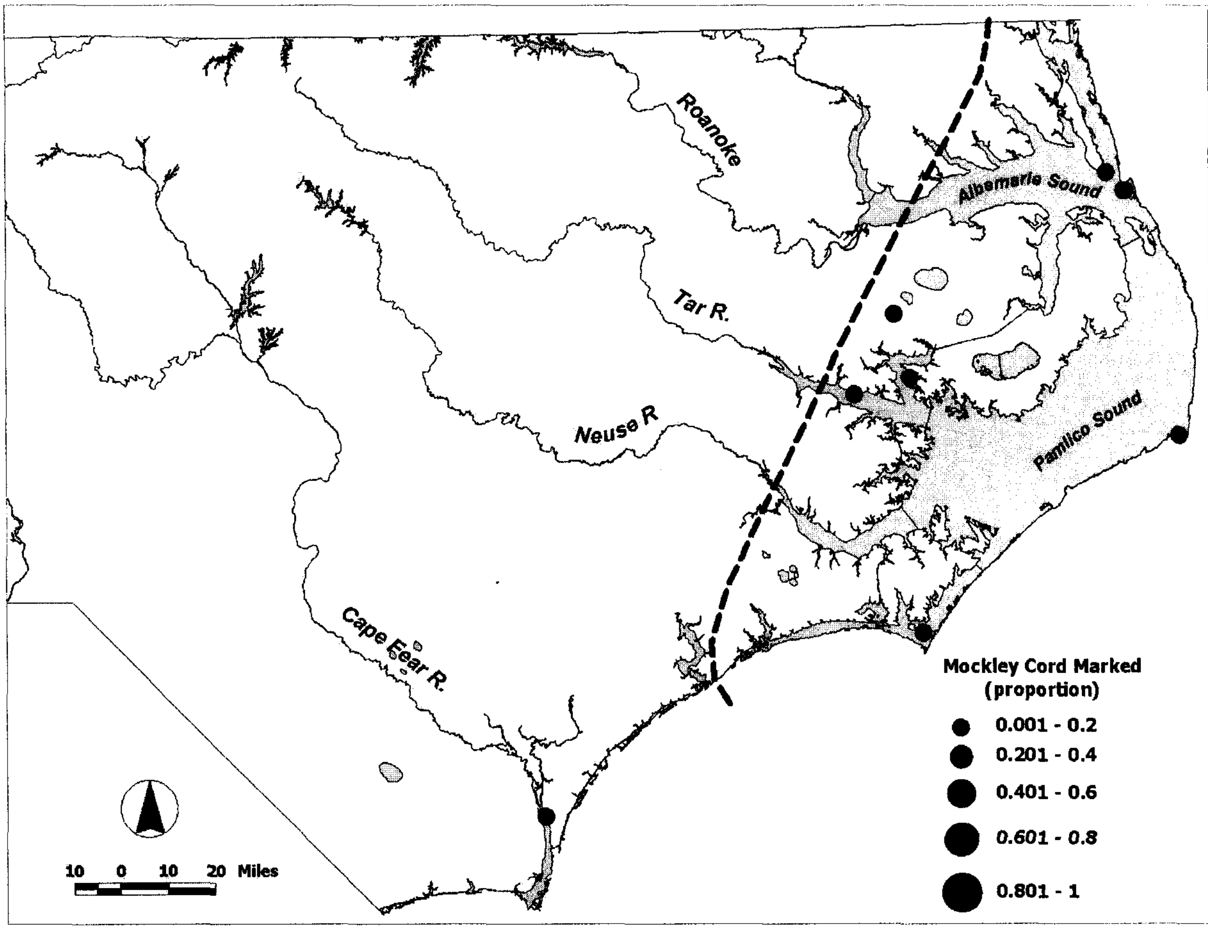

Figure 6.28. Distribution andfrequency (proportion) of Mockley Cord Marked sherds.

Late Woodland Traditions

At present, there are four pottery series identified for the Coastal Plain of North Carolina during the Late Woodland period (A.D. 800–1600), a relatively small number when the size of the geographic area and length of the period are taken into consideration. In part, this apparent meagerness is due to gaps in the archaeological data (not necessarily the archaeological record itself) that reflect recent re-evaluations. On the central and northern areas of the outer or lower coast, the shell-tempered Townsend series predominates in the Albemarle Sound region. Inland, the grit-tempered Cashie series characterizes the central and northern Coastal Plain. In the Sea Island section, the shell-tempered Oak Island series, once considered to be the southern equivalent of the northern shell-tempering tradition, has recently been overturned as the temper in the original type collection was found to be crushed limestone and dates have begun to place the limestone-tempered series in Early and early Middle Woodland contexts (Mathis 1999). In the Sandhills there are, as yet, no convincing candidates for a series dating exclusively to the Late Woodland period. The grog-tempering tradition of the Hanover series appears to have persisted into the Late Woodland, with some modifications to the method of preparing the paste. Quite late in the period two additional series are recognized. The Brunswick series, found mostly in the lower Cape Fear basin, is tempered with fine sand, or appears temperless, and consists primarily of a burnished type with some evidence for brushed and cob-marked types observed much less frequently. Also very late in the period the Swansboro series, tempered with finely crushed shell and typically burnished, is found along the central coast. There continues to emerge some tantalizing suggestion of a sand-tempered Late Woodland series along the central coast but, as described below, evidence is thus far inadequate for the task of defining a new series or confirming and refining the previously defined Adams Creek series (Loftfield 1979).

The use of crushed shell temper is the most widely spread tradition of Late Woodland pottery making on the Coastal Plain of North Carolina and is characteristic of the Townsend and Swansboro series. The Haag collection is completely adequate to describe the north-south boundaries of the shell-tempered series within the state, although it lacks coverage of the upper reaches of many rivers and streams in the tidewater region. Such is not the case for the grit-tempered Cashie series. The Cashie tradition is thought to have been located in the area stretching from the upper reaches of the tidal embayments of the Chowan, Roanoke, Pamlico and Neuse Rivers to the Piedmont-Coastal Plain boundary. Haag sampled very few sites in this region and no Cashie sherds were positively identified in the analysis of the Haag collection. This discussion of coastal pottery traditions therefore is restricted to the shell-tempered Townsend and Swansboro series, and the fine sand-tempered Brunswick series.

The Middle Woodland Mockley series, Late Woodland Townsend, and terminal Late Woodland Swansboro series are expressions of the coastal shell-tempering tradition that are distinguished principally by different surface treatment styles. Mockley series wares are net impressed or cord marked, Townsend is recognized by fabric impressing and simple stamping, and Swansboro by burnishing. There is also some suggestion that the manner of preparing the temper may have differed among some of these series. Mockley is often characterized as being crudely made with larger chunks of crushed oyter shell as the predominant temper. Townsend series wares are also tempered primarily with poorly sorted very coarse (1–2 mm) and granule size (> 2 mm) pieces of shell mixed in moderate and high proportion. The size, sorting, and proportion of shell temper, therefore, does not appear to be significantly different between the Middle Woodland Mockley and the Late Woodland Townsend series. The Swansboro series, however, is tempered with well-sorted, finely crushed shell, often including more mussel shell than seen in the Mockley or Townsend series. Swansboro ware is burnished and typically thin (<8 mm) and it may be that the difference between this ware and the White Oak and Colington wares is one of function.

Townsend Series

The overall distribution of shell-tempered ware appears to be restricted to the tidewater region primarily north of New Hanover County (Figure 6.33). The fact that shell-tempered Townsend and Rappahannock wares are the predominant Late Woodland pottery in Tidewater Virginia and the circum-Chesapeake region attests to the strength of the shell tempering tradition during this period in the region north of the northern limits of this study collection. The complete lack of shell-tempered ware from sites in Brunswick County and the absence of similar pottery on the South Carolina coast provide equally conclusive evidence that the tradition is rarely found south of the New River.

All shell-tempered fabric-impressed sherds are classified as Townsend Fabric Impressed and all shell-tempered simple-stamped sherds as Townsend series Colington Simple Stamped. Evidence suggests that although the two types are classified to the Townsend series, they exhibit different spatial distributions. As illustrated in Figure 6.29 and Table 6.7, the frequency of shell-tempered sherds was greatest in the Albemarle region and least in the Cape Fear basin. This trend of higher over-all frequency of shell-tempered ware on the north coast (Albemarle Sound) and lower frequency on the central coast (Bogue Sound) is reversed if one observes only fabric-impressed wares (with the exception of Cape Fear valley sites that yielded a negligible number of shell-tempered sherds).

Townsend Fabric Impressed. The apparent trend in frequency of fabric-impressed, shell-tempered ware (higher in the southern region and lower in the north) is more clearly expressed when sherd frequencies are standardized by the number of site assemblages analyzed in each region (Table 6.8). Standardized frequencies, or the average number of sherds of each type per region, indicate that the over-all proportion of fabric-impressed sherds is slightly higher in the Bogue Sound region than in the Albemarle region. Despite a higher number of sites, there is lower proportion of fabric-impressed sherds in the Pamlico than in the other two regions. Possible reasons for this are explored in discussions that follow. It might also be noted, however, that there is a tendency for higher density of fine and medium varieties of fabric impressing among shell-tempered sherds from sites in the Bogue region and higher density of the coarse variety in the Albemarle region.

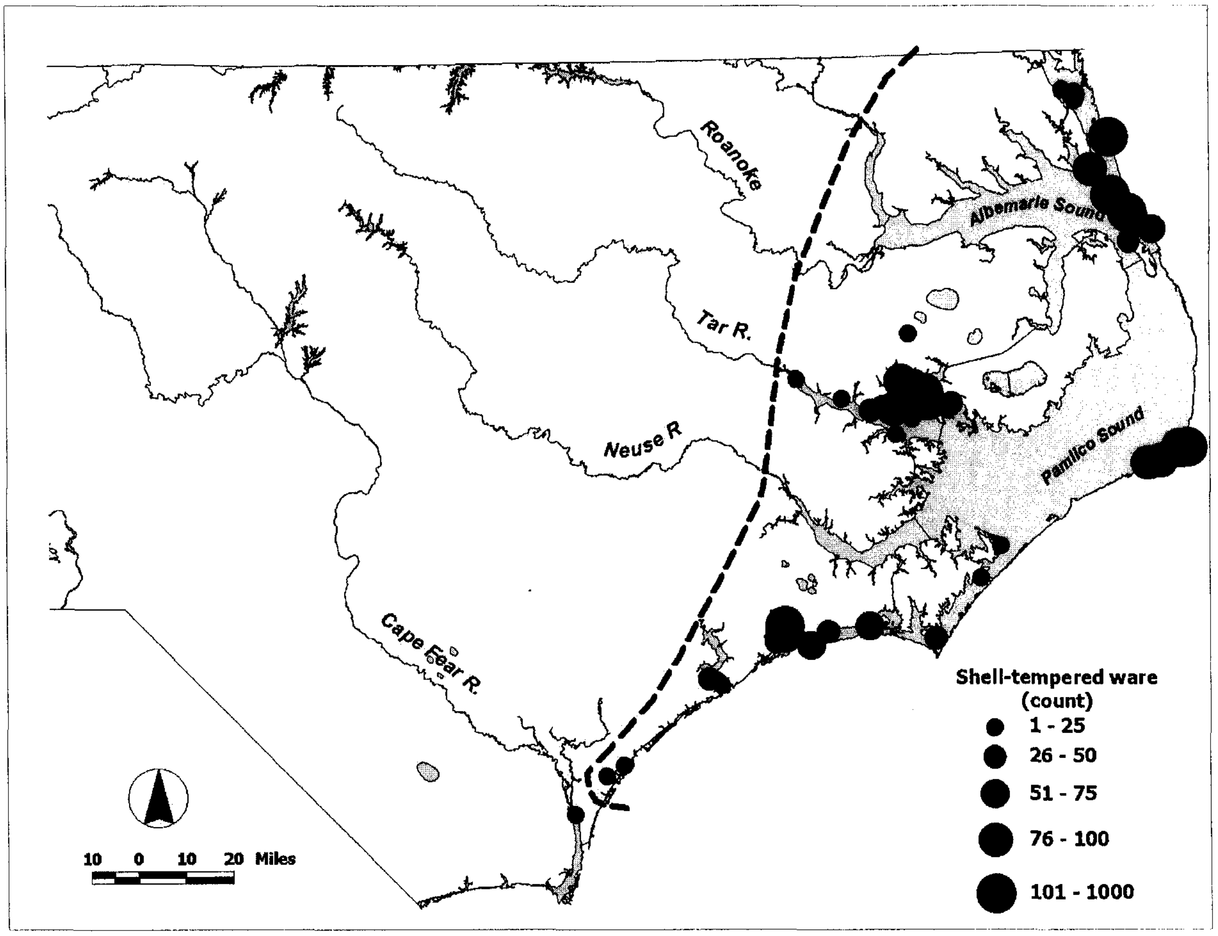

Figure 6.29. Distribution and frequency (count) of shell-tempered ware.

Table 6.7. Frequency (count) of Surface-treatment Types among Shell-tempered Ware from Four Coastal Regions.

	Geographic Region[1]			
Surface-treatment Variety	Albemarle	Pamlico	Bogue	Cape Fear
Burnished		1	19	2
Cord Marked, Parallel	3	8	2	
Cord Marked, Perpendicular	3			1
Fabric Impressed (indeterminate)	42	3		
Fabric Impressed, Coarse	97	14	62	
Fabric Impressed, Fine	27	39	50	
Fabric Impressed, Flexible	3	13	8	
Fabric Impressed, Medium	92	187	281	6
Net Impressed, Knotted	61	21	1	
Simple Stamped, Broad	6	12		
Simple Stamped, Narrow	4	18		
Smoothed (Plain)	47	17	41	
Smoothed-over Fabric Impressed	24			
Smoothed-over Net		1		
Smoothed-over Simple Stamped	6	11		1
Smoothed-over Stamped		1		
Eroded	560	447	181	
Total	975	793	645	10

[1] Regional samples are composed of site assemblages grouped by county in the following manner: Albemarle region: Currituck (7) and Dare (8); Pamlico region: Beaufort (29) and Hyde (6); Bogue region: Carteret (14) and Onslow (9); Cape Fear region: Pender (1), New Hanover (22), Columbus (7), and Brunswick (23).

Table 6.8. Average Number per Site of Shell-tempered Sherds among Fabric-impressed Types by Region.

	Geographic Region		
Surface-treatment Variety	Albemarle	Pamlico	Bogue
Fabric Impressed, Fine	1.80	1.11	2.17
Fabric Impressed, Medium	6.13	5.34	12.22
Fabric Impressed, Coarse	6.47	0.40	2.70
Fabric Impressed, Flexible	0.20	0.37	0.35
Total Fabric Impressed	16.60	7.23	17.43

Note: Proportion is calculated as the average number of sherds per site of each variety of fabric impressed sherds observed among shell-tempered pottery from each of three regions, including the Albemarle (15 sites), Pamlico (35 sites), and Bogue (23 sites).

The distribution of Townsend Fabric Impressed mirrors the overall distribution of shell-tempered ware (Figure 6.30). Sites with Townsend pottery are found from the northern reaches of Currituck Sound to the New River basin, with a single site in New Hanover County. Assemblage proportions are often over 60 percent. Townsend Smoothed (plain ware) was found to have a very similar distribution, albeit with many fewer sites and lower proportions.

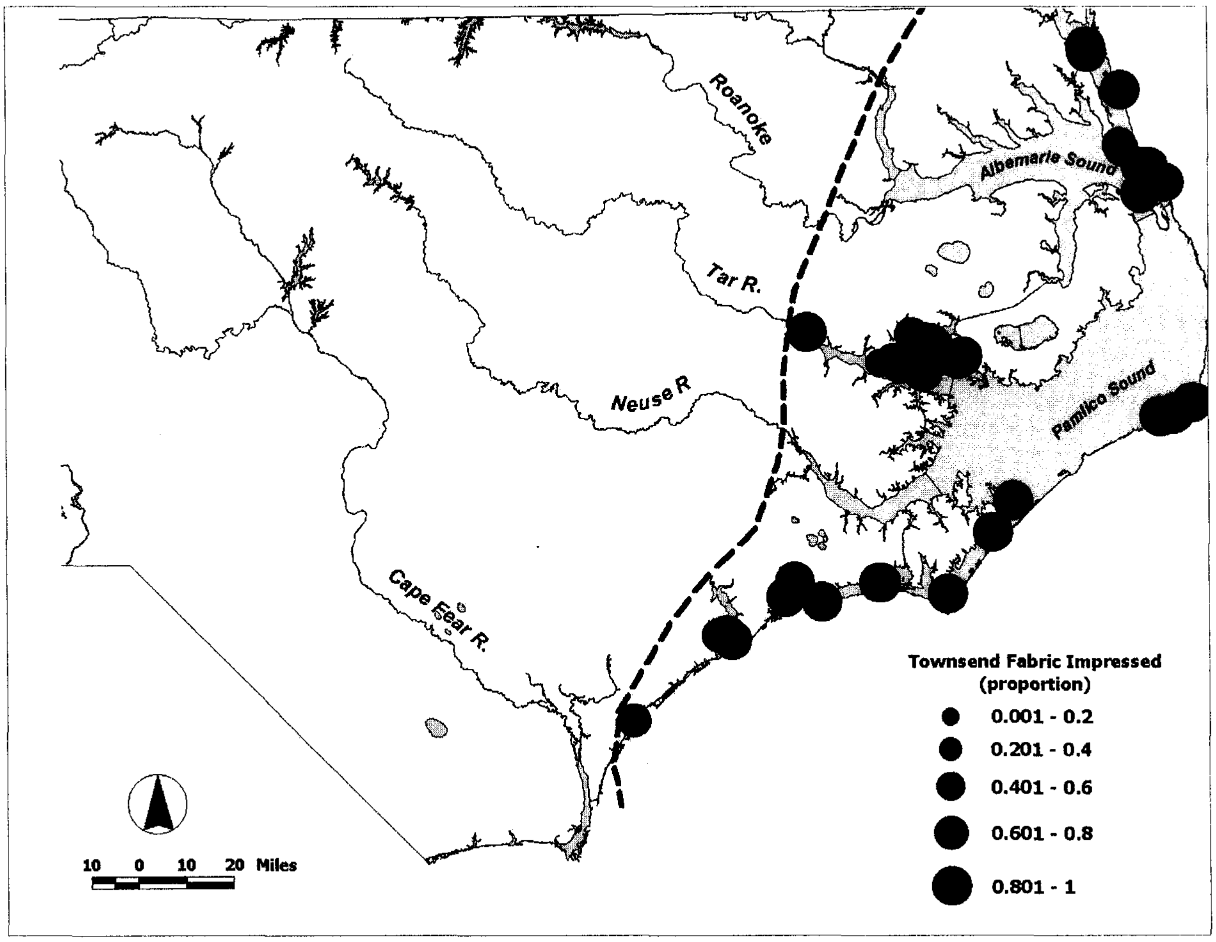

Figure 6.30. Distribution and frequency (proportion) of Townsend Fabric Impressed sherds.

Colington Simple Stamped. The pattern observed in shell-tempered simple-stamped ware is reversed in comparison to fabric-impressed sherds. Perhaps the most important indicator of this is the fact that no shell-tempered, simple-stamped sherds were found in the Bogue region. (It should be noted that Loftfield [1976:187] did observe shell-tempered, simple-stamped sherds from sites in

Onslow County, but they appear to have occurred in very low proportions.) Among simple-stamped sherds in the Pamlico and Albemarle regions, very similar overall densities are observed. Among varieties of simple stamping, however, the broad sort is found in higher density on sites in the Albemarle, and the narrow variety is found in higher density on sites in the Pamlico. It follows from the evidence described above that there are apparent differences in the geographic distribution of shell-tempered fabric-impressed and simple-stamped sherds in the Haag collection.

Colington Simple Stamped was found on sites mainly in the Albemarle and Pamlico Sound area (Figure 6.31). One small, shell-tempered, simple-stamped sherd was found at 31Nh265 near Ogden in New Hanover County.

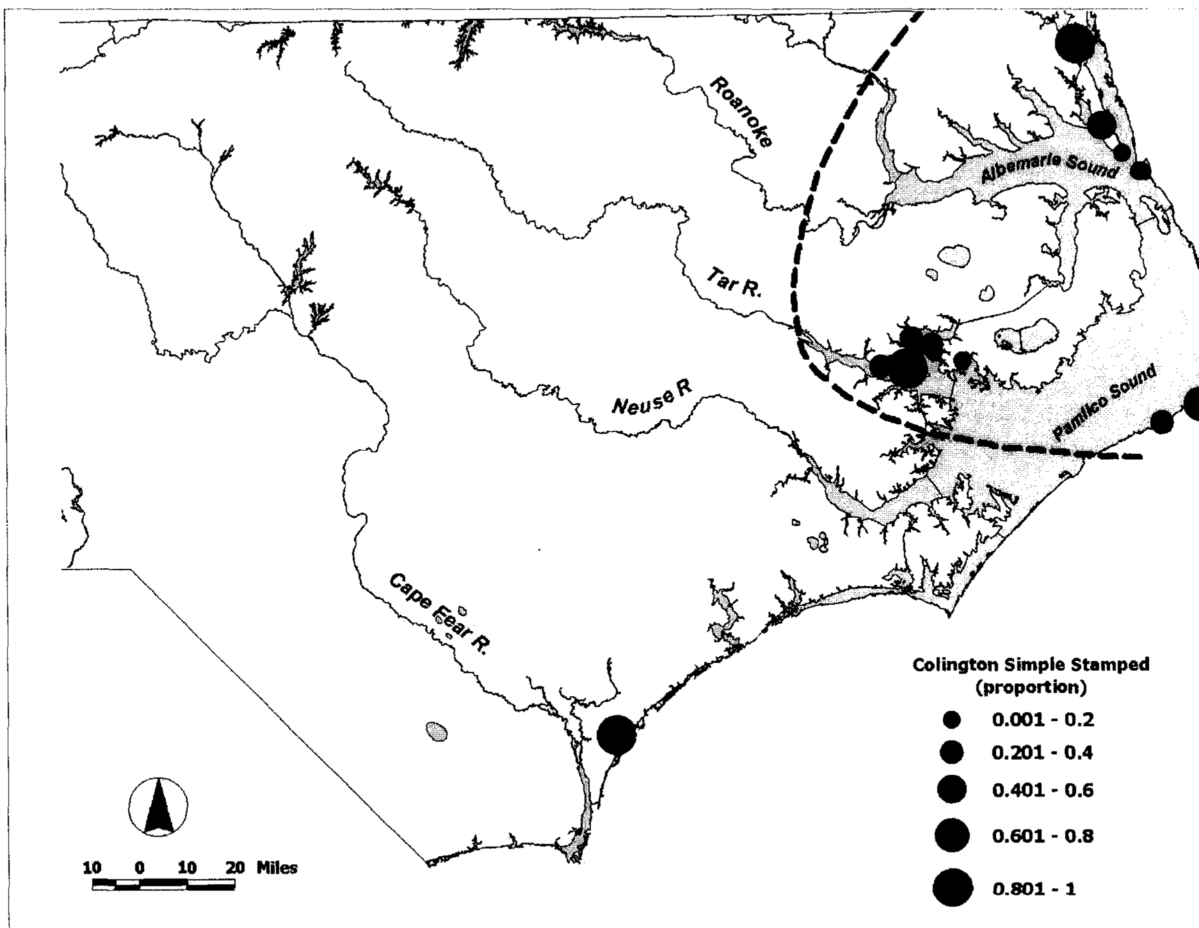

Figure 6.31. Distribution and frequency (proportion) of Townsend Series Colington Simple Stamped sherds.

Swansboro Burnished. Swansboro series sherds were identified by shell tempering in combination with burnished surfaces. Most Swansboro series sherds were tempered with fine shell, however, a few were tempered with medium shell and one was tempered with coarse shell. In all, Swansboro series were found on seven sites including one (31Nh650) in New Hanover County. Most were found on the central coast (New River, White Oak River, Bogue Sound) with two sites on the Outer Banks (31Dr1, and 31Dr25) yielding Swansboro series sherds (Figure 6.32).

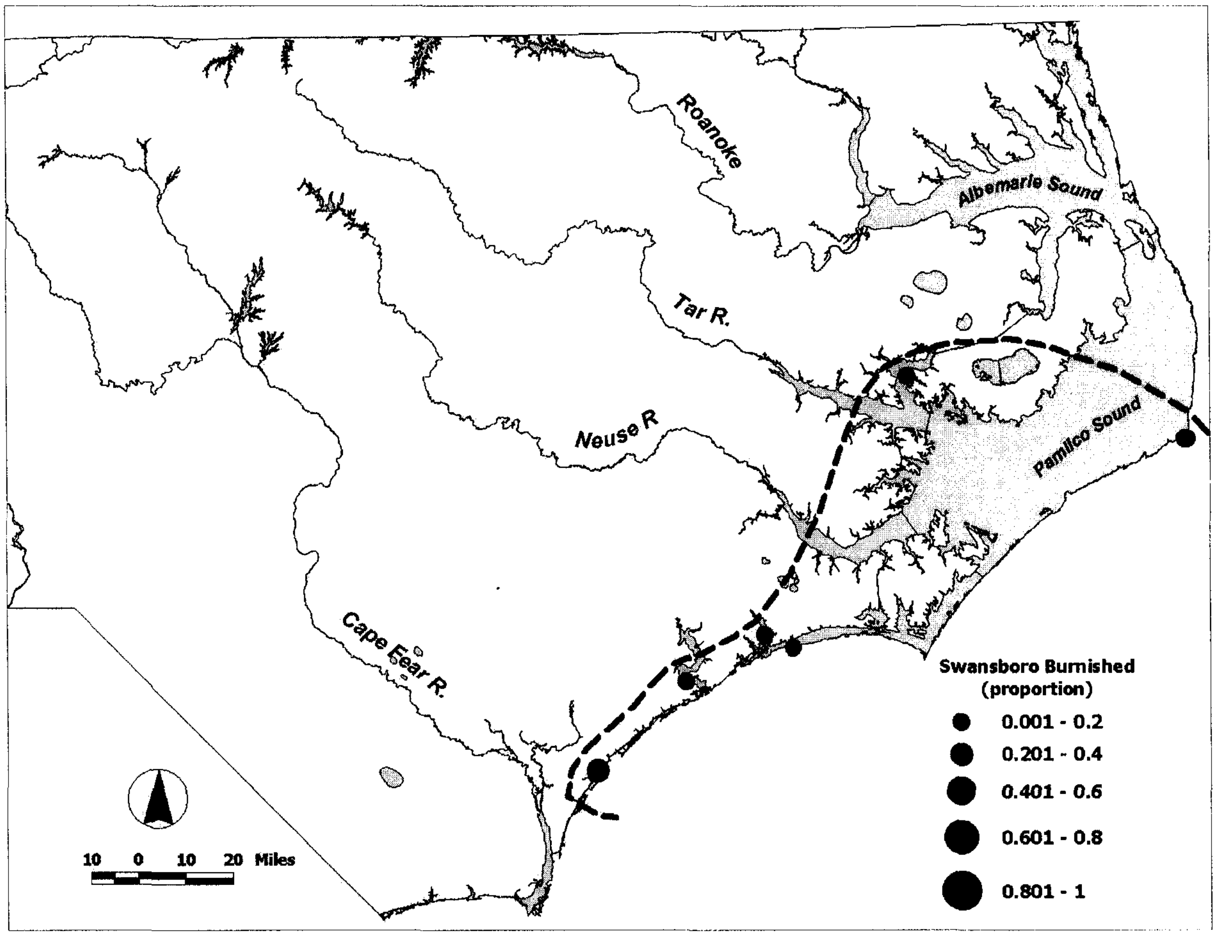

Figure 6.32. Distribution and frequency (proportion) of Swansboro Burnished sherds.

Brunswick Series

The Brunswick series was first described by South (1960) to characterize an assemblage of locally made burnished vessels found at Brunswick Town in context with European ceramics dating to the mid 18th century. Brunswick series vessels are described as temperless or occasionally tempered with fine sand. Vessel walls are typically thin (averaging about 6 m), and surfaces are either burnished or plain. Most unusual are the vessel forms in the two assemblages found by South, one at Brunswick Town and the other at Bath, that are interpreted as imitations of European ceramics found with them, including Delft, Oriental Porcelain, and English White Salt-glazed Stoneware, and Creamware.

Two fine-sand tempered or temperless burnished sherds were noted in the Haag collection, one each from Brunswick and New Hanover counties (Table 6.9). Although burnished, neither of these sherds provides evidence of vessel form suggesting likeness to European forms. Also found in the Haag collection were four sherds of similar temper, whose surfaces were either corncob-impressed or brushed. As there are no formally defined corncob-impressed or brushed types for the coastal region of North Carolina, and these few, small body sherds do not provide enough data to support such a definition, they are presented here with the Brunswick sherds as examples of Late Woodland or Contact period wares.

Table 6.9. Fine Sand Tempered Brushed, Burnished and Corncob Impressed Sherds.

Site	Temper	Surface Treatment
31Cr57	Fine Sand	Brushed
31Bw76	Fine Sand	Burnished
31Nh639	Fine Sand	Burnished
31Bf22	Fine Sand	Corncob Impressed
31Bf23	Fine Sand	Corncob Impressed
31Nh651	Fine Sand	Corncob Impressed

Although these few sherds cannot be confidently classified to any particular series, they exhibit certain resemblances to brushed, burnished, and corncob-marked types from neighboring regions. Ceramics associated with the Late Woodland period Dan River and Hillsboro focuses from the North Carolina Piedmont include corncob-marked and well-smoothed types (Coe 1952:310–311).

Summary and Conclusion

Several interesting patterns are evident in the geographic distribution of pottery types among the prehistoric periods, beginning with the Early Woodland. The Stallings tradition, arriving from the south with only the plain-ware portion of the stylistic package, appears commonly on the unembayed section of the southern coast, but rarely in the embayed section. In the interior Coastal Plain, Stallings occurs with some regularity spreading up to the Chowan River. The Thom's Creek Punctate tradition, that is contemporary with Stallings (although persisting somewhat longer), is restricted to the southernmost coastal margin, never achieving the broad distribution of Stallings. Refuge Allendale Punctate, is thought to occur just antecedent to Thom's Creek, but has an almost identical geographic distribution. This raises the question of the contemporaneity of these two traditions, and suggests that this curious method of punctation, executed on a temperless paste, may actually be in the Thom's Creek , not Refuge, tradition. There is so little soapstone-tempered Marcey Creek ware found anywhere on the coast that very little can be deduced about its distribution. If this tradition is spreading southward from the Viriginia Coastal Plain, as suspected, it does not appear to have penetrated much beyond Currituck Sound. The Hamp's Landing marl-tempering tradition also presents some intriguing patterns. It appears to be an indigenous technological style, occurring mostly in the lower Cape Fear and Tar/Pamilico drainages. The fact that so many different surface treatments are executed on marl-tempered paste suggests that the Hamp's Landing tradition spans the Early and Middle Woodland periods. The duration of this tradition is also indicated by the spatial distribution of surface-treatment types. The predominance of cord-marking on the marl-tempered wares in the Cape Fear valley, in contrast to the predominance of fabric-impressed marl-tempered wares in the Pamilco, suggests that the efflorescence of the marl-tempering tradition may have occurred earlier in the Cape Fear and later in the Tar/Pamilco basin. With the New River sand-tempering tradition, we see the first truly ubiquitous ceramic tradition on the North Carolina, occurring everywhere on the coast. As with Hamp's Landing, the New River series comprises a wide array of surface-treatment styles (suggesting a long-enduring tradition) that exhibit some spatial patterning. Cord- and fabric-marking are found throughout the coast, while simple stamping is most frequent in the Tar/Pamlico basin, and paddle-edge stamping is most frequent in the Cape Fear basin. These differences correlate to local stylistic expressions, but may also be temporally patterned, although the data needed to assess this proposition is yet to be acquired.

The Middle Woodland Yadkin tradition of tempering with crushed quartz and granitic rock appears to emanate from the eastern Piedmont into the Sandhills, but no further east. There is some suggestion of crushed-quartz tempering on the central coast, but the evidence for this is not yet sufficient to form any confident conclusion about its temporal position or spatial distribution. The geographic occurrence of the Cape Fear series appears to be very similar to the New River series, occurring throughout the Coastal Plain. Cape Fear Cord Marked seems slightly more frequent in the Cape Fear basin, and Cape Fear Fabric Impressed seems slightly more frequent in the Tar/Pamlico basin. Granule and pebble-tempered Mount Pleasant ware occurs in low frequency over the entire study area, but is most frequent in the Tar/Pamlico basin, where the net-impressed and simple-stamped types are found. Grog-tempered Hanover ware seems to be part of a very widespread grog-tempering tradition, including the Wilmington and St. Catherine's series, that extends from the Savannah River in South Carolina, to the Currituck Sound region of North Carolina. Most surface-treatment styles in this series occur over the entire coast, although paddle-edge stamping seems to be most frequent in the Cape Fear basin. The shell-tempered Mockley series is found only in the Tidewater region of the embayed section of the northern and central coast.

The Late Woodland shell-tempered Townsend series that occurs throughout the Chesapeake region finds its southern expression in the Townsend Fabric Impressed and Colington Simple Stamped types that are rarely found south of the New River. Simple-stamping is thought to emerge late in this tradition, and its occurrence seems to largely restricted to the Pamlico, Albemarle, and Currituck sound region. The Swansboro series appears to be very late in the sequence, as do all burnished wares throughout the region.

At the most general level, it seems clear that the principal source of information about pottery making in the Early Woodland period on the North Carolina coast reflected the ideas and practices of the Native potters of the South Carolina coast. The Stallings, Thom's Creek, Refuge, and Deptford series had their core areas in the South Carolina or Georgia Coastal Plain, but clearly influenced traditions on the North Carolina coast. Several other more indigenous Early Woodland traditions, such as Hamp's Landing and New River, appear to have emerged in the Cape Fear valley and flourished into Middle Woodland times. On the northern coast, the regions of distribution of the Croaker Landing and Marcey Creek series extend into the Virginia Coastal Plain showing affinity with this region. There is as yet too little chronological information to hazard a guess as the source area for these traditions or the direction in which information was moving about pottery making. By Middle Woodland times, these northern and southern influences seemed to have abated as the

Hanover, Mount Pleasant, and Cape Fear series appear to reflect traditions indigenous to the North Carolina coast. Northern influences are again seen in the Late Woodland Townsend series that is unquestionably related to traditions at home in the circum-Chesapeake region. It is not yet evident that the practice of burnishing, the hallmarks of the Swansboro and Brunswick series, are local derivations, but at present this seems most likely to be the case.

In the final chapter I take up the issue of the sources of the temporal and spatial patterns that have been the subject of discussion up to this point; modeling environmental, technological, and social influences on pottery-making traditions and applying these models to develop explanations.

CHAPTER 7
CERAMIC BOUNDARIES AND SOCIAL SPACES

The long-range goal of the previous chapters has been to develop archaeological data for elucidating shifting ceramic boundaries and social spaces on the North Carolina Coastal Plain through the Woodland era. In approaching this goal I have assessed existing archaeological materials and information where they were available and, in parts of the study area where adequate data were not available (especially on the southern coast and Sandhills), new information has been developed. By obtaining dates for a sample of diagnostic sherds from the Sandhills and lower Cape Fear valley and by analyzing stratigraphic relationships of ceramics from a few key sites on the northern coast, a basic taxonomy and sequence of types has been formulated. When mapped, the distribution of sites and frequency of pottery illustrate the geographic ranges of the various technological styles, represented by pottery series and types, occurring at different periods in prehistory. But archaeological data alone are insufficient to explain the temporal and spatial patterning of ceramic styles in a cultural context — the context in which the pots were actually made and used. This chapter explores some explanations for these observations, sketching relevant theoretical approaches and applying them to the most important patterns described in the preceding chapters.

Modeling Influences on Prehistoric Pottery-Making Traditions

The development of this exploratory model is designed around the initial question of interest. How does the archaeological evidence of prehistoric pottery-making from coastal North Carolina inform us about how people were organized into communities and why did this aspect of prehistoric culture evolve as it did? One important step in developing a model of why different pottery traditions occurred when and where they did, and why they changed the way that they did is to attempt to identify causal relationships. While the manifold array of potential causes is essentially limitless, it is useful to simplify by focusing on major sources of influence, or prehistoric conditions relevant to the adaptive problem at hand. The following discussion examines possible influences arising from different environmental constraints, technological parameters, and social practices.

Environmental Resources

Potters must have access to suitable clay and temper sources. It is assumed (although in no sense verified) that the distribution of clay adequate for making pottery was essentially continuous or ubiquitous during all of the prehistoric periods in question. While the distribution of clay resources adequate for pottery making may be considered to be universal throughout the coastal region, the characteristics of specific clay resources certainly varies. This variation has great potential to influence both the workability of the clay (its potential for shaping vessels), its drying, firing, and performance. Although this study does not delve into geological data describing Coastal Plain clay deposits, there is some anecdotal or casually collected information about clay types in the region. In a broad-scale study of regional differences in clay, Steponaitis et al. (1996:564) found that the clays of the Middle Atlantic Coastal Plain are mostly smectite, although some are rich in kaolinite and most contain minor quantities of illite. Clays gathered locally in the Sandhills have been found, through replication experiments, to be a very poor resource for pottery making. Very homogeneous clay procured from exposures around Fort Bragg was used to make coil-built vessels. Inadequate plasticity made the building process difficult as vessel walls could not support their own weight without separating. Small conical-based vessels, made upside down, were successfully built and fired, whereupon they were found to be extremely soft, easily crushed in the hand. In the same experiment, vessels built in the same fashion with sedimentary clay from the Lake Waccamaw region of Columbus County, (about 35 miles away) made perfectly suitable cooking pots. Today, the commercial brick-making and pottery-making centers in North Carolina are found in the Piedmont, not the Coastal Plain. So it would seem that while the best clays for modern commercial purposes are found in the Piedmont, clay may be found over a large part of the Coastal Plain, although portions of this area, particularly the Sandhills, the clay lacks the necessary plasticity to be adequate for building pots. The fact that pottery is found on sites throughout the Sandhills suggests that access to potting clay outside the Sandhills was not limited, and indicates that pots were carried by their owners or traded to locations within the Sandhills.

A more important restriction of access to clay resources might arise tangentially, in the form of intertribal competition for subsistence resource areas. In this regard, subsistence resources, rather than potting clay, may have been more critical in determining land-use patterns. If discontinuous subsistence resource distribution and attendant risk factors resulted in intertribal competition which limited access to certain areas, this limitation could also extend to the clay resources in those area. In general, the process of "tribalization" which Braun and Plog (1982:504), define as "intensification of regional integration," and associated geographic boundary formation, occurred throughout the Woodland period. The rate of intensification, however, may not have been continuous and gradual, but punctuated by technological developments, such as corn agriculture, which may have substantially affected settlement patterns and population dynamics (although archaeological evidence for such a phenomenon has not been found on the Coastal Plain of North Carolina).

The size of geographic regions of pottery-making information (ceramic areas) is therefore expected to be affected by regional population change through the Woodland period. Larger ceramic areas may reflect a greater degree of social group integration or information exchange. Smaller ceramic areas may be related to an increased awareness of territorial boundaries. The fixity or definiteness of ceramic-area boundaries might be expected to become more evident as population increase raised demands on the local environment, thereby increasing the likelihood of competition between neighboring groups (Boyd 1995; Cashdan 1992). The reduction in settlement mobility that accompanied the transition from foraging to farming in the Late Woodland period should also be reflected in a reduction in size of ceramic area and an increase in boundary definition (or resolution) of ceramic areas, but not necessarily for reasons of regional competition for scarce resources, (Braun and Plog 1982). Long-term trends in regional social integration, and the degree of technological information exchange, may be related to the risks associated with an increased reliance on food production in the context of sedentism. Such trends are documented in the Illinois Valley (Braun 1983) and in the southwestern United States (Braun and Plog 1982), and are expected throughout the Southeast.

Braun and Plog (1982) articulated an evolutionary interpretation of patterns of social integration measured as the diversity of ceramic decoration on pots from Middle and Late Woodland sites in Illinois. Former theories interpreted homogeneity of artifact styles within smaller, well-defined regions, occurring primarily after A.D. 500, as evidence of increasing regional autonomy of social groups which evolved as a defensive response to increasing population density and competition for scarce resources. Braun and Plog explained the same pattern as evidence for increase in the integration and formalization of regional social systems which were implemented as a means of avoiding the local risk associated with increasing dependency on food production in an unpredictable environment. Neiman's (1995:27) simulation model of the interassemblage distance, measured as the diversity of pottery decoration, indicated that the data tend to support the earlier population-competition hypothesis — levels of intergroup transmission began at low levels, rose to a maximum during the Middle Woodland and declined to new lows in the Late Woodland. The Hopewell climax corresponds with the highest level of movement within the region, and the Late Woodland is marked by social isolation among potters in different demes (Neiman 1995:28).

In portions of our region of interest, the ceramic data indicate that by Middle Woodland times, ceramic techno-stylistic areas assumed spatial extents that appear to coincide to some degree with environmental zones. South (1960) noted the presence of a ceramic area boundary along the coast that coincides with the boundary between the Sea Island (south of the Neuse) and Embayed sections (north of the Neuse). Egloff (1985) has noted similar patterns in eastern Virginia. By Middle Woodland times culture areas corresponding to physiographic zones had became established between Interior and Estuarine Coastal Plain provinces when the Mockley series became ubiquitious to the Chesapeake region north of the James River. For the Late Woodland period, Egloff (1985) notes that Cashie and Prince George series appear to be restricted to the Interior Coastal Plain and Townsend to the Estuarine Coastal Plain. Similar patterns have been recognized on the coast of North Carolina (Phelps 1983) for the Late Woodland period.

There is certainly ample evidence to distinguish at least three broad biogeographic zones in the study area (Interior, Sea Island, and Embayed sections) based on biomass richness, species diversity, and a host of specific environmental variables. There is also evidence that these factors affected the particular forms of human ecological adaptations and ultimately deomographics. These findings, however, appear to have no readily identifiable linkage with differences in ceramic technological styles. In fact, the specific geographical positions of the triad of linguistically distinct historic Native American groups on the North Carolina coast — Siouan speakers south of the Neuse in both Sea Island and Interior sections, Algonkian speakers in the Embayed section, and Iroquoian speakers in the Interion section north of the Neuse — appears to be the result of social rather than ecological factors. The expectation has long been that Late Woodland period ceramic-area boundaries will be found to coincide with these ethnohistorically defined culture areas (Phelps 1983). Although the data sampled in this study are insufficient to test this model where it concerns the interior Coastal Plain on the northern coast, results thus far do support the hypothesis differentiating

Late Woodland cultures of the Embayed section (the makers of Townsend series pottery) from those found in the Sea Island and Interior sections of the southern coast.

Technological Processes

A basic tenet assumed here is that pots functioned prehistorically as containers with specific purposes. Whereas textile bags and baskets served to store and transport items, pots were designed to function as cooking vessels, short-term storage containers (especially for liquid), and serving vessels. Cooking pots were clearly not a necessity for food processing during most of prehistory. Meat could be dried, smoked, broiled, or baked in the quarry's skin, and baskets were used for indirect (boiling stone) cooking. Nuts, acorns and roots could be parched in coals or steamed over stone hearths. It might be inferred from the dramatic increase in frequency of cooking vessels, however, that direct-heat cooking (with the pot on the fire) became much more important sometime in the Early Woodland period (in coastal North Carolina, probably around 1500 B.C.) and especially in the Middle Woodland (400 B.C.–A.D. 800) . The paleobotanical record for the Middle Woodland, however, does not appear to be characterized by a dramatic shift to greater reliance on plant foods requiring long periods of boiling. (It must be noted, however, that the paleobotanical record for the Middle Woodland is essentially non-existent for North Carolina.) The rate of increase in the use of domesticates seems to be gradual, evolving at different rates according to environmental and social conditions, alongside traditional strategies for foraging wild plant foods (Fritz 1993; Yarnell 1993). The increased occurrence of coil-built, conical-based, straight-walled, cooking pots began in the Early and Middle Woodland with the Thom's Creek and Refuge traditions. This coincides with the period of very gradual intensification in the use of starchy seeds which eventually (post A.D. 800) led to the cultivation of domesticates including corn (Yarnell and Black 1985; Yarnell 1993). Ethnohistoric accounts affirm the ubiquity of boiled meat-and-vegetable stews at the aboriginal hearth and it is reasonable to assume that this was the case over the entire coastal region throughout the Late Woodland period (ca. A.D. 1100–1500). In general, it is safe to say that the importance of clay cooking pots is temporally correlated to the intensification of plant food production, but this correlation is as yet inadequate to explain the appearance of the various tempering and surface-treatment traditions.

Varying rates of residential mobility may also have influenced the types of pots found in the archaeological record. The pottery technology of the highly mobile band-level foragers group might be expected to be different from that of village agriculturalists. Although there is little archaeological evidence at present to support the notion of intensive corn agriculture on the coast, a mixed economy of marine resource utilization and plant-food production is hypothesized here as equivalent in terms of residential mobility to a settled village agricultural system. Such shifts in residential mobility may have influenced the size, shape and weight of pottery vessels (Schiffer and Skibo 1987; Skibo et al 1989), as well as influencing the stochastic aspects of information transmission (Neiman 1995), and patterns of breakage and discard (Deal and Hagstrum 1995; DeBoer and Lathrap 1979; Longacre 1985).

Social Practices

Braun (1995:125) has defined social practices as "any cultural practices that specifically affect the flow of information and materials among people, the extent of peoples' cooperation or competition, the ways in which decision making takes place within groups, or the persistence of groups themselves." An almost endless variety of cultural practices might be identified as potentially influencing information flow and the development and persistence of particular pottery making practices. For simplification, this model focuses on three classes of social practice specifically affecting pottery making: sex roles, kinship, and intergroup relations.

Although it is possible that men occasionally made pots, ethnographic data suggest that pottery was most often made at the household level by women (Skibo and Schiffer 1995). Ethnohistoric data support this interpretation for the Late Woodland coastal peoples. It is reasonable, then, to infer that the pottery comprising the subject of this study was made by women to be used at the household level. This is not to suggest that the trade of pots did not take place, or that pots were not sometimes made specifically for trade, but the most common type of vessel represented in the assemblages comprising this study were utilitarian cooking and storage vessels. Crafting pottery was very likely a life-long task the learning of which began in childhood as the imitation of the activities of the adult women in community.

Dietler and Herbich (1994) make the very important point that variation in the social context of pottery production may be quite different than the social context of consumption. Sassaman and Rudophi (2001) focus on potential sources of variation in the social context of production, pointing how variation in kinship systems and marriage rules might affect the system in which pottery making is learned.

Minimally, the production sequence included selection and preparation of the materials including the clay body and tempering agents, forming the vessel, drying, and firing (Rye 1981). While the ceramic medium allows some variability, there are tolerance limits within each of these steps that, if violated, may result in vessel failure. By Middle Woodland times (ca. 200 B.C., and perhaps much earlier) the process of building effective cooking pots was firmly established in the repertoire of skills routinely practiced by women inhabiting coastal communities in Carolina. From ethnographic and archaeological data we can infer that in addition to child rearing a typical woman's repertoire of skills probably included basket and textile making (without benefit of drop-spindle or loom), hide preparation, foraging and food preparation, cultivation of food plants, pottery making, and the preparation of all the tools necessary to these crafts — essentially all the skills necessary for survival. As the knowledge necessary for success in these crafts was paramount to the knowledge necessary to survive, significant deviation from a successful tradition would likely have incurred risks. The same mimetic learning process that assured a certain consistency in replication of techniques that produced effective cooking pots (reducing risk), therefore, also resulted in the faithful replication of traits we recognize as "stylistic" traditions.

Assuming that women were the ceramic artisans of prehistoric communities, kinship systems may have structured the parameters of the transmission of pottery-making traditions and trade or exchange of pottery vessels by gifting. If groups reckoned descent matrilineally and practiced matrilocal residence (in fact, ethnohistoric data vaguely suggest this), we might expect a certain amount of conformity between regions of ceramic similarity and kin systems.

Additional permutations are presented in consideration of intergroup or intercommunity relations. It is not uncommon among ethnographic hunter-gatherers, for instance, for fictive kinship, or special friendship status to be conferred on members of unrelated groups. Membership composition in such foraging bands can be quite fluid. Generally, strict incest taboos promote exogamy. Disagreements within communities often results in group fissioning. Intertribal or intergroup disputes or warfare may result in the delineation of territorial boundaries. Any of these and many other social practices may have influenced the manner in which information regarding pottery making was transmitted.

Applying the Model to Develop Explanatory Ideas

From the foregoing review of factors potentially influencing pottery traditions, it can be concluded that some method is needed to simplify the model. The data provide one means of simplification. The classification of pottery series and types is based largely on variation in two classificatory dimensions, temper and surface treatment. The specific temporal and spatial patterns observed in these two dimensions could be interpreted in many different ways with respect to environmental, technological and social influences.

Temper

As has been shown, most Woodland period pottery series of coastal North Carolina have for many decades been defined primarily by differing types and proportions of aplastic additive or temper. Using this taxonomic approach, pottery classes are distinguished by traits that may reflect significant differences in methods of construction, vessel performance, or simply cultural preference of materials. The proposition that pottery classes defined by sets of functional traits may also be used to identify ethnic groups or community boundaries requires careful consideration. Change in functional characteristics may reflect evolving technology not related to ethnic or cultural identity. The differential transmission of functional traits may be subject to selective pressures as well as stochastic factors. Features of the selective environment (conditions that impinge on the construction and performance of a vessel) may affect the information passed from one potter to another. Consequently, functional change does not necessarily signal change in ethnic identity.

Environmental, technological or social influences, might be expected to result in differential distributions of pottery series, or temper types, in space and time. In general, aspects of pottery making related to environmental resources, such as clay qualities, might be expected to vary geographically within the study area as a function of the distribution of different clay types. Features of pottery technology that affect vessel performance, such as those related to the intensification of plant-food production and requisite cooking requirements, might be expected to characterize certain periods over the entire study area. If the characteristics of ceramic technology are influenced primarily by social practices they might be expected to vary independent of clay or temper resource areas, and technological changes that might affect cooking and storage procedures. Some hypotheses and expected patterns of artifact distribution may be proposed.

If variation in temper type reflects the need to improve the workability of the clay specific to certain areas (or perhaps, aplastic particles are included incidentally in clay sources which occur differentially across the region), then temper classes should have a high degree of spatial discrimination. Series should occur in a single area during a particular period with little or no co-occurring series (or temper traditions). Temper-regions or series-areas should conform to environmental features that provide only certain types of clay and temper. Temper series should not co-vary with ancillary archaeological data which define culture periods or phases and, therefore, should not seriate as lenticular curves, but should show a rapid increase and sustained presence in the series-area until the advent of historic depopulation.

If variation in temper type reflects the performance requirements of finished vessels, then it should be associated with temporal trends in other technological systems. Temporal patterns should be long-term, potentially punctuated, and should be correlated with relevant aspects of technology in specific ways. For example, late-period vessels required to do heavy service as cooking vessels should have temper characteristics that serve to mitigate the negative effects of thermal stress, while exhibiting characteristics of thermal conductivity as great or greater than differently tempered vessels typical of preceding culture periods. The inception and increase in frequency of a series in a given area should coincide with other significant shifts in technology such as the intensification of plant-food production and corn agriculture. Seriated curves should encompass long periods of time (several hundred years), but not necessarily exhibit lenticular shapes. The lower limits of the curve could be steeply increasing and the upper limits steeply decreasing in cases where one technological process is quickly replaced by another. This should be expected where there is a significant differential in effectiveness or efficiency between two technologies which serve the same purpose. If primarily technological, pottery series should not be spatially discriminate. Technological processes are expected to transcend geographic or cultural boundaries, to be expressed pan-regionally over long periods of time.

If variation in temper type is primarily stylistic it should not exhibit a strong correlation with the discontinuous features of the geophysical environment. Neither should it be strongly correlated with long-term temporal trends in other technological traditions. If stylistic, temper types should exhibit , lens-shaped curves when seriated and these trends should be of shorter duration than the those exhibited by technological traits. Some difference in duration of trends in stylistic traits could be expected on stochastic grounds, however. During the Early Woodland period when population was sparse, a few longer-term trends might be expected while in the Late Woodland period when population was relatively dense and territorial ranges circumscribed, several shorter-term trends would be expected. Similarly, spatial discrimination of stylistic trends should increase with time and the intensification of regionalization.

Surface Treatment

Surface treatment is often considered to be a decorative embellishment of the secondary process of building pots by the paddle-and-anvil technique (Rye 1981:69-70). In this technique the exterior of the vessel is struck with a paddle, backed on the interior by an anvil, while the clay is in a plastic state. This process anneals the coils, smoothes the surfaces, thins and shapes the vessel walls, removes air bubbles from the clay body, and aligns temper particles. If the paddle face is carved or wrapped with thong, net, cord, or fabric, distinctive impressions are left on the surface. If surface treatment is hypothesized as a neutral variant, certain considerations should be made. First, few actualistic studies have been conducted to determine how different surface treatments are produced and how their production relates to the structural mechanics of the building process (e.g., in shaping the vessel or annealing coils). Second, while techno-functional studies have shown that measurable, but slight, differences exist in the performance of vessels with different surface treatments (Schiffer 1990), no actualistic studies have investigated the potential differences in performance between the types of surface treatments represented in the sample used in this study (i.e., carved-paddle stamped, simple-stamped, net-impressed, cord-marked, or fabric-impressed). If surface treatment is actually a neutral variant, then its frequency should vary independently of environmental and technological traits (except that it can only occur on paddle-built vessels). In general, the frequency of types of surface treatment should exhibit greater variability over time and between geographic areas than either environmental or technological traits.

The Implications of Coastal Ceramic Patterns

In foregoing chapters, I have presented some of the theoretical factors that might be useful in explaining the patterns observed in the ceramic data. Turning again to the temporal and spatial patterns described in the foregoing chapters, I consider them as case studies of the manifestation of ceramic technological styles expressed through the Woodland era on the North Carolina coast.

The Length of Traditional Periods

We can use the foregoing discussions of the temporal and spatial contexts for each major ceramic series to explore broad scale patterns. Looking first at the temporal scale of pottery series, which we might think of as tempering traditions, we see that series typically occupy periods of 800 to 1400 years. Ignoring, for the moment, changes in vessel building technology and decorative finishes that might arise within the period occupied by a single temper series, it is useful to explore the implications of the long duration of tempering traditions. If we assume that a new generation of potters is learning the craft from their cognatic or affinal kin every 25 years or so, in a period of 800 to 1400 years we can expect there to be 30 to 50 generations of potters. To gain some appreciation of the magnitude of this phenomenon, our inclination is to compare our own experiences. We can think of many technological artifacts in use today that were also used 800 years ago: leather soled shoes, iron cook pots, clinker-built wooden boats, oars, paddles, and sails, bows and arrows. But in each case we would find that although the items are still made, the technology used to make them has changed substantially.

In fact, it seems that we have very little experiential basis on which to draw analogies to these enormously long trajectories of perpetuation of prehistoric technologies. Our modern culture prides itself on innovation; market factors dictate that new technologies are implemented regardless of the effectiveness of the old ones. We take innovation for granted as the rule rather than the exception. A visit to any automobile manufacturing web site might provide you with a motto like this one I found on the Saab web page, "Our company is characterized by originality, novel approaches and the power of innovation." But what about innovation or the apparent lack of innovation in prehistoric hunter-gatherer cultures? From a selectionistic perspective, 50 generations is more than ample time on an evolutionary scale for innovation to arise in human tool making technology to encounter selective pressures that would countenance its perpetuation or hurl it into extinction. But this is not what we see archaeologically. Of the five major temper types, fiber, sand/grit, crushed stone, crushed pottery, and crushed shell, we find that they emerge more or less sequentially, with each technology replicated for 30 to 50 generations. During the period that each series is replicated, we do not observe simultaneous alternative tempering techniques arising from innovations and declining like branches of an evolutionary tree. Certainly, there are times in which two temper series seem to coexist in a region, and there are even examples of technologies that seem to have very limited historical expression. The Currituck Beaker ceramic technology is a possible example

(Painter 1977), but in this case, so very little is known about this archaeological phenomena that it is impossible to be sure of its relevance.

Perhaps the performance-related properties of tempering materials are so specific that they constrain innovations such that within the narrow range of possibilities innovation does not arise very often. One problem with this notion is that there are many effective tempering techniques found globally that did not find expression during the Woodland era in the Middle Atlantic: hair, bark, dung, ash, mica, and crushed bone, for example. Another problem with the notion that the temper types observed have very specific performance-related criteria that constrain deviation in a functional sense is that several of the aplastic materials used as temper are, from a mechanical perspective, rather poor choices. Calcium carbonates such as limestone, marl and shell, if not pre-fired, are subject to lime spalling that can destroy or weaken a pot (Rice 1987:97–98; Rye 1981:32–33). Quartz grains also expand up to 2% at 573 °C (temperatures of 900 °C are commonly reached in open fires) when they undergo an inversion that changes atomic structure resulting in expansion (Rice 1987:94–96). This would seem to argue against the use of large quartz granules or smaller grains in high proportion, since such use would be apt to weaken the vessel. In the case of grog, however, the temper has expansion properties that are identical to the clay. Grog tempering emerges in the Middle Woodland period around A.D. 200 persists well into the Late Woodland (post A.D. 800), then declines and disappears. Following the decline in the use of grog, pottery in various areas of the coast is tempered with shell (the Townsend series) and quartz sand (the Cashie and possibly Adams Creek series). The fact that the trend in tempering in this case moves from a mechanically effective solution to a mechanically less effective solution seems to contradict the notion that it is mechanical properties that are constraining or driving changes in tempering.

This apparent contradiction in the culture-evolutionary logic of the development of ceramic technology is no contradiction at all if the standard view of technological evolution as increasingly sophisticated mechanical solutions to adaptive problems is abandoned (Pfaffenberger 1992). There is, however, an abiding sense that in the *chaine operatoire* of pottery making, tempering is a rather highly specified process; preparing and adding temper is not a casual matter, but follows a particular set of guidelines specifying the type, size, and proportion of aplastic agents added in certain proportions to the clay.

Although a wide variety of environmental and social conditions may play important roles in how long a particular technological style is practiced, we have arrived at a few conclusions that we can be relatively certain obtained in this prehistoric case. First, tempering traditions consisted of a set of behaviors or operations that in most instances were very specific, involving several steps that had to be replicated faithfully and in sequence in order to produce the product observed in the archaeological record. Second, these traditions typically persisted over several hundred years, with very few short-lived traditions emerging and declining simultaneously. Given such long periods of time, it is unlikely, although not impossible, that a particular temper style or pottery series represents the product of a single culture group that identified itself, or was identified by others, as a distinctive ethnic group. Neither is it likely that a single understanding of the mechanical properties of a particular technique, at whatever level grasped by the practitioners, was passed down over 30–50 generations of potters as an explanation for the specific set of behaviors resulting in the class of artifacts we characterize as a distinctive tempering style or pottery series.

The Size of Traditional Regions

The spatial scale on which ceramic styles are manifested in this study is similarly grand. In the brief review above we see that fiber-tempered Stallings occupied a region about 450 miles across, stretching along the coast from northern central Georgia to northern North Carolina. The Middle Woodland grog-tempering tradition (including the Hanover and Wilmington series) extended over a region of similar proportions. The Middle Woodland shell-tempered Mockley tradition encompassed the entire circum-Chesapeake region extending south to central North Carolina. This region is very nearly replicated in Late Woodland times by the Townsend series. Although these stylistic regions certainly changed over time, it is useful to begin by limiting our investigation to these broad periods, each examined synchronically as if it were a unit. Using this synchronic approach, we may compare the archaeological patterns with those observed among modern social systems described through ethnographic studies.

For example, Hitchcock and Bartram (1998) conducted ethnographic studies in the Western Sandveld Region of the Central District of Botswana on several occasions from 1975–1987. The study area encompassed about 28,000 km^2 (or about 10,800 mi^2). An area of approximately equivalent size, superimposed on the North Carolina Coastal Plain encompasses the 14 counties south of the Neuse River (Figure 7.1). Hitchcock and Bartram (1998:16) estimated the population in this during the period of study from 1978–1979 to be about 4000 individuals comprising 22 distinct ethnic groups. Although in terms of subsistence technology the inhabitants were characterized as "part-time hunter-gatherers," due to the importance of agro-pastoralism in the economy, information on ethnic diversity, community size and technological organization are instructive. Within this region there existed seven territorial ranges clustered around water sources to which rights were restricted. Although there are many obvious differences between the modern hunter-gatherers of the central Kalahari Desert and the prehistoric inhabitants of the coast of North Carolina, the analogy is made on this general level simply to suggest the potential degree of social and ethnic complexity that may have obtained in this region during any of the three periods of Woodland prehistory.

In a study of the distribution of material-culture items among groups living along the Sepik coast of New Guinea, Welsch and Terrell (1998) found similar patterns of complexity. The region studied included a 300-km (195-mi) section of the coastline. For comparison, the coastline of the 14-county (hachured) area depicted in Figure 7.1 is about 180 miles long. In the New Guinea case, social processes involving the exchange of objects led to the a distribution of material culture that was considerably larger and more extensive than the villages and "face-to-face- communities" (Welsch and Terrell 1998:50). Along this stretch of the coast were found "more than 60 mutually unintelligible languages belonging to perhaps 24 different language families and at least 6 unrelated phyla" (Welsch and Terrell 1998:68). A cluster of from one to ten hamlets or villages comprised a named community, each with its own identity and character that differed from others. Historically, each named community acted as a separate polity, having its own rituals, economy, leadership, and ways of doing things (Welsch and Terrell 1998:57). Social ties within each community tended to be organized around kinship and marriage, but outside the community, nearly every individual and family was linked to many other communities through hereditary ties of friendship. In this way, each adult had an extensive network of social relations along the coast linking him or her to as many as 25 other communities. The authors traced the distribution of several types of items including earthenware pots, outrigger canoes, shell rings, black palm bows and sedge baskets. In none of these cases did the observable distribution coincide with the boundaries of a single ethnic or ethnolinguistic group, nor did shared material culture delineate a single society, culture, or culture area. Three distinctive pottery-making traditions were observed: (1) paddle-and-anvil shaping from a lump, (2) coiling and smoothing, and (3) slab building. None of these were found to be associated exclusively with a single language family. Despite this complexity, the authors observed,

> a common pool of material culture and a common set of expectations about friendship, about how to interact with visitors from afar, and about how to maintain stable and enduring relations with people from other places. Inherited friendship patterns map out a vast

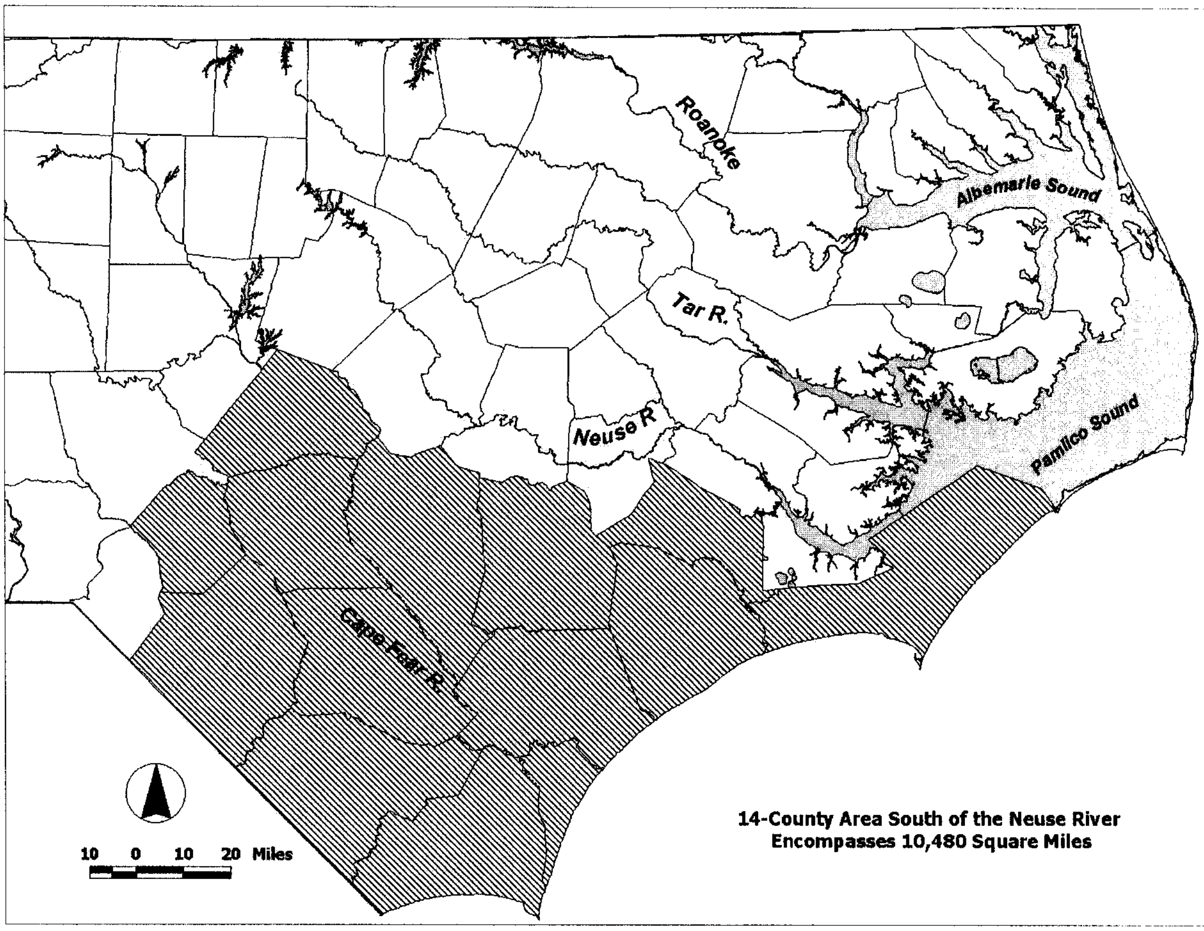

Figure 7.1. Area of the coast approximating that studied by Hitchcock and Bartram (1998).

> "community of culture" on the coast that cannot be parsed by language or other ready markers of corporate group membership or encompassing identities (Welsch and Terrell 1998:68).

Gosselain (1993) describes a somewhat different picture among potters inhabiting southern Cameroon between 1990 and 1992. Gosselain studied potters in an area roughly five and one half times larger than that shown in Figure 7.1 (an area more nearly equivalent to the size of the prehistoric pottery-style zones, or series regions, described above for the Atlantic coast). His informants consisted of 100 potters from 21 linguistic groups. In most cases, potters were members of small, politically independent, exogamous chiefdoms, but a wide variety of political and social structures and population densities were represented. In this case, "some stages of the manufacturing process, such as clay processing, firing, and postfiring, turn out to be poor cultural markers" (Gosselain 1998:92). The distribution of "fashioning" or vessel forming techniques, however, were found to generally coincide with linguistic boundaries, with some exceptions. Populations that were linguistically affiliated, and which shared a common history, tended to fashion their vessel in much the same way, or tended to use similar techniques that differed significantly from those of their nearest neighbors. In accounting for this pattern Gosselain (1998:101) noted these consistencies in the context in which vessel fashioning was learned,

> (1) learning mostly takes place within the nuclear or extended family, (2) the linguistic identity of the teacher generally coincides with that of her or his apprentices(s), and (3) post-learning movements imply short distances (most of them fall within a 50 km range) and rarely cross linguistic boundaries.

During the period from 1984 to 1995, MacEachern (1998) participated in studies of the regional archaeology and modern artifact styles in the Mandara Mountains of western Cameroon and eastern Nigeria. This study area encompassed approximately 3,600 mi^2, an area about one third the size of the 14-county hachured region depicted in Figure 7.1. Within this region, 23 ethnic groups have been identified (although MacEachern cautions that the identification of "ethnicity" has in many cases emerged as a matter of convenience for colonial governments, rather than by systematic anthropological definition). Moreover, MacEachern (1998:116) notes that,

> the group of primary self-identification and corporate organization among most northern Mandara communities...is the territorial patrilineage group, based upon the occupation of salient, defensibly physical features and using conceptions of autochthony, kinship, and ritual cycle to express political relationships between different segments. According to these criteria of self-identification and organization, hundreds of Mandara ethnic units exist...

In MacEachern's specific ethnoarchaeological research area, about 350 km^2 (130 mi^2) in size, 11 acephalous ethic groups divide themselves into about 70 territorial lineage groups. Illustrating the linguistic complexity of the region, MacEachern (1998:115) notes that in an area of 1,500 km^2, three language families are found. Three ceramic traditions were identified based on vessel shape, decoration such as incising, and type of handles. Within these broad types, varieties were identified based functional categories (water jars, cooking pots, beer jars, and ceremonial vessels) and on whether vessel bottoms were molded or coil built. Although in a few instances decorative techniques or vessel shapes seemed to conform to ethnic boundaries, MacEachern (1998:122) found that "regional variation at the level of the ceramic tradition and local variation at the community level appears to be far more important than is variation at the intermediate level of the ethnic group..."

The spread and perpetuation of the supra-ethnic ceramic tradition is explained in large part by patrilocal exogamous marriage rules (with respect to territorial lineage) together with a high incidence of divorce (3–10 per person is common) among female potters who are typically multilingual.

> Women who marry into a new community continue to make pots using techniques, morphologies, and decoration that they are familiar with for varying lengths of time, although they usually begin to imitate local pottery styles fairly quickly... [However, they] often have problems in learning to make new types of ceramics, and may not become proficient in producing vessels with correct proportions or in making local types of roulettes for decoration...Not surprisingly...there is a high degree of tolerance for production and use of pottery from different ceramic traditions within most communities...[and] it is difficult to see how ethnically specific suits of motor habits could develop without intentional and intensive training, which does not exist.

With regard to the social causes of ceramic stylistic regions, MacEachern's (1998:129) archaeological and ethnographic studies led him to the conclusion that:

> The people responsible for these regional traditions do not speak the same language; they belong to no self-conscious corporate unit; they encompass a host of different social, cultural, and political relationships. The nucleus of norms and behaviors that lends coherence and stability to such traditions is general and ill-defined. Such a core might encompass variously shared beliefs about exogamy and divorce, autochthony, magical protection, the importance of beer in ritual, and relations with the ancestors, but studies of such large-scale cultural distributions are lacking in Africa and elsewhere.

Obviously, these four ethnographic examples are not expected to serve as direct analogies for the Woodland hunter-gatherer bands or coastal villages of North Carolina. Nevertheless, they provide concrete examples that bring to our awareness the possibilities of ethnic and linguistic complexity that may have existed within any of the ceramic stylistic regions described for coastal Atlantic in any Woodland period. The ceramic stylistic regions described for the prehistoric Atlantic coast are typically quite large, almost certainly encompassing many ethnic groups and languages, as well as various differences including smaller social groupings such as lineage territories, varying social structures such as marriage and kinship rules, and customs regarding extralocal hereditary friendships, divorce, and magic. Despite the likelihood of such diversity in social structure and cultural custom in any prehistoric stylistic region, the technical choices made by potters can be determined through systematic analyses of the products of their craft and a potter's mode of obtaining technical knowledge and the manner in which that knowledge was spread or diffused can be modeled through ethnographic analogy.

The Independence of Temper and Surface Treatment

One of the most obvious characteristics of the pottery analyzed for this or any study of a pottery database of similar size and duration is that temporal trends and spatial distributions of (i.e., change in) tempering techniques and decorative modes of finishing vessel surfaces are independent of one another. The sequence of temper and surface treatment types described for the Sandhills region and the lower Cape Fear are examples. Perhaps because this observation is so obvious, or perhaps because of the force of the classificatory habit of dealing with these attribute categories in combination as diagnostic of particular types, archaeologists have seldom dealt with this issue explicitly. These two techniques represent distinctive steps in the *chaîne opératoire*: procuring and processing raw materials, and fashioning that portion of the vessel that will be visible to all who use it. The independence of the attributes representing these two techniques, however, is indicative not only of differences in technical choices and knowledge, but also belies differences in the manner in which the practices were first learned, habituated and, perhaps, understood.

Gosselain (1998:94) would very likely assign these two techniques to different phases in the learning process whereby pottery manufacturing knowledge is transferred and practices habituated. In the first phase, an apprentice assists his or her teacher with procuring, carrying and processing clay and tempering materials, preparing for the firing process and treating vessels after firing. This participation allows the learning of materials, transformation processes, and any taboos associated with the craft. The second phase consists of a formal relationship between teacher and student characterized by serious motivation. As the problems of manipulating the clay to form the desired shape arise, the apprentice is directed by the teacher, who works side by side, "correcting gestures, rectifying errors, and even taking her or his hands into her or his own, until the apprentice is able to work alone" (Gosselain 1998:94). At the end of the apprenticeship, which may last as little as two months or as long as a year, all gestures and postures related to what Gosselain calls the "fashioning process" will have become inculcated as motor habits. As a result of these differences in training, in the event a potter moves to a new village, they may change procedures for processing raw material and firing pots to share those of the new village, but fashioning techniques, habituated motor skills, will not be easily altered.

In fact, however, the archaeological record as represented in this analysis does not indicate radical differences in the size of tempering regions as opposed to surface-treatment regions. Neither do the data indicate significant differences in the periodicity of tempering techniques as opposed to surface treatments. In part, this may be due to the fact that different surface treatment styles are created primarily by differences in the nature of the paddle surfaces, not the manner in which the vessel was paddled. The constraints attending the selection of surface textures of paddles represents a different stage or step in the *chaîne opératoire*. This step, I believe, has more to do with a potter's understanding of the crafting of a vessel's appearance as metaphorically associated with other important crafts such as basketry, netting, and textile weaving (Ortman 2000; Tilley 1999). As baskets, nets and textiles are not only tools of survival but symbols of affluence in hunter-gather societies, the transposition of this visual symbol into the craft of pottery making by stamping with paddles that create a basket-like appearance on the exterior of a pot is not so unusual. This transposition may also have influenced the manner in which vessels were made. Several sherds were found in the Haag collection that appear to be from unfinished vessels made with coils of very small diameter (1 cm or less). Several basal fragments revealed the use of similarly small coils, indicating that vessel bases were commonly formed with coils rather than being drawn from a lump or a molded with a slab. This method of building the container by encircling with small coils beginning from the center of the base is a technique that would also have been used in basket weaving. This process represents not simply a transposition of technical practices from one medium to another, but a metaphorical connection among crafts at several levels in the *chaîne opératoire*. The crafting of ceramic containers that metaphorically express textile and basket-making crafts draws these practices together into a sphere of related activities that create functional artifacts that nurture the health and well being family members, while also reflecting the self-assuredness, accomplishment, and participatory engagement of the makers — thus linking artisans across ethnic and linguistic boundaries into transcultural communities of practice.

One of the most interesting challenges facing anthropological archaeology is the exploration of transcultural communities of practice with the goal of explaining the nature (source and mechanism) of the linkage (practices held in common) among ethnic and linguistic groups that are widely dispersed across space, through time, and along the continuum of cultural variation. Though the conceptual pendulum has in recent years swung away from the nomothetic construction of formulaic prescriptions designed to expose cultural processes as derived from environmental contexts, there is an underlying foundation to this school of thought to which all modern theorists must acquiesce. Human culture is the product of biological evolution, and the mechanics of the process are manifested in cultural practices that we may observe today and witness through the archaeological record. While most anthropologists would acknowledge the truth of this statement, far fewer recognize its importance. Perhaps, as Cosmides and Tooby (1987:276) point out, this is due to "a widespread tendency to overlook a crucial link in the causal chain from evolution to behavior: the level of innate psychological mechanisms, described as information processing systems...It is these mechanisms that evolve over generations; within any single generation it is these mechanisms that, in interaction with environmental input, generate manifest behavior. The causal link between evolution and behavior is made through the psychological mechanism."

The Nature of Boundaries

What is it then that we are witnessing when we observe the boundaries of spatial distributions of tempering or surface-treatment styles, or the combinations of these traits as pottery types? Although it is possible that in the Late Woodland certain pottery series identified in this study represent distinctive ethnic and linguistic groups, the probability that this is true for all of the pottery series identified is quite low. So, although it would be simple and satisfying to imagine the Hanover potters standing on the south bank of the Neuse River jeering, in an unintelligible language, at the Townsend potters on the north bank, this is an inaccurate representation of the archaeological record and an inappropriate portrayal of past events. Almost certainly, many ethnic and linguistic subgroups simultaneously inhabited the pottery regions represented by the distributions of ceramic series described in this study. Despite the fact that the ceramic technological styles defined in Chapter One may represent poly-ethnic contexts, at some level, ceramic technological styles are expressed over areas with shared cultural histories. The boundaries of these areas, evident in the archaeological record, mark the limits of the region in which the tradition was practiced.

There are several factors that may have influenced distributions and boundary conditions. Clay and temper types found only in certain areas most certainly influenced distributions and boundaries to some degree. Fiber-tempered Stallings ware is not found far north of the northern limits of Spanish moss. Marl-tempered Hamp's Landing ware is not often found outside of the region in which marl formations are exposed by surface erosion. Oyster shells, on the other hand, can be found in every part of the coast and yet the shell-tempered Townsend ware exhibits an abrupt boundary near the middle of the North Carolina coast. In this case, however, the southern boundary of the Townsend distribution falls very near the ecological boundary between the Sea Island and Embayed Sections of the coast. To the north of this boundary lie the broad sounds with their rich estuarine resources. To the south, embayments are relatively small and the estuarine ecotone between fresh-water swamps and the Atlantic coast is narrow. In this case, it would seem that the economic activities practiced by those who made shell-tempered pottery were so focused on estuarine resources that they chose to make their habitations along the sounds of the northern coast.

Demographic factors may also have influenced distributions and boundaries. In regions where resources were scarce or widely dispersed, carrying capacity would be expected to be low. Low population density and high residential mobility in such regions would promote the diffusion of ceramic technological information and practices through a widely extended network of social alliances developed as a strategy to avoid risk. Conversely, in regions of high resource density the capacity for carrying larger or more dense populations might be expressed as smaller regions of stylistic tradition conforming to territorial boundaries. Such conditions might arise not only in regions rich in natural resources, such as the embayments on the northern coast, but also as a result of food production. The conditions appropriate for higher population expansion are manifested in the rich estuarine sounds and through the practice of corn agriculture evident at coastal sites in the central and northern areas. The data in this study do, in fact, suggest a firmer boundary for the distribution of Townsend ware than for most earlier pottery series, with exception of those series whose distribution appears to be dependent on the availability of tempering materials (e.g, crushed limestone or granitic rock).

Conclusion

As has been cogently argued elsewhere, pots, as tools, evidence the evolution of human adaptive behavior. But whereas the tendency has sometimes been to seek direct relationships between the performance of technologies and the selection of those technological styles, it is not the technology, but the practice and, moreover, the psychological mechanisms behind the practice, that mediate the selective process. It is abundantly evident from the richly textured variegation of cultural solutions to the problem of constructing ceramic cooking vessels, that there are innumerable possible solutions. It is also quite clear that among the solutions can be found significant differences in effectiveness, measurable in terms of mechanical performance, e.g., between the thick-walled, flat-bottomed vessels of the Early Woodland and the thin-walled, conical-based vessels of the Middle and Late Woodland period. But much more common are variations in technological styles, the basis of pottery class definitions, that *do not* appear to represent significant differences in mechanical performance. This sort of variation has been called "isochrestic," referring to the apparent functional equivalency of solutions, and its source attributed to historical custom (Sackett 1977, 1982, 1985b). Although the apparent circularity of this interpretation (i.e., culture causes culture), and the inappropriateness of assuming functional isomorphism without adequate testing has been ardently argued (Binford 1989), perhaps the greatest deficit of this approach is that it fails to address the problem of the source of variation. As Lemonnier (1989:160) notes, "to attribute the distribution [of technological styles] to historical factors...is a way of sending the technological or general social logic of the phenomena observed back to an inaccessible past."

Although it is often wrongly argued that Neo-Darwinists view social agency as "passive and culturally meaningless" (e.g., Gosselain 1998:81), it is true that in their desire to segregate the source of variation from the selective processes acting on that variation, social agency and innovation have sometimes been viewed as essentially irrelevant to the process of selection and ultimately, to the patterning we see in the archaeological record. This view fails to take into consideration the fact that the source of technological variation (i.e., innovation) is a non-random product of the evolutionary process; human cognition is an evolved mechanism that is highly selective in the sense that, at any given time of observation, cognitive processes are prefigured or programmed in innumerable ways by millions of years of evolution.

> Because they leave the causal chain by which evolution influenced behavior vague and unspecified, such attempts have sown the widespread confusion that hypotheses about economics, culture, consciousness, learning, rationality, social forces, etc., constitute distinct alternative hypotheses to evolutionary or "biological" explanations. Instead, such hypotheses are more properly viewed as proposals about the structure of evolved cognitive programs and the kinds of information they take as input. (Cosmides and Tooby 1987:303)

It is important therefore to attempt to determine how an adaptive problem would have manifested itself in prehistory and to develop a theory of information processing that integrates the model of the adaptive problem with as much knowledge as possible regarding relevant prehistoric conditions. The theory may then be used to identify design features that any cognitive program capable of solving the problem must have, and to develop models of cognitive programs that might have evolved to solve the adaptive problem. Alternative candidate models may be eliminated by experimentation and field observation, and ultimately models may be compared against modern behavior patterns (Cosmides and Tooby 1987:302–303).

By approximating to some degree the process prescribed by Cosmides and Tooby (1987), I have attempted to properly frame the problem of spatial and temporal patterning in ceramic technological styles in the context of the prehistoric adaptive environment, both ecological and social, on the coast of North Carolina. Models of learning, practice, and the transmission of technological styles have been proposed and evaluated by exploring cognitive issues and examining steps in the production process. Ethnographic observations have allowed some refinement of the models. On balance, given the scale at which we view the manifest results of evolutionary processes, we can at least have reasnable confidence that the ceramic types, composed of independently varying traits, reflect communities of practice likely encompassing multiple ethnic and linguistic groups. Practicing technological styles that metaphorically expressed related crafts had the effect of drawing practitioners together into a sphere of related activities that nurtured and protected health and well being while also reflecting the self-assuredness, accomplishment, and participatory engagement of potters, thus linking artisans across ethnic and linguistic boundaries in transcultural communities of practice.

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APPENDIX A
NC COASTAL POTTERY ATTRIBUTE CODE

SITE IDENTIFICATION NUMBERS

STATE (1-2)

COUNTY (3-4)

SITE NUMBER (5-8)

SPECIMEN IDENTIFICATION NUMBERS

ACCESSION NUMBER (10-13)

SPECIMEN CLASS (14)

SPECIMEN NUMBER (15-18)

SPECIMEN SUBNUMBER (19)

(Accession number format follows NC Office of State Archaeology protocol. Unique numbers are assigned at the site level and by attribute classes described in this key.)

COUNT

SIZE

1 Small (<2 cm)

2 Medium (>2 and <4 cm)

3 Large (>4 and <8cm)

4 Very Large (>8cm)

(Size was determined by placing the sherd over a cirular tmeplate. Note that theses four classes combine some Wentworth size classes for efficiency.)

VESSEL PORTION

10 Rim

11 Jar (straight or everted)

12 Bowl (inverted)

20 Body

30 Base

31 Conical

32 Flat

TEMPER TYPE

000 None (clay paste with no added temper)

100 Quartzose aggregate

110 Medium (.25–.5 mm) (the majority of the temper is <= .5 mm; sand less than .25 mm in diameter assumed to be too small to be temper)

120 Coarse (.5–1 mm) (the majority of the temper is .5–1mm)

130 Very Coarse (1–2 mm) (at least 50% of the temper is coarse or very coarse sand)

140 Granule (2–4mm) (at least five granule-size grains in microscope field of view)

150 Pebble (4–64mm) (at least five pebble-size grains in microscope field of view

151 Rounded (almost spherical)

152 Subrounded (angular edges are well rounded)

153 Subangular (angular edges show some rounding)

154 Angular (angular edges show no rounding at all)

160 Sand/Granules (all subrounded or subangular)

170 Sand/Marl (fine sand, with blocky voids observed)

180 Sand/Marl (medium and/or coarse sand with blocky voids)

190 Sand/Shell (fine, medium or coarse sand with platey voids or shell)

200 Clay (distinguished as lumps, different in color and texture than matrix, but not clearly recognizable as crushed sherds)

210 Clay/Marl

220 Clay/Granule

230 Clay/Sand (medium sand with occasional coarse and granule sizes)

240 Clay/Shell

300 Grog (dinstinguished from matrix by color, texture, angularity and partile alignment)

310 Grog with medium sand

311 rounded grains

312 subrounded grains

313 subangular grains

314 angular grains

320 Grog with coarse sand

321 etc.

330 Grog with very coarse sand

340 Grag with granule

400 Calcite

410 Fine Shell (five largest pieces <1 mm)

420 Medium Shell (five largest peices >1 and <2 mm)

430 Coarse Shell (five largest peices > 2.0 mm)

440 Marl/Limestone

500 Fiber (voids left from the oxidation of Spanish moss)

600 Soapstone

610 Medium (.5 mm)

620 Coarse (.5<x<1mm)

630 Very Coarse (1<x<2 mm)

640 Granule (2<x<4mm)

650 Pebble (4<x<64mm)

611 rounded grains

612 subrounded grains

613 subangular grains

614 angular grains

700 Feldspar

800 Granite

900 Sandstone

TEMPER PROPORTION

0 None

1 Light (<25%)

2 Moderate (25 50%)

3 Heavy (>50%)

EXTERIOR SURFACE TREATMENT

000 None

100 Smoothed

- 110 Smoothed-over Stamped
  - 111 smoothed-over cord-marked
  - 112 smoothed over fabric-impressed
  - 113 smoothed-over simple-stamped
  - 114 smoothed-over net impressed
  - 115 smothed-over scraped (shell-tooled)

200 Stamped

- 210 simple stamped
  - 211 broad land (>2 mm)
  - 212 narrow land (<2 mm)
- 220 check stamped (square)
- 230 check stamped (linear)
- 240 complicated stamped (rectilinear)
- 250 complicated stamped (curvilinear)

300 Net Impressed

- 310 knotted
  - 311 open weave (space >5 mm)
  - 312 closed weave (space < 5 mm)
- 320 looped
  - 321 open weave (space >5 mm)

322 closed weave (space < 5 mm)

330 twined

331 open weave (space >5 mm)

332 closed weave (space >5 mm)

400 Cord Marked

410 parallel

411 S-twist

412 Z-twist

420 perpendicular/oblique

421 S-twist

422 Z-twist

500 Paddle-edge Stamped (also called cord-wrapped stick)

501 S-twist

502 Z-twist

600 Fabric Impressed

610 coarse weft-faced (weft diameter > 2 mm, interwoven over non-cordage warp)

620 medium weft-faced (weft diameter 1– 2 mm, interwoven over non-cordage warp)

630 fine weft-faced (weft diameter < 1 mm, interwoven over non-cordage warp)

640 flexible warp (coarse–medium weft-faced, interwoven over cordage or fiber warp)

650 spaced weft, over-stamped (coarse–fine weft, spaced on non-cordage warp)

800 Burnished

900 Punctate

910 zone linear (reed or awl, stab-and-drag, or stab-and-lift around neck)

920 random (straw bundle stab-and-drag, or possibly pine cone roulette)

930 other (fingernail, gastropod)

1000 Eroded

1100 eroded stamped

1110 eroded cord-marked

1120 eroded fabric-impressed

1130 eroded net-impressed

1140 eroded paddle-edge marked

1150 eroded check-stamped

2000 Corn-cob impressed (corn cob rouletted)

2100 Brushed

3000 Corugated (unanneiled, or partially anneiled coils)

INTERIOR SURFACE TREATMENT

1 Smoothed (wiped with fingers)

2 Scraped (scraped with shell or similar edged tool)

3 Brushed (brushed with bristled brush)

4 Burnished (polish developed on leather-hard surface with smooth stone)

5 Cord Marked (paddle used as anvil)

6 Fabric Impressed (paddle used as anvil)

7 Floated (repeatedly wiped with wet fingers to develop surface film with slip-like appearance, covering temper particles)

8 Paddle-edge (also called cord-wrapped stick)

9 Net-impressed

THICKNESS

0 Very Thin (<4 mm)

1 Thin (4–6 mm)

2 Medium (6–8 mm)

3 Thick (8–10 mm)

4 Very Thick (>10 mm)

RIM FORM

1 Straight

2 Everted

3 Inverted

4 Folded

5 Carinated

6 Recurved (constricted neck, everted lip)

LIP FORM

1 Rounded

2 Flattened (no textile or cord impressions)

3 Paddle impressed (flattened with textile or cord-wrapped paddle)

4 Pointed

5 Notched

6 Rolled

EXTERIOR SURFACE DECORATION

10 Incised

- 11 Bold
- 12 Fine

20 Punctate

- 21 Reed
- 22 Fingernail

30 Cord Impressed

- 31 Horizontal

FIRST DECORATION LOCATION

1 Lip

2 Interior Rim

3 Exterior Rim

4 Neck

5 Shoulder

6 Body

SECOND DECORATION LOCATION

1 Lip

2 Interior Rim

3 Exterior Rim

4 Neck

5 Shoulder

6 Body

TYPES

010 Stallings-related (fiber often included with medium sand)

011 Plain (smoothed)

012 Punctate (any variety)

020 Croaker Landing (grog/granule, grog/shell, clay/granule, clay/shell)

021 Cord-marked (any variety)

022 Net-impressed (any variety)

023 Plain (smoothed)

030 Marcey Creek (soapstone temper, any surface treatment)

200 Thom's Creek (medium sand in low proportion, typically thin sherds of yellowish color)

210 punctate

211 zone linear

213 other (fingernail, gastropod)

220 simple-stamped (any variety)

230 plain

300 Alendale (medium sand)

310 punctate (random, straw-bundle stab-and-drag or pine cone rouletted)

400 Deptford (coarse and very coarse sand)

- 410 check-stamped
- 420 linear check-stamped

500 New River (medium, coarse or very coarse sand temper)

- 510 fabric Impressed
  - 514 flexible warp
  - 515 spaced weft, over-stamped
- 520 Cord Marked
  - 521 parallel
  - 522 perpendicular
- 530 Net Impressed
  - 531 knotted
  - 532 looped
  - 533 twined
- 540 Paddle-edge Marked
- 550 Plain (smoothed)
- 560 Simple Stamped

600 Hamp's Landing (marl or marl-sand temper)

- 610 Fabric-impressed
- 620 Cord-marked
- 630 Simple-stamped
  - 631 broad land
  - 632 narrow land
- 650 Plain

700 Hanover (clay or grog temper)

- 710 fabric-impressed
  - 711 coarse weft
  - 712 medium weft
  - 713 fine weft

714 plain-twined textile

715 smoohted or eroded

720 cord-marked

721 parallel

722 perpendicular

725 smoohted or eroded

730 net-impressed

735 smoothed or eroded

750 plain

800 Cape Fear (fine, medium, coarse or very coarse sand)

810 fabric-impressed

811 coarse weft

812 medium weft

813 fine weft

815 smoohted or eroded

820 cord-marked

821 parallel

822 perpendicular

825 smoohted or eroded

830 net-impressed

835 smoothed or eroded

850 plain

900 Mount Pleasant (granule temper, also granule with sand of any size)

910 fabric-impressed

911 coarse weft

912 medium weft

913 fine weft

914 plain twined or interwoven with small, flexible warp

915 smoohted or eroded

920 cord-marked

921 parallel
922 perpendicular
925 smoohted or eroded
930 net-impressed
931 knotted, open weave
932 knotted, closed weave (knot roughened)
933 looped
935 smoothed or eroded
950 plain

1000 Mockley (coarse shell)
1010 net-impressed
1020 cord-marked

1100 Colington (coarse and medium shell)
1120 simple-stamped
1121 broad land
1122 narrow land
1133 smoothed simple-stamped

1200 Townsend (medium and fine shell)
1210 fabric-impressed
1211 coarse weft
1212 medium weft
1213 fine weft
1215 smoohted or eroded
1220 plain

1400 Brunswick (fine sand/ or no temper; burnished)

1500 Swansboro (fine shell temper; burnished)

1700 Yadkin (crushed quartz)