COLES CREEK VESSEL TYPES: FORM AND FUNCTION

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This research is being conducted as part of the analysis of ceramic collections from the Feltus site. Feltus is located in Jefferson County, Mississippi in the Natchez Bluffs region (Slide 1). While the site originally had four platform mounds surrounding an open plaza, only three remain today. In 2006 and 2007, four areas of the site were tested—the three remaining mounds and an area in southern end of the plaza (V) (Slide 2). Stylistic analysis of the ceramics from these excavations and a series of radiocarbon dates (Slide 3) indicate that there was a flurry of activity in the southern plaza during the Sundown phase of the Coles Creek period (Slide 4) and then another period of intense site use (Slide 5) involving pre-mound activities and mound building during the middle to late Ballina phase.

The stylistic analysis focused on variations in decoration as compiled in Phillips's type-variety method of Lower Mississippi Valley ceramics. However, decorative treatment represents only one step in a series of choices that a potter must make when crafting a ceramic vessel. It is integral to also recognize variables such as raw materials, formation technique, firing technique, vessel shape and vessel size as important choices made by the potter. In particular, vessel shape and size are meaningful in that they can reveal a great deal about vessel function. By starting with the assumption that ceramic vessels are utilitarian objects that reflect the needs and desires of their users, functional analyses attempt to explicate what activities took place on a site to create a given archaeological assemblage. When combined with spatial and chronological information like that available from Feltus, functional analyses have the further ability to identify activity areas and changes in site use over time (Slide 6). Our goal in this project is to lay the groundwork for a functional analysis of the Feltus ceramics by:

- Defining a set of vessel forms commonly occurring during the Coles Creek period.
- Recording and quantifying the range of variation within and among these forms.

- Considering potential functional categories that correlate with these different forms.
- Exploring the potential for applying these categories to fragmentary archaeological collections to better understand the types of activities taking place at the site.

Many functional analyses rely on collections of whole or nearly whole pots to identify the different shape classes that could exist at any given site; ethnographic data or intuitive reasoning is then used to assign specific functions to these vessel classes. That said, no whole pots were recovered from the Feltus excavations and the very fragmentary nature of the ceramic collections overall is problematic when considering the assemblage in this way. Thus, before beginning work on the Feltus collections, it was necessary to identify a more complete collection from which to build our understanding of the range of variation in Coles Creek vessel forms. To do so, we used the illustrations of whole pots and projected whole pot shapes from Ford 1951 and Phillips 1970. Limiting our data set to only those pots that dated to the Coles Creek period and were drawn as if they were complete vessels, we were able to amass 97 illustrations. It is important to note that most of these pots were not actually found complete, but rather reconstructed from sherds. Initial vessel shape categories were determined by visual examination of contour and proportion; six basic categories were identified (Slide 7): bowls, restricted bowls (Slide 8), beakers, pyramidal beakers (Slide 9), necked jars, and restricted jars. After their initial identification, these vessel shape categories were defined based on visual recognition of a number of characteristics such as the number of inflection points, corner points, and points of vertical tangency along the vessel contour as defined by Shepard (Slide 10). Additionally, the location of the widest point and narrowest point on the vessel were also recorded and used in our definitions.

As with any classification system, it was necessary to prioritize certain criteria as those most important to characterizing the different vessel forms. In defining these six basic vessel shape categories, emphasis was placed on characteristics that were exclusive to a small number of vessel forms and/or likely to be functionally significant (Slide 11).

As recognized by Shepard, visual evaluations of vessel shapes can differ wildly based on optical illusions caused by differences in vessel contour. Thus, our next step was to see if quantitative measurements could be used to support visual identifications. To do so, six measurements were taken on each vessel drawing . Because these measurements were taken on vessel drawings that were published with no scale, we were unable to use the direct measurements to compare the vessels to one another; instead, eight key ratios were used. Of these, the one most sensitive to general vessel shape is the ratio of height to diameter at the widest point; thus, we focused on this ratio in order to test our initial categories.

A simple bar graph of the mean height to diameter at the widest point values for all vessel shapes shows that there are noticeable differences between each of the categories (Slide 12). This was further explored by a histogram of all height to diameter at the widest point values (Slide 13). In this histogram, bowls, restricted bowls and pyramidal beakers, beakers, and restricted jars and necked jars are all identifiable as separate modes. As indicated above, a number of vessel forms have the same ostensible definitions when you rely solely on the visual observations used above. This height to diameter at the widest point histogram can be broken apart to highlight the differences between these cases, clearly demonstrating that there is good reason to divide them into separate categories (Slide 14).

Two of the aforementioned ratios have the potential to reveal particularly interesting information regarding vessel function (Slide 15). The ratio of height to rim diameter or, if the vessel has a shoulder, the ratio of height at the shoulder to shoulder diameter, most directly relate to two of the most common measures of vessel function: degree of containment security and frequency of access (Slide 16). Degree of containment security refers to the ability of a vessel to hold its contents without spilling due to either depth or rim angle; thus, a deep vessel will have a high containment security value and a shallow, unrestricted vessel will have a low containment security value. Frequency of access refers to the volume of material that may pass through the vessel orifice per unit time; thus, a vessel with a wide orifice will have a high frequency of access value and a vessel with a narrow orifice will have a low frequency of access value. Commonly, storage vessels will have low frequency of access value and high containment security, serving vessels will have high frequency of access value and low containment security, and food preparation or cooking vessels will have high frequency of access value and high containment security. Thus, in terms of the ratios calculated for the whole pots in this assemblage, we would expect that storage vessels would have a high ratio of height to rim diameter, serving vessels would have a low ratio of height to rim diameter, and food preparation or cooking vessels to have a ratio of height to rim diameter in the middle ranges.

To see how well these predictions work when applied to actual data, we created a bar graph of the mean ratios of height to rim diameter for each vessel class (Slide 17). Ideally, we would have liked to see distinct groupings of vessel shapes—one with low values, one with middle values, and one with high values. It could be argued that this did occur, with shallow bowls, simple bowls and deep bowls having values below 0.5, restricted bowls and flaring beakers having values right around 1.0, and straight-sided beakers, necked jars, pyramidal beakers, and restricted jars having values above 1.2. That said, this does not fit very well with the commonly accepted functions for these vessel types as it would eliminate jars from the cooking vessel category altogether.

The histogram of ratios of height to rim diameter or, if the vessel has a shoulder, the ratio of height at the shoulder to shoulder diameter values for all of the pots individually shows a more likely trimodal distribution (Slide 18). In this histogram, a cluster of vessels with ratio of height to rim diameter or, if the vessel has a shoulder, the ratio of height at the shoulder to shoulder diameter values below 0.6 could be interpreted as serving vessels; this category contains all of the bowls and one restricted bowl. A large cluster of vessels with values of 0.7 to 1.9 could be interpreted as cooking vessels; this category contains most of the beakers, jars and restricted bowls. And finally, a small cluster of two necked jars with values above 2.0 could be interpreted as storage vessels. Admittedly, if a ratio of height to narrowest point were used instead of height to shoulder diameter, a few additional necked jars may have values above 2.0. With regard to the commonly accepted uses of different vessel forms, this division of functional categories appears to fit reasonably well—bowls are serving vessels, beakers, restricted bowls and some jars are cooking vessels and other jars are storage vessels. Specifically, the presence of only necked jars in the storage category matches Fontana and colleagues' recognition that "pots meant to be used for storage have smaller openings as a rule, and they have rims enabling one to tie a thong around them to secure a covering." If these functional categories are accepted, however, this does raise a concern about using this collection of complete vessel forms to explicate other, more fragmentary Coles Creek collections because it seems to under-represent storage vessels. While this is not surprising, as storage vessels may tend to be larger, coarser and less decorated than other categories, it may cause some vessel categories present in the archaeological assemblages to be ignored.

This type of rough categorization provides an interesting starting place for a functional analysis, but it is undoubtedly oversimplified. Other aspects of vessel shape must also be taken into consideration. As mentioned above, Braun argues for a focus on vessel mouth characteristics. This would undoubtedly be a fruitful area of future research as many measurements that speak to this differentiation were not included in this study. In addition, less commonly considered characteristics should also be bore in mind; for example, Shepard accurately predicts that certain restricted shapes such as our pyramidal beaker category would be uncommon because “they have an acute angle at the base that makes them difficult to clean … and a smaller capacity than convex forms of equal all-over dimensions.” By looking at degree of restriction alone, this functional implication would be lost, but by also taking into consideration the location of the widest point, it could be easily recognized.

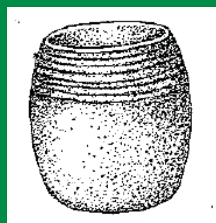
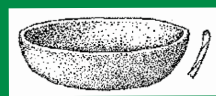
In addition to acknowledging the many facets of shape that must be taken into consideration, a number of studies have recognized that shape alone cannot be used to identify function because as Shepard has pointed out “the same shape may have a variety of uses, and conversely the same purpose may be served by many forms”. In particular, many scholars now recognize that size may actually be an equal or better determinant of vessel function. In this study, there is no good way to get at pure size differences because we are working with relative measurements (i.e.: ratios) rather than exact measurements. Because all of the drawings used were made with no reference to scale, it is impossible to tell the difference between a large and small version of the same vessel shape. That said, when sherds from an archaeological assemblage for which quantitative measurements can be taken are being used, the possibility of locating different subcategories purely based on size should be kept in mind (Slide 19).

When applied to the assemblage of whole vessel drawings from Ford and Phillips, the categories that we initially created seem to hold up visually and quantitatively. Moreover, when viewed through Braun's scheme, these categories seem to have some utility in determining vessel function. That said, most archaeological collections are not made up of whole vessels. Thus, we would like to end this paper by discussing how the scheme outlined in the previous three sections might best be applied to an excavated archaeological assemblage as typified by the Feltus collections.

When rim sherds are present in a collection, it is often possible to estimate rim diameters for the parent vessels. Moreover, evaluations of rim angle can often be combined with a general understanding of potential vessel forms to place sherds into rough formal categories. That said, the fragmentary nature of most ceramic assemblages makes directly estimating much else about the size of these forms impossible. Thus, having an understanding of how rim diameter relates to other vessel dimensions is incredibly important. What this study has done is provide conversion factors that will allow us to estimate vessel height from a rim diameter measurement for every vessel shape category. These vessel height measurements can then be used to complete probable vessel profiles from the rim profiles. From there, these vessel profiles can be spun in a program such as DesignCAD or adobe illustrator to create three-dimensional models of the parent vessels (Slide 20). These three dimensional models can then be used to make estimates about things like vessel volume, total surface area, etc.

We believe it is important to end this paper by mentioning some of the issues with relying primarily on shape and size to talk about function. Shepard recognizes that we have no way to know the variety of uses that prehistoric people may have had for ceramic vessels. Consequently, we may be over- or under-emphasizing certain functions based on our own biases, misinterpreting the use of a particular pot based on faulty assumptions, or even ignoring some common uses of vessels altogether. That said, this does not negate the usefulness of studies like the one described here. As Braun pointed out "It is here maintained that individual vessels were constructed with a particular range of uses in mind. Even if a single vessel were put to an originally unintended use, the vast majority of vessels of similar form would still be used primary as intended". While this intended use is what is being studied here, it is still essential to draw attention to the importance of incorporating other means of learning about vessel function in future studies. For example, analyses of rim and base form can identify vessels particularly well adapted to pouring, lifting, or retaining liquids. Likewise, the inclusion of wall thickness, temper, surface finish, decoration, and paste characteristics may significantly augment functional analyses. Perhaps most importantly, studies of the residues and use-wear left on a vessel during its use have the potential to explain not only a vessel's intended use, but also its actual use. That said, this study has provided an important starting place for completing a functional analysis of the ceramics at Feltus based on vessel shape and size. Future work on this project should include additional measurements, but those used here should provide a baseline for beginning to explore the types and scales of activities taking place at the site.

Coles Creek Vessel Types
Form and Function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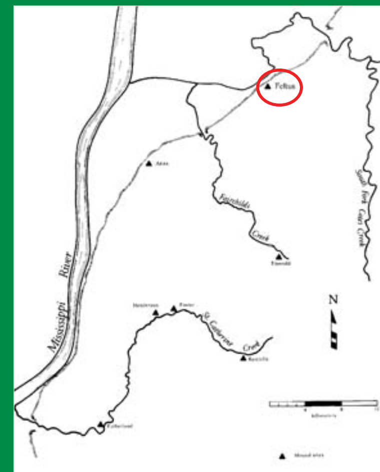
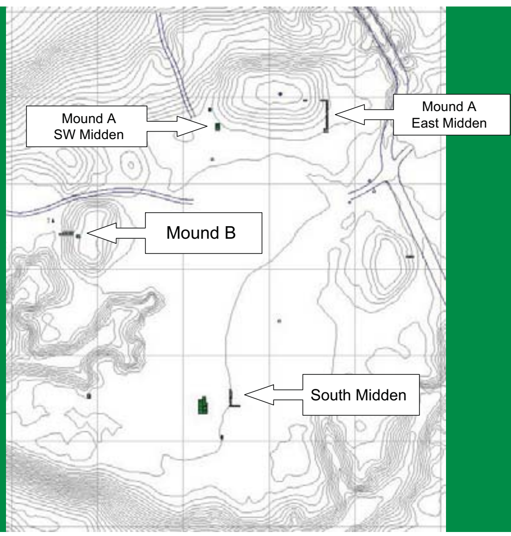
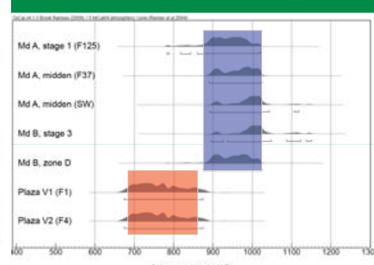
Feltus Mounds:
A Coles Creek Site in Jefferson County, Mississippi





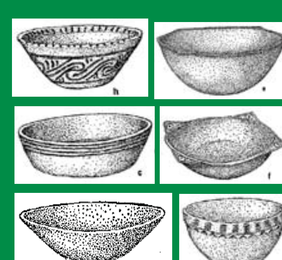
Chronology at Feltus Mounds



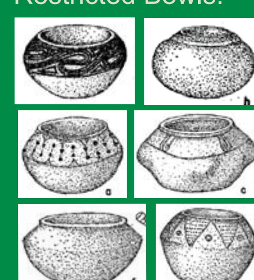
Project Goals

1. Devise a set of vessel forms commonly occurring during the Coles Creek period.
2. Record and quantify the range of variation in these forms.
3. Consider potential functional categories that exist within and among these forms.
4. Apply some of these categories to the Feltus ceramics in order to test their utility on fragmentary collections.

Bowls:

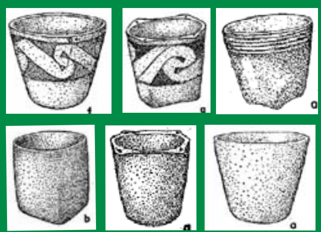


Restricted Bowls:

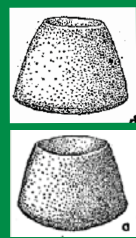


Goal 1: Devise a set of vessel forms commonly occurring during the Coles Creek period.

Beakers:



Pyramidal Beakers:



Goal 1: Devise a set of vessel forms commonly occurring during the Coles Creek period.

Necked Jars:

Restricted Jars:

Goal 1: Devise a set of vessel forms commonly occurring during the Coles Creek period.

Vessel Form	IP/CP (#)	VT (#)	Widest Point	Narrowest Point
Bowl	0*	0	Rim	Base
Restricted Bowl	0-1†	1	Midline or Above	Base
Pyramidal Beaker	0	0	Base	Rim
Beaker	0	0/All	Rim/All	Base/All
Necked Jar	1-2†	1-2†	Around Midline	Rim/Base/Neck
Restricted Jar	0	1	Midline or Above	Rim/Base
			* unless carinated † depending on the degree of shoulder/neck elaboration	

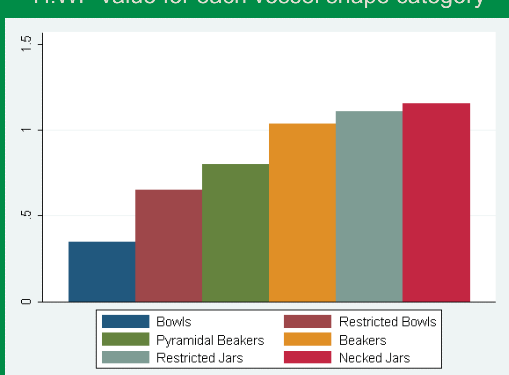
Measurement	Abbreviation
Rim Diameter	RD
Diameter at the Widest Point	WP
Diameter at Shoulder	SD
Height	H
Height at the Widest Point	H@WP
Height at Shoulder	H@SD

Eight Key Ratios

Ratio	Measure	High Value	Low Value
RD:WP	Constriction at Rim	Less constricted	More Constricted
SD:WP	Constriction at Shoulder*	Less constricted	More Constricted
H:RD	Containment Security	High	Low
	Frequency of Access	Low	High
H@SD:SD	Containment Security*	High	Low
	Frequency of Access*	Low	High
H:WP	Shape of Vessel	Tall and Skinny	Short and Squat
H@WP:WP	Rate of Constriction at Base	Gradual	Rapid
H@WP:H	Location of Widest Point	High on Vessel	Low on Vessel

Goal 2: Record and quantify the range of variation in these forms.

H:WP value for each vessel shape category



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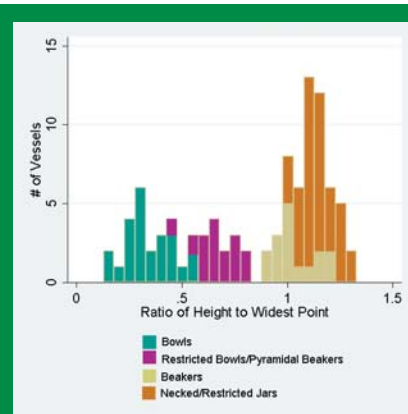
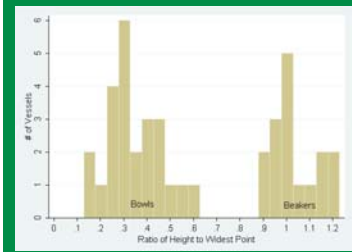
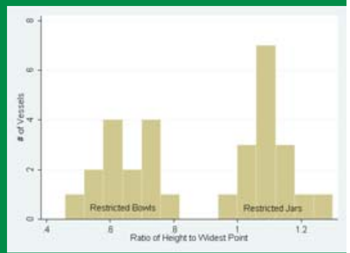


Goal 2: Record and quantify the range of variation in these forms.

Histograms of H:WP values indicating clear separation between vessel categories with the same visual definition.





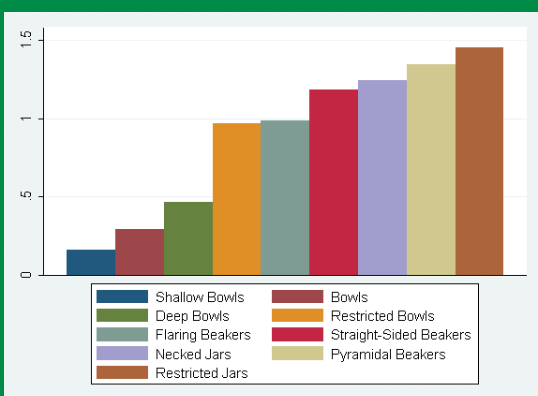
Goal 2: Record and quantify the range of variation in these forms.

Ratio	Measure	High	Low
RD:WP	Constriction at Rim	Less constricted	More Constricted
SD:WP	Constriction at Shoulder*	Less constricted	More Constricted
H:RD	Containment Security	Low	High
	Frequency of Access	High	Low
H@SD:SD	Containment Security*	Low	High
	Frequency of Access*	High	Low
H:WP	Shape of Vessel	Tall and Skinny	Short and Squat
H@WP:WP	Rate of Constriction at Base	Gradual	Rapid
H@WP:H	Location of Widest Point	High on Vessel	Low on Vessel
RD:SD	Degree of Flare in Neck	More Flared	Less Flared

*applies only to necked vessels may take the place of the ratio immediately above it.

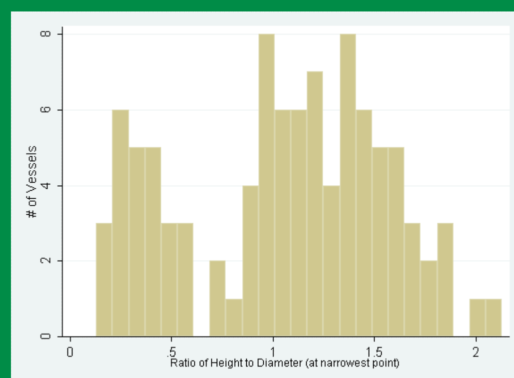
Goal 3: Consider potential functional categories that exist within and among these forms.

Mean ratios of height to rim diameter for each vessel class



Goal 3: Consider potential functional categories that exist within and among these forms.

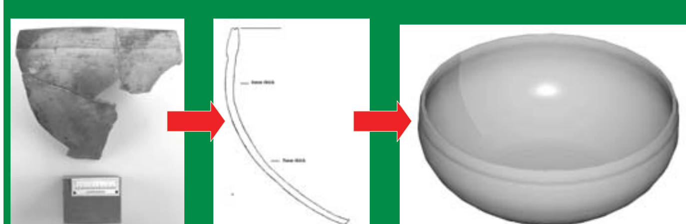
H:RD (or H@SD:SD) values showing trimodal distribution



Goal 3: Consider potential functional categories that exist within and among these forms.

Vessel Form	Potential Subcategory	# of Vessels	Conversion Factor
Beaker	Flaring	12	0.99 x measured RD
	Straight-Sided	4	1.18 x measured RD
Bowl	Shallow	3	0.16 x measured RD
	Simple	11	0.29 x measured RD
	Deep	10	0.47 x measured RD
Necked Jar	-	25	1.54* x measured RD
Pyramidal Beaker	-	2	1.35 x measured RD
Restricted Bowl	-	14	0.97 x measured RD
Restricted Jar	-	16	1.45 x measured RD
	*This measurement would be smaller, but more accurate to function, if SD was used instead; however, because SD is rarely measurable on sherds, RD was used.		

Goal 4: Apply some of these categories to the Feltus ceramics in order to test their utility on fragmentary collections.



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