TITLE

Exploring the Materiality of Late Seventeenth- and Early Eighteenth-Century Lowcountry Colonoware through Practice-Based Analysis

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ABSTRACT

Colonoware—a low-fired earthenware pottery made by enslaved African and Indigenous potters across the Lowcountry region of South Carolina—is a clear material consequence of colonial identity formation. This process certainly involved African and Indigenous groups, but it also drew in English, French, and Spanish colonial powers, and the various economic, political, and social networks that bound them together. While scholars have recently offered nuanced and inclusive theoretical frameworks to help situate colonoware production within the process of colonial identity formation, thus far, these studies have lacked analytical methods that operationalize the link between potting practices and colonial identity formation through the analysis of archaeological data. In this paper, we present our attempt to forge the link between practice and data by analyzing a number of attributes that illustrate various choices potters made while constructing vessels. In particular, we are interested in comparing the methods of pottery manufacturing employed by local Indigenous potters in the "Lowcountry" region around Charleston, South Carolina prior to European colonization to the methods used by resident potters at early colonial settlements in the late 17th and early 18th centuries.

Introduction

In a recent paper on colonoware, Cobb and DePratter (2012:452) make the case for examining this low-fired earthenware as an example of the "'paradox of globalization'—the simultaneous unfolding of heterogeneity and homogeneity throughout the world" as a result of colonialism. They, like Singleton and Bograd (2000) before them, argue for a shift away from a search for the ethnic identity of the potter (the African vs. Indigenous question). Instead, they recast colonoware as a materialization of the much broader process of colonial identity formation, which involved Africans and Indigenous groups, but also English, French, and Spanish colonial powers, and the various economic, political, and social networks that bound them together. Although these authors' nuanced and inclusive theoretical frameworks of identity formation are indeed a good thing, thus far, research has lacked analytical methods that operationalize the link between potting practices and colonial identity formation through the analysis of archaeological data. In this paper, we present our attempt to forge the link between practice and data by analyzing a number of attributes that illustrate various choices potters made while constructing vessels. In particular, we are interested in comparing the methods of pottery manufacturing employed by local Indigenous potters in the "Lowcountry" region around Charleston, South Carolina prior to European colonization to the methods used by resident potters at early colonial settlements in the late 17th and early 18th centuries.

Using study samples from seven sites around Charleston, South Carolina, we find that there is a clear distinction in potting traditions between assemblages from precolonial sites and colonial sites in the region (Figure 1). The precolonial tradition was marked by homogeneity in practice and was based on coarse-tempered clays, with assemblages consisting of coil-made, carved-wooden-paddle stamped jars and plain and burnished bowls made with a paddle-and-anvil technique. The colonial tradition was much more diverse, exhibiting some intra-site consistency in choice of temper size, but having greater intra- and inter-site variability in manufacturing technique (for example, coil or mass modelled, paddled or hand formed), and also vessel form, and surface treatments. We conclude by offering some explanations linking these observed differences in the cultural practice of potting to the emergent historical conditions of the early colonial landscape.

Colonoware Typologies and an Analytical Focus on Ethnicity

Since it was first identified, colonoware has been an analytical category utilized to identify ethnic identity, beginning with Noël Hume's (1962) study of what he calls "Colono-Indian ware" at sites in Virginia. Although archaeologists associate this pottery with Indigenous groups in Virginia and parts of Maryland (Baker 1972; Deetz 1999; Mouer et al. 1999), excavations in South Carolina and the surrounding Lowcountry increasingly reveal colonoware's strong connections to plantations and sites populated by enslaved Africans and African Americans, in addition to Indigenous groups (South 1971, 1974; Polhemus 1977; Anthony 1979; Drucker and Anthony 1979; Lees and Kimery-Lees 1979; Ferguson 1980; Wheaton, Friedlander, and Garrow 1983; Zierden, Drucker, and Calhoun 1986; Ferguson 1992). Interestingly, despite the wide variation in colonoware's physical attributes and presumed ethnic origin—especially between Virginia and South Carolina—one of the primary common definitions of this ware type is, to varying extents, a mimicry of European forms and styles (Baker 1972; Lees and Kimery-Lees 1979; Deetz 1999). For example, early studies of pottery produced by the Catawba in the 18th century focus on the intention of these vessels for European markets (Harrington 1908; Fewkes 1944; Baker 1972).

Once archaeologists discovered that both free and enslaved Indigenous people as well as enslaved Africans produced colonoware in the colonial Lowcountry, they began searching for ways to identify ethnicity-based pottery traits—attributes that materialized their ideas of what African and Indigenous potting traditions would have produced. As with most ceramic analytical methodologies, this took the form of pottery typologies. Sherds with similar physical attributes were grouped together into types, and differences between those types were thought to derive from differences in function and ethnic associations (Drucker and Anthony 1979; Wheaton, Friedlander, Garrow 1983; Zierden, Drucker, Anthony 1986). The most prominently used colonoware types, described here, are defined by physical attributes such as temper coarseness, paste structure (e.g., laminar), and surface treatment. Ronald W. Anthony (1986:Table 7-12; 2009:86-87) summarizes the "Yaughan" type as having a coarse, low-fired, laminar paste formed by hand-modeling, with "crudely smoothed" walls that are uneven in thickness. He (2009:86) identifies this type as a "village" ware, made by enslaved Africans on plantation sites in the Lowcountry. Anthony (2009:87-88) describes the "Lesesne" type as having a relatively fine and laminar paste that is "virtually temperless" with thin, even vessel walls and burnished surfaces. He (2002, 2009, 2016) argues that Lesesne colonoware is a market ware produced by enslaved Africans, recovered from most urban contexts in downtown Charleston as well as planter housing on surrounding plantations. Finally, Anthony defines a type he calls "Stobo," which is characterized by a non-laminar and highly reduced paste, very coarse tempering, and often smoothed, but not burnished, surfaces. Stobo is also believed to have been a market ware, but in this case produced by local Indigenous groups beginning in the 18th century (Anthony 2016). Anthony (2016:44) argues that the Stobo type can be used to research the presence of Indigenous groups who settled in the Lowcountry after the Yamasee War and their involvement in local trade (see also Nyman 2011 and Steen 2012).

This pottery typology has proven to be quite a useful heuristic method for making sense of variability in colonoware assemblages. Indeed, the three types described above have been utilized in a number of formative studies that have contributed much to our understanding of the social and economic “lives” of colonoware (Joseph 2004; Isenbarger 2006; Brilliant 2011; Isenbarger 2012; Anthony 2016; Seeber 2020; see Anthony 2009 for major type descriptions). We believe, however, that there are two aspects of this analytical schema that can be improved. First, as has been recognized by proponents of colonoware typology, there is a tendency to associate these types with particular ethnic identities a priori (Brilliant 2011:89; Anthony 2016:44). This can lead to the problem of circular reasoning when an analyst seeks to demonstrate the existence of ethnicity-related differences in pottery by comparing types that have been defined by presumed (rather than demonstrated) ethnicity-related differences in pottery manufacturing. Second, analytical types are, by definition, discrete units; however, variability in attributes like temper size, the primary determinate of the type Stobo, is continuous. Types thus defined by continuous variation suffer from the inability to draw a definitive line to separate one type from another – in the case of Stobo, between “fine” and “coarse” tempering (Lyman et al. 1997:4-8). The resulting problems of not having a firm dividing line separating types include a lack of replicability across analysts, as well as the fact that a large number of “indeterminate” sherds fall in between the types, leaving those types to be populated only by those sherds at the extreme ends of the attribute continuum.

Scholars have also attempted to define ethnicity by observed iconography on colonoware vessels. “X”-marked pots recovered from waterways and plantations around Charleston, South Carolina are thought to be connected to the Bakongo cosmogram, a religious symbol in West African ideology that represents the boundaries between the worlds of the living and dead

(Ferguson 1992, 1999; Agha and Isenbarger 2011; Ewen 2011; Fennell 2011; Ferguson 2011; Gundaker 2011; Joseph 2011; Agha et al. 2012). These markings, and others, are also hypothesized to be a type of signature, similar to that of an enslaved African potter from Edgefield named Dave (Joseph 2007; Agha and Isenbarger 2011; Joseph 2011). In addition, Ferguson (Ferguson 2007; Ferguson and Goldberg 2019) proposes that these vessels were used for medicinal and spiritual purposes, relating them to the function of similar vessels in West Africa. All of these discussions regard the marked "X" as an indicator of the potter being African in heritage. Others caution against the deterministic nature of these associations and argue that they ignore the role Indigenous groups played in colonoware production, trade, and use (Crane 1993; Espenshade 2007; Steen 2011). In addition to these critiques, the reliance on this iconographic evidence is problematic because it only addresses a small percentage of the colonoware sherds recovered from archaeological sites.

In recent decades, archaeologists have critiqued these studies on marked vessels as searching for what Herskovits (1958) calls "Africanisms," or physical evidence of supposed direct African heritage (Crane 1993; Singleton and Bograd 2000; Hauser and DeCorse 2003; Steen and Barnes 2010; Agha et al. 2012; Cobb and DePratter 2012; Hauser 2017). Singleton (1999:8) argues that a focus on Africanisms ignores the complexities of the colonial period, subsequent cultural interactions, and the mutability of ethnic markers and their meanings (see also Espenshade and Kennedy 2002; Hauser and DeCorse 2003; Steen and Barnes 2010; Isenbarger and Agha 2015). In light of these issues, recent colonoware research attempts to navigate the benefits of applying ceramic typologies and considering precolonial pottery traditions, while still recognizing the complexity and fluidity of colonoware use and meaning in the colonial period (Agha, Isenbarger, and Philips 2012; Joseph 2016; Ferguson and Goldberg 2019; Sattes et al. 2020; Seeber 2020).

New Directions in Colonoware Research

In 2000, Singleton and Bograd (2000) published a chapter suggesting new directions for colonoware research in order to better understand the lives of those producing and using this pottery. They (2000:18) advocate for focusing on the "colono" in colonoware, examining the practice of making this pottery and its role in the formation of colonial identities. The authors (2000:8) also discuss the problems with typologies creating discrete groups when, in reality, Africans and Indigenous groups may not have themselves been discrete during these times. Instead, the authors (2000:18) push for research that analyzes variability in colonoware use, especially in food production, and how this suggests significant interactions between Africans, Indigenous peoples, and Europeans. With this shift, archaeologists can more accurately emphasize the changes and adaptations of these communities and their active roles in the creating the colonial landscape around them.

With their 2012 paper, Cobb and DePratter (2012) provide a response to Singleton's and Bograd's discussion, arguing for the application of multi-sited theory and practice of colonoware to examine the colonial cultural interactions of Indigenous communities in the Savannah River Valley. They (2012:447) advocate for a move away from identifying ethnicity and the accompanying power struggle of identity politics. Instead, Cobb and DePratter (2012:446) examine potting practices like the adoption of burnishing and the mimicry of European forms as products of the mutual paradigm of colonialism, which impacted every historical site regardless of other intra-site variations. Building on Singleton's and Bograd's (2000) call for examining practice, the authors successfully lay out the framework of using multiple sites impacted by the colonial system and discussing the functional influences of colonoware between these communities.

The arguments of Singleton and Bograd (2000) as well as Cobb and DePratter (2012) highlight the need for researching colonoware within a theoretical framework developed around the materiality of colonial identities. This framework should appreciate the complexity of colonialism and allow for the possibility of seemingly contradictory motivations in the actions of individuals and communities. Colonoware production and use need to be viewed from multiple perspectives: as a confrontation of colonialism through production; as a labor requirement of enslavement; as the development of a new foodway; and as a negotiation between Africans, Indigenous groups, and Europeans. Building on Cobb's and DePratter's framework (2012), colonoware studies should examine multi-sited assemblages indicative of this pottery-making tradition. Finally, this framework requires a shift in methodology from techniques that serve typology to techniques that operationalize the relationship between objects (e.g., colonoware vessels) and the cultural practices associated with their production and use.

Considering the "Colono" in Colonoware

The work by Silliman (2005, 2012, 2015) provides a framework for situating our study of the English colonial project in the Carolinas, including the interactions of Europeans, various Indigenous groups, and Africans from a wide range of geographic origins, all within a landscape of violence, enslavement, power imbalances, and disease. By definition, European colonial projects install and enforce economic, social, and political hierarchies upon Indigenous and settler groups, and the influence of these structures—and the violence with which they were enforced—are so profound that they continue to affect these groups today (Silliman 2005:59). Silliman (2005, 2012, 2015) outlines three related concepts that we can use to develop an effective theoretical framework for exploring colonoware: 1) recognizing colonialism as encompassing dynamic, sustained, and reciprocal interactions among all colonial groups, and not just as a static instance of culture contact (2005); 2) exploring experiences during this time as formed by systems of slavery and complex power dynamics (2015); and 3) applying multi-scalar studies to extend the time period in question and frame discussions more appropriately within the broader context of colonialism, rather than considering all experiences as new and unprecedented across the precolonial-colonial divide (2012). The implementation of these three concepts enables us to more accurately understand pottery variability, the diversity of choices made by potters during the colonial period, and the complex impacts of the slavery system to cultural practices, particularly in terms of time constraints.

When writing about the interaction between Indigenous and Settler groups, even first meetings, Silliman (2005) avoids the term "contact" and uses "colonialism." He uses the latter term because it more accurately stresses the prolonged entanglement of cultural groups, the role of power dynamics, and the holistic perspective of all groups in creating and re-creating social practices. The idea of "contact," and the reduction of cultural interactions to one moment in time, ignores the violence and enslavement restricting Indigenous and African people for generations (Silliman 2005:57). Within this paradigm, it is important to acknowledge the small level of autonomy enslaved communities had in forming new social practices; however, this must be considered within the broader structure of slavery and power imbalance (Silliman 2005:64).

A broader consideration of colonialism ties into Silliman's (2012) argument for a multi-scalar application of time, contextualizing events and cultural phenomena within both the long and short histories of cultural groups. On one hand, social change has frequently been reduced to singular events, such as the implementation of European colonialism in America, and the subsequent experiences are represented as unprecedented and disconnected from the history preceding colonization. This sole consideration of a short history, what Silliman (2012:114) calls the "short puree," reduces cultural identities to only a particular event—in this case, the arrival of Europeans and enslaved Africans in the American colonies. By not expanding that historical narrative to the precolonial period, we would only receive a Eurocentric and colonized perspective of cultural experiences.

On the other hand, Silliman (2012:117) describes the "long durée" as the extension of the investigated timeline in order to fully capture all historical experiences relevant to understanding colonial groups. The bookends of this long history are not defined by a colonized perspective, but rather by all pertinent and connected cultural narratives. Silliman (2012:121) cautions that scholars—particularly historical archaeologists—must reorient their temporal scales to an appropriate baseline in order to effectively contextualize colonial cultures with precolonial history. The application of both the "short puree" and "long durée" provides a more accurate and complex understanding of cultural memory, resistance, acceptance, and the many dynamic strategies undertaken by groups during the colonial period. We apply this framework to our study by considering potting traditions over the course of some 500 years. In doing so, we hold open the possibility of persistence and change, as well as the complex cultural and historical dynamics that led to potters' choices.

Colonial experiences must be recognized as varied and not just as something occurring within marginalized communities. Because of the fluid boundaries between the colonizer and the colonized, Silliman (2005:67) further argues against searching for discrete ethnic groups, emphasizing that the simultaneous destructive and creative nature of colonialism results in material culture that cannot be demarcated by precolonial traditions—in other words, we cannot expect to identify colonial Indigenous pottery simply by possible similarities to precolonial Indigenous pottery. The development of "colonial identities" must be understood as not only occurring to the coloniz*ed* (something Silliman (2015:283) critiques as marginalizing), but also to the coloniz*er*. All groups within this colonial project experienced certain levels of remembering, adaptation, and creation of new social practices (Silliman 2015). This framework can be applied to colonoware, for example, in the discussion of foodways; appropriation, in the past, has only been considered in terms of changes to African and Indigenous food production, and studies neglect European appropriation of traits learned from the other two groups (see Singleton and Bograd 2000:18, and Cobb and DePratter 2012:455 for further critique). Similarly, the emphasis on European mimicry in colonoware attributes needs to be reconsidered, instead exploring how all groups negotiated pottery-making practices in this new system.

We thus situate our study of colonoware as a materialization of a colonial cultural paradigm that is "made, remade, and contested in 'projects' and in the interaction between individuals"; that is an exchange between all groups and political entities; and that occurs in unpredictable levels of variation and complexity for both the colonized and the colonizer (Thomas 1994; Silliman 2005:66). As we discuss below, our exploration of colonial identity also needs to be grounded in empirical analyses that operationalize this theoretical framework via quantitative methods linking ceramic attributes to the actions of potters - actions that either explicitly or implicitly "made, remade, and contested" colonial identities. The major goal of these new methods is to identify patterned variation that accurately reflects the choices that potters made—particularly those associated with raw material choice and processing, manufacturing technique, vessel shape, and surface treatment. Viewing colonoware as the materialization of colonial identity and doing so through quantitative methods, this framework recognizes the complex and nuanced decisions associated with daily life in colonial settlements—decisions that were likely influenced by explicit and implicit motivations of memory, forgetting, resistance, and accommodation.

Study Setting and Sample Description

The Carolina colony was originally established as a proprietary colony in which a group of eight wealthy proprietors had complete control over laws, distribution of land, and colonial relations with Indigenous groups (Clowse 1971:17-22; Duff 2001; Gallay 2002:43). The colony was intended to be a commercial venture that served to increase the fortunes of proprietors and colonists alike through trade with Indigenous groups in captives and deerskins, as well as through the development of a robust plantation economy founded upon the enslaved labor of Indigenous and African people (Duff 2001; Nash 2001; Gallay 2002:49, 208-209).

The importance of enslaved people and their labor can be traced to the very origins of English settlement in Carolina. Enslaved Africans were noted along with the first English colonists who settled at Albemarle Point in 1670, and two Indigenous Kussoe prisoners were allowed to be sold in 1671 (Johnson 2018:41-42). In just two years, the number of enslaved Africans and Indigenous people held in the colony had grown into the hundreds; by 1690, the number of enslaved Africans alone is estimated to have been 1,500, and in 1720, the total reached 12,000 (Johnson 2018:43; Navin 2020:100). Historical records documenting the capture and sale of Indigenous people are quite lacking, but estimates ranging from 24,000 to 51,000 captives between 1670 and 1715 have been published (Gallay 2002:299). While most Indigenous captives were exported to other colonies, they still composed a significant portion of the enslaved population during the study period—about 25% of the total enslaved population and 35% of the female population in 1708 (Gallay 2002:294-308; Johnson 2017, 2020:191).

The dramatic increase in the population of enslaved Africans at the turn of the 18th century coincides with the full expression of a plantation-based economy, focused upon growing rice, cotton, and later indigo. Prior to the 18th century, enslaved African and Indigenous people labored in agriculture, timbering, and cattle raising, however, the switch to extensive plantation systems resulted in the need for an exponentially larger enslaved force (Wood 1975; Zierden and Reitz 2016). Scholars believe that West Africans were particularly targeted for enslavement because of their knowledge of rice cultivation along the northwest coast of Africa, and the Black population soon became the majority in Charleston by 1708 (Wood 1975; Carney 2001). Rice cultivation dominated the Charleston economy by 1730, leading to the restructuring of plantation labor into what is known as the "task system." Because of the specialized skills necessary for growing rice and the lack of needed oversight, enslaved Africans had more relative "control" (for lack of a better term) of their day's tasks (Morgan 1982; Morris 1998).

The legacy of the Carolina colony and its historical reliance on mass enslavement and control of land resulted in the emergence of new identities for all three major colonial groups: Indigenous, African, and European. Especially for Indigenous and African peoples, life in the emerging colonial landscape required altering or enacting new cultural practices and lifeways. We argue that these reworked practices, like colonoware manufacture, were certainly strategic, in that they provided a way for enslaved people to better negotiate life within the oppressive colonial system. In order to better characterize the potting practices that constituted colonoware manufacture in late 17th- and early 18th-century Lowcountry settlements, we assemble a study sample of colonoware from a variety of sites in and around Charleston, South Carolina (Figure

1). These contexts reflect the wide range of land use, structures of enslavement, and cultural identities present in the South Carolina Lowcountry during the early colonial period. We also establish a baseline of precolonial potting practices with samples recovered from Indigenous settlements that predate the establishment of the Carolina colony. By comparing the choices of potters with respect to clay source and initial processing, manufacturing technique, vessel form, and surface treatment, we are able to gain a richer understanding of variability in the choices made by precolonial and colonial potters.

Our study utilizes samples drawn from contexts predating the English colonial project in the Lowcountry, as well as late 17th- and early 18th-century contexts marking the first few decades of the South Carolina colony. Table 1 presents summary information resulting from the analyses discussed below, and Table 2 presents relative frequency data for surface treatment, vessel form, and manufacturing technique from each site in our study. In order to characterize the potting practices of local Indigenous communities during the precolonial period, we include samples recovered from excavations at two sites—Charles Towne Landing State Historic site (38CH1) and the Daniel Island site (38BK1633). The precolonial-period occupation at the Charles Towne Landing State Historic site was identified by Stanley South (2002) during his 1969 excavations of South Carolina's first colonial settlement. Not the intended focus of the project, the archaeological features at the site composed a 200 x 200 ft. palisaded "moundless ceremonial center" with an estimated occupation range of A.D. 1275–1400 (South 2002:227). Sherds used in this study (n=98) were recovered from surface survey conducted across the entire site. The Daniel Island site includes the remains of what is likely a single Indigenous household occupation dating to the period A.D. 1590–1670 (Marcoux et al. 2011). A lack of feature overlap, pottery seriation results, and radiocarbon assays together suggest a serial occupation consisting of two, relatively short-term periods of settlement separated by a hiatus (Marcoux et al. 2011:16-17). The presence of European cultigens (cowpea and peach), but lack of European-made artifacts (a single glass bead), indicate that the site was abandoned prior to the establishment of the Charles Towne Landing site in 1670. Sherds in the study sample from this site (n=43) were recovered from pit features.

The archaeological sites associated with English colonial settlement in this study have similar occupational ranges (late 17th and early 18th centuries) and all included enslaved inhabitants, yet they also evince significant diversity in location and the kinds of activities in which free and enslaved inhabitants engaged. The Lord Ashley site (38DR83a) contains the remnants of a settlement that was part of a large plantation, known as St. Giles Kussoe, belonging to Lord Proprietor Anthony Ashley Cooper (Agha et al. 2012; Agha 2016, 2018). Diagnostic artifacts and historical records indicate that the Lord Ashley site was occupied from 1674 until 1685 (Agha 2016:95–108). Initial interpretations of the settlement suggest that it was a site of agricultural experimentation and trade with local and nonlocal Indigenous groups (Agha 2020:237-238; 299-300; Marcoux 2020). Sherds included in this study (n=79) were recovered from unit and feature contexts across the site. The Ponds Site (38DR87) has an historical connection to the Lord Ashley site in that its original owner was Andrew Percival—the agent of Lord Proprietor Anthony Ashley Cooper who managed St. Giles Kussoe. The early colonial occupation at this site, which most likely dates to Percival's period of ownership (1682–1723), has been identified through archaeological survey and excavation (Bailey et al. 2014). Given Percival's role as manager of Lord Ashley's trade with Indigenous groups, it is likely that the Ponds served a similar role, especially after his dismissal from service in 1685 (Bailey et al. 2014:16). Sherds included in this study (n=132) were recovered from unit and feature contexts across the site. Far to the north of these Ashley River valley settlements in the Santee River delta is the small, rural settlement known as the Spencer site (38CH241-99). Archaeological investigations (2015–2018) identified evidence of a single house, associated cellar pit and paling fence (Jones 2018). European artifacts from the site and land records suggest an occupation in the early decades of the 18th century, and the will of the owner, Joseph Spencer, indicates that activities at the settlement focused on raising cattle (Hester 2014; Jones 2018:2). Colonoware sherds from this site (n=68) were recovered from excavations on top of and surrounding an unexcavated cellar pit feature.

The study sample also includes specimens from contemporaneous early colonial sites including a church parsonage and outbuildings associated with a colonial Governor's house. The Parsonage site (38CH2292) contains the archaeological remnants of the parsonage house linked to St. Paul's Church—part of the eponymous parish located to the south of Charleston along the Stono River (Pyszka 2012). The parish house stood for eight years (1707–1715) before it was burned during the Yamasee War (Pyszka 2012:75). The colonoware sherds included in this study (n=80) were part of an artifact assemblage recovered from the brick-lined cellar of the house. The site's excavator, Kimberly Pyszka (2012:77-92), demonstrates that this artifact assemblage reflects activities much more akin to those taking place at a tavern than at a typical house. The final site included in this study is the Ashley Hall site (38CH56). Established with a single small house in 1676 by one of the earliest English settlers in the area, the core settlement grew under the management of Governor William Bull in the early 18th century to include a grand estate house, kitchen house, laundry/enslaved quarters, and dairy house (James et al. 2021). Colonoware sherds included in the study sample (n=39) were recovered from excavation and feature contexts primarily in the laundry/enslaved quarters, and to a lesser extent in the kitchen house.

The *Chaîne Opératoire* Approach

Archaeologists have long drawn connections between material culture and social identity, examining objects and their manufacturing processes as indicators of cultural practice and transmission (Leroi-Gourhan 1964; Lemmonier 1992; Gosselain 2000; Livingstone Smith 2007; Mesoudi and O'Brien 2009; Shennan 2009; Jeffra and Karr 2013; Jeffra 2015; Roux 2016; Buscaglia 2017; Delucia 2019). These studies are based upon the idea that the technical skills and steps taken to produce objects reflect specific cultural traditions and the mechanisms by which they are shared within and between groups. Pierre Lemmonier (1992:11) discusses the "anthropology of technology" and the ways in which technical processes and the gestures that create artifacts are "social phenomena." Lemmonier draws from the work of André Leroi-Gourhan (1964), who proposed the method of *chaîne opératoire* to better understand the tools and techniques used for creating objects. Leroi-Gourhan (1964) argues that these operational sequences—from raw material acquisition to object use—can be analyzed in much the same way as language, combining a specific set of technical skills that are indicative of particular social groups (see also Roux 2016).

The *chaîne opératoire* approach has been used by many archaeologists over the past decades to examine the techniques that may be representative of respective social identities and the ways in which those skills are transferred (Dietler and Harbich 1989; Gosselain 2000; Roux et al. 2011; Ard 2013; Jeffra and Karr 2013; Jeffra 2015; Roux 2016). Led primarily by the work of Gosselain (2000) and his students, the *chaîne opératoire* approach has frequently been applied to ceramic studies as a way for understanding the relationship between potting practice and cultural identity, as well as for examining how potters exchange knowledge about potting traditions (Harrington 1908; Fewkes 1944; Baker 1972; Dieter and Harbich 1989; Gosselain 2000; Livingstone Smith 2007; Roux et al. 2011; Ard 2013; Roux 2016; Ernst and Hofman 2019) This emphasis on the techniques and operational sequences of ceramic manufacturing corresponds to Singleton's and Bograd's (2000) call for colonoware to be examined as the material result of intentional and active choices made by potters. Similarly, the work of Gosselain (2000) and others on the transmissibility of technical skills allows for a more accurate and nuanced perspective into colonoware variation in the Lowcountry—and how local coarse earthenware traditions shifted over time (see also Shennan 2009; Jeffra and Karr 2013; Jeffra 2015).

Especially when investigating societies that lived/are living under such institutions as colonialism, the related material culture needs to be analyzed as a result of the associated complex power dynamics (Buscaglia 2017; Ernst and Hofman 2019). In particular, the operational sequences and technical skills used to produce objects under colonialism are indicative of the ongoing cultural negotiations made by social groups during this period. Ernst and Hofman (2019) apply a *chaîne opératoire* approach to ceramic assemblages from early Spanish colonial sites in the Caribbean to examine the material changes to potting traditions that came as a result of colonial interactions. They (2019:139) argue that the transmission of technical skills occurred differently depending on the specific contexts and varying power relationships. We apply this perspective to precolonial- and colonial-period local coarse earthenwares to reveal the ways in which ceramic traditions in the Lowcountry adjusted to the implementation of colonialism, especially regarding the specific operational sequences and techniques most diagnostic of changing social identities.

Operationalizing *Chaîne Opératoire*

Helping to bridge the divide between pottery sherds and potting practices, a number of recent studies have developed a suite of digital imaging techniques that provide analysts an empirical method to record ceramic attributes associated with pottery production (Livingstone Smith 2007; Livingood and Cordell 2009; Lindahl and Pikirayi 2010; Kahl and Ramminger 2012; Winter et al. 2012; Reedy, Jenifer, and Reedy 2014; Reedy, Jenifer, Reedy, and Liu 2014; Thér 2016; Park et al. 2019). These methods involve segmenting and measuring high-resolution scans of sherd profiles using digital imaging software. The main benefit of these techniques is that they provide comparable quantitative data to the results of traditional (i.e., optical) thin section microscopy and petrographic analysis, but with lower processing times. Consequently, these techniques can be used to collect data from much larger samples, resulting in more robust datasets. Archaeologists are therefore exploring the viability and accuracy of using digital imaging techniques to characterize attributes like plastic inclusions, manufacturing technique, and firing temperature (Livingstone Smith 2007; Livingood and Cordell 2009; Reedy, Jenifer, Reedy, and Liu 2014).

Several studies compare results between traditional petrographic analysis and the use of thin sections scanned at high resolutions and segmented using imaging software (Livingood and Cordell 2009; Reedy, Jenifer, and Reedy 2014; Reedy, Jenifer, Reedy, and Liu 2014). Although petrographic methods are well-established in archaeological ceramic studies and provide accurate results regarding clay compositions, digital imaging techniques can be more efficiently applied to large sample sizes, easily shared between analysts, and adjusted to different types of assemblages (Livingood and Cordell 2009:871). Patrick C. Livingood and Ann S. Cordell (2009) argue in their study of temper particles that digital imaging techniques are less adept at measuring small, birefringent particles. However, they and others suggest that a high-resolution scanner (over 4,800 dots-per-inch (dpi)) and a well-adapted segmentation recipe for isolating the particles will address the reported disadvantages of digital imaging analysis (Livingood and Cordell 2009:869; Reedy, Jenifer, and Reedy 2014:17; Reedy, Jenifer, Reedy, and Liu 2014:265). In addition to following these guidelines, and as we discuss below, we do not include silt in our temper analysis, thereby mitigating much of the reported bias in measuring smaller particles through digital imaging methods. These studies have also reported that these methods are both reliable and accurate for quantifying voids in ceramic studies as long as the visible pores are effectively isolated in the image (Livingood and Cordell 2009; Reedy, Jenifer, and Reedy 2014). In summary, although petrographic methods can provide more detail and range in the composition of clays, the proper application of digital imaging protocols—which must include a high-resolution scanner and a well-adapted suite of image segmentation—can produce accurate and reproducible measurements of temper and voids in paste profiles.

Although these new techniques offer a more efficient alternative to optical microscopy and petrographic analysis—and are more accurate than visual estimation—the use of thin sections and specialized imaging software continues to impose in-processing time and expense. In this study, we propose a methodology that is perhaps more accessible to most scholars and institutions. Instead of relying on thin sections, we grind a flat and clean profile by using a high-powered rotary tool outfitted with a tungsten-carbide cylindrical burr. Using the same imaging standards proposed by Chandra L. Reedy and others (Reedy, Jenifer, Reedy, and Liu 2014; see also Livingood and Cordell 2009; Reedy, Jenifer, and Reedy 2014), each sherd profile is digitized with a 5 or 10mm scale as TIFFs using a high-resolution scanner set to 6,400 dpi. Each profile scan is scaled and segmented to produce a simple two-toned, black-and-white image.

These images serve as the basis for recording data on the following attributes: temper size and density, manufacturing technique, void density, and void shape. This study includes data from a sample of 539 individual sherd scans. All images are processed in Adobe Photoshop, and the summary statistics are calculated using the freeware program JASP (Jeffreys's Amazing Statistics Program). Below, we provide more details addressing how attribute data are recorded, and an illustrated, step-by-step workflow of this process can be found at xxx (hosted data site needed).

Temper Size and Density

We follow the methods used in the recent digital imaging studies mentioned above in order to address potters' choices in the quantity and size of quartz sand temper particles added to the clay bodies of sherds in our sample (Kahl and Ramminger 2012; Winter et al. 2012; Reedy, Jenifer, Reedy, and Liu 2014; Park et al. 2019). After isolating the profile in each high-resolution scan, the selected area is segmented by applying a suite of image filters to maximize the contrast between the paste and the quartz sand. The Threshold tool then creates a two-toned image by converting all pixels lighter than a set level to white and all pixels darker to black. Although the analyst can manipulate this threshold, we found that the automatic setting predicted by Photoshop after the suite of segmentation steps accurately and consistently displayed the quartz sand as white shapes on a completely black background (Figure 2). These temper particles are now selected by using the Select Color Range tool, and the Record Measurements function provides a data table of each selected shape (i.e., quartz sand particle).

The table of measurements produced by this analytical module includes the count, area, height (along the y axis), and width (along the x axis) for each selected temper particle. For temper size, we record the maximum dimension (height or width) for each particle. The study sample (n=539) produced an average of 1,500 individual temper particle size measurements per sherd, resulting in approximately 810,000 total data points. For each sherd, only temper particles with maximum dimensions greater than 0.06mm are included, as this is the threshold for the size category of silt (Wentworth 1992:381). The mean temper particle size for each sherd is calculated from the filtered size data. Temper density is measured as a ratio of the summed area of all measured temper particles and the total area of the sherd profile.

Manufacturing Technique

Although manufacturing technique can be determined by certain macro evidence (e.g., coil breaks, lamination, etc.), these are not always easily identifiable, especially with smaller sherds (Drucker and Anthony 1979; Wheaton et al. 1983; Livingstone Smith 2007; Anthony 2009; Brilliant 2011; Isenbarger 2012). Archaeologists have recently argued (and shown via experimentation) that the orientation of the pores in the paste correspond to the way the vessel was shaped (Livingstone Smith 2007; Lindahl and Pikirayi 2010; Kahl and Ramminger 2012; Winter et al. 2012; Reedy, Jenifer, and Reedy 2014; see also Thér 2016 for a discussion of using temper orientation instead). Although secondary forming techniques or other steps that follow the initial manufacturing process may impact the pore orientation, Thér (2016:223) argues that the signatures left behind by the primary forming technique remain distinct enough to make an accurate identification.

Because identifying manufacturing technique relies on determining the directionality of the force applied to the vessel, only rim sherds were used in this part of the study (n=157). In order to isolate the voids, sherd profiles are filtered using a sequence of segmentation tools in Adobe Photoshop, similar to those used to isolate temper. The void orientation and patterning are then analyzed for manufacturing technique. The appearance of these voids in a sherd profile can indicate the specific forming method used: mass modeling and/or coiling (Figures 3-6).

Using the descriptions and illustrations found in previous studies (Livingstone Smith 2007; Lindahl and Pikirayi 2010; Kahl and Ramminger 2012; Thér 2016), the manufacturing technique for each analyzed rim sherd is identified as N-coiled, U-coiled, S-coiled, unidentified coiled, or modelled. N-coiling (Figure 3) involves stacked coils that are then smoothed in opposite directions, moving downwards on the interior and upwards on the exterior (or vice versa), creating a diagonal orientation in the voids (Livingstone Smith 2007; Lindahl and Pikirayi 2010; Kahl and Ramminger 2012; Sanger 2016:590). U-coiling (Figure 4) is similar, but the coils are smoothed in the same direction on both the interior and exterior. In this case, the voids will form either a U or ∩ shape in profile (Livingstone Smith 2007; Lindahl and Pikirayi 2010; Kahl and Ramminger 2012; Sanger 2016:590). S-coiling (Figure 5) consists of off-set coils smoothed so that they then are elongated and create an S or Z shape in profile—the voids in profile follow this shape (Livingstone Smith 2007:121). Finally, modelling (Figure 6) is identified by a linear orientation of the voids, running parallel to the vessel wall. This lamination reflects the building-up of the clay by hand, without the use of coils (Livingstone Smith 2007; Lindahl and Pikirayi 2010; Sanger 2016:590-591). Because the vessel lip can be added using a different manufacturing technique (e.g., a modelled vessel could have a lip formed from an added coil), a coiling method is only identified when two coil breaks are visible.

Void Density and Shape

The final attributes we capture in this study include void density and shape. In addition to indicating manufacturing technique, the frequency and shape of voids—or pores—can also be indicative of firing temperature, organic inclusions, and intended vessel function (Kahl and

Ramminger 2012; Reedy, Jenifer, and Reedy 2014; Park et al. 2019). In order to measure the height and width the voids in the paste, we use the segmented profile image of each rim sherd from the manufacturing technique analysis (Figures 3-6). Using the same method we employed for measuring temper particle size, we isolate and record the height and width of each of the voids. Voids less than 0.05mm in minimum dimension are filtered from this dataset, thereby capturing only what Reedy, Jenifer, and Reedy (2014) call “macropores,” which they argue are the most reliable for measuring. Each sherd (n=157) contained an average of 375 macropores, resulting in a dataset of over 58,000 voids. Void density is calculated by dividing the sum of individual void areas by the total area of the profile. In order to document void shape, we calculate the aspect ratio of height to width. For each sherd, we calculate the mean of this value, with a mean ratio of 1.0 indicating mostly circular voids, and a mean ratio larger than 1.0 indicating more oblong, vertical voids.

Replicability

One of the fundamental challenges in artifact and attribute measurement is maintaining adequate precision and reproducibility of techniques across analysts. The workflow described above addresses this challenge by prioritizing steps that minimize analyst subjectivity—primarily visual estimation. We wrote macros, or recordings of an action or set of actions, for each of the programs to ensure expediency, consistency, and accuracy for each sherd. To measure inter-analyst variation, the authors each performed the digital image analysis workflow for mean temper particle size on a randomly chosen sample of ten sherd scans. The average difference between analysts is 0.0054 mm, which represents an average error of 3.5%. Furthermore, a repeated measures Analysis of Variance (ANOVA) testing inter-analyst variation indicates that there is no statistically significant difference among the mean particle size values calculated by each analyst ($F[2, 28] = 3.045$, $p = 0.064$). We conclude that this method can be reliably replicated and the results compared across analysts and across studies.

Other Attributes

To the above collected data, we add vessel form, surface treatment, and rim diameter (if measurable). Vessels are classified as either bowl, jar, or unidentified forms. A future development of this project includes characterizing these shapes in more detail to better represent the diversity of vessel forms observed in Figure 7. Body surface treatment is identified as either plain, burnished, or stamped. The specific decorative elements applied via stamping (e.g., line block stamping, curvilinear stamping, etc.) are not analyzed for this study so that broader patterns of surface treatment choices could be examined alongside other steps in the pottery-making process. Rim diameter is measured for rim sherds whose lip length exceeded 10% of the vessel circumference. These results are best viewed in the digitized vessels in Figure 7.

Results

Despite being only a single component of the foodways of community members, which are themselves but a portion of the total number of cultural practices that constitute daily life, the performative aspect of colonoware production and its attendant materiality can greatly aid in reconstructing the identities of the denizens populating the colonial landscape of the Lowcountry. Indeed, the digital image analysis methods we employ in our study allow us to bridge the gap between archaeological data and cultural practices, identifying quantitative patterns that reflect the material consequences of intentional choices made by potters. Mean temper particle size reflects choices in selecting clay sources and tempering agents. The size and density of voids in the clay body are often associated with the degree to which organic matter was removed from clay during initial processing, or the application of different building techniques (primarily paddle and anvil vs. hand forming). Digital image analysis of voids in rim sherd profiles also reveals evidence of the two primary manufacturing techniques—transverse voids resulting from the joining of clay coils or long, parallel, vertical voids resulting from mass modeling. To these data, we add the traditional attributes characterizing choices in surface treatment and vessel form. The resulting dataset allows us to characterize the chain of manufacturing steps, or "recipes," that form what we might call "potting traditions." With samples drawn from both precolonial and colonial contexts, we compare the potting traditions used in the Lowcountry prior to the establishment of the English colonial project to those following English settlement and sustained interaction among enslaved and free Indigenous people, enslaved and free Africans, and Europeans.

Choices in Clay Source, Temper Material, and Cleaning

We begin by examining attributes that reflect potters' choices of clay source and degree of cleaning through the removal organic material. Mean temper particle size in this study reflects the choice to build vessels using clays with either coarse or fine temper inclusions. All sherds in this study have quartz sand as the primary tempering agent. The texture of the clay can be achieved either by selecting clay sources with naturally occurring coarse or fine sand content, or by adding sand of desired coarseness to the clay. Figure 8 presents a notched box plot comparing the mean temper particle size of sherds across the seven sites in our sample (n=539). A notched boxplot shows the distribution of mean temper particle size within each site assemblage. The box contains the middle 50% of the values, and the horizontal line at the narrowest portion of the V-shaped notch is the median. In comparing sites, if the notches of boxplots do not overlap, then the median values of those two sites are significantly different. The figure shows that the mean temper particle sizes of Charles Towne Landing and Daniel Island assemblages, the two precolonial sites in the sample, are significantly greater than those of the colonial-period assemblages. This distinction is also shown in Figure 9, comparing examples of precolonial and colonial sherds that range in both temper size and density (Table 1). In addition, these results suggest a greater degree of variability in temper particle size among the colonial sites, with Parsonage and Ashley Hall assemblages having significantly finer temper than the Ponds, Spencer, and Lord Ashley sites. We will revisit this finding of greater variability in colonial-period sherd assemblages below.

The overall density of air voids in vessel bodies also suggests potter choice associated with the cleaning of the unfired clay. Void density in the sample differs significantly between precolonial and colonial assemblages (Figure 10). Specifically, sherds from precolonial contexts have significantly lower void density than colonial sherds. Figure 10 also indicates that the higher void density in colonial assemblages applies to both coil-made and mass modeled vessels. Figure 11 provides a visualization of these differences in void density and shape. Void density may reflect the amount of organic material that burned out during the firing process, leaving behind air voids (Kahl and Ramminger 2012:2213; Reedy et al. 2014:337). The results suggest that colonial-period potters could have utilized clay that was not cleaned and picked through thoroughly.

Manufacturing Technique, Vessel Form, and Surface Treatment

Air voids can also be studied to determine manufacturing techniques. Using the imaging methods described earlier, the precolonial sample includes 33 rim sherds made by coiling and no sherds made by modeling. The colonial sample includes 46 rim sherds produced by coiling and 25 rim sherds produced by modeling. Figure 12 presents a comparison of void shape, measured as a ratio of void height to void width The results of the comparison show that colonial-period vessels, both coil-made and mass modeled, have significantly more elongated voids than the solely coil-made precolonial pots. These related void patterns suggest that precolonial and colonial potters chose to employ fundamentally different forming techniques. Archaeological evidence and ethnohistoric accounts provide ample evidence that Indigenous potting traditions across the southeastern United States employed a wooden paddle and some sort of anvil to anneal vessel coils (Holmes 1903; Fewkes 1941; Williams and Shapiro 1990). The malleation of coils with a wooden paddle and an anvil involves significant compressive force, which results in the elimination of air voids (Rye and Evans 1976:37; Kreiter et al. 2004:88-89). The likely forming techniques used to produce colonoware (pinching/drawing of coils or slabs, or pressing in a mold), by contrast, applies far less force, and results in the retention of more voids (Rye 1981:70). Hand forming using pinching or modeling over a mold also results in more elongated voids (Lindahl and Pikirayi 2010:Figure 8; Kahl and Ramminger 2012:2216; Sanger 2016:Figure 13).

Comparing manufacturing technique (coiled vs. modeled) to vessel form among the study assemblages reveals additional significant differences. Figure 13 presents simple sherd frequencies by site organized by the two fundamental vessel form categories (jar and bowl) and color-coded by manufacturing technique. Precolonial assemblages from the Charles Towne Landing and Daniel Island sites are dominated by jar forms, and all vessels for which manufacturing technique could be identified were made by coiling. By contrast, bowls are by far the primary vessel form in assemblages from colonial sites, and roughly 25% of the vessels in the colonial-period assemblage for which form and manufacturing technique are identifiable were made by mass modeling (Table 2).

Although small sample size precludes the quantitative comparison of vessel shape attributes, the study sample does suggest fundamental differences in vessel forms that can be operationalized in later studies. Figure 7 presents representations of vessels based on rim sherds large enough to correctly orient. First, colonial assemblages feature a shallow bowl form that are largely missing in precolonial assemblages (second and third columns in the colonial assemblages). Deep bowl forms are found in both assemblages (fourth column); however, precolonial-period bowls feature rim embellishments (primarily added nodes or notched applique rim strips) and straight sides, whereas colonial-period deep bowls have everted rims and more globular sides. Jar forms in precolonial contexts include specimens with in-slanting rims or gently curving excurvate rims, and jars from colonial contexts have much more sharply everted rims.

Finally, another simple frequency comparison shows that potters at precolonial and colonial sites also chose starkly different surface treatments for vessels (Figure 14, Table 2). Approximately 75% of the surfaces of sherds in precolonial assemblages were impressed with carved wooden paddles (denoted as "stamped" in the figure), as opposed to just 16% of sherds in colonial period assemblages. Furthermore, most of the stamped portion of the colonial assemblage comes from the Ponds site, which likely had local Indigenous residents or visitors (Bailey et al. 2014). With the exception of the Ponds, 85%–95% of sherds in the colonial assemblages feature either plain or burnished surfaces (Table 2).

Additional Comparisons of Variation

We can further explore differences between precolonial- and colonial-period potters by calculating coefficients of variation values (CVs) for two manufacturing attributes—mean temper particle size and vessel wall thickness. A coefficient of variation is a standardized measure of distribution that compares variation across samples. It is most often used to quantify the degree of standardization for archaeological assemblages (Eerkens and Bettinger 2001; Wang and Marwick 2020), but in our study, we use it to compare the degree of variation in the choices made by precolonial and colonial potters regarding two metrics—temper particle size and vessel wall thickness (Table 1). A comparison of CVs for mean temper particle size indicates that variation among colonial period sherds is significantly higher than precolonial-period sherds (n=539, Precolonial Mean=0.19, CV=15.18, Colonial Mean=0.14, CV=19.15, $p<0.01$). Likewise, comparing the CVs of sherd thickness finds significantly higher variation in the colonial assemblage (n=539, Precolonial Mean=7.05, CV=17.74, Colonial Mean=6.79, CV=23.41, $p<0.001$). Taken together, the results of both comparisons indicate that precolonial potters were making significantly more homogenous choices than colonial potters with respect to temper particle size and vessel wall thickness.

Discussion

Our comparison of precolonial- and colonial-period site assemblages reveals two major data patterns that together characterize the colonoware potting traditions practiced in the late 17th- and early 18th-century European settlements around Charleston. First, most colonial-period potters made significantly different choices during the potting process, including choices about clay sources, tempering agents, manufacturing technique, vessel form, and surface treatment. Second, colonial-period assemblages exhibit significantly greater variation along these dimensions, reflecting a broader set of choices made by colonial-period potters. These patterns of change do not simply mark temporal changes in potting traditions; instead, we argue that the changes we see in the production and use of low-fired earthenware represent the core materiality of colonial identity formation for Indigenous people, Africans, and Europeans. The simple act of making a pottery vessel involved the strategic deployment of practices that variously emphasized complex cultural constructs like memory, forgetting, dominance, resistance, and acquiescence.

All of the analyses identify glaring disjunctures in manufacturing choices between precolonial and colonial potting traditions. Precolonial Indigenous potters in the area produced assemblages reflecting a broad regional potting tradition associated with what is known as the Lamar archaeological culture (Williams and Shapiro 1990; Hally 1994). That is, the potters began with sandy clays and employed coiling and paddle-and-anvil manufacture methods to produce open and restricted jars (all bearing motifs produced by stamping with carved wooden paddles) and a much smaller number of bowls. While geographic and temporal variation within the Lamar potting tradition is certainly evident, this basic combination of choices was enacted by potters in communities stretching from east Alabama to the South Carolina and Georgia coasts, and from north Florida to southwest North Carolina between A.D. 1250 and 1700 (Williams and Shapiro 1990:4-5). In our study, the similarities in choices between Charles Towne Landing (A.D. 1275–1400) potters and those living at the Daniel Island site (A.D. 1590–1670) suggest the persistence of this potting tradition for over three centuries (Marcoux et al. 2011; Nyman 2011). Another study of variation comparing Indigenous assemblages of similar ages in our study area found the same degree of consistency (Nyman 2011:123-125). Following initial English settlement, there is a period of perhaps 30 to 50 years where this tradition has a strong presence in pottery assemblages at colonial settlements (e.g., the Ponds site in our study); but by the 1720s, it is clear that the local precolonial Indigenous potting tradition is no longer practiced regularly—at least not in its full expression (Zierden et al. 1999:268; Bailey et al. 2014).

Given the fact that settler colonialism is at its core a disruptive historical force marked by the intrusion of non-Indigenous people, a disjuncture in potting traditions of the magnitude found in our study is completely expected (Lightfoot 2015). However, the trajectory is not one where Indigenous potting traditions were simply replaced wholesale by European or African ones. Instead, the entrenchment of English colonial settlements, with their enslaved African and Indigenous residents, created spaces of intersectionality drawing together a whole new set of "actors" in the cultural networks composing the colonial landscape. The interaction of diverse groups of people, each with their attendant cultural practices and technologies, made these places sites of tremendous cultural change and creative potential. Of course, the interaction was not without constraints, being situated within the violent, race-based power hierarchies of enslavement and the colonial project. It is from this perspective that we interpret the data patterns identified above.

Markedly greater diversity in manufacturing techniques, vessel form, and surface treatment, as well as significantly higher CV values for temper particle size and vessel wall thickness during the colonial period clearly reflect the diversity of the potting traditions that must have been present at colonial settlements. Indeed, enslaved potters would have had cultural ties to countless African and Indigenous groups, as well as to potters who produced colonoware in the Caribbean (Menard 1995; Gallay 2002; Curet and Hauser 2011; Zierden and Reitz 2016). Early in colonoware studies, it was thought that the presence of hand modeling in a vessel suggested enslaved African production, while the coiling method was associated with Indigenous production (Wheaton et al. 1983:335; Anthony 2002:54); however, detailed studies of production methods in Africa have recorded an incredibly diverse set of manufacturing techniques including coiling and mass modeling (Gosselain and Livingstone Smith 1995:Figure 2; Livingstone Smith 2001). It is reasonable, then, to assume that many potters making colonoware in the Lowcountry during the late 17th and early 18th centuries, so early in the colonial project, would have employed the varied practices they learned from the potting traditions of their forbearers.

The other constraints shaping colonoware production were associated with the time and labor demands placed upon enslaved potters. During the late 17th and early 18th centuries, before the transition to cultivating rice led to the adoption of the “task system”, colonists presumably relied on what has been called a “gang labor” system (Morgan 1982:564). Brought to Carolina from Caribbean sugar plantations, this system involved groups of enslaved laborers working under the surveillance of enslavers or their agents. As many historians have pointed out, however, this form of control would have been quite difficult to impose in the early years of the Carolina colony, when plantations were small and isolated, and when tasks varied greatly (Wood 1975:47, 50). The inability of enslavers to completely control the activities of the enslaved is supported by the fact laws had to be passed in the late 17th and early 18th centuries barring enslaved individuals from engaging in trade, timbering, hunting, or agriculture (Morgan 1982:569-572). The same factors that precluded enslavers’ ability to constantly surveil the enslaved, however, also contributed equally to the daily burden born by enslaved individuals. In the pre-rice, early colonial economy, enslaved laborers largely worked in remote areas, clearing land, timbering and producing naval stores, and tending agricultural fields, hogs, and cattle (Wood 1975:106-107; Hart 2010:19; Agha 2020:157-201). Working at these tasks, often far afield, left little time for domestic activities like gardening, hunting, cooking, and pottery making. With time such a rare commodity, and considering the many steps involved (e.g., clay procurement, clay processing, vessel building, drying, firing), one can imagine that enslaved potters might seek ways to produce vessels in as little time as possible. As discussed below, patterns identified in our study suggest that this goal influenced the choices made during pottery making.

Temper particle size and void density indicate that colonial-period potters used significantly different paste recipes than precolonial-period potters, choosing finer sand inclusions and less thoroughly cleaning the clay. This difference may reflect clay preferences of nonlocal potting traditions associated either with a potter's original homeland or other place of captivity (e.g., Caribbean). Finer particle size may also reflect the choice not to add aplastic temper to the clay body. Given the time constraints associated with enslaved labor, the additional production steps of collecting sand and mixing it into the raw clay may have been deemed too costly. In order to pursue this question, fine-grained petrographic analysis of sherds and samples of local clay is required in order to identify a difference between naturally occurring and intentionally added temper material. Also perhaps motivated by time constraints, the higher void density in colonial vessels may reflect the potter's choice to clean raw clay less thoroughly, leaving more organic material in the clay body. Among the colonial assemblages alone, we identify significant differences in temper particle size between the Lord Ashley, Ponds, and Spencer sites, on one hand, and the Ashley Hall and Parsonage sites on the other. As an explanation, we posit that this difference may reflect the local production of coarser paste vessels recovered from sites associated with trade with Indigenous groups and cattle raising at the outskirts of the colony, whereas the finer paste vessels reflect purchased market wares bound to be used in a governor's kitchen and a church parsonage whose pottery assemblage has been likened to that of a tavern (Pyszka 2012:77-92).

Colonial potters' choices regarding methods of manufacture, vessel form, and surface treatment were similarly shaped by cultural preferences and/or time demands associated with their labor. The higher density of voids (resulting from the use of hand building instead of paddle-and-anvil) and the use of both coiling and mass modeling/molding techniques presents a sharp contrast to the singular coil/paddle-and-anvil manufacturing practice of precolonial potters and reflects a nascent tradition marked by a diverse set of potting practices. Much like the choice not to clean clay, the use of hand forming methods, likely with the aid of a mold, would have allowed potters to produce large numbers of vessels in a much shorter time than if they had employed coiling techniques and a paddle and anvil method of manufacture.

The dramatic increase in the frequencies of bowls versus jars signals that the foodways practiced by the inhabitants of colonial settlements were fundamentally different from local Indigenous foodways—at least in areas associated with cooking, storage, and serving (Joy 2016, 2020). It is reasonable to assume that the lack of jars in colonial assemblages reflects a difference in the types of technology used in storage and cooking. European-made ceramic vessels, glass bottles, and wooden casks and barrels served the same role as the low-fired storage jars in precolonial assemblages, and iron or brass kettles would have been equally suited to cooking as their precolonial earthenware counterparts. The exception to this pattern is, expectedly, the Ponds site, where some inhabitants continued to produce and use jars in the local wooden-paddle-stamped style (Bailey et al. 2014). Given that bowls were mostly used as serving vessels, their greater abundance in colonial assemblages suggests either a larger emphasis on serving meals or a similar substitution of serving technology as seen with jars. In this case, earthenware vessels may have been substituted for serving vessels made of perishable material like wood or woven plant material.

Conclusion

For four decades, archaeologists have lauded the research value of colonoware and its analytical potential to address questions about the lives of enslaved Africans and Indigenous people during the colonial and antebellum periods (Nöel Hume 1962; Ferguson 1980, 1992; Crane 1993; Mouer et al. 1999; Steen 1999; Singleton and Bograd 2000; Isenbarger 2006; Ferguson 2007; Anthony 2009; Galke 2009; Steen and Barnes 2010; Brilliant 2011; Cobb and DePratter 2012; Steen 2012; Anthony 2016; Joseph 2016). For much of this time, however, realizing the research potential of colonoware has been hampered by the lack of an analytical approach that both is framed within our current understandings of how colonial identities may have been enacted and that employs robust empirical analyses of sufficient "resolution" to identify subtle variation within the cultural practice of pottery making. Scholars have acknowledged the limited applicability of analytical typologies, as well as the problems associated with a priori assignments of ethnic identity (Brilliant 2011:89; Anthony 2016:44).

More recently, colonoware scholars have taken to Singleton and Bograd's (2000:9) admonition to approach colonoware "as the catalyst for understanding identity formation, cultural interaction, and change under colonialism." Through their multi-sited approach, Cobb and DePratter (2012), for example, achieve a much richer understanding of how the production and use of colonoware by African and Indigenous peoples materialized the historical forces of enslavement, population movements, and global trade that influenced the colonial landscape of the late 17th and early 18th centuries. By restricting their analysis to the documentation of two traits (burnishing and vessel morphology) rather than a more comprehensive chaîne opératoire, however, they (Cobb and DePratter 2012:455-456) missed the opportunity to fully explore variability in the practices that created their hypothesized "extended" communities of practice (sensu Stark 2006). Additionally, colonoware research has so far lacked the application of robust and quantitative analytical methods, mostly relying on macro identifications that are less consistent and accurate across analysts. The examination of visual estimations and categorical attributes alone to characterize colonoware has obscured the diverse choices employed by potters as well as how their pottery making recipes may be diagnostic of the conditions of the colonial Lowcountry.

In this paper, we have demonstrated that combining a chaîne opératoire approach with digital imaging methods allows us to better define and analyze the relationship between sherd attributes and the constellations of choices from which precolonial and colonial potters chose. Linking archaeological data to practice in this way further helps us characterize colonoware as another material signal of the myriad cultural disjunctures that comprise all colonial projects. Although it may seem an obvious conclusion that colonial-period colonoware was made differently than precolonial coarse earthenwares—and our results indeed show this—the value of these methods and the framework in which they were approached reveals much more detail about colonoware production and use. This study demonstrates the patterning of choices made by potters and which specific attributes are most diagnostic of the changes occurring during the colonial period. From this, we can gain a more detailed understanding of the reasons behind these decisions. Overall, these empirical methods, based in chaîne opératoire, enact a dramatic shift in the perspective of the analyst—moving from pottery sherds solely as objects that can be sorted into groups based upon observable attributes, to pottery sherds as the consequence of cultural practice, whose attributes can be measured and analyzed to reveal patterns in the choices made by potters—choices conditioned by how daily life in the spaces of colonial settlements was negotiated and managed.

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TABLES

TABLE 1
SUMMARY ATTRIBUTE DATA FOR THE SEVEN SITES INCLUDED IN THIS STUDY

Site	Total Sample (n)	Median Particle Size (mm)	Mean Particle Size (mm)	Particle Size CV	Mean Temper Density (%)	Median Void Density (%)	Median Void Shape Ratio (Height/Width)	Mean Thickness (mm)	Thickness CV
Charles Towne Landing Site	98	0.194	0.194	15.46	7.55%	5.85%	1.53	6.71	15.03
Daniel Island Site	43	0.178	0.182	14.84	3.19%	3.55%	1.56	7.86	17.72
Total Precolonial	141	0.191	0.190	15.18	6.22%	5.15%	1.55	7.06	17.74
Lord Ashley Site	79	0.139	0.138	13.77	5.47%	7.37%	1.86	7.18	23.3
The Ponds Site	132	0.152	0.156	19.87	3.77%	7.22%	1.84	6.75	21.88
Spencer Site	68	0.143	0.144	17.36	4.64%	6.65%	1.74	6.95	23.11
Parsonage Site	80	0.131	0.126	11.90	4.55%	6.08%	1.78	6.33	23.51
Ashley Hall Site	39	0.119	0.123	13.82	1.64%	4.15%	1.85	6.92	26.12
Total Colonial	398	0.136	0.141	19.15	4.20%	6.50%	1.84	6.80	23.41

TABLE 2.
RELATIVE FREQUENCY DATA FOR SURFACE TREATMENT, VESSEL FORM, AND MANUFACTURING TECHNIQUE FROM THE SEVEN SITES IN THIS STUDY

Site	Total Sample (n)	Surface Treatment[a]						Rim Sherd Sample (n)	Vessel Form[b]				Manufacturing Technique Analysis Sample (n)	Manufacturing Technique[c]			
		Plain		Burnished		Stamped			Jars		Bowls			Coiled		Modeled	
		n	%	n	%	n	%		n	%	n	%		n	%	n	%
Charles Towne Landing Site	98	1	1.2%	0	0.0%	69	70.4%	98	25	25.5%	4	4.1%	28	16	58.3%	0	0.0%
Daniel Island Site	43	3	7.0%	2	4.7%	34	79.1%	22	18	81.8%	4	18.2%	22	17	77.3%	0	0.0%
Total Precolonial	141	4	2.8%	2	1.4%	103	73.0%	120	43	35.8%	8	6.7%	50	33	66.0%	0	0.0%
Lord Ashley Site	79	59	74.7%	17	21.5%	0	0.0%	102	9	8.8%	37	36.3%	32	14	43.8%	9	28.1%
The Ponds Site	132	17	12.9%	49	37.1%	61	46.2%	88	41	46.6%	45	51.1%	30	18	60.0%	2	6.7%
Spencer Site	68	47	69.1%	19	27.9%	0	0.0%	12	9	75.0%	2	16.7%	12	4	33.3%	1	8.3%
Parsonage Site	80	54	67.5%	24	30.0%	2	2.5%	21	0	0.0%	18	85.7%	21	3	14.3%	12	57.1%
Ashley Hall Site	39	7	18.0%	26	66.7%	0	0.0%	14	6	42.9%	8	57.1%	12	7	58.3%	1	8.3%
Total Colonial	398	184	46.2%	135	33.9%	63	15.8%	237	65	27.4%	110	46.4%	107	46	43.0%	25	23.4%

Note: The table does not report on minority types or sherds classified as "unidentifiable." These specimens are included in total sample frequencies when calculating percentages.
[a]Percent of total respective site samples
[b]Percent of total rim sherds in site sample
[c]Percent of rims selected for manufacturing technique analysis

FIGURES

FIGURE 1

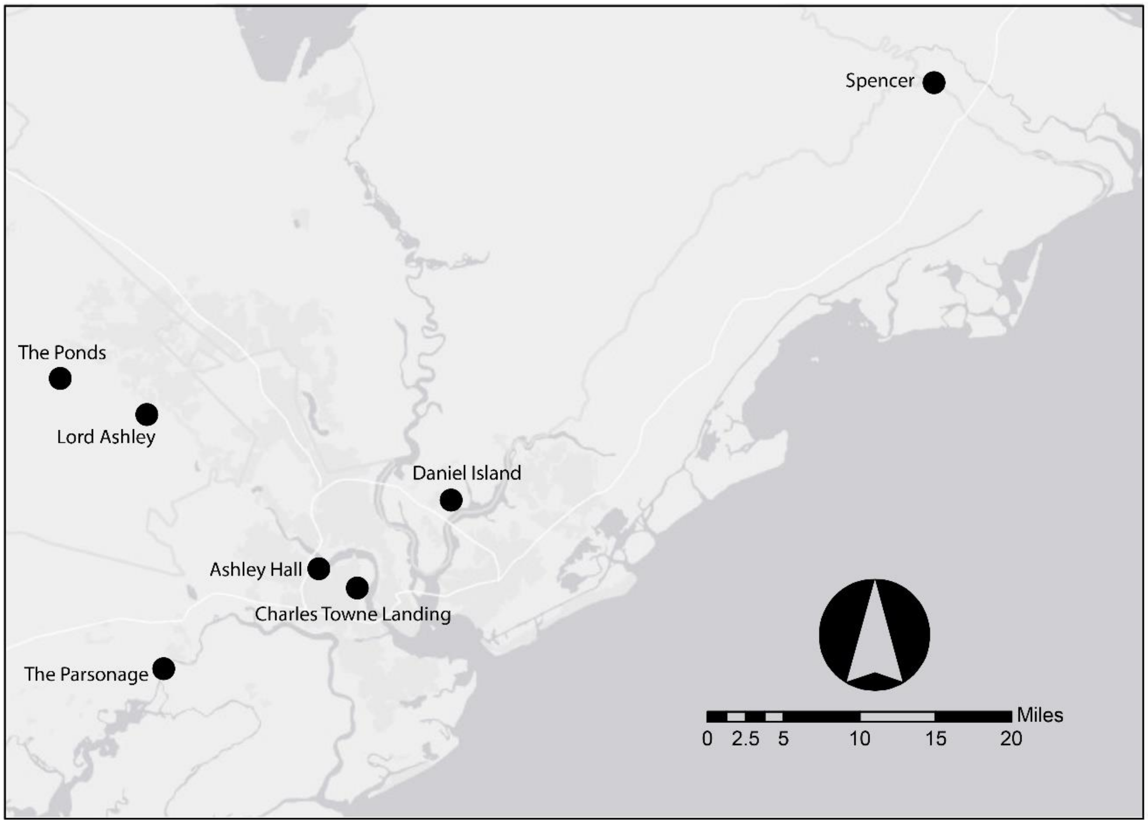


FIGURE 2

FIGURE 3

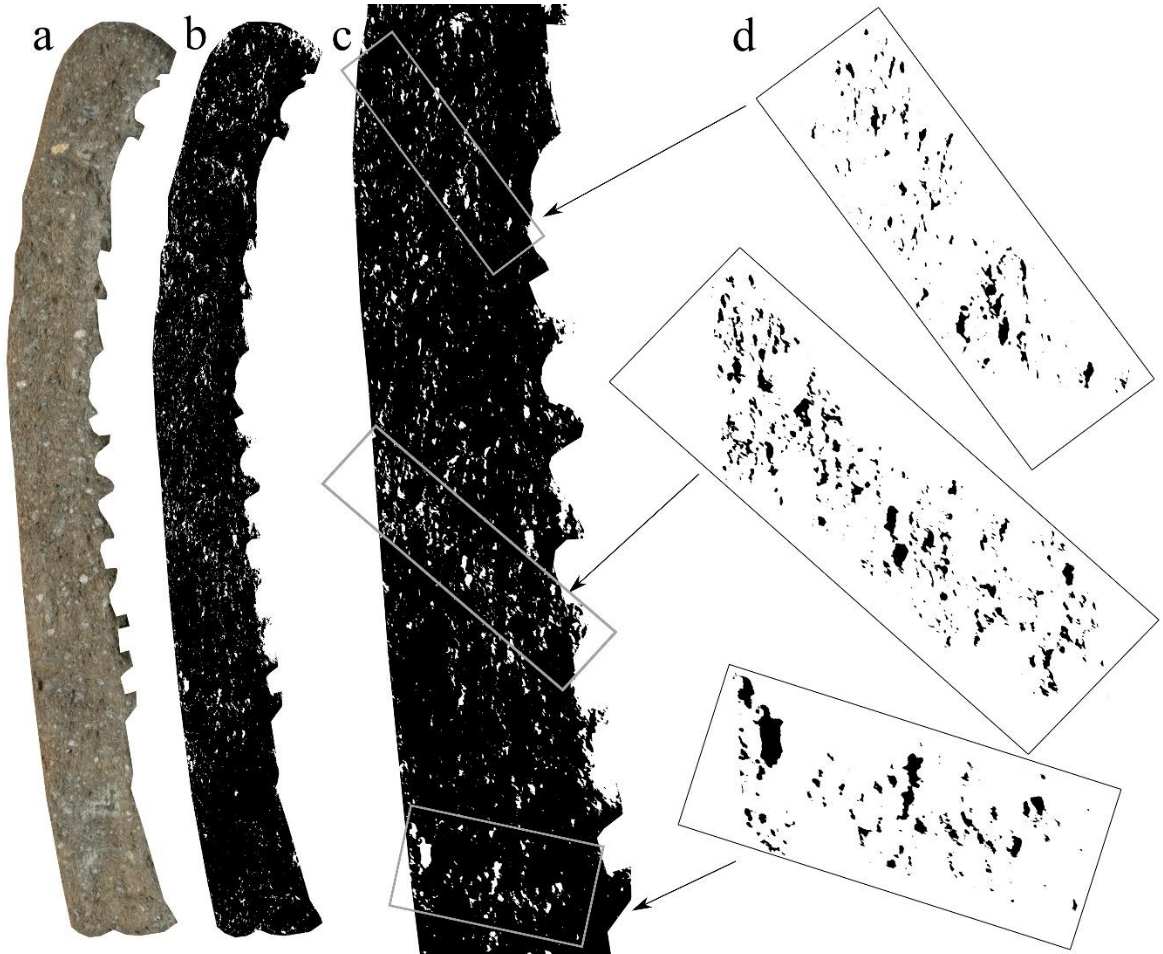


FIGURE 4

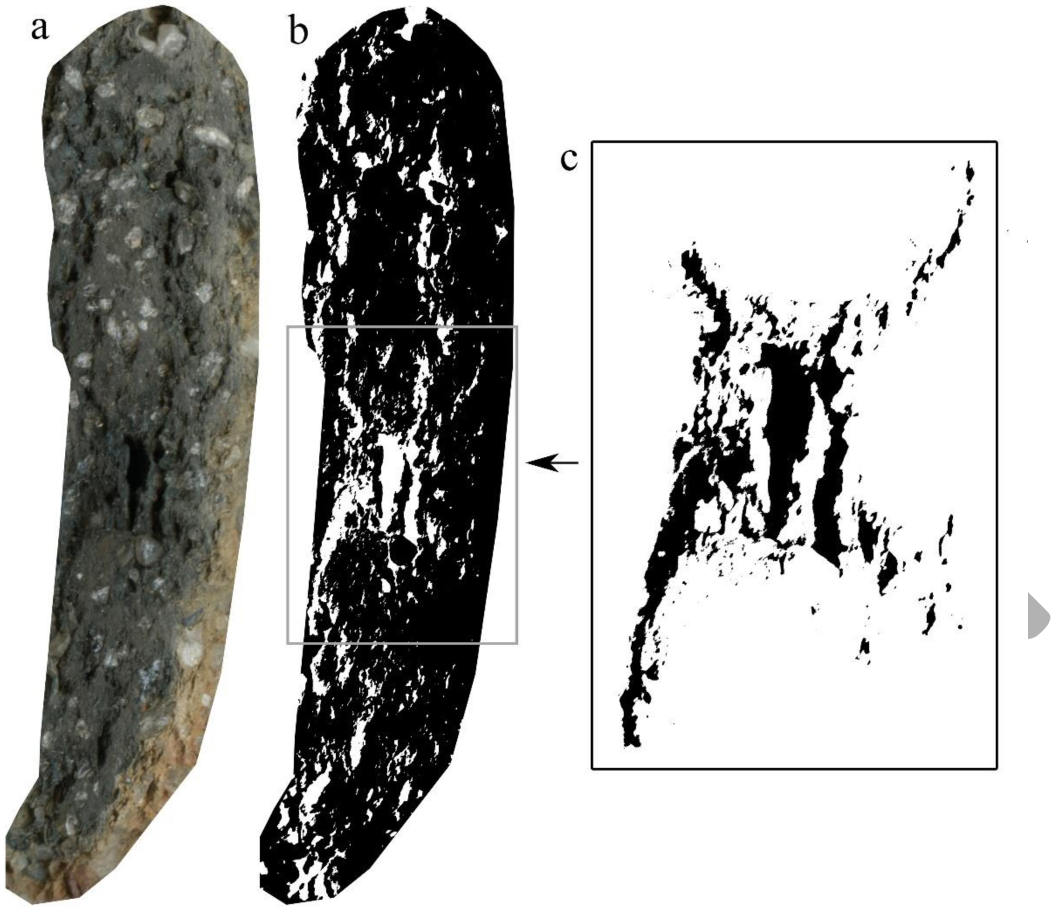


FIGURE 5

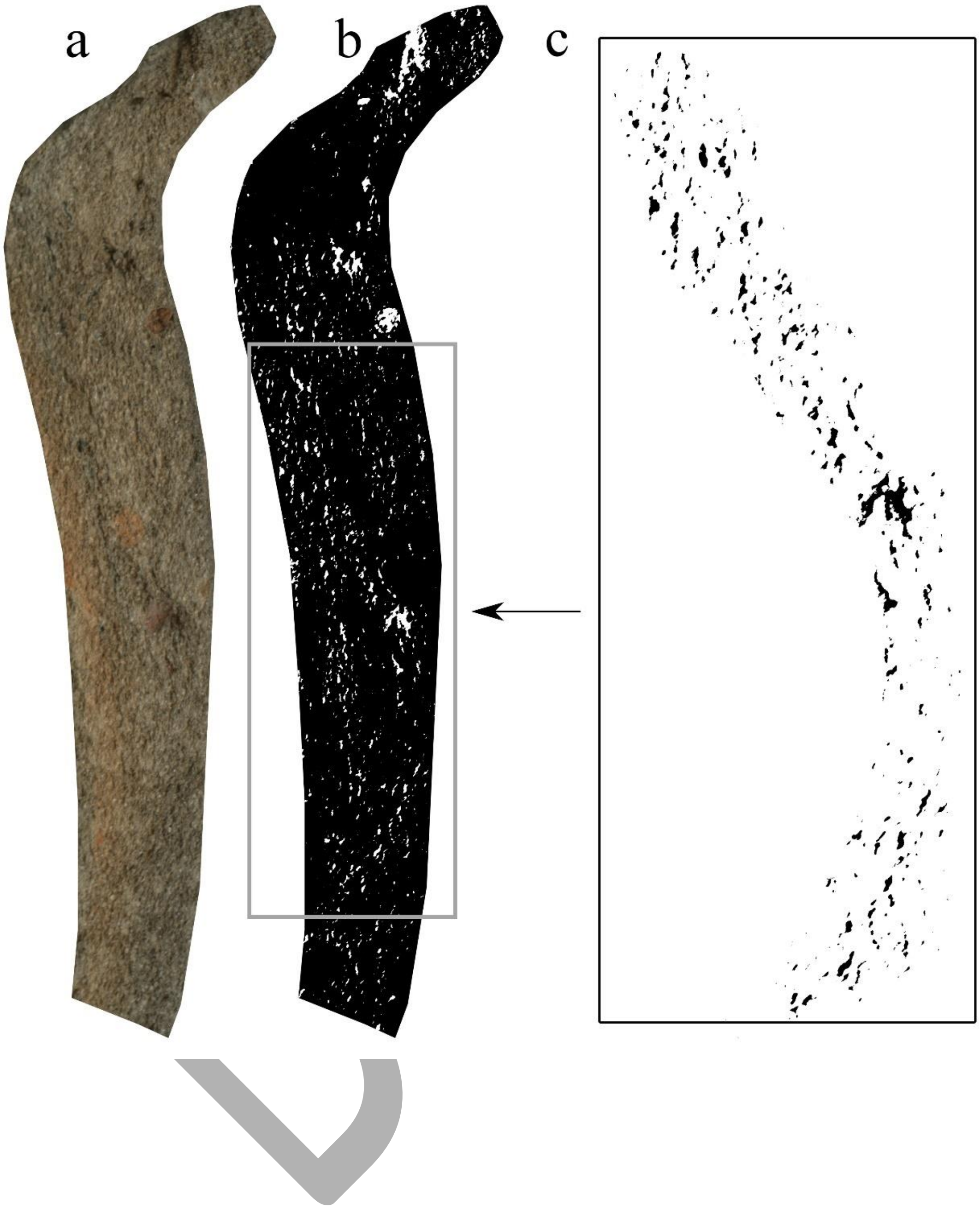


FIGURE 6

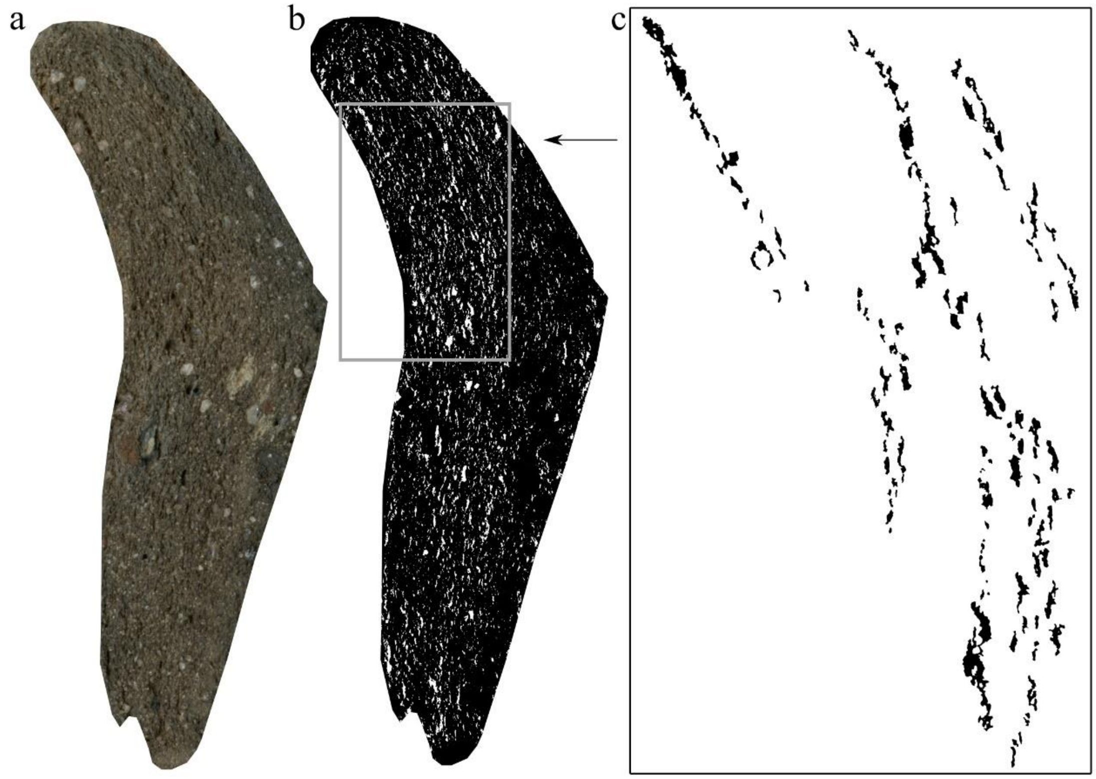


FIGURE 7

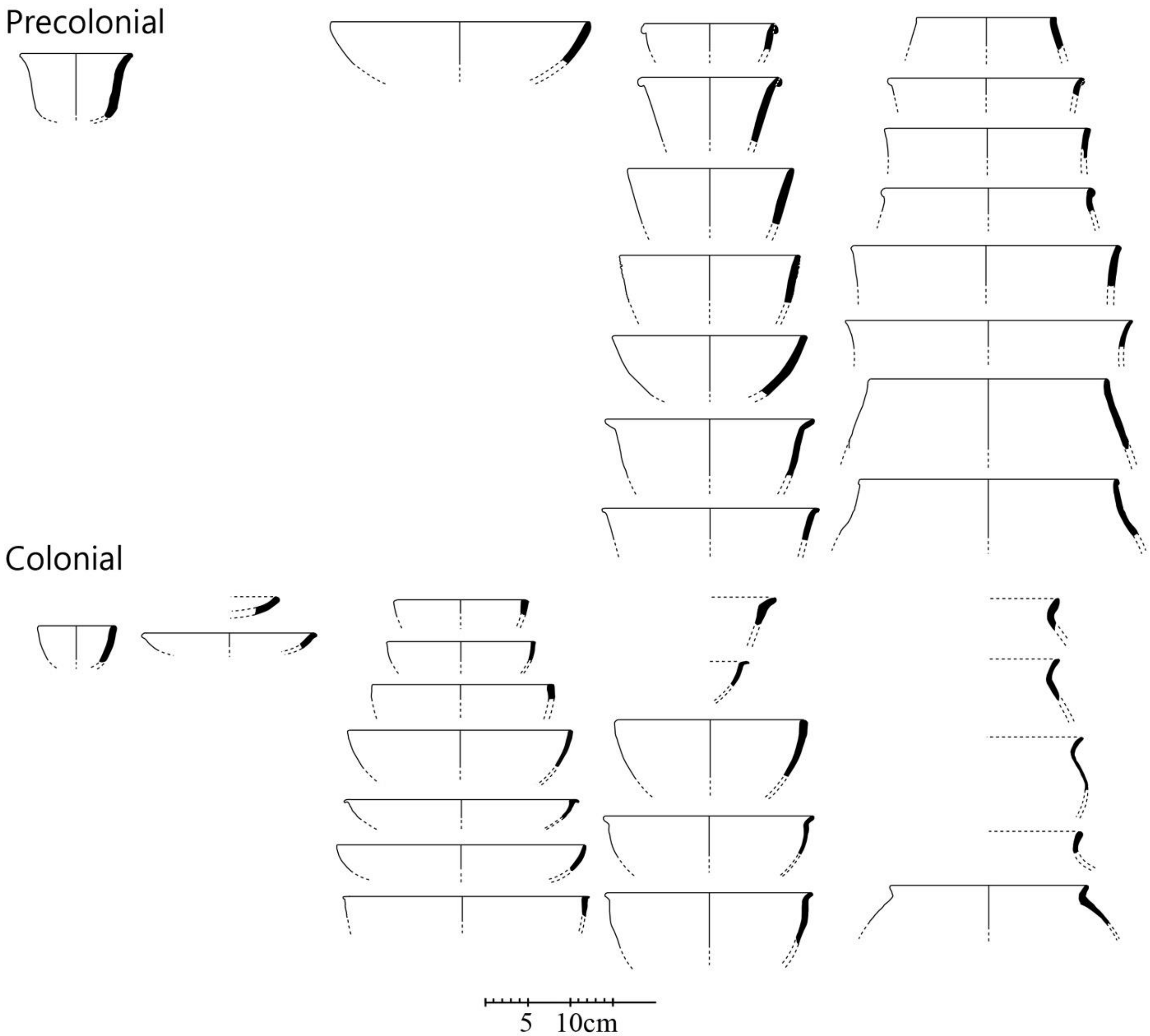
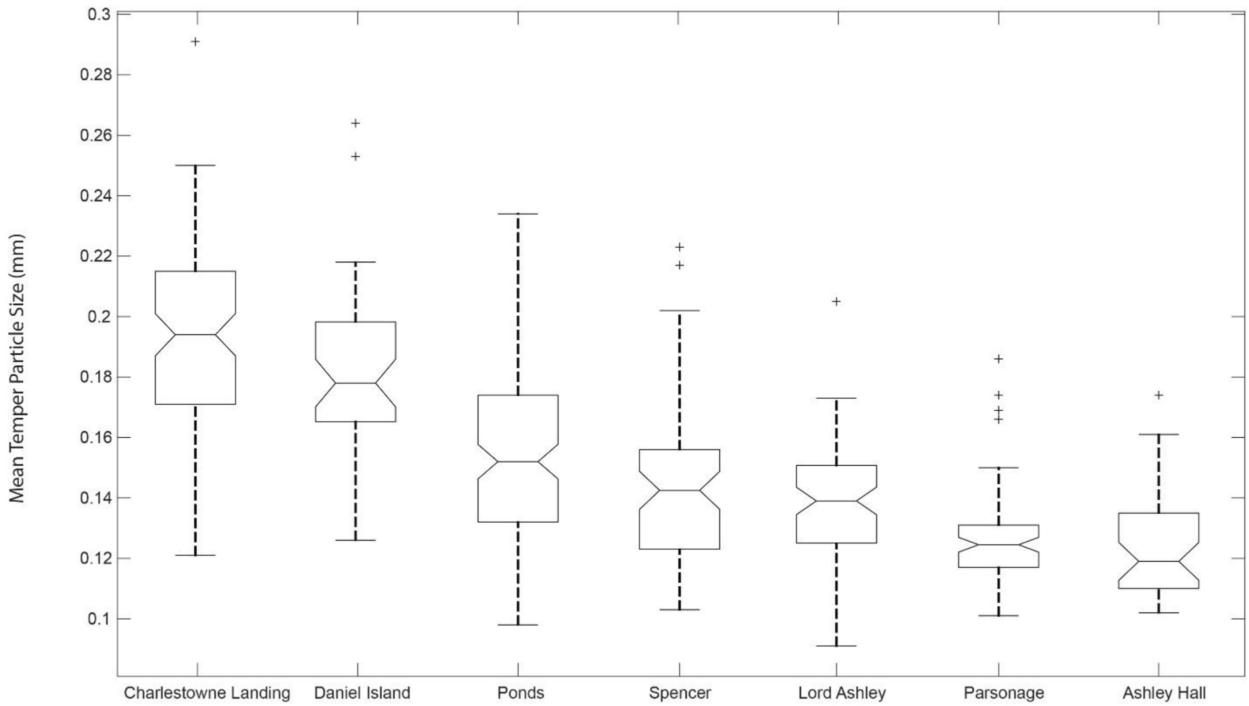
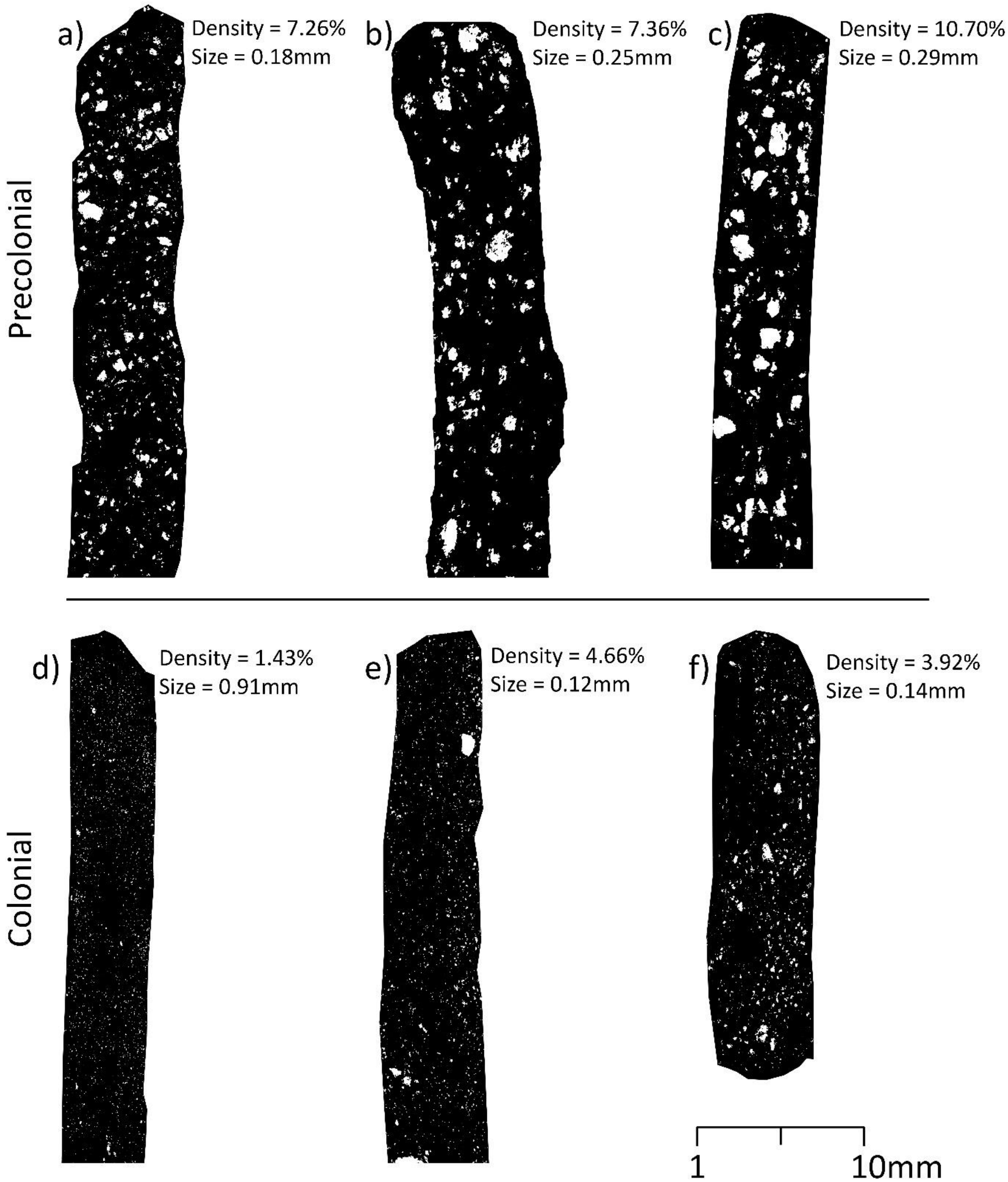


FIGURE 8



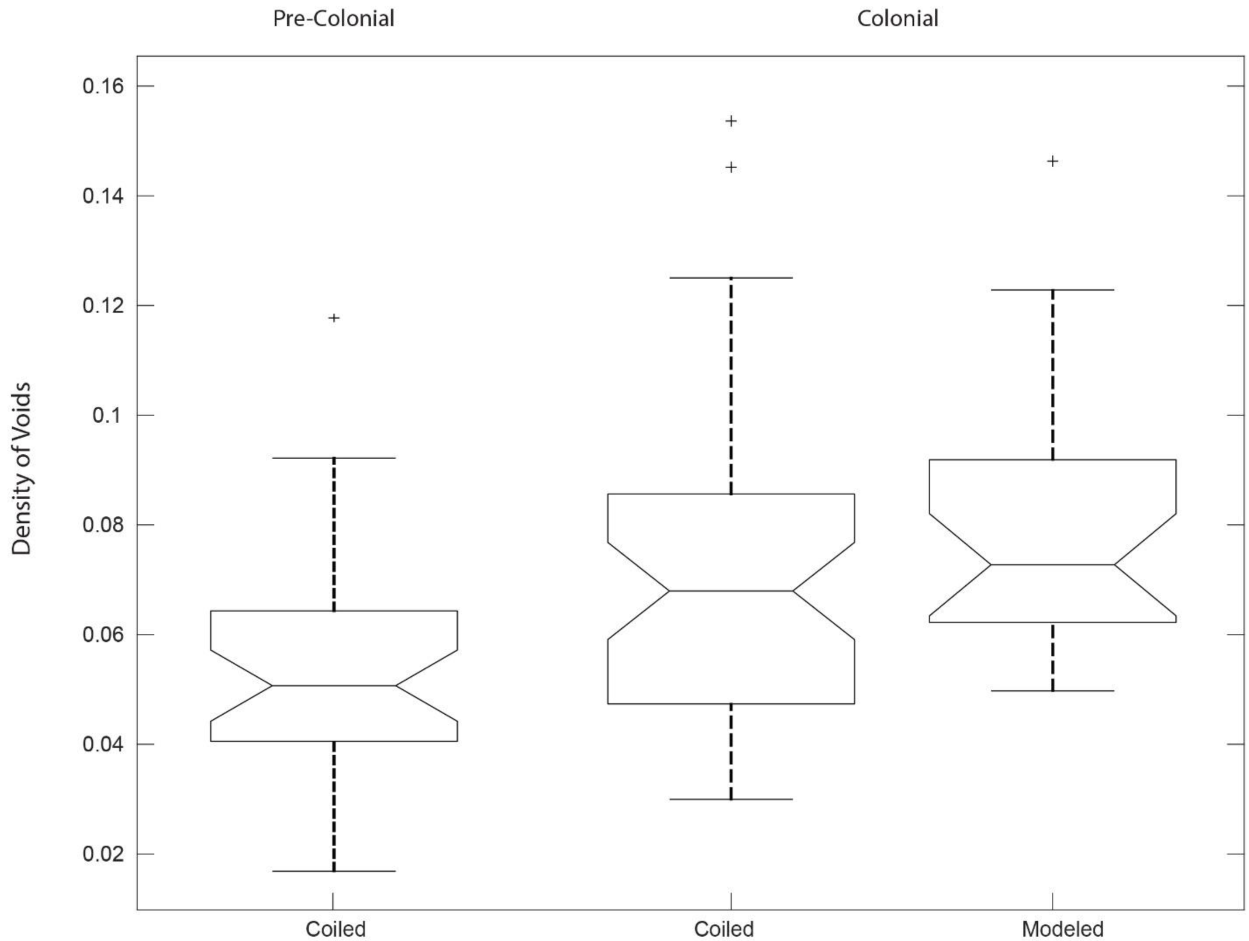
Mean Temper Particle Size (mm)
0.3
0.28
0.26
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
Charlestowne Landing
Daniel Island
Ponds
Spencer
Lord Ashley
Parsonage
Ashley Hall

FIGURE 9



Precolonial
a)
Density = 7.26%
Size = 0.18mm
b)
Density = 7.36%
Size = 0.25mm
c)
Density = 10.70%
Size = 0.29mm
Colonial
d)
Density = 1.43%
Size = 0.91mm
e)
Density = 4.66%
Size = 0.12mm
f)
Density = 3.92%
Size = 0.14mm
1
10mm

FIGURE 10



Pre-Colonial
Colonial
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
Density of Voids
Coiled
Coiled
Modeled

FIGURE 11

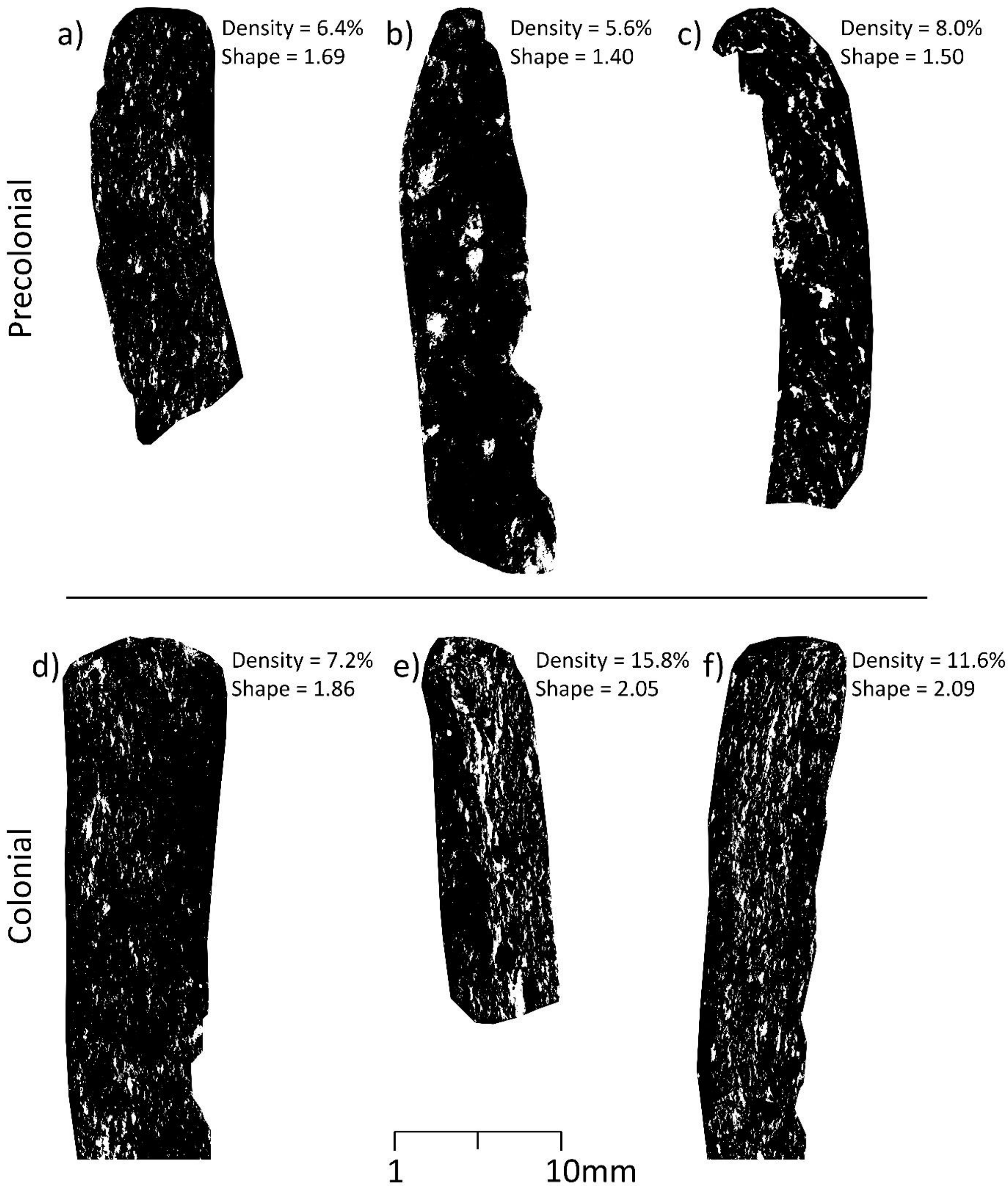

a)
Density = 6.4%
Shape = 1.69
b)
Density = 5.6%
Shape = 1.40
c)
Density = 8.0%
Shape = 1.50
Precolonial
d)
Density = 7.2%
Shape = 1.86
e)
Density = 15.8%
Shape = 2.05
f)
Density = 11.6%
Shape = 2.09
Colonial
1
10mm

FIGURE 12

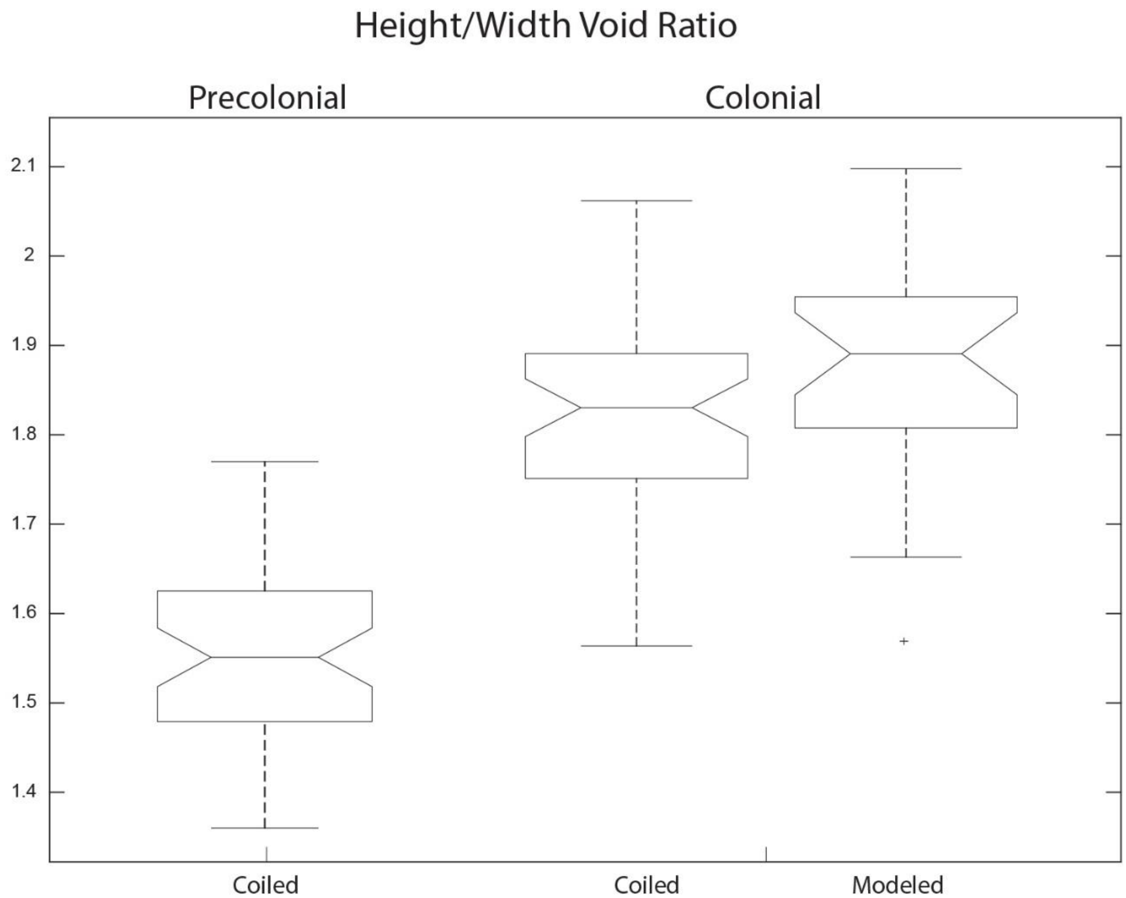

Height/Width Void Ratio
Precolonial
Colonial
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
Coiled
Coiled
Modeled

FIGURE 13

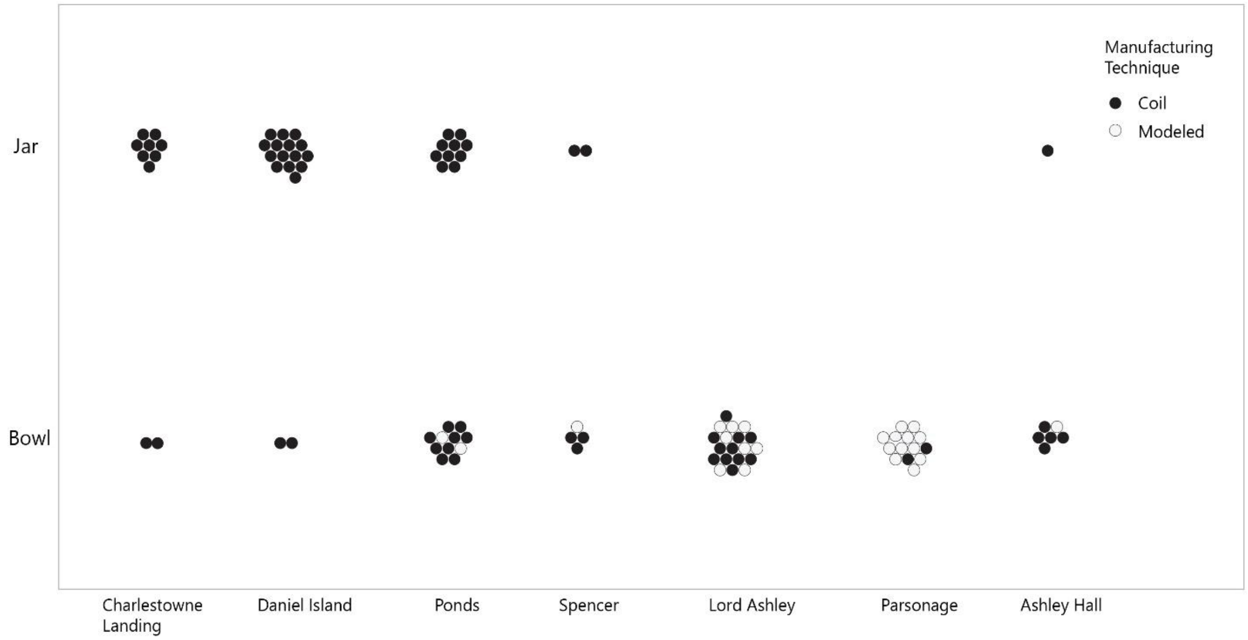
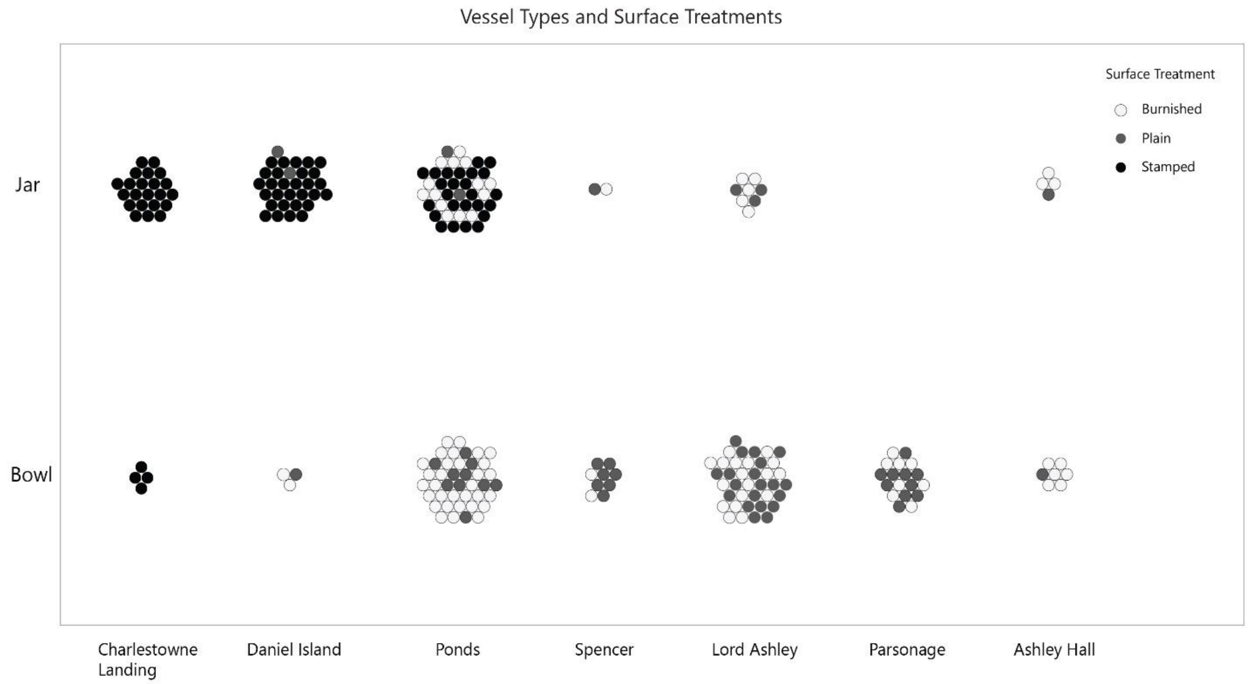

Manufacturing Technique
Coil
Modeled
Jar
Bowl
Charlestowne Landing
Daniel Island
Ponds
Spencer
Lord Ashley
Parsonage
Ashley Hall

FIGURE 14



Vessel Types and Surface Treatments
Surface Treatment
Burnished
Plain
Stamped
Jar
Bowl
Charlestowne Landing
Daniel Island
Ponds
Spencer
Lord Ashley
Parsonage
Ashley Hall

FIGURE CAPTIONS

FIGURE 1. Map of Charleston and the surrounding area, showing the location of the seven sites from which colonoware data was used for this study. (Figure by author, 2022)

FIGURE 2. *(a)* Ground profile, scanned at 6400 dpi with a 5 mm scale using a high-resolution flatbed scanner. *(b)* Optimized profile after image adjustments, displaying the quartz sand temper particles as white against a black profile. The example shown here is a stamped vessel from the Charles Towne Landing site. (Figure by author, 2022)

FIGURE 3. N-coiled sherd. *(a)* Original high-resolution scan. *(b)* Optimized image, showing the voids in the paste as white against a black profile. *(c)* Magnified section of the same profile, showing three coil breaks. *(d)* Isolated voids from the three coil breaks, shown as twice as large as figure *(c)*—each box highlights one break and the arrows indicate where on the profile the breaks are seen. The example shown here is a stamped jar from the Daniel Island site. (Figure by author, 2022)

FIGURE 4. U-coiled sherd. *(a)* Original high-resolution scan. *(b)* Optimized image, showing the voids in the paste as white against a black profile. *(c)* Isolated voids from the visible coil break, shown as twice as large as figure *(b)*—U- and upside-down-U-shaped void orientations are both visible. The example shown here is a stamped jar from the Ponds site. (Figure by author, 2022)

FIGURE 5. S-coiled sherd. *(a)* Original high-resolution scan. *(b)* Optimized image, showing the voids in the paste as white against a black profile. Two coil breaks are visible. *(c)* Isolated voids from the visible S-shaped coil break, shown as twice as large as figure *(b).* The example shown here is a burnished bowl from the Ashley Hall site. (Figure by author, 2022)

FIGURE 6. Modelled sherd. *(a)* Original high-resolution scan. *(b)* Optimized image, showing the voids in the paste as white against a black profile. *(c)* Isolated voids from a section of the sherd, shown as three times as large as figure *(b),* and highlighting several prominent examples of void patterns being oriented parallel to the vessel wall. The example shown here is a plain bowl from the Parsonage site. (Figure by author, 2022)

FIGURE 7. Digitized vessel forms from Pre-colonial and Colonial assemblages. Vessels with an incomplete orifice do not have measurable rim diameter, but its orientation is identifiable and representative of the diversity of forms. (Figure by author, 2022)

FIGURE 8. Notched boxplot comparing the distribution of mean temper particle size from each site's sample (n=539). The box contains the middle 50% of the values, and the horizontal line at the narrowest portion of the V-shaped notch is the median. If the notches of boxplots do not overlap, then the median values of those two sites are significantly different. (Figure by author, 2022)

FIGURE 9. Comparison of precolonial and colonial choices in temper density and size (measured by the mean temper particle size for each sherd). Temper particles are represented as white shapes on a black profile. *(a)* Stamped, unidentified vessel from the Charles Towne

Landing site; *(b)* Stamped, unidentified vessel from the Daniel Island site; *(c)* Stamped, unidentified vessel from the Charles Towne Landing site; *(d)* Plain jar from the Lord Ashley site; *(e)* Plain, unidentified vessel from the Parsonage site; *(f)* Plain, unidentified vessel from the Spencer site. (Figure by author, 2022)

FIGURE 10. Notched boxplot comparing the void density between precolonial and colonial sites, organized by manufacturing technique (n=157). The box contains the middle 50% of the values, and the horizontal line at the narrowest portion of the V-shaped notch is the median. If the notches of boxplots do not overlap, then the median values of those two sites are significantly different. (Figure by author, 2022)

FIGURE 11. Comparison of precolonial and colonial choices in void density and shape (measured as a ratio of void height to void width). Voids are represented as white shapes on a black profile. *(a)* Coiled, unidentified vessel from the Charles Towne Landing site; *(b)* Coiled, plain jar from the Daniel Island site; *(c)* Stamped jar with unknown manufacturing technique from the Daniel Island site; *(d-f)* Modeled, plain bowls from the Lord Ashley site. (Figure by author, 2022)

FIGURE 12. Notched boxplot comparing the void shape ratio between precolonial and colonial sites, organized by manufacturing technique (n=104). The box contains the middle 50% of the values, and the horizontal line at the narrowest portion of the V-shaped notch is the median. If the notches of boxplots do not overlap, then the median values of those two sites are significantly different. (Figure by author, 2022)

FIGURE 13. Simple sherd frequencies plotted by site, organized by vessel form, and color-coded by manufacturing technique. (Figure by author, 2022)

FIGURE 14. Simple sherd frequencies plotted by site, organized by vessel form, and color-coded by surface treatment. (Figure by author, 2022)

COMPLIANCE WITH ETHICAL STANDARDS

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CONFLICT OF INTEREST STATEMENT

On behalf of all authors, the corresponding author states that there is no conflict of interest.