Shell-tempered ceramics appeared at different times in various places along the northern coast of the Gulf of Mexico. In some instances, these wares completely replaced local non-shell-tempered wares, while in other instances shell-tempered ceramics formed only a small addition to the non-shell-tempered, local ceramic assemblage. This paper examines the chronological spread and geographical distribution of such shell-tempered wares, the possible causes for their emergence and adoption, and their potential points of origin.

**Introduction**

Although shell-tempered ceramics have been recorded at several Early to Middle Woodland period sites along the mid-Atlantic Coast (Gleach 1988; Phelps 1983; Stephenson 1963; see also Herbert, this issue), such tempering generally appears to have been nothing more than a substitute in rock-poor areas for the more common and contemporaneous grit tempering of the region (Stephenson 1963). Likewise, scattered shell tempering has been documented from Middle Woodland sites in the upper Mississippi River Valley (see Boszhardt, this issue), northern Alabama (Feathers 2008), and northeast Mississippi (Rafferty and Peacock, this issue). However, as pointed out by Feathers (2006) and Feathers and Peacock (this issue), none of these cases led to the continued use or a dramatic rise of shell-tempered ceramics in their respective regions. It was not until ca. A.D. 800–1200, during Late Woodland and early Mississippi times, when the frequency of shell-tempered pottery increased dramatically across most of eastern North America.

Determining a so-called heartland for this rise and spread of shell tempering has proved somewhat elusive over the years. Initially, sites within the Mississippi River floodplain of northeast Arkansas and southeastern Missouri were thought to have been the loci where shell tempering began (Marshall 1965, 1987; Morse and Morse 1980, 1983:218–222, 1990; Williams 1954). Now, however, sites in the eastern Ozark Mountains of northern Arkansas and southern Missouri are gaining significant favor as potential earlier sources for such material (Lynott 1982, 1986; Lynott and Price 1989; McNutt 1996:225–227; Price 1986; see also Sabo and Hilliard, this issue, and Lafferty, this issue).

Regardless of the exact origin of shell-tempered pottery, the northern coast of the Gulf of Mexico was no exception to this general late expansion, and such ceramics began to appear at sites extending from the panhandle of Florida westward to southwest Louisiana. However, the timing of the introduction of shell-tempered wares into this broad region was not consistent from place to place, nor was the apparent intensity of use the same across the whole area.

Accordingly, the following sections of this paper will (1) examine the distribution of shell-tempered ceramics along the northern Gulf Coast, (2) identify potential “hot spots” or site clusters where the use of such tempering appears to have flourished, (3) look at the potential points of origin for these cluster areas, and (4) discuss the possible reasons for the spread of shell tempering into these cluster areas. In order to do this, we rely on existing syntheses of the culture history of different areas of the Gulf Coast (i.e., Aten 1983; Blitz and Mann 2000; Brown 2004; Fuller 1998, 2003; Kidder 2004; Milanich 1994, 2004; Ricklis and Weinstein 2003), supplemented by more thorough treatments of specific sites for which we have abundant data. In other words, this paper is not meant to be a literature review of shell-tempered pottery in the region, but it will provide an outline of the variable scenarios by which we feel it was adopted and utilized.

At the height of its use, shell-tempered pottery covered much of the southeastern United States (Figure 1). From Kentucky and Tennessee to eastern Oklahoma and Texas, such wares became part of the ceramic repertoire of numerous aboriginal groups. Some, like the Caddo and their prehistoric predecessors, had diverse ceramic assemblages that included wares ranging from purely shell-tempered vessels, to those with a mixture of shell and grog, a mixture of crushed bone and grog, or to those containing only grog. Others, such as the middle to late Mississippian populations of the central and lower portions of the Mississippi Valley, produced ceramics that were almost purely tempered with shell. Often, large utilitarian vessels included abundant shell temper, mostly with relatively large pieces of shell, while smaller serving and ceremonial vessels were made with tiny fragments of finely crushed shell.

Generally, people living along interior rivers and streams utilized crushed freshwater mussel shells as
the temper for their shell-tempered vessels (Million 1980; Morse and Million 1980), while peoples residing along the Gulf Coast sometimes used crushed shell from the brackish-water rangia clam as a tempering agent (Fuller 1996:3; Gagliano and Weinstein 1979:A-24 to A-25). Interestingly, at least one aboriginal group, the protohistoric and historic Chickasaw of northeast Mississippi, used crushed fossil shell for their shell-tempered ceramics (Atkinson 1979, 1987a, 1987b; Jennings 1941; Lieb 2004; Stubbs 1982).

Certain coastal regions of the northern Gulf of Mexico were included in the spread of shell tempering, and the general pattern of shell tempering occurring throughout the late prehistoric Southeast usually was replicated by those peoples living along the coast and just inland from the coast. However, the east-west geographic distribution of shell-tempered pottery was more limited than that across the interior Southeast. As shown in Figure 1, major use of shell-tempered ceramics extended only across what can be considered the central part of the northern Gulf Coast, from the western panhandle of Florida to the eastern chenier plain of southwest Louisiana.

In the eastern Florida Panhandle and southward down the west coast of that state, sand-tempered, limestone-tempered, and other non-shell-tempered wares (especially grit- and grog-tempered wares) predominated, such as those of the Fort Walton, Pasco, and Pinellas series manufactured by people of the Fort Walton and Safety Harbor cultures (Milanich 1994, 2004; Willey 1949). Along the western chenier plain of Louisiana and farther down the Texas Coast, sandy-paste wares of the Goose Creek, San Jacinto, and Rockport series were manufactured from late prehistoric to historic times by ancestral and modern members of the Attakapas, Akokisa, and Karankawan bands that inhabited the region (Aten 1983; Ricklis 1996).

Although the major distribution of shell-tempered ceramics occurred across the central part of the northern Gulf Coast, some areas came to be occupied by people who used ceramics tempered only with shell, while other areas were home to groups employing a mixed assemblage of shell-tempered and grog-tempered wares, or vessels that contained both shell and grog tempering or shell and sand tempering. There also were diachronic differences across the region, as some areas saw the introduction of shell-tempered pottery several hundred years earlier than other areas. This may reflect the different ways in which shell tempering was introduced. For instance, people exposed to such a new technology, either through the trade of pots or

Figure 1. Distribution of shell-tempered pottery across the Gulf South, ca. A.D. 1000 to 1750. Note that almost all shell-tempered pottery along the Gulf Coast occurred between the eastern portion of the Louisiana chenier plain on the west and the Choctawhatchee River on the east.
intermittent contact with other potters, may have reacted differently than if the technology was associated with the intrusion of foreign groups. Even in the face of intrusions by people from other areas, local populations may have resisted new technology. This may reflect the conservative or highly parochial nature of some resident groups, as opposed to other societies that were more willing to accept new people and their technologies.

The following sections will examine the “hot spots” of shell tempering more closely and the mechanisms by which such tempering may have been introduced and accepted. In the case of potential intrusions (the actual movement of people from one area into another), we will examine their possible origins and causes.

Distribution of Early Shell Tempering along the Eastern Portion of the North-Central Gulf Coast

The north-central Gulf Coast can be divided into three general areas indicative of the differential distribution of shell tempering across the region (Figure 2). The easternmost of these areas, and probably the earliest to have adopted shell tempering, is situated around Mobile Bay and within the Mobile-Tensaw Delta immediately north of the bay. Included within the area is the impressive mound site of Bottle Creek (1Ba2). Sites associated with this cluster are usually considered to be elements of the Pensacola culture (or the Pensacola variant of Mississippian culture). By a quirk of archaeological fate, the culture initially was named for a group of sites around Pensacola and Choctawhatchee bays (Willey 1949). It is clear from subsequent research, however, that the center for the culture is Bottle Creek and there are more Pensacola-related sites around Mobile and Perdido bays than around Pensacola and Choctawhatchee bays (Brown 2003a:7; Knight 1984; Milanich 1994). Ceramically, early components of Pensacola culture show close ties to the great mound center at Moundville, located in the Black Warrior River Valley to the north (Figure 3a–b). By the fourteenth century, a distinctive regional ceramic complex and settlement pattern had evolved (see Figure 3c–i and Figures 4 and 5) (Fuller 2003:27).

Those individuals most familiar with the area’s archaeology see the indigenous predecessor to Pensacola culture not only as having been tied to the Black Warrior River Valley but also as perhaps directly established by people from that region (Brose et al. 1983:156; Brown 2003a:7; Fuller 2003:62; Morgan 2003:808). This latter hypothesis stems from the fact that Late Woodland artifacts are abundant in the

Figure 2. Spread of shell-tempered pottery across the north-central part of the Gulf Coast, with dates of initial introduction to specific areas identified.
bottomlands of the Mobile-Tensaw Delta, but the latest, terminal Late Woodland artifacts are not present at Bottle Creek, as would be expected at the capital of local Mississippian culture were it an indigenous phenomenon. However, in premound midden deposits at Bottle Creek, which date to about A.D. 1150–1250, Moundville types of fine and coarse shell-tempered wares represent 40 percent of the pottery. Analysis of ceramics from Bottle Creek suggests a sudden appearance of Moundville styles and a complete lack of “transitional” pottery types that would be anticipated for an in-place change from Woodland culture to Mississippian culture (Fuller 1998:25, 2003:61). This idea of an intrusive Mississippian population being responsible for Bottle Creek also is supported by the presence of a palisade trench in the earliest occupation layers beneath Bottle Creek Mounds C and D. Additionally, as Brown (2003c:211) has noted, the well-planned arrangement and relatively rapid construction of the mounds is a “Mississippian idea and plan.” These facts support the model that Mississippian culture (at least as it is represented by shell-tempered pottery, Moundville decorative styles, and multiple mound centers) was introduced to the region by Moundville-related groups from the north.

Meanwhile, it seems that Late Woodland people throughout much of the surrounding region continued to live as they had previously, possibly for several more generations (Dumas 2007; Fuller 1985, 1998:20; Morgan 2002, 2003). Radiocarbon dates for single-component Late Woodland sites in the lower Tombigbee River Valley correspond with, and postdate, the estimated
A.D. 1100 arrival of people who made shell-tempered pottery. Located within 10 km of the nearest known locale for early shell-tempered pottery, the Barn site (1Ck286) contained a feature that yielded a 2-sigma calibrated radiocarbon range of A.D. 1023 to 1228 (Shorter 1999:175). At the nearby James Village (1Ck5), two charcoal samples from a pure Late Woodland feature yielded 2-sigma ranges of A.D. 1150–1281 and A.D. 1148–1328 (Weisman 1983:321). In the Mobile-Tensaw Delta about 2 km from Bottle Creek, a Late Woodland component from the Larry Island Branch site (1Ba269) dated to A.D. 1150–1258, overlapping the hypothesized dates for the intrusion of Mississippian people into the area (i.e., ca. A.D. 1150–1250). Similar situations of coexistence between people making pottery of different ceramic traditions have occurred elsewhere across the Gulf Coastal Plain, that is, within the Black Warrior River Valley (Jenkins 2003) and along the lower Chattahoochee and Apalachicola River Valleys (Blitz and Lorenz 2002, 2006), to name a few.

The earliest expression of Mississippian culture in southwest Alabama is called the Andrews Place phase (A.D. 1100–1250) (Fuller 1998:24–25) (Figure 6). This phase was initially hypothesized based on a complex of pottery from the shell midden at the Andrews Place site (1Mb1) on Portersville Bay (Gardner 2005; Wimberly 1960:37–40). It is recognized by the presence of shell-tempered pottery types associated with early Moundville, such as early varieties of Carthage Incised and Moundville Incised. Mississippi Plain jars with
peaked loop handles and plain bowls are characteristic. Finewares display engraved designs rather than the combination of incising and engraving seen on later shell-tempered pottery in the area. The absence of ceramic markers for the later Pensacola culture, such as Pensacola Incised and D’Olive Incised, may be another characteristic of the Andrews Place phase (R. Fuller to N. Jenkins, letter, January 21, 2008, Center for Archaeological Studies, University of South Alabama, Mobile).

In addition to these shell-tempered types, some amounts of sand-tempered and grit-tempered, late Weeden Island Wakulla types are present. The complex also includes a minority of transitional late Coles Creek to early Plaquemine types such as found in the lower Mississippi Valley, except that in the Mobile-Tensaw Delta they occur on both grog- and shell-tempered wares. Coles Creek Incised, Addis Plain, L’Eau Noire Incised, and Carter Engraved may be expected. In fact, D’Olive Engraved, a fine shell-tempered plate associated with the Andrews Place phase, is suggested to be a direct copy of the Plaquemine type Anna Incised (Fuller 2003:43). At saline sites on the lower Tombigbee River and in the lowest levels at Bottle Creek, components of the Andrews Place phase also contain abundant fragments of Kimmswick Fabric Impressed saltspans (Figure 7a). Based on the various types and varieties of pottery associated with Andrews Place components, along with their stratigraphic position, it would appear that the Andrews Place phase corresponds to the end of the Moundville I phase (A.D. 1120–1200) and the beginning of the Moundville II phase (A.D. 1200–1300) (Fuller 1998, 2003). This was the time during which the Moundville polity became well established in the Black Warrior Valley (Knight and Steponaitis 2007).

In addition to the Andrews Place site and the immediate vicinity of Bottle Creek, early Mississippian, shell-tempered pottery has been found at several other locales between the coast and the lower Tombigbee River. A case in point is the Plash Island site (1Ba134) located on southeastern Mobile Bay. Recent excavations at the locale uncovered at least two features with Andrews Place phase assemblages (Dumas 2008). Both features included similar proportions of Mississippi
Plain (23.8 and 30.0 percent) and plain sand-tempered sherds (25.0 and 40.0 percent), in addition to plain grog (21.5 and 20.0 percent), and a few late Coles Creek varieties of Carter Engraved (2.4 and 5.0 percent) (Dumas 2008:146–47). Unfortunately, neither of the features contained material for radiocarbon dating. Similarly, on the northeastern shore of Mobile Bay, the lowest stratigraphic zone at the D’Olive Creek site (1Ba196/1Ba251) contained early varieties of shell-tempered Moundville Incised, coarse sand-tempered types indicative of the region’s terminal Woodland, and grog-tempered early Plaquemine types (Brose et al. 1983:1530154; Jenkins 1976:11–19). Because of their proximity to coastal resources, occupants of Plash Island and D’Olive Creek, like those folks residing at the Andrews Place site itself, may have focused on the acquisition of marine-derived items for trade and/or craft production.

Perhaps most significant, there is the consistent presence of early Mississippian, shell-tempered Moundville pottery at a series of prehistoric salt-making sites. Located primarily near the east bank of the Tombigbee River, numerous salines began to be exploited in the Late Woodland period for the purpose of making salt. An excavation at the Lower Salt Works (1Ck28) revealed a pure Late Woodland component in the lowest layer. Wood charcoal from a hearth-like feature within the layer yielded a 2-sigma calibrated date of A.D. 934–1017 (Dumas 2007:344), which corresponds to terminal Woodland times. An Andrews Place ceramic assemblage was present above this component and included local sand-tempered Late Woodland types (51.6 percent), a few early Moundville diagnostics (1.5 percent), minor amounts of grog-tempered late Coles Creek types (2.6 percent), and abundant Kimmswick Fabric Impressed saltpans (39.4 percent). Importantly, this occupation sequence is repeated at several salines along the lower Tombigbee River (Dumas 2005, 2007).
or a number of other reasons, such as trade. However, the Coles Creek and Moundville pottery types are almost entirely utilitarian, and no other exotic items have been found in the vicinity thus far. It is suspected that different groups of people, making different types of ceramics, interacted at sites of desired resources, such as the Tombigbee salines and coastal shell middens, but not in such a way that transitional ceramic traditions developed. The presence of Andrews Place components at such diverse sites as the salines and shell middens, as well as at the ceremonial center of Bottle Creek, suggests that the people who made shell-tempered and grog-tempered pottery may have intended initially upon short-term intrusive visits, but this strategy soon was replaced by a more intense focus on colonization. Generally, the desire for salt and marine items may have been the stimulus for the initial introduction of shell-tempered pottery (not to mention other aspects of Mississippian culture). As for Bottle Creek, the reason for its initial occupation by people using shell-tempered pottery is undetermined, but its central location in the delta likely served it well as a center of trade and ritual (Brown 2003c:212, 218).

As Fuller (2003:62) has written, “Either through unconscious stylistic drift or through a conscious effort to establish a regional identity, the Mississippian potters at Bottle Creek gradually developed local styles that ultimately became recognizable as Pensacola.” Such changes in ceramics led to what now is recognized as the Bottle Creek I phase (A.D. 1250–1350) (see Figure 6): D’Olive Engraved became D’Olive Incised, early Moundville Incised types changed enough to become sortable as Pensacola Incised, new rim modes appeared, and lower Mississippi Valley types declined in frequency. In addition, the upper layers at the Lower Salt Works site revealed a sudden change in saltpan types from fabric- to cane-impressed exteriors. While tied in part to changes in salt-making technology, and not necessarily to the evolution of Pensacola ceramics, the new saltpan types nonetheless represent the appearance of resident Pensacola groups who likely were serving the emerging Bottle Creek chieftdom in the Mobile-Tensaw Delta (Fuller et al. 1984:177). Salt Creek Cane Impressed pottery (see Figure 7b) is found with Pensacola ceramics at numerous sites in southwest Alabama, and most of these sites do not appear to be directly associated with salines (Brown 2003b; Fuller et al. 1984). Unlike the localized abundance of Kimmswick Fabric Impressed at salines in the region, the ubiquity of Salt Creek Cane Impressed pottery is reflective of a widespread group of culturally similar Pensacola people. The Pensacola ceramic series seems to have evolved rapidly from its Moundville and lower Mississippi Valley–like origins into something different, and this evolution of ceramic style and form coincided with the spread of Pensacola culture.

After about A.D. 1250, Pensacola culture was well established along the north-central Gulf Coast, around Mobile Bay, and in the lower Tombigbee River drainage. Pensacola potters, whether descended from locals or intruders, used decorative motifs and temper that had been introduced from the lower Mississippi and Black Warrior River Valleys during the Andrews Place phase. The culture and its ceramic styles spread eastward as far as Choctawhatchee Bay (Knight 1984; Milanich 1994:380–383), but in that part of the coastal area it overlapped with the indigenous Fort Walton culture. People of the early Fort Walton culture (A.D. 900–1000) primarily made grit-tempered pottery, proportions of which decrease as one moves to the west even as shell-tempered Pensacola types decrease toward the east (Lazarus 1971). Check stamping of the Weeden Island tradition continued well into the thirteenth century in Fort Walton components (Marrinan and White 2007:297; Willey 1949:438, 457). Additionally, unlike the lack of transitional types in the Andrews Place and Bottle Creek I phases, many grit-tempered Fort Walton vessel forms and decorative motifs are similar to other Mississippian ceramics (Griffin 1949; Marrinan and White 2007:293; Milanich 1994:356, 365), and later Fort Walton people (A.D. 1000–1500) continued to temper their pottery with grit.

While sharing similar settlement patterns, means of subsistence, and other aspects of Mississippian culture (Knight 1984), suggesting a high probability of direct interaction, Pensacola and Fort Walton people maintained different ideas about how to temper their pottery. However, it is unclear if the preference of grit temper by Fort Walton potters was a way to maintain regional identity, if it provided certain technological advantages, or if it was used for other unknown reasons (Marrinan and White 2007:294). Obviously, the nature of the introduction of shell tempering and/or the environment in which it took place differed between the Pensacola and Fort Walton regions such that the former evolved and spread rapidly to north, east, and west, while the latter remained a localized development.

People residing along the Mississippi Gulf Coast also used shell-tempered pottery, but the social context of its adoption in that area appears to have been different than in the Mobile Bay area. Blitz and Mann (2000:60, 102) defined the Pinola phase (A.D. 1200–1350) (see Figure 6) to encompass the appearance of shell-tempered ceramics, new vessel forms, and decorations like those in the Moundville, Pensacola, and lower Mississippi Valley style series. They refer to this phase as “a fusion of the old and the new, the local and the distant,” having no definitive break between the use of indigenous and Mississippian pottery (Blitz and Mann
While Pinola phase people adopted some shell temper and continued to use traditional late Coles Creek/early Plaquemine grog-tempered types, they also blended grog and shell temper. At the Singing River site (22Ja520) in Pascagoula, 184 sherds with mixed grog and shell temper were recovered from Pinola phase contexts (Blitz and Mann 2000:Table B.14). These blended tempers are found in vessels of local form that have decorations of both the local and intrusive ceramic traditions. At Singing River, there is a gradual stratigraphic replacement of gog-and-shell-tempered pottery with pottery tempered solely with shell.

Blitz and Mann (2000:57–58) consider this sequence to be an example of the process of acculturation that occurred due to interaction between coastal and interior populations, resulting in a “proto-Pensacola” culture. Perhaps there was a gradual replacement of indigenous populations as “foreign” families and potters moved, or were brought, into the area. However, as pottery types do not necessarily equal ethnic groups, we cannot discount the possibility that the gradual change from gog-and-shell-tempered pottery to shell-tempered pottery was the result of simple diffusion and the gradual adoption of new tempering technologies by indigenous potters. The presence of Kimmswick Fabric Impressed saltpans in Pinola phase contexts led Blitz and Mann (2000:58) to suggest that the manufacture of salt for exchange with interior people was a stimulus for the period of interaction and the introduction of new ideas. This idea warrants investigation, but we should keep in mind that saltpans do not necessarily equate with salt production (Bennett 1941:165–166; Brown 1980:28–30, 2008).

In short, one of the earliest introductions of shell-tempered pottery to the north-central Gulf Coast region was by some type of Mississippian intrusion around A.D. 1100, and this is represented archaeologically by the Andrews Place phase. Social interaction between local people and the intrusive Moundville-related people was not of a nature to produce transitional types of pottery. Probably within a generation or two, the descendants of the intruders had settled in the region and began to make pottery reminiscent of their northern heritage yet distinctive enough to represent a new cultural ideal that archaeologists have named Pensacola. In contrast, on the eastern fringe of Pensacola culture, Fort Walton populations appear to have had little use for shell-tempered pottery. To the west, the gradual use and adoption of shell-tempered pottery by coastal populations in present-day Mississippi hint at more prolonged initial contact through permanent resettlement of potters or entire family groups.

Distribution of Early Shell Tempering along the Central Portion of the North-Central Gulf Coast

The second area along the north-central Gulf Coast to have utilized shell-tempered ceramics includes those sites in southeast Louisiana that were influenced to varying degrees by lower Mississippi Valley (LMV) cultures and/or Pensacola culture (see Figure 2). Historically, most locales in this region have been categorized as elements of Plaquemine culture (McIntire 1958; Neuman 1984; Rees and Livingood 2007), although those with the strongest ties to Pensacola culture (mainly in St. Bernard and Plaquemines parishes) have been included in the Bayou Petre phase of Mississippian culture (or Pensacola Mississippian) (Kniffen 1936; Knight 1984; Phillips 1970; Weinstein 1987). Plaquemine populations generally produced gog-tempered ceramics, or vessels with a mixture of shell and gog temper, while Bayou Petre peoples usually produced shell-tempered ceramics. At times Plaquemine assemblages also included heavily shell-tempered ceramics that were likely trade items from Mississippian groups located to the north and/or east.

Perhaps the best example of these coastal sites with a mixture of LMV and eastern Gulf ceramics is the Sims Place (16SC2), situated on a relict Mississippi River distributary channel west of New Orleans. The site at one time consisted of at least six mounds and surrounding midden area that formed one of the largest mound centers in the region, if not the largest (Figure 8). As with Bottle Creek, Sims likely served as the political center for much of the surrounding area. It also may have been one of the main trading centers responsible for supplying marine-related resources (particularly shells and shell beads) to populations living up the LMV. Research by McIntire (1958:65, Plate 13), Weinstein et al. (1977:23–41, Figures 4–11, 2008:65, Plate 13), Weinstein et al. (1977:23–41, Figures 4–11, 2008:65, Plate 13), and others has shed light on the cultural interactions that took place in this area.

Figure 8. Map of the Sims site (16SC2), St. Charles Parish, Louisiana. Note the locations of excavation units in Areas 1 and 3 adjacent to Mounds B and E, respectively. It was from these units that most of the site’s important stratigraphic data were obtained. (After Giardino 1985:Figure 2.)
Tables 2–5), Davis and Giardino (1981), Davis (1981, 1984:221–224), and Giardino (1985:96–133, 220–276, Figures 2–10, 16–24) has shown that the post–Coles Creek period occupation at the site contained a mixed assemblage of ceramics indicative of both LMV (Plaquemine and Mississippian) cultures centered to the north and Pensacola culture centered to the east.

Of interest is the fact that the post–Coles Creek assemblage from Sims has been divided by Davis (1981) and Giardino (1985) into early (lower) and late (upper) components, with the former occurring primarily in the southwestern part of the site (identified as Area 1) and the latter falling mainly in the northeastern corner of the site (labeled Area 3) (see Figure 8). Based on several $^{14}$C and thermoluminescence dates, the early component was likely deposited sometime between ca. A.D. 1100 and 1450 (Davis 1981:61; Giardino 1985:100; Hays 1995; McGimsey and van der Koogh 2001:30–31), or about the same time as the Andrews Place and Bottle Creek I phases in and around Mobile Bay, while the late component was related to an occupation that occurred sometime between ca. A.D. 1500 and 1700 (Davis 1981:61; Giardino 1985:103; Hays 1995; McGimsey and van der Koogh 2001:30–31), or roughly equivalent in time to the Bottle Creek II and Bear Point phases to the east (see Figure 6). Interestingly, only ceramics related to the Plaquemine culture (and encompassing certain varieties with mixed shell and grog tempering) reportedly came from the early occupation at Sims. These included the types Anna Incised, Leland Incised, and L’Eau Noire Incised (Davis 1981:Table 1), and hinted at some relationship to the Barataria phase (Holley and DeMarçay 1977), a manifestation recognized for its ties to Plaquemine culture and believed to date between ca. A.D. 1200 and 1450.

Ceramics related to the later occupation, on the other hand, included items indicative of all three cultures. Once again, the Plaquemine-related varieties of Anna Incised, Leland Incised, and L’Eau Noire Incised reportedly were present (Davis 1981:Tables 1–2; Giardino 1985:A-1). To these were added other Plaquemine culture types, such as Coleman Incised, Maddox Engraved, Plaquemine Brushed, and Carter Engraved (Davis 1981:Tables 1–2; Giardino 1985:103; Hays 1995; McGimsey and van der Koogh 2001:30–31), or roughly equivalent in time to the Bottle Creek II and Bear Point phases to the east (see Figure 6). Interestingly, only ceramics related to the Plaquemine culture (and encompassing certain varieties with mixed shell and grog tempering) reportedly came from the early occupation at Sims. These included the types Anna Incised, Leland Incised, and L’Eau Noire Incised (Davis 1981:Table 1), and hinted at some relationship to the Barataria phase (Holley and DeMarçay 1977), a manifestation recognized for its ties to Plaquemine culture and believed to date between ca. A.D. 1200 and 1450.

Figure 9. Shell-tempered ceramics associated with Pensacola culture from the Sims site: (a) D’Olive Incised, var. Dominic; (b–c) D’Olive Incised, var. Mary Ann; (d–e) Pensacola Incised, cf. var. Jessamine; (f) human rim effigy, probably off a vessel of Mound Place Incised. (a–e, CEI 1977 Sims site collection; f, after Giardino 1985:Figure 9, no scale in original, size estimated for present illustration.)

The impression one gets from the above review is that Pensacola-related types at the Sims site were a small minority and occurred only in the late occupation. However, several years ago the senior author and Richard Fuller examined a small collection of sherds obtained at Sims in 1977 and discussed and illustrated by Weinstein et al. (1977:29–39, Figures 8–10, Tables 2–4). As can be seen in Figure 9, several excellent examples of Pensacola-related types and varieties are present. Those identified correctly in 1977 included some of the Pensacola Incised sherds (Weinstein et al. 1977:Figure 10a–b) and the specimens of Moundville Incised (Weinstein et al. 1977:Figure 10d–g). Unfortunately, other sherds indicative of Pensacola culture were misclassified as LMV types. These included D’Olive Incised, vars. Dominic and Mary Ann (see Figure 9a–c) and some of the Pensacola Incised sherds that probably are examples of vars. Jessamine and/or Holmes (see Figure 9d–e). The D’Olive sherds were typed as Anna Incised (Weinstein et al. 1977:Figure 8b–g), while the Jessamine and/or Holmes sherds were classed as Maddox Engraved (Weinstein et al. 1977:Figures 9h–n, 10h–i). Likely specimens of Mound Place Incised (Weinstein et al. 1977:Figure 9a–b) also apparently were typed as Leland Incised.

later occupation would appear somewhat in line with what generally is considered the Bayou Petre phase, ca. A.D. 1300 to 1700, although only a few sherds are indicative of Pensacola ceramics.

The impression one gets from the above review is that Pensacola-related types at the Sims site were a small minority and occurred only in the late occupation. However, several years ago the senior author and Richard Fuller examined a small collection of sherds obtained at Sims in 1977 and discussed and illustrated by Weinstein et al. (1977:29–39, Figures 8–10, Tables 2–4). As can be seen in Figure 9, several excellent examples of Pensacola-related types and varieties are present. Those identified correctly in 1977 included some of the Pensacola Incised sherds (Weinstein et al. 1977:Figure 10a–b) and the specimens of Moundville Incised (Weinstein et al. 1977:Figure 10d–g). Unfortunately, other sherds indicative of Pensacola culture were misclassified as LMV types. These included D’Olive Incised, vars. Dominic and Mary Ann (see Figure 9a–c) and some of the Pensacola Incised sherds that probably are examples of vars. Jessamine and/or Holmes (see Figure 9d–e). The D’Olive sherds were typed as Anna Incised (Weinstein et al. 1977:Figure 8b–g), while the Jessamine and/or Holmes sherds were classed as Maddox Engraved (Weinstein et al. 1977:Figures 9h–n, 10h–i). Likely specimens of Mound Place Incised (Weinstein et al. 1977:Figure 9a–b) also apparently were typed as Leland Incised.
While such classification confusion between Pensacola-related ceramics and LMV types and varieties was unfortunate, it is easy to understand how such occurred. Virtually all of the confused ceramics are very similar, if not identical, in decoration to one another, with differences in paste actually setting them apart. For example, the LMV type Anna Incised and the Pensacola type D'Olive Incised both are represented by incised lines on the interior of shallow bowls and plates. In the former, the paste can consist of abundant yet finely ground pieces of grog (usually classed as Addis ware), a mixture of grog and shell (Greenville ware), or very fine shell (Bell ware). D'Olive Incised, on the other hand, has a paste that is tempered with very, very fine shell equivalent to the Pensacola culture's version of Bell ware. If one is not completely familiar with the ceramics from the two culture areas, as was the case when Weinstein et al. (1977) classified their small collection from Sims, then it is easy to apply LMV names to sherds that actually are representative of Pensacola culture. Such a problem still continues to this day, albeit at a lesser scale, even by archaeologists extremely well versed in identifying ceramics from both culture areas (for example, see Fuller 2003:43).

It is apparent that Davis (1981) and Giardino (1985) perpetuated the same errors committed by Weinstein et al. (1977), as a similar review of their illustrations by the senior author and Fuller found that many Pensacola culture sherds were misclassified as LMV types. For instance, of the four sherds that Giardino (1985:Figure 18b–e) illustrates as examples of *vars. Anna* and *Australia* of the type Anna Incised (called L'Eau Noir Incised by Giardino), two would appear to be excellent examples of D'Olive Incised, *var. D'Olive*, while the other two are specimens of D'Olive Incised, *var. Dominic*. Both of these latter varieties originally were identified in the Mobile Bay region as markers of the Bottle Creek phase (Fuller and Stowe 1982:55–61), and have since been included in the Pensacola A1 subset of the Bottle Creek I and II phases, ca. A.D. 1250 to 1550 (Fuller 2003:47, Figures 2.6–2.7).

In addition to the sherds of D'Olive Incised, specimens illustrated by Davis (1981:Figure 2c) and Giardino (1985:Figure 23) as Maddox Engraved also would appear to be potential examples of Pensacola Incised, *vars. Jessamine* and/or *Holmes*, while another sherd listed as Winterville Incised (Giardino 1985:Figure 17a) most likely should have been classed as Mound Place Incised. In fact, of the sherds of Mound Place Incised classified correctly to type (Giardino 1985:241–245, Figures 19b, 24b), both their descriptions and illustrations suggest that they likely are examples of *var. Waltons Camp*. Once again, *Jessamine*, *Holmes*, and *Waltons Camp* were originally established in the Mobile Bay region as diagnostic elements of the Bottle Creek phase (Fuller and Stowe 1982:66–68, 75–78). Since then, they also have been placed in the Pensacola 1A subset (Fuller 2003:47, Figures 2.6–2.7).

Perhaps most compelling of all in favor of a significant connection between Sims and the Pensacola heartland is a human effigy head illustrated by Giardino (1985:Figure 9) (see Figure 9f). The head was found in proximity to several sherds of Mound Place Incised, and Giardino (1985:241) suggested that it might have been a rim adorno attached to a bowl of that type. This almost certainly was the case, as effigy heads of very similar style (the so-called Mound Island or Hair Bun human type) have been found at sites in Mobile Bay dating to between A.D. 1300 and 1550 (Richard S. Fuller, personal communication 1990; see Wimberly 1960:Figure 67a, 1968).

While it would be important at this point to quantify the actual numbers of Plaquemine, LMV Mississippian, and Pensacola Mississippian ceramics at Sims, such, unfortunately, cannot be done with the data at hand. To provide correct counts and percentages would require a thorough reanalysis of the Sims ceramic collection, something beyond the scope of this paper. Using the old analyses reported by Weinstein et al. (1977), Davis (1981), and Giardino (1985) would not provide a very clear picture of the actual situation, since so many of their classifications were obviously in error. For now, we must simply recognize that there are ceramic elements of all three cultures at Sims without knowing exactly how much of each actually is present.

Finally, although the Pensacola influence can be seen at Sims and other sites in southeast Louisiana, it should be noted that the exchange of ideas and ceramics was not unidirectional. As noted earlier, a small percentage of LMV types has been reported in the Andrews Place and Bottle Creek I components at Bottle Creek, with fewer LMV types occurring in the subsequent Bottle Creek II component (Fuller 2003:43–44, Figures 2.6–2.7). These LMV-related specimens apparently included both locally made versions of Plaquemine and Mississippian ceramics and exotic vessels presumably obtained through trade or some other form of interaction. LMV types also have been found in minor quantities at some salt-making sites in the lower Tombigbee River drainage (Dumas 2007:Tables 7.2, 7.6, 7.11, 7.16).

Overall, radiocarbon assays from Sims and cross-dating with like types from other regions suggest that this mixed assemblage of Plaquemine, LMV Mississippian, and Pensacola ceramics probably was in use in coastal Louisiana from ca. A.D. 1250 to at least 1600. This is the same period during which shell-tempered pottery was in use along the Mississippi Gulf Coast. Other late prehistoric sites in the Barataria Basin and southeast Louisiana attest to the rather widespread nature of similar mixed assemblages. An example is the premound shell midden noted by Bushnell (1909:3–6, Plate 3) in his discussion of excavations into a mound.
located on Chinchuba Creek in St. Tammany Parish about 1.5 mi north of Lake Pontchartrain. An assemblage of Pensacola-related sherds is illustrated and includes excellent examples of D’Olives Incised, var. Mary Ann (Bushnell 1909:Plate 4a–b), Moundville Incised (Bushnell 1909:Plate 4g, i), and Mound Place Incised, var. Waltons Camp (Bushnell 1909:Plate 4d). While not as obvious as at Sims or Chinchuba Creek, other sites with similar assemblages are known to occur across an area stretching from St. Bernard Parish in the east to western Terrebonne Parish in the west, and from the Gulf of Mexico to the north shore of Lake Pontchartrain (see Figure 2).

While procurement of salt by Moundville groups may have been the impetus behind the development of the Andrews Place phase in the eastern portion of the north-central Gulf Coast, and subsequent use of the same salines by folks of the Bottle Creek I and II phases is well documented, there is no evidence of salt production or salt procurement by the people residing at Sims or any other site in southeast Louisiana. Nevertheless, it is well known that salt was a necessity of most, if not all, Mississippian and Caddoan groups who relied heavily on maize agriculture (Brown 1980:3–7; Early 1993:7–9; Schambach and Newell 1990) and that the Caddo of northwest Louisiana and southwest Arkansas obtained salt at several prominent salines in that region and were heavily involved in its production and trade (Brown 1980:11, 15, Figures 1–2, 1981:4, Figures 1–2; Early 1993:12–14).² Other aboriginal groups in the region (Quapaw, Tunica, Koroa, Taensas) also are known to have acted as facilitators in the trade of this highly important commodity (Brown 1980:9; Early 1993:12; Kniffen et al. 1987:208–209; Swanton 1942:42, 139; Webb and Gregory 1986:20–21).

Although the importance of maize in the diets of Bayou Petre peoples is not known, there certainly is evidence that the staple was consumed by members of the phase (Dering 1994:554–55; Fritz 1995:346, Table 55; Gagliano and Weinstein and 1979:A-15, Figure A-8, Table A-1; Holley and DeMarçay 1977). One site, in particular, the Buras Mounds (16PL13), is known to have yielded corncobs from dredged midden deposits, even though it is located on a small distributary in the marshes almost as far south as the modern mouth of the Mississippi River (Gagliano and Weinstein 1979). Sims itself is located farther up the Mississippi River than the Buras Mounds, in an area whose historic aboriginal inhabitants are known to have produced enough corn to supply early French explorers and settlers (Bienville 1699; Giardino 1985:80; Swanton 1912:246). Given all of the above, then, it would appear that the prehistoric residents of Sims likely grew corn and needed salt just as much as any Mississippian group of the time. However, since a significant portion of the diet of Bayou Petre phase people likely came from marine and estuarine fish and shellfish, both of which may have provided enough salt to sustain life, there might not have been a need for the acquisition of salt either through direct procurement or trade. What, then, can account for the clear connection in terms of ceramics between the Bayou Petre phase people of southeast Louisiana and Mississippian groups to the east? Was it participation in a general east-west trade of various commodities across the central Gulf Coast? Or was it an actual movement of people from the east to the west?

Several years ago, Dave Davis (1984:228–231) argued that the mixed ceramic assemblages noted from Bayou Petre phase sites was a reflection of short-term alliances between different groups from both the Pensacola and LMV culture areas. Such alliances were known from early historic times, so Davis suggested that they probably occurred in protohistoric and late prehistoric times, as well. A few years later, George Riser (1987) offered another explanation to account for such mixed assemblages. He argued that people from the Pensacola and LMV areas were coming into southeast Louisiana (principally around the edges of Lake Pontchartrain) on a seasonal basis to catch and dry shrimp for subsequent transport back to their homelands. This led to a symposium at the 1987 Southeastern Archaeological Conference that was devoted to an examination of Riser’s hypothesis. All of this subsequently inspired Ian Brown (1988) to examine both the Davis and Riser hypotheses. Brown (1988:39–40) rejected both hypotheses for reasons that will not be addressed here. Instead, he suggested that the mixing of ceramic traits in southeast Louisiana simply reflected the geographical position of the region. As Brown (1988:39) stated, “Does it seem all that strange that a people intermediate to Mobile Bay and the Lower Valley would also exhibit a blend in ceramics?” Nevertheless, Brown (1988:39–40) indicated that the data at hand were not enough to answer accurately the nature of the contact that led to such ceramic mixing. More survey and site excavations would be needed before one could attempt to find an answer.

Unfortunately, only a minimal amount of such work has occurred in the region in the past 20 years, and consequently, the “mixing” topic has not been adequately addressed. Despite this problem, the present authors feel that Brown’s simple argument has merit. Individuals using typical aboriginal canoes could very easily traverse the area in question, from the western panhandle of Florida to southeastern Louisiana, without having to venture out into the open Gulf. The entire trip from Choctawhatchee Bay westward could be accomplished by passing through Santa Rosa Sound, Pensacola Bay, Big Lagoon, Perdido Bay, Bon Secour Bay, Mobile Bay, Mississippi Sound, Lake Borgne, and Lake Pontchartrain, with only one or two short
portages along the way. One or two additional minor portages would allow the travelers to reach the Mississippi River and all of its major distributaries leading into the entire southeastern Louisiana coastal zone, either by way of Bayou St. John to the present-day New Orleans area or through Pass Manchac, Lake Maurepas, and Bayou Manchac to a point just south of Baton Rouge. Thus it is not inconceivable that east-west interaction along the north-central Gulf Coast could have been accomplished very easily.

In fact, such interaction has been well documented from previous eras, particularly during Late Archaic/Poverty Point times (e.g., Gagliano and Webb 1970; Gibson 1974, 1980, 1994, 2000; Gibson, ed. 1994; Lehmann 1991, 1994; Sassaman 1993; Saunders and Hays 2004; Webb 1968, 1982; Williams and Brain 1983:389, 398–399). With such interaction would have passed the actual transfer of ceramic vessels from one area to the other, or the ideas and knowledge needed for the manufacture of like ceramics. It is perhaps no coincidence that the range of Pensacola culture and/or its influence along the Gulf Coast matches almost exactly the area encompassing the various bays, sounds, and lakes noted above.

**Distribution of Early Shell Tempering along the Western Portion of the North-Central Gulf Coast**

In a situation similar to that in southwest Alabama, intrusive groups interested in exploiting salt resources may have been the first to introduce shell-tempered pottery into southwestern Louisiana. At the appropriately named site of Salt Mine Valley (16IB23) (see Figure 2), Ian Brown and his coworkers (Brown 1980:77–79, 1981:18–21, 1999:127, 2003b:36–39; Brown and Lambert-Brown 1978:5–6, 1979a, 1979b) identified an almost pure assemblage of LMV Mississippian pottery that was associated with salt production. Over 43,000 shell-tempered sherds were recovered during excavations at the locale, with the largest quantity attributable to shallow bowls of Mississippi Plain that were used as saltpans (Figure 10a). However, other sherds clearly represented ceramic types typical of Mississippian pottery from farther up the LMV, particularly areas such as the upper Tensas Basin in Louisiana and the lower Yazoo Basin in Mississippi (Brown 1980:77). These included Cracker Road Incised (see Figure 10b–c), Barton Incised, Grace Brushed, Old Town Red, Parkin Punctated, Pouncey Pinched, and Owens Punctated (see Figure 10d–e) (Brown and Lambert-Brown 1979a:Table 9, Figure 11; 1979b).

Available radiocarbon dates and cross-dating with similar ceramics at other sites in the LMV suggested that the shell-tempered pottery at Salt Mine Valley was manufactured between ca. A.D. 1550 and 1650 (Brown 1999, personal communication 2007; McGimsey and van der Koogh 2001:28–29). By all accounts, it appears that this assemblage of pottery represents a brief, but highly intense, period during which Mississippian people from more northerly areas of the LMV traveled to Avery Island to acquire salt. Such salt then might have been sent back to the Mississippian’s homeland or to other areas for trade. Of course, this brings up the question of why the LMV Mississippians would have traveled to Salt Mine Valley if they were able to acquire salt from the Caddo and other neighboring groups who were involved in the salt trade. Perhaps such trade did
not occur until very late in protohistoric and historic times, or perhaps there were periods of conflict between LMV Mississippians and the salt producers in northwest Louisiana and southwest Arkansas during which salt was not available. Or, possibly, one entrepreneur-minded group of LMV Mississippians decided simply to take over a portion of the salt trade in a manner similar to the Moundville folks exploiting the salines along the lower Tombigbee River.

Regardless of the above, it is important to point out that minor amounts of LMV shell-tempered pottery also occur beyond Avery Island, at a few sites around Vermilion Bay and on some of the eastern cheniers in the marshes to the west (Brown et al. 1979). Components with such ceramics have been assigned to the Petite Anse phase of the region (Brown 1982:Table 1, 1984:Figure 4.2; Weinstein 1987:95). This means that, like the people associated with the Andrews Place phase, the Mississippians who came to Avery Island did not confine themselves solely to salt-making locales. They were involved in supplementary subsistence activities, such as fishing, hunting, and shellfish collecting (Brown et al. 1979:181). They may also have been responsible for collecting marine resources suitable for trade to the north, such as mollusk and bivalve shells for the manufacture of beads, pendants, or other items of personal adornment.

Summary

It has been suggested that shell-tempered ceramics came to the north-central Gulf Coast from at least two main sources. Those that eventually would become associated with Pensacola culture spread south from the Moundville area sometime between ca. A.D. 1100 and 1250 and evolved into the ceramics found at sites of the Bottle Creek phase in the Mobile Bay region. Such pottery then spread east and west from there. At their greatest extent, Pensacola wares reached as far westward as the south-central Louisiana Coast. It was in that region, and other eastern areas of coastal Louisiana and Mississippi, that Pensacola people and/or ceramics came into contact with typical Plaquemine and Mississippian wares and/or people of the LMV. This latter influx, believed to date between ca. A.D. 1400 and 1550, produced a fairly large zone where the two ceramic assemblages became mixed. While there may have been some minor spread of shell-tempered wares westward from this mixed area, the data are not currently present to support such a possibility. Instead, sometime between ca. A.D. 1550 and 1650, a very intense incursion of LMV shell-tempered wares occurred at and around Salt Mine Valley on Avery Island, thus bringing substantial numbers of such pottery into that area for the first time.

As expressed throughout this paper, it would appear that the spread of shell-tempered pottery along the north-central Gulf Coast was linked to the spread of Mississippian peoples moving southward from Moundville and the LMV. However, it is perhaps most striking that only at Avery Island and the south Alabama salt-production sites were there major salines in the Gulf coastal region known to have been exploited by Native Americans (Brown 2003b:6). These salines would have been potential sources of salt for thousands of prehistoric peoples and important locales for cultural interaction and change. The initial spread of shell-tempered pottery into these two areas, albeit at slightly different times, likely came as a byproduct of the movements of Mississippian peoples, with the subsequent spread of shell-tempered pottery along the north-central Gulf Coast tied to either a cultural expansion of this Mississippian incursion or as one of the more obvious material items that traversed the region, possibly in association with the trade of salt.

Of course, the above ideas create additional questions that cannot be answered at the present time. For instance, why did shell-tempered pottery not spread into more easterly areas of Mississippian culture, that is, the south Atlantic Coast and the Fort Walton area of Florida? Perhaps it was a lack of intrusions by people bearing shell-tempered pottery (as opposed to the situations in south Alabama and at Avery Island) that would account for the absence of such ceramics. Or, we may be seeing the result of how people resist culture change, particularly when it involves an integral aspect of their daily lives, such as pottery. In this case, shell-tempered pottery might be viewed as any other mode of pottery production, like decorative style or form, that can be adopted fully, rejected, or integrated with other modes. The mixture of shell into the paste of traditional grog-tempered forms in the Pinola phase serves as an example. If shell tempering conferred a technological advantage (e.g., Bronitsky and Hamer 1986; Feathers 1989; Steponaitis 1984; Tite et al. 2001), there are cases where knowledge of the advantage either was not transmitted or was not considered to have been crucial enough for such tempering to be adopted. Besides the Mississippian Fort Walton culture, the Lamar chiefdoms in east Alabama and north and west Georgia can serve as another example of an otherwise fully Mississippian culture that continued to use grit and sand for the majority, if not all, of its pottery, even after shell tempering was introduced (e.g., Blitz and Lorenz 2006; Knight 1985; Marrinan and White 2007; Scarry 1990; Williams and Shapiro 1990). Overall, after examining the various means by which shell-tempered pottery was introduced and adopted across the central Gulf Coast, it is apparent that the region will have much to offer toward answering these intriguing questions.
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1 Radiocarbon dates obtained from the literature were recalibrated using Calib Version 5.0.10 by Stuiver and Reimer (1993), based on atmospheric data in Reimer et al. (2004).

2 We are working under the assumption that salt increased in importance as a dietary supplement in direct proportion to the amount of maize or other grains consumed. There has been much debate about whether salt is a necessary dietary supplement. Basing most of their studies on ethnographic data, some anthropologists see the use of salt simply as the result of cultural preference, as a prestige good, or due to the pressure of the body’s liquids, for nerve transmission, and for muscle contraction (Whitney et al. 1992:282). Hunter/gatherers usually receive enough salt incidentally through the consumption of meat. However, everywhere in the world where people adopt a diet based on the grains and vegetables of a horticultural subsistence, they begin to seek sources of salt (Brown 1980:4). Using distribution maps, Driver (1961:249) shows that there is a close correspondence between the predominance of cultivated vegetable food and the distribution of the intentional eating of salt. In addition, it is widely accepted that salt is an especially important supplement for people who perform manual labor in particularly humid environments, that is, they lose excessive amounts of salt through their sweat (Dauphinee 1960:416). Thus, while the craving for salt certainly has become engrained in the culture of many peoples, the motivation for seeking it likely begins as the fulfillment of a physiological need. Given all of this, the production and distribution of salt may have been highly important considerations for those Mississippian populations who relied heavily on maize for their subsistence.

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