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Constructing community at civic-ceremonial centers: pottery-making practices at Crystal River and Roberts Island

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ABSTRACT

Crystal River (8CI1) and Roberts Island (8CI36, 8CI40, 8CI41) are neighboring mound complexes on Florida's west-central Gulf Coast, with mainly sequential occupations during the Middle and Late Woodland periods, respectively. Previous work at Crystal River produced assemblages marked by a diversity of pastes and surface treatments, suggestive of distinct communities of practice. However, these excavations were unsystematic and poorly controlled, thus confounding understanding of temporal and spatial variation in practice. Recent excavations in domestic areas, combined with the analysis of older collections from mounds, support a finer-grained understanding of variation in ceramic production. Our analysis suggests that communities of practice persisted through time, although there is variation that corresponds well with changes in settlement.

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In recent years, southeastern archaeologists have come to the realization that several of the largest civic-ceremonial centers in the region did not simply develop in situ among local populations, but instead formed through the aggregation of people from diverse traditions. Perhaps the best documented example is Cahokia, now widely understood to have developed in large part through the "centripetal immigration" (Emerson and Hargrave 2000:4) of individuals and small groups of varying ethnicities and from far-flung areas (Alt 2002, 2006, 2012; Pauketat 2003, 2007; Pauketat and Lopinot 1997). While the process of Mississippianization that began at Cahokia was no doubt in many ways unique, there may be commonalities to the broader outlines by which civic-ceremonial centers develop, and not only for the Mississippian period. For example, Sassaman (2005:356) argues that the Late Archaic-period center at Poverty Point formed through " … the syncretism of two or more distinct ethnic groups."

Emerson and Hargrave (2000:2) observe that the key to understanding the social diversity inherent in the development of civic-ceremonial centers, such as Cahokia, is the accumulation of "detailed historical and cultural contextual analyses that distinguish constellations of situationally significant materials and attributes … " (see also Emerson and McElrath 2001:202). Unfortunately, such detail is often lacking for many of the largest civic-ceremonial centers in the region. One frequent problem is a paucity of reliable radiocarbon dates. Another problem is the longstanding – and in many cases continuing – reliance on traditional ceramic typologies, which tend to reduce variation by relegating sherds and vessels to a limited number of discrete types (Emerson 1999).

We describe ceramic assemblages from the Crystal River site (8CI1) and the Roberts Island Shell Mound Complex (principally sites 8CI36, 8CI40, and 8CI41), neighboring Middle and Late Woodland-period civic-ceremonial centers on the west-central Gulf Coast of Florida (Figure 1). The former site is famous as the southernmost major expression of the Hopewell Interaction Sphere, thanks to investigations of its Main Burial Complex (Figure 2) by Moore (1903, 1907, 1918) and Bullen (1951, 1953, 1966) in the early and middle twentieth century, respectively. The Main Burial Complex includes a dome-shaped mound (F) surrounded by a low platform (E) and a circular embankment (C), all of which contained burials. In addition to this mortuary complex, Crystal River includes a separate burial mound (G), a plaza, three platform mounds (A, H, and K), and an extensive, deep comma-shaped midden. Roberts Island, which consists of a complex of closely related sites (Weisman 1995b), is lesser known and, until recently only minimally investigated. The complex includes three platform mounds (A, B, and C) arranged around an apparent plaza, with an extensive shell midden (Figure 3).

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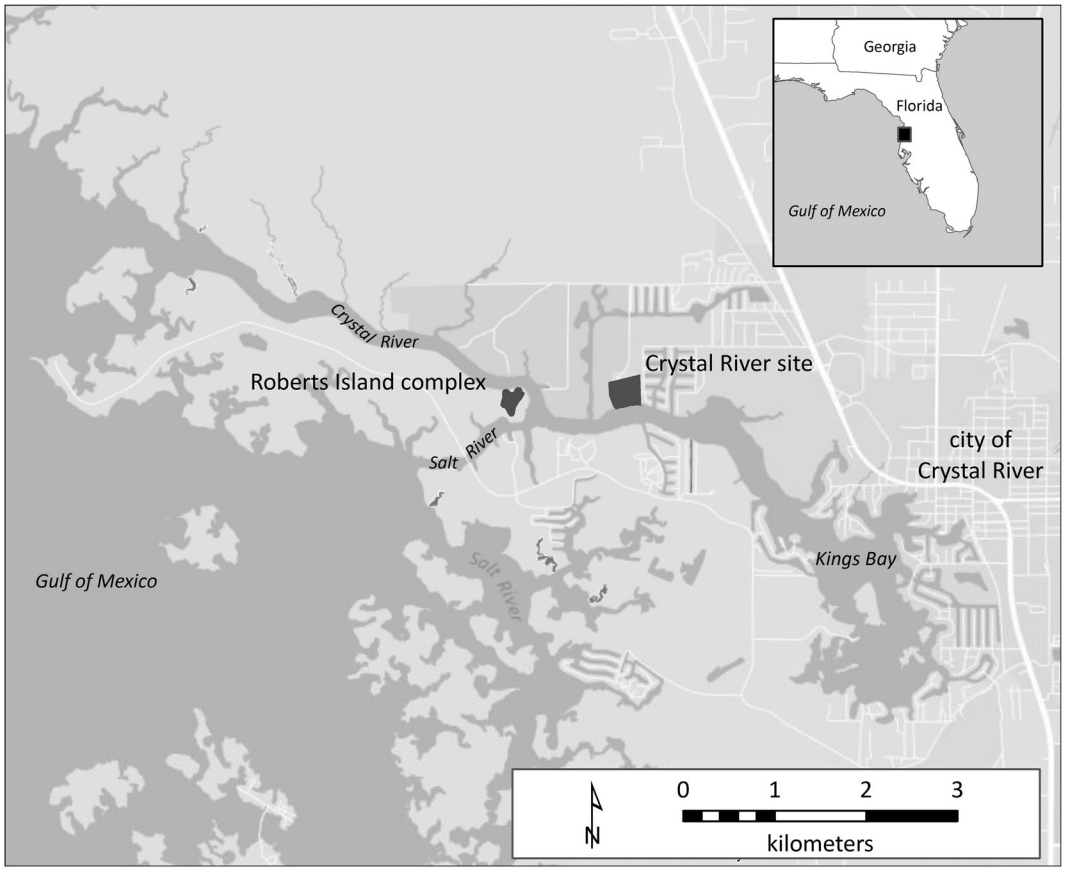

Figure 1. Location of the Crystal River site and Roberts Island complex.

Previous reports of the pottery assemblages from Crystal River suggest a diversity of formal types, including: sand-tempered Deptford Check Stamped; sand-tempered Swift Creek Complicated Stamped; various incised, punctated, and red filmed types of the sand-tempered Weeden Island series; plain and occasional other varieties of the limestone-tempered Pasco series; and, finally, plain and occasional other types of the St. Johns series produced from clays heavily laden with microscopic sponge spicules or diatomaceous earth, but no macroscopically observable temper (Weisman 1995a). The diversity of tempers, in particular, would seem plausibly explained by the coming together of people with different pottery traditions, perhaps akin to the formation of Cahokia or Poverty Point. Prior excavations at Crystal River were unsystematic and poorly controlled, however, and the analysis relied heavily on normative assumptions about types, thus confounding understanding of temporal and spatial variation in pottery-making practice. Recent excavations in domestic areas at Crystal River and Roberts Island, combined with the analysis of older collections from mounds, support a finer-grained understanding of variation in ceramic production.

We employ a "communities of practice" perspective (Lave and Wenger 1991) to understanding temporal variation in pottery at Crystal River and Roberts Island. As defined by Lave and Wenger (1991:98) a "community of practice is a set of relations among persons, activity, and world, over time and in relation with other tangential and overlapping communities of practice." Communities of practice theory focuses on how an individual is integrated into a group by "peripheral learning," through imitation, observation, and graduated participation (Lave and Wenger 1991:29; Wenger 1998). Originally developed under the disciplines of education and psychology, "situated learning" theory and "legitimate peripheral learning" were ways to understand knowledge transference (Lave and Wenger 1991:29–31). Lave and Wenger's (1991:30–31) study of crafting in West Africa led them to the conclusion that situated learning is not simply hands-on, but a vital part of social practice. Learning the ways of the community is part of becoming a member of that community and its social circle. In the sense of communities of practice, "learning is not merely a condition for membership, but is itself an evolving form of membership" (Lave and Wenger 1991:53).

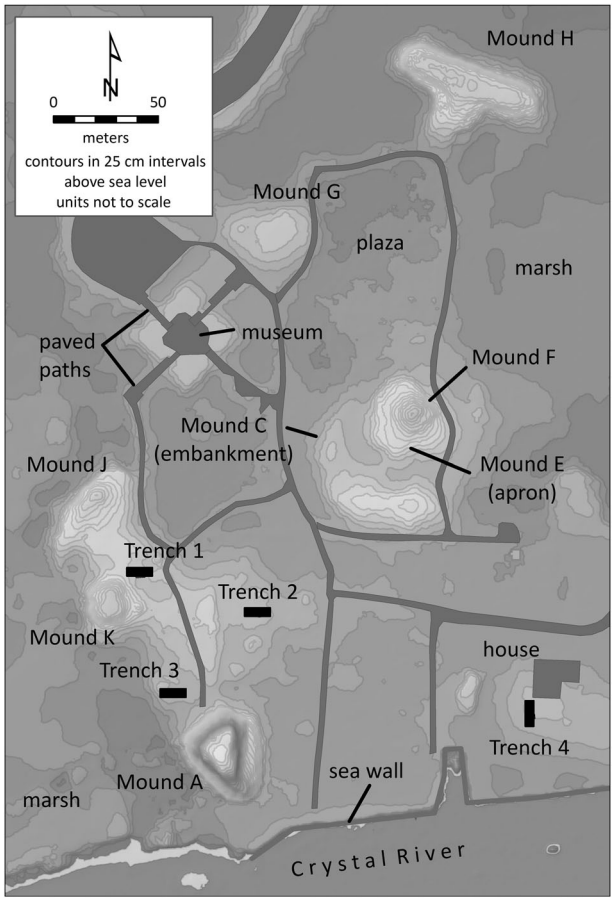

Figure 2. Map of the Crystal River site.

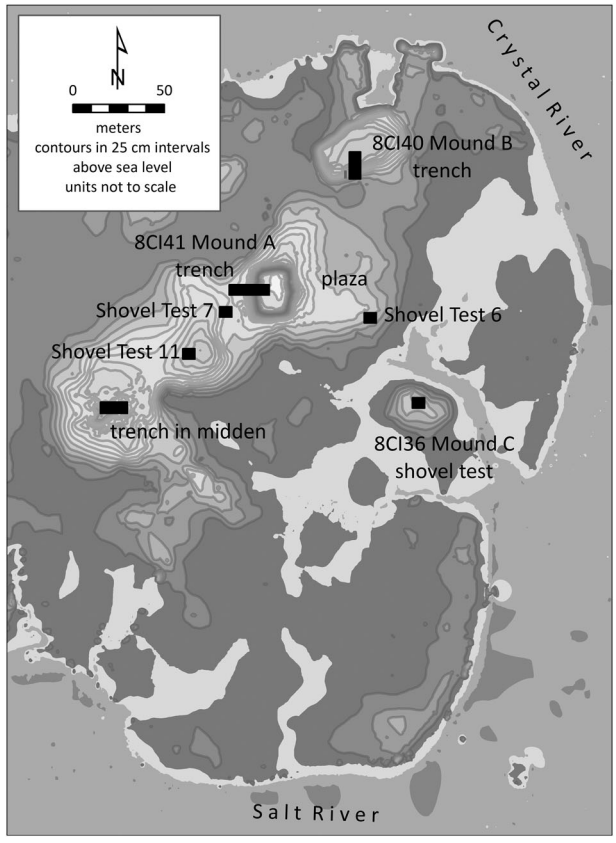

Figure 3. Map of the Roberts Island complex.

Situated learning and communities of practice provide a useful framework for understanding temporal changes in ceramics at Crystal River and Roberts Island and, by extension, the scales of social interaction and social diversity through time. All stages of the pottery chaîne opératoires can reflect community membership. Of course, as Gosselain (2000:190) states, the transmission of ideas is not the same for all the stages of pottery production. Some stages are arguably more easily affected by subtle changes, such as the mimicking of decoration or clay selection, while other production stages such as paste creation and vessel forming require a much more substantial influence to alter technique (Gosselain 2000:191–192; Lyons and Clark 2012:24–25; Minar 2001; van der Leeuw 1984, 1993).

Communities of practice theory is particularly useful for understanding possible changes in learning associated with ceramic production in archaeological contexts, in that it does not require that we specify the precise relationship of the transfer of knowledge (Wendrich 2012a). It thus avoids the difficult issue of identifying ethnicity in the archaeological record (Jones 1997; Shennan 1989), a possibility we do not exclude but also do not assume. Additionally, this perspective leaves open the possibility that individual potters may have been enmeshed in multiple communities of practice (Wendrich 2012b).

Methods

The midden assemblages under consideration derive from recent work at the sites under the auspices of the Crystal River Early Village Archaeological Project (CREVAP), a study funded by the National Science Foundation under the direction of Pluckhahn, Victor Thompson, and Brent Weisman. Based on Bayesian modeling of more than 30 recently obtained radiocarbon dates on stratified midden layers and features, Pluckhahn et al. (2015b) (see also Cherkinsky et al. 2014) divide the domestic occupation of Crystal River and Roberts Island into four phases. Thompson (2016) used these phases to examine change in domestic pottery assemblages over time, focusing on pottery from well-dated midden contexts. We follow the same tactic here. These well-dated contexts are admittedly somewhat limited in terms of spatial coverage, including selected levels from four 1-×-1-m test units at Crystal River (see Figure 2), and three 50-×-50-cm shovel tests and one 1-×-2-m test trench at Roberts Island (see Figure 3). As an additional

caveat, because of variations in the duration, intensity, and extent of occupation, the assemblages from some phases are smaller than others.

The mound assemblages described here result from the previous excavations by Bullen (1951, 1953, 1966), as well as our own, much more modest sampling. We rely primarily on Kemp's (2015) re-analysis of the Crystal River mound assemblages derived from previous excavations by Bullen, curated at the Florida Museum of Natural History. Pluckhahn has also examined the ceramics recovered by Moore, now curated at the National Museum of the American Indian, which we address in qualitative terms. For the mounds at Roberts Island, we focus on the ceramics recovered from a 1-×-6-m trench on the slope of Mound A, a 1-×-4-m trench on the slope of Mound B, and a 50-×-50-cm shovel test on the summit of Mound C.

Bullen's mound excavations are poorly documented, which limits their utility for understanding change through time. However, we conducted Geoprobe coring and geophysical survey of all but the burial mounds to gain greater insight into the nature and timing of mound construction. For the burial mounds, we also have retrieved new dates on artifacts and human remains recovered by Bullen. Discounting a few early dates retrieved by Bullen that have error ranges of more than 100 years, there are presently 18 radiocarbon dates from six mounds or mound complexes at Crystal River; this includes three retrieved dates by Katzmarzyk (1998:Tables 3–8, 3–9) and 15 recovered by Pluckhahn and colleagues (2015a; see also Norman 2014). For Roberts Island, we have one AMS date for two of the three mounds. The timing for Mounds A and H at Crystal River and Mound A at Roberts Island benefit further from optically stimulated luminescence (OSL) dating of sediments within and below the monuments (Pluckhahn et al. 2015a). As with the midden dates, we conducted Bayesian modeling of the start and end dates for mound construction in OxCal 4.2 (©Christopher Bronk Ramsey 2013; Bronk Ramsey 2009).

A few cautions should be borne in mind with regard to our discussion of mound assemblages and their timing. First, because of the absence of detailed notes or maps, Bullen's mound assemblages can only be tied to general proveniences. Second, our reconstruction of mound construction episodes is often based on the very limited windows on stratigraphy provided by small diameter cores and geophysics. We omit Mound J from consideration because its odd shape and stratigraphy make it difficult to interpret. Finally, we note that the ceramic assemblages from mounds do not necessarily reflect the period of use.

The pottery from both midden and mounds was sorted by temper and surface attributes. We used previously defined types (e.g., Goggin 1952; Willey 1949) where appropriate, but we also were attuned to variations that could not be subsumed within these discrete categories. For example, our analysis suggested that a significant fraction of the pottery at Crystal River and Roberts Island contains a mix of aplastics – especially sand and limestone – that might suggest mingled production practices. Although our analysis also extended to vessel form and use-wear (Kemp 2015; Thompson 2016), we omit these in the interest of space. Since the majority of the vessels from domestic assemblages from all phases are simple open bowls, however, these analyses would have added little more to our interpretation.

Results

We structure the discussion by phase. Table 1 summarizes the pottery assemblages from middens by phase. The pottery assemblages from the Crystal River and Roberts Island mounds are summarized in Tables 2 and 3.

Phase 1

Phase 1 of midden deposition has a modeled start date of *cal A.D. 69 to 225* and an end date of *cal A.D. 144 to 265* (here and elsewhere, we focus on the 95 percent probabilities of the posterior density estimates, and follow the convention of using italics to distinguish Bayesian modeled dates (Bayliss et al. 2011; Pluckhahn et al. 2015b:31). The assemblage from well-dated midden contexts for this phase is limited to only 37 sherds from the lowermost levels in two test trenches at Crystal River, so our conclusions are necessarily limited.

The Phase 1 assemblage consists of an almost even mix of sand and limestone-tempered pottery, with few mixed-temper sherds, and St. Johns-like wares. Surface treatments consist only of plain and check stamped. If we assume the pottery from this phase is locally made, given the lack of unusual tempers or surface treatments, it would be consistent with the emergence of Crystal River as a ceremonial center for a community dispersed across the local landscape, perhaps especially on the marsh islands to the west. Based on its limited spatial extent, the Phase 1 resident population at Crystal River appears to have remained relatively small (Pluckhahn et al 2015b). Isotopic studies of oysters suggest it may have been restricted to a seasonal occupation during colder months, perhaps in association with ceremonies that included mound construction (Thompson et al. 2015).

Table 1. Summary of ceramics from well-dated midden contexts by phase (from Thompson 2016).

Paste group	Type/description	Phase 1 midden *N* (%)	Phase 2 midden *N* (%)	Phase 3 midden *N* (%)	Phase 4 midden *N* (%)
Residual/unidentified		40	2377	360	960
Sand/grit tempered	Franklin/Weeden Island Plain	10 (27.03)	286 (16.17)	113 (43.13)	269 (51.04)
	Deptford Linear Check Stamped	7 (18.92)			
	Deptford Check Stamped		2 (0.11)		
	Deptford Simple Stamped		2 (0.11)		
	Wakulla Check Stamped			89 (33.97)	45 (8.54)
	Swift Creek Complicated Stamped		7 (0.40)	13 (4.96)	2 (0.38)
	unidentified stamped		5 (0.28)	2 (0.76)	12 (2.28)
	Weeden Island Red		9 (0.51)		3 (0.57)
	Weeden Island Zoned Punctate				4 (0.76)
	Weeden Island Zoned Incised/Punctate		2 (0.11)		
	Ruskin Dentate Stamped				2 (0.38)
	UID complicated stamped		2 (0.11)		
	Carrabelle Incised				2 (0.38)
	UID incised		1 (0.06)	1 (0.38)	
	UID cord marked		1 (0.06)		
	Total sand/grit tempered	17 (45.95)	317 (17.92)	218 (83.21)	339 (64.33)
Limestone tempered	Pasco Plain	18 (48.65)	1230 (69.53)	41 (15.65)	107 (20.30)
	Pasco Check Stamped	1 (2.70)			
	Pasco Simple Stamped		1 (0.06)		
	Pasco Red		29 (1.64)		
	Total limestone tempered	19 (51.35)	1260 (71.23)	41 (15.65)	107 (20.30)
St. Johns like	St. Johns Plain		17 (0.96)	2 (0.76)	5 (0.95)
	Dunns Creek Red		1 (0.06)		
	St. Johns Check Stamped				1 (0.19)
	St. Johns Incised				1 (0.19)
	St. Johns Scored		1 (0.06)		
	Total St. Johns like	0 (0.00)	19 (1.07)	2 (0.76)	7 (1.33)
Other and mixed temper	Plain, mixed sand/limestone	1 (2.70)	171 (9.67)		74 (14.04)
	Plain, shell tempered		1 (0.06)	1 (0.38)	
	UID incised, mixed sand/limestone		1 (0.06)		
	Total other and mixed temper	1 (2.70)	173 (9.78)	1 (0.38)	74 (14.04)
Total identifiable		37 (100.00)	1769 (100.00)	262 (100.00)	527 (100.00)

Although we suggest that the seasonal inhabitants of Crystal River were drawn from the local area, the almost equal division between sand and limestone tempering in the Phase 1 midden assemblage suggests that it nevertheless may have included two distinct communities of pottery-making practice. Looking at sherd cross-sections under magnification, the extremes in tempering are striking: some sherds are densely packed with fine, medium, and coarse light-colored nodules (mainly limestone), others lack these large inclusions entirely but are very sandy, and still others have no apparent temper or inclusions. Crystal River is situated on one of many limestone outcrops in this karst landscape. In core samples, we noted sandy clays lying just above the limestone substrate (see Norman 2014) that would seem to have been suitable for pottery making. Ann Cordell (2016) conducted ceramic petrography of a sample from one such on-site clay layer, as well as three other clays from exposed beds on nearby islands and mainland. Two of the samples had high sand content and two moderate (with one of these also including sponge spicules). None of the clays contained limestone, although nodules of gypsum and phosphate were noted.

Thus it would seem that the people living at Crystal River had a choice with regard to clay recipes – they had easy access to relatively pure clays and also to limestone that could be used for temper. Limestone outcrops are rare with increasing distance from the mainland, and we might therefore expect this temper to have been less commonly utilized by people who resided on the marsh islands downstream and seaward of Crystal River.

The possible social division that is evident in temper may be repeated in the mounds. Radiocarbon dating suggests that Mound G may have been one of the earliest architectural features initiated at Crystal River, perhaps even beginning a century or two before the first domestic occupation (Katzmarzyk 1998; Milanich 1999:23). The identifiable sherds from this mound total only 155 (Kemp 2015). Generally consistent with the Phase 1-midden assemblage, the majority (70 percent) of the sherds from Mound G are limestone-tempered, with sand-tempered following at 18 percent. Also consistent with the Phase 1-midden assemblage, most of the sherds from Mound G are plain, with the few decorated types limited to a few sherds at most.

The Main Burial Complex also appears to have formed early in the history of Crystal River, and, like Mound G, may have been initiated even before the village was occupied. The ceramic assemblages from the complex are clearly different from those from Mound

Table 2. Summary of ceramics from Crystal River Mounds A-G (from Kemp 2015).

Paste group	Type/description	Crystal River Mound A *N* (%)	Crystal River Mound C *N* (%)	Crystal River Mounds E and F *N* (%)	Crystal River Mound G *N* (%)
Residual/unidentified			463	70	14
Sand/grit tempered	Franklin/Weeden Island Plain	2 (4.88)	4644 (40.50)	467 (24.05)	24 (15.48)
	Deptford Linear Check Stamped		47 (0.41)	5 (0.26)	
	Deptford Check Stamped		31 (0.27)	4 (0.21)	1 (0.65)
	Deptford Simple Stamped		18 (0.16)	9 (0.46)	1 (0.65)
	Wakulla Check Stamped		417 (3.64)	68 (3.50)	
	Swift Creek Complicated Stamped		82 (0.72)	30 (1.54)	1 (0.65)
	Weeden Island Red		1024 (8.93)	94 (4.84)	1 (0.65)
	Weeden Island Zoned Red		20 (0.17)	3 (0.15)	
	Weeden Island Zoned Incised		13 (0.11)	4 (0.21)	
	Weeden Island Zoned Punctate		87 (0.76)	42 (2.16)	
	Weeden Island Zoned Incised/Punctate		3 (0.03)	2 (0.10)	
	Ruskin Dentate Stamped		139 (1.21)	13 (0.67)	
	Ruskin Linear Punctated		6 (0.05)		
	Crystal River Negative Painted			1 (0.05)	
	New River Complicated Stamped		1 (0.01)		
	Crooked River Complicated Stamped		2 (0.02)	8 (0.41)	
	St Andrews Complicated Stamped		12 (0.10)		
	Tampa Complicated Stamped		23 (0.20)		
	Old Bay Complicated Stamped		1 (0.01)		
	UID stamped				
	Carrabelle Incised		23 (0.20)		
	Carrabelle Punctate		28 (0.24)		
	UID incised				
	UID punctate				
	Hillsborough Shell Stamped		26 (0.23)		
	Lochloosa Punctate		3 (0.03)		
	Indian Pass Incised		7 (0.06)		
	Keith Incised		23 (0.20)	8 (0.41)	
	Thomas Simple Stamped		13 (0.11)	3 (0.15)	
	West Florida Cord Marked		5 (0.04)	2 (0.10)	
	St Petersburg Incised		1 (0.01)		
	Safety Harbor Incised		1 (0.01)		
	Safety Harbor Punctate			3 (0.15)	
	Pinellas Plain			1 (0.05)	
	Total sand/grit tempered	2 (4.88)	6700 (58.42)	767 (39.50)	28 (18.06)
Limestone tempered	Pasco Plain	35 (85.37)	1512 (13.18)	329 (16.94)	109 (70.32)
	Pasco Check Stamped		23 (0.20)		
	Pasco Red		166 (1.45)	67 (3.45)	
	Pasco Punctated				
	Pasco Incised		5 (0.04)	2 (0.10)	
	Total limestone tempered	35 (85.37)	1706 (14.88)	398 (20.49)	109 (70.32)
St. Johns like	St. Johns Plain	3 (7.32)	1958 (17.07)	565 (29.09)	1 (0.65)
	Dunns Creek Red		905 (7.89)	183 (9.42)	
	St. Johns Check Stamped	1 (2.44)	3 (0.03)	1 (0.05)	3 (1.94)
	St. Johns Simple Stamped			1 (0.05)	
	St. Johns Incised		5 (0.04)	4 (0.21)	
	St. Johns Punctated		1 (0.01)		
	Oklawaha Plain		1 (0.01)		
	Oklawaha Incised		6 (0.05)		
	Papys Bayou Plain		1 (0.01)	1 (0.05)	
	Papys Bayou Punctated		25 (0.22)	1 (0.05)	
	Papys Bayou Incised		5 (0.04)		
	Little Manatee Zoned Stamped		2 (0.02)		
	UID stamped				
	Total St. Johns like	4 (9.76)	2912 (25.39)	756 (38.93)	4 (2.58)
Other and mixed temper	Plain, mixed sand/limestone		22 (0.19)	1 (0.05)	
	Plain, sand with UID inclusions		100 (0.87)	4 (0.21)	
	Plain, sand with mica		25 (0.22)	13 (0.67)	
	Plain, fullers earth?		3 (0.03)	3 (0.15)	
	Plain, shell tempered				
	Total other and mixed temper	0 (0.00)	150 (1.31)	21 (1.08)	0 (0.00)
Total identifiable		41 (100.00)	11468 (100.00)	1942 (100.00)	155 (100.00)

G and the midden (Kemp 2015). The 1942 total identifiable sherds from Mounds E and F are dominated by sand-tempered and St. Johns-like ceramics, with less amounts of limestone-tempered. The pattern is similar for the 11,468 identifiable sherds from Mound C. Surface decorations from the Main Burial Complex

Table 3. Summary of ceramics from Crystal River Mounds H and K, and Roberts Island Mound A–C (from Kemp 2015 and Thompson 2016).

Paste group	Type/description	Crystal River Mound H *N* (%)	Crystal River Mound K *N* (%)	Roberts Island Mound A *N* (%)	Roberts Island Mound B *N* (%)	Roberts Island Mound C *N* (%)
Residual/unidentified		1	2	638	554	15
Sand/grit tempered	Franklin/Weeden Island Plain	3 (10.71)	2 (6.25)	95 (47.26)	135 (48.56)	13 (81.25)
	Deptford Linear Check Stamped					
	Deptford Check Stamped					
	Deptford Simple Stamped					
	Wakulla Check Stamped			6 (2.99)	31 (11.15)	1 (6.25)
	Swift Creek Complicated Stamped				23 (8.27)	
	Weeden Island Red			3 (1.49)		
	Weeden Island Zoned Red					
	Weeden Island Zoned Incised					
	Weeden Island Zoned Punctate			1 (0.50)		
	Weeden Island Zoned Incised/Punctate					
	Ruskin Dentate Stamped			1 (0.50)	5 (1.80)	
	Ruskin Linear Punctated					
	Crystal River Negative Painted					
	New River Complicated Stamped					
	Crooked River Complicated Stamped					
	St Andrews Complicated Stamped					
	Tampa Complicated Stamped					
	Old Bay Complicated Stamped					
	UID stamped			7 (3.48)	29 (10.43)	
	Carrabelle Incised					
	Carrabelle Punctate					
	UID incised			1 (0.50)		
	UID punctate				1 (0.36)	1 (6.25)
	Hillsborough Shell Stamped					
	Lochloosa Punctate	1 (3.57)				
	Indian Pass Incised					
	Keith Incised					
	Thomas Simple Stamped					
	West Florida Cord Marked				1 (0.36)	
	St Petersburg Incised					
	Safety Harbor Incised					
	Safety Harbor Punctate					
	Pinellas Plain					
	Total sand/grit tempered	1 (3.57)	2 (6.25)	114 (56.72)	225 (80.94)	15 (93.75)
Limestone tempered	Pasco Plain	22 (78.57)	22 (68.75)	57 (28.36)	5 (1.80)	
	Pasco Check Stamped					
	Pasco Red					
	Pasco Punctated				1 (0.36)	
	Pasco Incised					
	Total limestone tempered	22 (78.57)	22 (68.75)	57 (28.36)	6 (2.16)	0 (0.00)
St. Johns like	St. Johns Plain	2 (7.14)	3 (9.38)	11 (5.47)	28 (10.07)	
	Dunns Creek Red			1 (0.50)	1 (0.36)	
	St. Johns Check Stamped			3 (1.49)	11 (3.96)	1 (6.25)
	St. Johns Simple Stamped					
	St. Johns Incised					
	St. Johns Punctated			1 (0.50)		
	Oklawaha Plain					
	Oklawaha Incised					
	Papys Bayou Plain					
	Papys Bayou Punctated					
	Papys Bayou Incised					
	Little Manatee Zoned Stamped				1 (0.36)	
	UID stamped				1 (0.36)	
	Total St. Johns like	2 (7.14)	3 (9.38)	16 (7.96)	42 (15.11)	1 (6.25)

(*Continued*)

Table 3. Continued.

Paste group	Type/description	Crystal River Mound H *N* (%)	Crystal River Mound K *N* (%)	Roberts Island Mound A *N* (%)	Roberts Island Mound B *N* (%)	Roberts Island Mound C *N* (%)
Other and mixed temper	Plain, mixed sand/limestone		2 (6.25)	13 (6.47)	5 (1.80)	
	Plain, sand with UID inclusions		3 (9.38)			
	Plain, sand with mica					
	Plain, fullers earth?					
	Plain, shell tempered			1 (0.50)		
	Total other and mixed temper	0 (0.00)	5 (15.63)	14 (6.97)	5 (1.80)	1 (6.25)
Total identifiable		28 (100.00)	32 (100.00)	201 (100.00)	278 (100.00)	16 (100.00)

exhibit a much greater variety than is apparent in the midden. Although the majority of the sherds are still plain, Weeden Island Red and other types contribute substantially to the overall assemblages from Mound C and Mounds E and F, even if each individual type is low in frequency.

These differences in the ceramic assemblages from the Main Burial Complex relative to Mound G and Phase 1 midden contexts probably reflect a longer period of use for the former mortuary feature. However, the pottery assemblages also may reveal social differences, given the placement of separate burial facilities on opposing sides of the plaza. The discrepancy in burial goods also is conspicuous; burials in Mound G produced few grave goods, and those that were present were primarily made from locally obtainable shell. Mound F in the Main Burial Complex produced most of the Hopewell exotics for which Crystal River is famous (Moore 1903, 1907, 1918). Presumably, many of the ceramics from the Main Burial Complex were imported from other regions; examination of Moore's vessels from the Main Burial Complex indicated that many were made from micaceous clays that would not be found in peninsular Florida.

Phase 2

Phase 2 is the longest of the four intervals of occupation at Crystal River, with a modeled start date of *cal A.D. 221–321* and a modeled end date of *cal A.D. 434–544* (Pluckhahn et al. 2015b:31). During this phase, the village at Crystal River grew rapidly to its full areal extent. It also grew vertically with the deposition of copious quantities of midden comprised mainly of oyster shell. Finally, the occupation appears to have become more permanent; isotopic studies of oysters from this phase exhibit evidence for collection during all seasons (Thompson et al. 2015). Elsewhere (Pluckhahn and Thompson 2017), we have speculated that the development of a larger and more permanent village may have been given impetus by a pulse in sea level rise in the first centuries A.D. (Goodbred et al. 1998; McFadden 2015, 2016) that made life on low-lying marsh islands more tenuous, although we also suggest that the increasing elaboration of the ceremony might have served as a powerful attraction.

In the pottery assemblage from Phase 2 midden contexts, limestone tempering comes to dominate over sand, forming over 70 percent of the assemblage compared to less than 20 percent sand (Thompson 2016). This pattern is consistent across various sampling proveniences, and suggests the establishment of a more uniform, local potting tradition. Surface treatments also are consistent with this; although a number of named types are present, more than 96 percent of the midden pottery from Phase 2 is plain.

A possible blending of pottery-making traditions or communities is indicated by the observation that nearly 10 percent of sherds from Phase 2 midden contexts appear to have a fabric comprised of mixed sand and limestone. Such mixing may be much more common than allowed for by our macroscopic sorting; gross paste analysis has revealed that much of the pottery we classified as sand contained small amounts of limestone, and that many of the sherds we classified as limestone-tempered contained sand (Kemp 2015; Thompson 2016).

Recent dating suggests that two of the smaller platform mounds at Crystal River – Mounds H and K – were constructed during Phase 2 (Norman 2014). The pottery assemblages from these mounds, although limited in size, are remarkably similar to those from the midden. The FLMNH has collections from two units Bullen (1966) excavated on or near the summit of Mound H, the small ramped platform mound anchoring the north end of the plaza. Only 28 identifiable sherds are present, but the proportions are remarkably similar to the midden in regard to temper, with a majority of limestone-tempered (Kemp 2015). Also like the Phase 2 midden, 97 percent of the Mound H assemblage is plain.

Bullen (1966) excavated one unit in Mound K. The assemblage of identifiable pottery from this mound is

small ($n = 32$), but again shows great consistency with the Phase 2 midden in the dominance of limestone (at 65 percent) over other tempers, and plain (at 97 percent) over other surface treatments (Kemp 2015). Also similar to the Phase 2-midden ceramics, the Mound K assemblage exhibits a relatively high frequency (15 percent) of mixed-temper sherds.

Phase 3

Phase 3 has a modeled start date of *cal A.D. 478–634* and an end date of *cal A.D. 663–810* (Pluckhahn et al. 2015b:32). This phase saw a waning of settlement at Crystal River; the village contracted to the area north of Mound A and there was less midden deposition. Some of the population may have moved to Roberts Island, where settlement initiated during this interval. Other people probably dispersed across similar small settlements. The settlement shift at Crystal River was mirrored at contemporaneous mound centers across much of the Gulf Coast (Menz 2015; Russo et al. 2014; Wallis and McFadden 2016; Wallis et al. 2015). The causes of this apparent region-wide reorganization of settlement are currently unclear, but shifts to a drier or more variable (or both) climate have been implicated for some of the changes in the region during this interval (Marquardt 2014:10; Sassaman 2012:262; Smith 2009).

Pottery appears to track these changes in settlement, although the precise mechanisms for this are not clear. In the Phase 3 midden assemblages, sand (at 83 percent) comes to dominate over limestone (16 percent), and there is a reduction in the proportion of mixed-temper sherds (Thompson 2016). The increase in sand at the expense of limestone is reminiscent of Phase 1, and suggests that this temper is more common in this area when the population was more dispersed, rather than concentrated at Crystal River. The lesser proportion of mixed tempers could be consistent with potters in greater isolation from each other.

The surface treatments that are represented in Phase 3 midden assemblages show greater spatial variability than those of preceding phases. The sub-assemblage from Crystal River is almost entirely plain, and thus shows continuity with Phase 2. However, the Phase 3 sub-assemblage from Roberts Island is more varied, with significant amounts of Swift Creek Complicated Stamped and Wakulla Check Stamped and trace amounts of several other decorative types.

Recent work suggests that Mound A, the large platform mound at Crystal River, was completed during Phase 3, even as the settlement of the site was diminishing. No excavations have been conducted in Mound A, but Bullen (1951) and Smith (1951) surface collected a minimal number of sherds. Kemp (2015) documented 41 sherds from these investigations. In contrast with the midden, most are limestone-tempered. The assemblage is entirely plain, with the exception of one St. Johns Check Stamped. The discrepancies between the mound and midden assemblages suggest the possibility that Mound A may have been constructed at least partially of repurposed midden. This finds some support in the stratigraphic inversion of carbon dates (Norman 2014). It also may be supported by isotopic studies of oysters (Thompson et al. 2015). Samples from Mound A were determined to have been gathered across seasons, as with those from the midden; in contrast, oyster samples from all of the other mounds that were sampled were only harvested in cooler months.

Phase 4

The final phase of occupation at Crystal River and Roberts Island has a modeled start date of *cal A.D. 723–881* and end date of *cal A.D. 891–1060* (Pluckhahn et al. 2015b:31). By this point, Crystal River appears to have been abandoned except for a small area of occupation immediately north of Mound A. Conversely, this was the period when most of the midden was deposited at Roberts Island; radiocarbon dates indicate it also was the interval when at least two of the three mounds (Mounds A and B) were constructed (Mound C is undated).

Sand-tempered pottery remained dominant in Phase 4 midden assemblages, although less so than in Phase 3 (Thompson 2016). The proportions of limestone-tempered and St. Johns-like sherds increased slightly, while mixed-tempered sherds increased more dramatically. Surface decoration remained mostly plain but with continued trend toward a greater richness in minority wares, which now include a variety of Weeden Island types, St. Johns and Wakulla Check Stamped, and Swift Creek Complicated Stamped. However, it should be noted that there is considerable variation in the proportions of both tempers and surface treatments across proveniences. These trends and the diversity across sampling units are difficult to interpret, but could be consistent with more seasonal use of both settlements in association with ceremonies.

The assemblages from the three mounds at Roberts Island are generally consistent with those from the midden in terms of the dominance of sand-tempered pottery. However, the mounds show greater proportions of St. Johns-like pottery than the midden, and lesser relative frequencies of mixed-temper sherds. As with the diversity in the Phase 4 midden, this is difficult to interpret.

Discussion

Potters at Crystal River made choices – probably both deliberate and unconscious – regarding pastes and decorations. These choices persisted across phases of occupation and monument construction, but not without potentially significant variation. The close correspondence between temporal changes in the ceramic attributes (especially temper) in midden assemblages and shifts in settlement suggest that these changes may be explained by variation in the intensity of interaction among communities of potters. Such variation might be expected with the waxing and waning of civic-ceremonial centers.

For Phase 1, when Crystal River appears to have had a relatively small and seasonal resident population, the relatively even split between limestone- and sand-tempered pottery in the midden suggests to us that it was a ceremonial center for two distinct communities of potters. This interpretation is lent some additional credence by the apparent maintenance of two distinct burial facilities. Presumably, given the lack of exotic tempers or surface decorations from midden contexts, these were social groups from the general area. But it is clear that the site also attracted people or materials, or both, from farther afield, as evidenced by the diversity of ceramics and other burial goods in the Main Burial Complex.

During Phase 2, the village at Crystal River grew substantially in both size and permanence, at a rate dramatic enough to suppose that it must have involved an influx of people. The pottery from midden assemblages suggest both a convergence toward locally-available limestone aplastics and a blending of ceramic-making practices as potters came into more sustained contact, a pattern similar to those observed in the ceramics from similar coalescent communities elsewhere (e.g., Eckert 2012; Garraty 2013; Lyons and Clark 2012; Roddick 2009; Sassaman and Rudolphi 2001).

Phases 3 and 4 are somewhat more difficult to interpret. In general, however, the higher relative frequencies of sand-tempered pottery and greater variation in surface decoration (even as plain continues to dominate) may be consistent with a renewed dispersal of population to the seaward marsh islands as Crystal River gradually declined in population and ritual importance, and Roberts Island grew.

As Lave and Wenger (1991) and others (e.g., Roberts 2006) have noted, communities of practice are not static. It follows that our archaeological approaches to communities of practice must be able to recognize temporal fluidity in material remains. This is perhaps especially true for the communities that converged at civic-ceremonial centers of the scale of Crystal River, which we now know frequently involved the aggregation of people from different areas and traditions of material culture.

Given the difficulties of definitively identifying ethnicity from the material record (Jones 1997), we are not ready to go so far as to necessarily equate differences in pottery-making practice at Crystal River and Roberts Island with distinct ethnic groups, as has been argued from other facets of material culture for the civic-ceremonial centers at Poverty Point (Sassaman 2005) and Cahokia (Emerson and Hargrave 2000). As we have noted, much of the variation in temper may be related to shifts in settlement and concomitant variability in the availability of particular clays and aplastics. Still, we recognize ethnicity as a possible explanation for ceramic variation and, by extension, social difference. Emerson (1999) has cogently argued for the understanding of ethnicity not in terms of discrete and bounded social groups but instead as a process, akin to what we suggested above for communities of practice. To the extent that we can extrapolate from communities of pottery-making practice to ethnic groups and identities, the evidence presented here would seem to suggest that the process was uneven.

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Data availability statement

Bullen's collections from Crystal River are curated at the Florida Museum of Natural History in Gainesville. The artifacts from CREVAP excavations at Crystal River and Roberts Island are temporarily curated at the University of South Florida Department of Anthropology, with final curation at the Florida Bureau of Archaeological Research.

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