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WITH DOUGLAS V. ARMSTRONG & KEVIN FARMER

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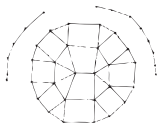

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Sourcing Domestic and Industrial Ceramics from Trents Plantation, Barbados using LA-ICP-MS (Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry)

Lindsay Bloch

Abstract

A wide variety of ceramics are recovered in plantation contexts in Barbados, from hand-built coarse earthenwares to refined tablewares, as well as industrial forms for sugar production. However, the origins for these ceramics are often uncertain. While many ceramics were imported from production centers in Great Britain and elsewhere in the Americas, planters in Barbados also brought in European potters to establish domestic pottery workshops. Made in the same tradition and in the same forms in Barbados as in Europe, it is difficult to visually identify the source of these earthenware products. To better understand the origins of coarse earthenwares found at Trents Plantation on the west coast of Barbados, 117 samples were analyzed via LA-ICP-MS, and their elemental values compared with those from known British and American earthenware sources. The results show significant evidence for Barbadian production of domestic and industrial wares. In particular, the shift from imported coarse earthenwares to locally produced wares may be linked to the intensification of sugar production around the mid-seventeenth century. This evidence for local ceramic production in Barbados illuminates the economic strategies of colonial Barbados in the British Atlantic world.

Keywords: *Pottery, sourcing, compositional analysis.*

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Introduction

This paper presents an elemental analysis of earthenware recovered from Trents Plantation using LA-ICP-MS (Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry). The objective was to determine the makeup and source of domestic and industrial earthenware recovered from three foci on the plantation. Broadly, there were three potential sources for earthenware in Barbados during the historic period: 1) local production; 2) European imports, mainly English; and 3) imports from other English or European colonies in the Americas. Which of these potential sources for coarse earthenwares contributed to the ceramic assemblages on Barbados plantations? Were domestic wares and industrial wares from the same source(s), and did the sources used change over time? To address these questions, I carried out LA-ICP-MS analysis on 117 earthenware ceramics, including 114 samples from Trents plantation. This assemblage was selected by Douglas Armstrong and Sara McNamara from a collection of 6881 earthenwares excavated from Trents Plantation (Armstrong this volume; Armstrong and Reilly 2014; McNamara 2016).

Given the dramatic expansion of the plantation system in the 1640s on Barbados, access to all forms of material goods and supplies, including pottery, was critical. In 1670, Samuel Newton, stated a need for potters (quoted in Spavold and Brown 2005:82):

> '*send over artificers and tradesmen such as may be fit for our plantation by the first especially Taylers and Smiths and when you are at leasure in Derbyshire goe to Tickner and procure a potter and allow him wages. Pray send over one that is a workman.*'

Newton himself was from Derbyshire in the East Midlands of England. With a long history of pottery production in the region, he knew that his agent could find an experienced potter there who was capable of making the types of vessels he desired in Barbados. Documentary and archaeological evidence show that colonial planters in Barbados were endeavoring to establish domestic production of necessities such as pottery on their plantations. More so than in many other English (and later British) colonies, Barbados plantations required large quantities of ceramics. In addition to everyday household needs for food storage, preparation, and serving, the early adoption of sugar production necessitated large quantities of industrial earthenwares including sugar molds and drip jars.

Although seeking self-sufficiency, at the same time Barbados planters maintained strong economic relationships with merchants in England and Scotland. They also had firm social and economic ties with Dutch and English traders and mariners (Armstrong 2019). These connections to the broader Atlantic world provided the colony with access to goods from the Far East, Africa, South America, North America, and Europe. Though initially limited by finance, once the sugar plantation system was set in motion, planters were able to obtain a wide variety of imported everyday and luxury goods to supplement food and materials grown and made in Barbados. It also led to the replacement of what had been small numbers of primarily European laborers working under short-term contracts, to large numbers of African laborers transported to Barbados from Africa as chattel slaves (Armstrong and Reilly 2014; Beckles 2006).

Trents Plantation is located in Saint James Parish on the west coast of Barbados. This plantation was occupied from the initial colonial settlement of Barbados in 1627 through emancipation (Armstrong and Reilly 2014). The site has yielded information on early pre-sugar era and sugar plantation contexts. From 1627 until the late 1640s the property was operated as a relatively small-scale farm with planters and laborers living in close proximity in and around the planter's house (Locus 1). The shift to sugar involved a dramatic shift in scale and social relations, with formerly small numbers of indentured laborers replaced by large numbers of enslaved African laborers.

The earthenware samples derive from three areas on the site. Data for the pre-sugar era derives from the combined planter and laborer context at Locus 1. This area continued on as the planter's residence. However, with the shift to sugar in the late 1640s, a new enslaved laborer village was constructed and occupied until the end of slavery (Locus 2). With emancipation in 1838, the planter household (Locus 1) continued to be used, but the enslaved laborer quarters were removed to a free laborer tenantry at the edge of the plantation (Armstrong this volume; Armstrong 2015a). The third locus from which samples derive is Trents Cave and rock shelter (Locus 3). The cave and shelter were hidden in a gully situated between the village and the planter's mansion. The cave and associated rock shelter were clandestinely used recurrently over a period of more than 100 years from the 1750s until the 1850s (Armstrong 2015b). The cave contained quantities of iron and steel, including weapons, but the deposits had no pottery or glass. However, the shelter area had a wide array of domestic wares related to recurrent use tied to practices and rituals performed in the cave. Together, the three loci at Trents provide a comprehensive sample of material associated with pre-sugar era (1620s – 1640s) as well as sugar plantation era planter and enslaved laborer contexts that spanned the shift to sugar (late-1640s) to emancipation (1838).

The earthenware from excavations at Trents offered the opportunity to investigate temporal changes in earthenware procurement, in particular the effects of plantation intensification. The sample of 117 sherds that was tested using LA-ICP-MS included domestic wares and industrial sugar production wares. Some sherds clearly exhibited characteristics of hand-built Caribbean pottery. Other samples were consistent with known British production regions; yet, the majority of sherds were visually ambiguous as to production origin. Barbadian earthenwares have been described as soft and poorly fired (Loftfield 2001:225), but this description could apply equally to many earthenwares made across the Atlantic world at this time. Lead glazed coarse earthenwares were produced throughout the post-medieval European world in similar forms and using common methods such as wheel throwing (Gibble 2001:258). Coupled with the limited range of variation in surface treatment, it can be challenging to ascertain the origin of an earthenware vessel, especially at the sherd level. For this reason, elemental analysis was conducted to recover information about the origin of these artifacts, in concert with macroscopic analysis.

The samples were analyzed via laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) in order to obtain their elemental concentrations. These values were then compared with each other and with reference materials from identified earthenware production sources outside of the Caribbean. The results demonstrate the importance of local production of earthenware for industrial and domestic purposes during the sugar era in Barbados.

History

The production of earthenware in Barbados differed in many respects from that of other colonial Caribbean contexts. This is in part because the island was abandoned when first visited by English mariners in 1625 (Handler 1977; Harlow 1925). Archaeological investigations have found pre-Columbian pottery dating from the Saladoid through Suazan Troumassoid phases in Barbados (500 BC-1400 AD) (Drewett 2000). Elemental and descriptive analyses indicate that indigenous ceramics found at sites across the island, including a site near the shore at Holetown, and an extensively excavated site at Heywoods, a few kilometers to the north, were likely produced on the island (Drewett 2000; 2002; 2007; Fitzpatrick 1996; Lawrence *et al.* 2016). This indicates that local clay sources were readily accessible. Given the lack of indigenous inhabitants present in Barbados at the time of English colonization, there was no active, local on-island tradition affected by the arrival of Europeans and enslaved Africans (Armstrong and Reilly 2014; Handler 1977; Harlow 1925). However, upon arrival the pioneering colonists travelled to Guiana and brought back 30-40 Indigenous '*Arawaks*' who played a significant role in the early life of the colony, particularly in relation to food production and consumption (Armstrong this volume; Armstrong 2019; Handler 1977; Harlow 1925).

In other British colonies, notably Jamaica, there was a strong cottage industry of earthenware production by enslaved households, utilizing creolized methods of manufacture such as coil building and open firing (Hauser 2008). In Barbados, there is little evidence of such a tradition. Instead, the vast majority of historic earthenwares found in Barbados, many of which were likely locally produced in plantation pothouses, were wheel-thrown and kiln-fired forms using European-style methods (Handler 1963a; Loftfield 2001).

A number of researchers have investigated this historic pottery tradition in Barbados, including its transformation into a cottage industry in the present day (Farmer 2011; Handler 1963b, 1963a; Loftfield 2001; Scheid 2015; Stoner 2000). By bringing over English potters, such as the one requested by Samuel Newton, English planters in Barbados established pottery workshops to produce industrial sugarwares and domestic goods. Working as indentured servants or wage laborers, English potters trained enslaved workers on the plantations, who then took over production (Finch 2013; Handler 1963b). Whereas it is known that around 20 kilns were operating in the eighteenth century (Finch 2013:122; Handler 1963b:135), only two historical potteries in Barbados have been archaeologically tested: Codrington and Colleton (Loftfield 2001; Scheid 2015; Stoner 2000). The archaeological evidence suggests that production of domestic wares at these plantation pothouses was far outweighed by architectural and industrial wares. At Codrington during the eighteenth century, domestic goods made up only eight percent of the waster assemblage (Scheid 2015:342). Furthermore, within the extensive documentary evidence for Codrington, there is no reference to the sale of domestic earthenwares to other plantations on the island (Scheid 2015:212).

Both Codrington and Colleton are located within the Scotland District of Barbados. Geologically, Barbados consists of two primary zones: the limestone coral reef cap, and the exposed basement material in the Scotland District (Figure 14.1). Unlike most of the Lesser Antilles, Barbados is non-volcanic in origin. The majority of the island is covered by the coral cap; a sedimentary limestone deposit extending to

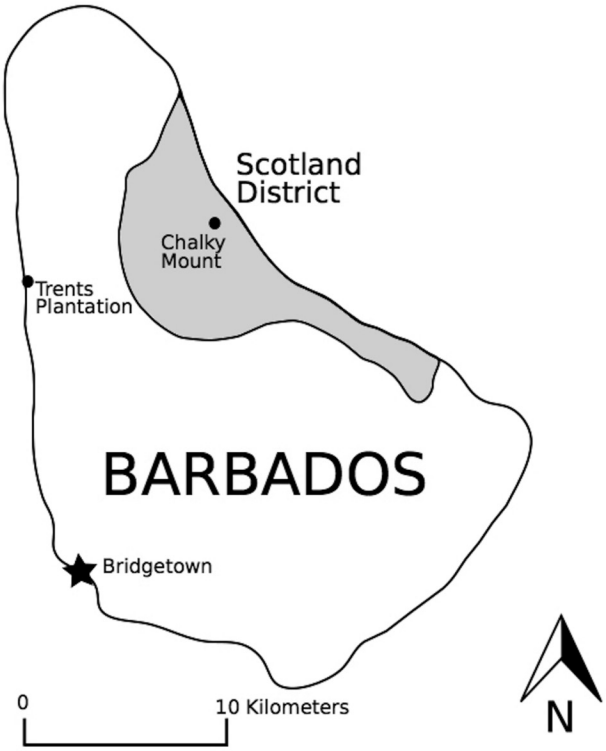

Figure 14.1. Topographic map of Barbados showing the Scotland District and location of Trents Plantation and Chalky Mount Pottery.

a depth of several hundred feet in places. Small clay outcrops have been noted within this cap, including at Trents plantation (McNamara 2016:37), but large deposits of clay suitable for ceramic production are not known. The analysis of pre-Columbian pottery suggests that these isolated deposits, many occurring in marshes, were utilized for pottery production by past people (Drewett 2000; Fitzpatrick 1996). To date, the evidence for historic use has been lacking.

On the eastern side of the island is the Scotland District, making up approximately 15 percent of the exposed landmass of Barbados. A rugged, rocky landscape of sandstone and other mixed deposits of terrestrial and marine origin characterizes this zone. Extensive clay deposits are common in this region, and the vast majority of historic potteries were recorded in or directly adjacent to the Scotland District (Scheid 2015). It was anticipated that Scotland District potteries would have been among the most likely sources for locally made earthenware for Trents plantation in the seventeenth to nineteenth centuries.

Samples

The site now known as Trents Plantation was established in 1627, with occupation continuing through emancipation in 1838. Excavation by Douglas Armstrong began at Trents in 2012 and to date has focused on three main loci (Armstrong, this volume). The earthenware samples from Trents were selected by Doug Armstrong and were recovered from six distinct contexts within these loci, as described below (Table 14.1; Armstrong this volume).

Type	Country	Location	Context	Count
Unknowns (n= 117)[1]				
	Barbados	Trents (St. James)	Locus 1 Early Mansion	52
	Barbados	Trents (St. James)	Locus 2 House 1	13
	Barbados	Trents (St. James)	Locus 2 House 2	8
	Barbados	Trents (St. James)	Locus 2 House 3	24
	Barbados	Trents (St. James)	Locus 2 House 4	13
	Barbados	Trents (St. James)	Locus 3	4
	Barbados	Chalky Mount (St. Andrews)		3
Knowns (n=214)[2]				
	Great Britain	Buckley (Coal Measures)		22
	Great Britain	Liverpool (Coal Measures)		49
	Great Britain	Staffordshire (Coal Measures)		18
	Great Britain	Surrey-Hampshire		18
	Great Britain	London		45
	United States	Philadelphia-Baltimore-Alexandria		62

[1] For further information on Barbados samples, see McNamara 2016.

[2] For further information on reference samples, see Bloch 2015.

Table 14.1. Earthenwares sampled.

The earliest occupation investigated at Trents Plantation, which included the early mansion house and plantation core, was identified as Locus 1. This initial occupation, beginning in the 1620s, preceded intensification of sugar production on the plantation. At this time, a small group of indentured servants lived and labored in the plantation core, alongside the planter's family. Excavation at Locus 1 included a well stratified midden deposit adjacent to the extant main house. In the 1640s, sugar took hold in Barbados, which led to an expansion of the sugarworks near the Mansion and the move of enslaved laborers to a separate village to the east. Locus 1, within the plantation core, is closest to the sugarworks, which likely explains why there were so many industrial earthenwares present at this location.

The enslaved laborer village, Locus 2, was occupied from the mid-seventeenth century until emancipation. Within Locus 2, five distinct house assemblages have been excavated. Each house area consisted of one or more buildings and associated yard space. Additionally, there are several earthenware samples from the rock shelter that is linked to Trents Cave (Locus 3).

The samples from Trents represent the range of coarse earthenwares recovered within these domestic loci. The majority were domestic earthenwares such as cooking pots, bowls, and storage jars. Sugarwares found in these domestic spaces, including drip jars and sugar cones or molds, were also sampled. These industrial wares were far more common at the planter's midden, which was located in close proximity to the sugar works and factory. While less frequent in the village (Locus 2) they are present, and some are in forms in that appear to have been used in water storage.

Methods

Following the provenience postulate (Weigand *et al.* 1977), ceramic sourcing studies rely upon the principle that clays from different sources have distinct compositional signatures, and that these signatures remain within the fired ceramic bodies. These markers reflect the geological origins of the clay, which in most cases will map geographically onto the locations where the ceramics were produced. Due to the worldwide prevalence of clay suitable for earthenware manufacture, before the twentieth century most earthenware potters dug clay in the immediate vicinity of their potworks (Arnold 1985). In Barbados, evidence shows that this was true both prehistorically (Fitzpatrick 1996) and in the twentieth century (Handler 1963a:315).

Given the trade history of colonial Barbados, there were three potential primary sources for earthenwares: 1. local production in Barbados; 2. European, especially English, sources; and 3. production in other Caribbean and American colonies. Sourcing studies may identify the origins of artifacts in several ways: by comparing the unknowns to known raw materials or known products, or developing compositional groups within unknowns that can be used with additional lines of evidence to infer origin. For example, in prehistoric studies, the 'criterion of abundance' may be used to conclude that the most abundant ware type in a particular assemblage is a local product (Bishop *et al.* 1982:301). However, in the historic period, when ceramics were routinely traveling in large quantities through the Atlantic world, this criterion must be considered more critically. Instead, this study emphasized the use of known reference material from British and American production zones, alongside a few samples of unfired earthenware from Barbados. With this dataset, it was possible to begin to establish the universe of potential origins of these earthenwares. While not encompassing all possible production regions, the reference material established some of the primary compositional differences among earthenwares produced in Great Britain, the mainland American colonies, and Barbados.

To map chemical variation onto discrete sources, this study incorporated reference materials from a number of known historic kiln sites from Great Britain and mainland America (Table 14.1). The goal was not to tie vessels recovered in Barbados to individual pottery workshops, but to identify broader geographic and cultural regions known as production zones (Monette *et al*. 2007). Wasters, sherds of vessels that broke before leaving the production site, were analyzed to develop chemical 'fingerprints' for distinct production zones. For this project, the defined zones included four in Great Britain and one in North America. For a more detailed description of the production zones and samples, see Bloch (2015).

The Coal Measures macrogroup comprises products from three major earthenware industries in England and Wales, including Buckley, Liverpool, and Staffordshire. Coarse earthenwares from the Coal Measures geological region share a number of visual characteristics due to the shared geology and pottery technology. These wares are typically high-fired, may have marbled pastes mixing red and buff clays, and contain abundant quartz and ferruginous inclusions.

Two sites from Buckley in Northern Wales were sampled: Brookhill pottery, and Pinfold Lane. From the town of Burslem in Staffordshire, one of the six towns of Stoke-on-Trent, Swan Bank pottery was sampled. In the greater Liverpool area, domestic samples were taken from Prescot and Rainford. Over the course of the eighteenth century, Liverpool took on prominence as a port for the British colonies to trade their

goods, including sugar products. Potters there began producing sugar-refining wares for this industry. To capture potential variation in the earthenware recipe for industrial vessels in contrast to domestic vessels, 23 sherds of sugar cones and drip jars identified as Liverpool products were obtained from various assemblages at the Museum of Liverpool and were analyzed alongside the Barbados samples. Visually, these sherds fell into two categories. The first (n=14) were similar in appearance to 'Buckley-type' domestic wares from the Coal Measures, being highly fired, with marbled paste and abundant inclusions (Maryland Archaeological Conservation Laboratory 2011). Elementally, these industrial wares fit within the broad Coal Measures group. The second type of Liverpool sugarwares (n=9) had a softer body and fewer inclusions than typically seen in coarse earthenware from the Coal Measures, but the inclusions in at least one sample incorporated grog produced from a 'Buckley-type' vessel. These samples were elementally very different from the bulk of Coal Measures material, and seem to represent a distinct clay source or clay recipe used to produce sugar-refining wares in the Liverpool area. This subset of Coal Measures pottery was separated in this analysis into the 'Liverpool' production zone.

The London area also contributed to the colonial trade of coarse earthenwares. Earthenwares produced within the geological zone of the London Basin have a fine sandy texture, and have been called 'Red Sandy Ware' or 'London-Area Post-Medieval Redware,' among other names (Bloch 2015:100). They often have a dark firing core and brightly oxidized exterior surfaces. This study included reference material from three production sites in Harlow, Essex, and several sites from Woolwich in south London including the Teardrop pottery. London potters also produced sugar-refining wares, which have been found in British colonial contexts such as eighteenth-century Philadelphia (Bloch 2015:137). Samples were also selected from the Farnborough Hills kiln site as reference material for Surrey-Hampshire Border ware. This sixteenth and seventeenth century product is regularly found on early English colonial sites in the New World. It is typically buff in color with very few inclusions or no inclusions, and copper green or yellowish lead glazes (Pearce 1992).

In North America, reference materials from three prominent Mid-Atlantic towns were included: Philadelphia, Baltimore, and Alexandria. These towns were known to conduct intercolonial trade along the mainland coast and in the Caribbean (Shepherd and Williamson 1972; Steen 1999). Although I have previously demonstrated that Philadelphia can be reliably differentiated from the other Mid-Atlantic sources (Bloch 2016), as the goal of this initial study was to establish broad source attributions, combining them was advantageous. Overall, these production zones, representing the potential non-local origins of earthenwares in Barbados, are not exhaustive but offer a valuable starting position for characterizing and identifying these artifacts.

With only three samples from Chalky Mount, a contemporary pottery production site in Barbados, there was not enough reference material to define a Barbados production zone. It is possible to say that certain groups within the Trents Plantation samples are non-European, and 'Barbados-like,' but they cannot be absolutely identified as Barbados products. Samples from known historic production sites in Barbados such as Codrington and Colleton pothouses will be incorporated into future analyses in order to confirm the assignments of these vessels to Barbadian production.

Elemental analyses of the Barbados earthenwares were conducted by the author in the Mass Spectrometry lab at UNC-Chapel Hill in 2016. With the exception of the industrial Liverpool samples, all reference material had been previously analyzed, using the same methods, in 2014 (Bloch 2015, 2016). After being cataloged and photographed, a small fragment of each sherd was removed and smoothed with a tungsten carbide bit to present an even surface for analysis. Samples were then rinsed in deionized water, dried, and mounted on microscope slides.

An Excite 193 ultra short pulse excimer laser and ablation system (Teledyne/Photon Machines, Bozeman, MT), was coupled to an Element XR double-focusing magnetic sector field inductively coupled plasma-mass spectrometer (Thermo Fisher Scientific, Bremen, Germany) for analyzing each sample. During laser ablation, a laser beam vaporizes part of the solid sample and suspends it in a carrier gas to the plasma torch. The high heat of the plasma torch (7-10,000 Kelvin) atomizes the sample. These charged atoms are then sorted by mass-to-charge ratio. This analysis focused on the clay matrix. The laser ablation technique is especially effective for ceramics analysis because it can be used to individually sample the component parts of pottery, minimizing the dilution effects of inclusions or surface treatments on the signature of the clay matrix. Three ablation lines 600μm long and 110μm wide were placed on each sample using the integrated camera. The lines were set to avoid inclusions or voids greater than 30μm and any surface treatments.

Data were collected on 44 isotopes. The Gratuze method (Gratuze 1999) was used to convert elemental intensities to parts-per-million values, and sample replicates were averaged. NIST SRM 679 (Brick Clay) and NIST SRM 610 and 612 (Trace Elements in Glass) were used as reference standards for quantifying the elemental data. Each was analyzed at the beginning and end of each day, and after every 10-15 samples. The resulting values for the ceramic samples were then log-transformed and a variety of exploratory data analyses were conducted to identify core compositional groups within the data. All analyses were conducted in R (version 3.2.3).

Results

To define the patterned variation within the samples from Barbados, it was necessary to establish their relationship to the known production zones. Principal components analysis was conducted on the full dataset of reference material and unknown samples (n=331), using a subset of 12 elements that offered the best separation of groups (Figure 14.2a). While some Barbados samples overlapped with known production zones in the first two principal components, the majority fell outside of these groups into distinct clusters. Along principal component one (PC1), the Barbados samples appear to cluster into at least four groups. The samples were provisionally sorted into these four trial groups according to PC1 scores (Figure 14.2b). Outlying samples and those with strong group overlap were provisionally classified as unidentified.

Group membership was then evaluated for the Barbados samples by calculating posterior probabilities with Mahalanobis distances on the 12 principal components, within the full dataset of five known groups and 4 provisional Barbados groups. Jackknifing, a form of leave-one-out cross-validation, was performed as a conservative measure to calculate probabilities (Speakman *et al.* 2008:60). Outlying samples

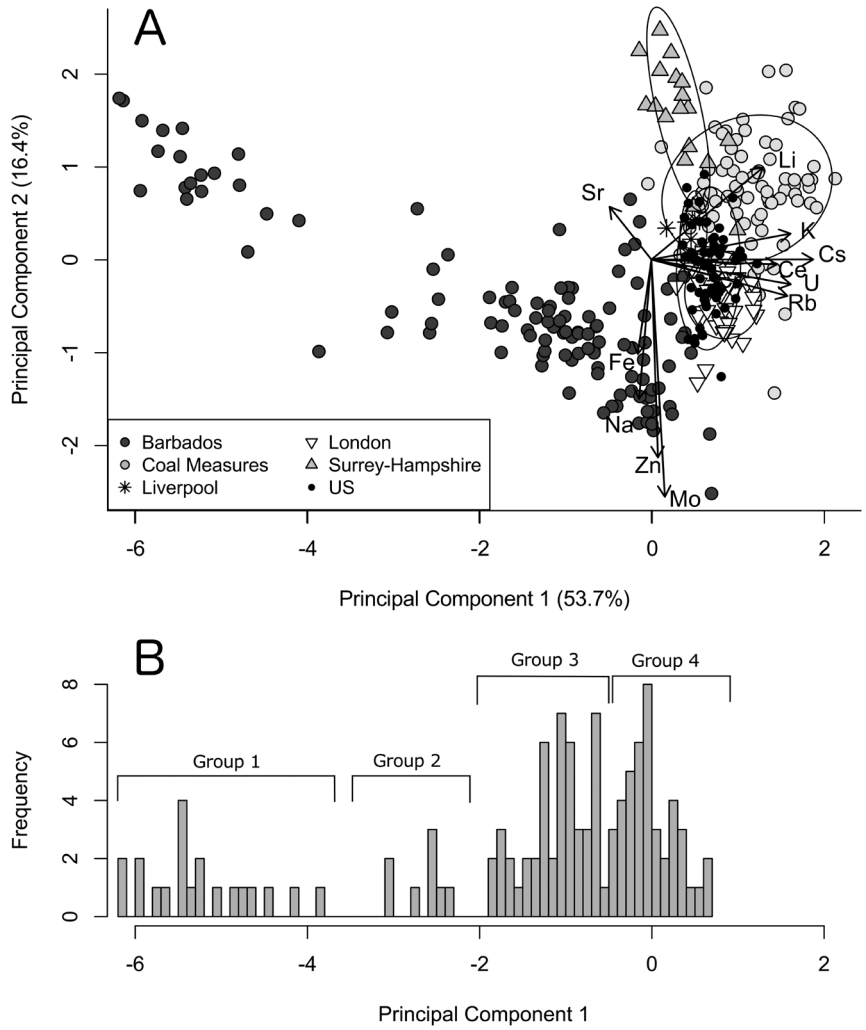

Figure 14.2a. Biplot of the first two principal components. Ellipses represent 90% confidence intervals for the known production zones.
Figure14.2b. Histogram of the Barbados samples PC1 scores, showing division into four trial groups.

were removed and reinserted into the predicted groups until stable membership was achieved. Samples that had no probability of membership to any of the groups, and samples that could not maintain stable membership within a single group were classified as unassigned (n=13).

The elemental results confirmed that there were at least four distinct compositional groups within the Barbados samples that were not consistent with previously identified non-local groups (Figure 14.3, Table 14.2). For clarity I call these Barbados Groups 1-4, but emphasize that while they may well be of Barbadian origin, further testing is needed to confirm this attribution. Overall, only 11% of samples (n=13) could be reliably attributed to non-local sources. No Barbados samples had a predicted group membership to Surrey-Hampshire or to the Mid-Atlantic

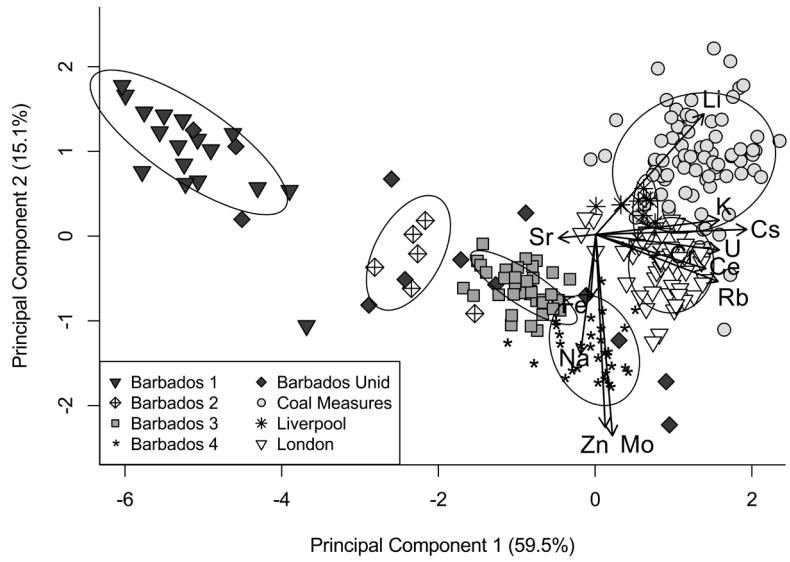

Figure 14.3. Principal components analysis biplot showing final group assignments. Ellipses represent 90% confidence intervals for the known production zones and Barbados groups.

Assemblage	Barbados 1	Barbados 2	Barbados 3	Barbados 4	Coal Measures	Liverpool	London	Unid	Site Total
Trents L1EarlyM	15	2	2	25	-	1	5	2	52
Trents L2House1	-	-	9	-	-	-	1	3	13
Trents L2House2	-	-	6	-	-	1	-	1	8
Trents L2House3	2	1	13	-	2	-	2	4	24
Trents L2House4	-	3	7	-	-	-	1	2	13
Trents Locus 3	-	-	-	4	-	-	-	-	4
Chalky Mount	-	-	-	2	-	-	-	1	3
Group Total	17	6	37	31	2	2	9	13	117

Table 14.2. Summary of Barbados assignments.

US region, so these reference groups were removed from subsequent analyses. The primary European source was London (n=9).

Barbados Group 1 (n=17) was visually and elementally distinctive. These sherds were low fired, hand-built, and heavily reduced. All but one were identified as cooking pot fragments and have exterior sooting. The sherds that comprise this compositional group were broadly consistent in production method and overall appearance with Afro-Caribbean ware found in other Caribbean locales (Heath 1999). They had very high density of inclusions. This is likely due in part to their function. Earthenware potters worldwide tend to have heavily tempered vessels for cooking, as the presence of inclusions within the clay matrix increases strength under thermal shock (Tite *et al.* 2001).

Chemically, sherds in this group tended to be much higher in elements such as calcium, and were depleted in many trace elements. Geological deposits of marine origin are typically very high in calcium and associated elements such as strontium. For this reason, some research projects have applied correction factors or removed these elements from

analysis (e.g.: Descantes *et al.* 2008). However, in this study, since the concentrations of these elements had meaningful variation, they were retained. This notable compositional difference may indicate that these vessels were produced from the local marsh clays derived from the limestone reef cap covering much of the island, rather than Scotland Series clays. Raw clays and prehistoric pottery associated with the Heywoods site, in the NW of Barbados near Trents Plantation, and the Silver Sands site in the south were found to be significantly higher in calcium than Scotland District clay deposits such as Chalky Mount (Fitzpatrick 1996). Mineralogy also confirmed that clays from Silver Sands were distinct from Scotland District clay deposits (Drewett 2000). Alternately, the compositional difference could be related to the inclusions. Though larger inclusions were avoided in the LA-ICP-MS analysis (those >30um), finely crushed limestone may still have contributed to the elemental signature of these sherds. It is also possible that these vessels came from another Caribbean location away from Barbados.

Barbados Group 2, 3, and 4 shared many visual similarities. They were wheel thrown, and most domestic vessels in these groups were lead glazed on one or more surfaces. The domestic sherds from these groups were also similar in thickness, averaging around 7mm. This is in contrast to the thicker Barbados 1 samples, which averaged over 9mm (Figure 14.4). Group 2, composed entirely of domestic sherds, was higher in potassium than Groups 3 and 4, but otherwise consistent. Groups 3 and 4 were the most elementally similar, although Group 4 samples were generally higher than other groups in major elements such as iron and sodium, as well as trace elements such as uranium and cerium. Whereas Groups 2 and 3 were almost entirely domestic wares, Group 4 consisted of half domestic wares and half industrial sugarwares. Notably, the two modern prepared samples of Barbadian clay from Chalky Mount Pottery had a predicted assignment to Barbados 4. The assignment of these samples to Group 4 was a strong indicator that Group 4 was a local Barbadian production group. By extension, because of the elemental similarities of Groups 2, 3, and 4, this lends evidence to the idea that these three groups are all Barbadian. The town of Chalky Mount is located within the Scotland District, and the potter Mr. John Springer, who provided the samples, obtains his clay locally (McNamara 2016:xiii). Given their elemental composition, it is likely than many of the unidentified sherds were local Barbadian products. It is also possible that there are few latent English sherds among these samples, from production zones that were not represented in this analysis, such as Bristol and North Devon. In particular, it is documented that the port of Bristol was active in the Barbados sugar trade (Handler 1963b), though no Bristol earthenware products have been identified on the island.

When comparing the samples by locus and house, several trends emerged that added a clear temporal dimension to the data (Table 14.2). The sherds within the Barbados 1 core group, which were hand-built cooking pots, were predominantly from the earliest context, the Mansion House. Barbados 4 samples were also found only in early contexts: Locus 1 Mansion House and the rock shelter. The absence of this group in Locus 2 contexts indicated a shift in local procurement of earthenware among Trents households away from this source during intensification. When slave housing moved from the plantation core to the periphery, the available earthenware also changed. This was a shift not only in source, but in form, as hand-built cooking pots were also lacking in Locus 2 (except for a single sherd at House 3).

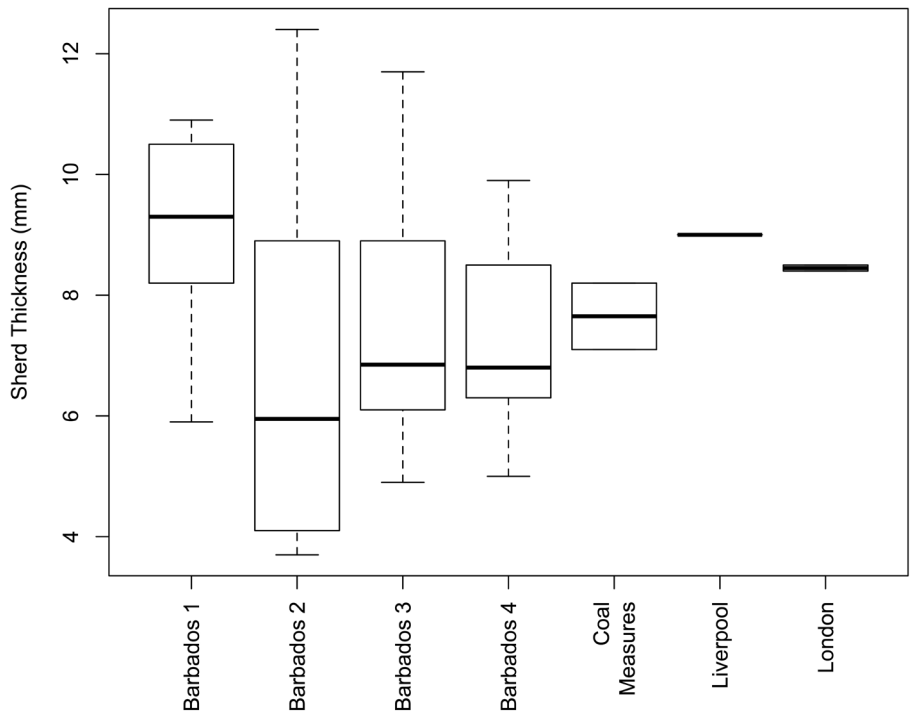

Figure 14.4. Boxplots of domestic sherd thickness by compositional group.

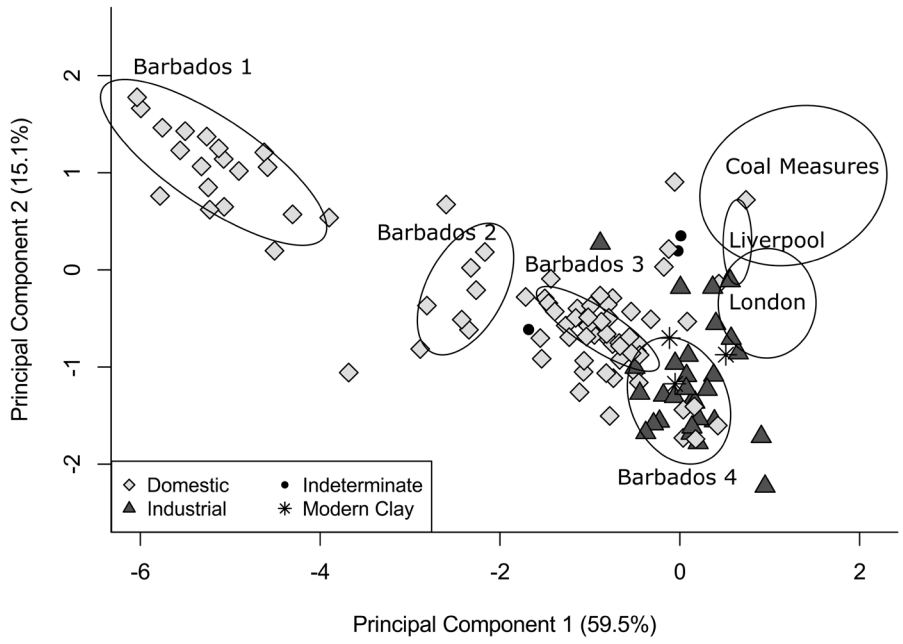

Figure 14.5. Principal components analysis plot of Barbados samples by vessel type. Ellipses represent 90% confidence intervals for compositional groups.

Barbados 2 was comprised of domestic samples across Locus 1 and 2, as was Barbados 3. As discussed above, these two groups were very similar and may merely be examples of slightly different recipes from nearby potteries or even the same pottery in the Scotland District. Given that they overlap at the same house sites, the difference between these groups was likely not temporal. Thus, Barbados 1 and 4 may be characterized as early groups, and Barbados 2 and 3 as later production groups. It was notable that the modern clay from Chalky Mount was most similar to the earliest historic pottery at Trents, rather than the nineteenth century wares. This suggests ongoing extraction of the Chalky Mount clay source over the historic period, but also marks distinct production sources available to Trents plantation residents at different points in time.

When the samples were coded by vessel type, it was evident that the sources for industrial wares in Barbados were different from those for domestic wares (Figure 14.5). London and Barbados 4 were the only identified groups for industrial wares. Industrial wares were found in far fewer quantities at Locus 2 than Locus 1, so it was difficult to make a direct temporal comparison. However, it appeared that the early sugar industry at Trents utilized London cones and drip jars as well as locally produced ones, from the Barbados 4 production zone. A single Locus 2 House 1 drip cone fragment was also sourced to London, but the remaining Locus 2 industrial samples (n=4) were unidentifiable.

Discussion

As hypothesized, the elemental results indicated that the majority of coarse earthenwares found at Trents Plantation in Barbados were most likely local to Barbados. It had been thought that the production of domestic earthenwares was ancillary to the production of industrial sugarwares for plantation use. Instead, this evidence showed that domestic earthenwares were extensively used by plantation residents, and thus likely were commonly made and marketed across the island.

The distinct qualities of handmade versus wheel thrown vessels are evidence that these products are the result of two disparate systems, with indications that Barbados Type 1 was a small-scale, perhaps household-made product, manufactured with different materials than those utilized for European-style products. These vessels, produced without the use of a pottery wheel or kiln, may represent local production of domestic necessities prior to the inception of English pottery workshops in Barbados. Before the late seventeenth century, sugar molds were more commonly made from wood than ceramic (Handler 1963b), so there was not the same market for locally production in the early years of sugar intensification as there would be by the turn of the eighteenth century.

Future research will expand the sampling of earthenwares at Trents to better quantify the variation in industrial earthenwares over time. Furthermore, samples from historic production sites in Barbados, along with fired earthenwares from modern Chalky Mount pottery will be included to better represent the known production zones on the island. Finally, the analysis of earthenwares from plantations across the island should be included to determine whether the patterns seen at Trents Plantation are consistent with that at other plantations.

The dominance of industrial manufacturing in Great Britain meant that Barbadian planters had a ready source for industrial ceramics needed for sugar production as well

as domestic wares. Potentially some planters, maintaining close economic relationships with Great Britain, may have chosen to rely upon imported earthenwares even though locally made ones were available. Documentary evidence shows that some planters in the mid-eighteenth century were continuing to order imported sugarwares (Handler 1963a:136). More research is needed to link British ports and Barbadian plantations to better understand the trade network and market pressures for these goods.

Other plantations may have entirely eschewed imported coarse earthenwares. The ceramic evidence shows that at Trents, and likely for many plantations in Barbados, local European-style products largely supplanted British imports from the start. At Trents Plantation, further work needs to be done to firmly establish which compositional groups are Barbadian, and which are European, but at this stage it seems that locally made European-style wares dominated the assemblages. At the same time, there are clear temporal shifts in the use of wares from distinct local sources in Barbados at Trents. The earliest occupation phase was dominated by hand built coarse earthenware vessels and vessels compositionally related to modern Chalky Mount Pottery. By the height of occupation in the eighteenth century in the slave village (Locus 2), wheel thrown domestic wares from different Barbadian sources or recipes were standard. Given these initial patterns, the pressures of local market forces should be further investigated, as plantation- and assemblage-specific sources show spatial and temporal variation in the local coarse earthenwares being produced or marketed on these islands. These ceramics shed light on their enslaved makers and users, serving as a proxy for understanding the depth of engagement in home production, local markets, and global trade.

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