

Ceramic Petrography of Six Prehistoric Sherds from Site 41AT287, Atascosa County, South Texas

By

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Introduction

A ceramic petrographic analysis was conducted on six prehistoric sherds from site 41AT287 in northern Atascosa County, South Texas. The petrographic analysis was part of the larger analysis project of the site undertaken by a contract between Archeological and Environmental Consultants LLC and the Texas Department of Transportation. The work was carried out in late 2018 and early 2019.

Location

The site lies near the northern margins of the Texas Brush Country in northern Atascosa County, immediately west of Highway 16 and a short distance south of the Bexar County line. The location is on the Thelma, Texas 7.5' USGS quadrangle map. The immediate site environment is an alluvial terrace of Pinos Altos Creek, a tributary of the southeastward flowing Atascosa River.

Geological Background

The immediate geological substrate of the locale, beneath and around the site for several miles, is the Eocene Carrizo Sand, a wide formation of sandstone with additional sands and silts (BEOG 1983). Of significance for this study are the Manning formation and other formations of the Jackson Group. These formations have significant igneous components, notably

volcanic tuffs. The nearest outcrops of the Jackson Group undivided lie some 22.4 miles southeastward and downstream of the site (BEOG 1976, 1983).

Ceramic Sample

The study sample of six ceramic sherds was selected by Timothy K. Perttula of Archeological and Environmental Consultants, LLC. Suitability for study by ceramic petrography and Instrumental Neutron Activation Analysis (INAA) was a principal element in the selection of the study specimens. The sherds also appeared to have a large amount of diversity in their traits and attributes. These raised questions about origins, trade, and transport that technological analyses might help answer.

Petrographic Methods

The petrographic analysis applied the near-standard method of point counting 200 bodies or species in a thin section of the sherds prepared by National Petrographic Inc. of Houston (Chayes 1949; Shepard 1942, 1976). Point counting gives an accurate picture of the proportions of all the rocks, minerals, and voids in the section, as well as baseline information about the ceramic matrix of the vessel. The microscope work was conducted on an Olympus OH2 stereographic petrographic microscope at Texas Archeological Research Laboratory (TARL).

Results

Results of the point count and additional observations are presented in Tables 1 and 2. They allow for comparisons and further inferences of ceramic technology and behavior at

41AT287. The ceramic pastes and the aplastic inclusions within them accentuate the assessment of great variability among the selected specimens.

Table 1. Paste attributes of sherds in thin sections. Matrix and voids are proportions of a 200-point count, except for PDI (particle diversity index).

section	matrix ppl	matrix xpl	PDI	med. Particle size	isotropy	matri x %	voids
P-1	black	black	7	c. silt	isotropic	7.5	15.5
P-2	black	black	11	fine sand	isotropic	5	24
P-3	brownish-grayish-green	black	16	fine sand	isotropic	9	10.5
P-4	reddish-brown	black	12	c. silt	isotropic	10	15
P-5	red-brown	red to gold	6	fine sand	anisotropic	7	16
P-6	red-brown/greenish gray	black to grey gold	7	c. silt	anisotropic	10	11.5

Ppl=plane polarized light; xpl=cross polarized light.

Table 2. Minerals, rock fragments, and other bodies in thin sections. Proportions of a 200-point count.

section	Common Qtz	Composite Qtz	Chert	quartzite	Bone temper	trachyte	plagio- clase	alkali feldspar
P-1	16.5		3		40.5			
P-2	30	3.5	1		15	0.5	6.5	6.5
P-3	11	1	3	4		1.5	2.5	
P-4	52.5	1	5	7.5	22.5	0.5		1
P-5	33.5		2		29			
P-6	6.5	1			45			

section	vitreous tuff	crystal tuff	lithic tuff	glass particles	ferrous hem.	ferric hem	volc rock frags	miscellaneous
P-1							2	olivine-tr. Chlorite-1.5
P-2								olivine-0.5
P-3	2.5	1	0.5	25.5	5.5	5.5	1	
P-4							0.5	orthopyroxene- 0.5 felsite-1

Section P-1. The sherd is a copiously bone-tempered sandy paste sherd. The bone particles appear heavily burned. The sand is quartz with a small fraction of chert particles. The angular and sub-angular shapes of the arenitic sands and silts are typical of alluvial terraces, creek, and river deposits. Rounded particles definitive of beach sands are not seen in the material. Incidental particles in the sands are four particles of an unidentified volcanic rock fragment and one crystal of olivine. These constituents point toward source areas of bone-tempered ceramics farther to the northwest, perhaps to beds of streams draining the Llano uplift, or regions farther north.

Section P-2. The sherd is a bone-tempered and sandy paste sherd, but one with vastly different constituents than sherd P-1. The sand fraction has subrounded and subangular particles, while the clay resident quartz silts are angular and very angular; this suggests that the larger sands were added to the clay as an adjunct to the bone temper. The most striking feature of the section, however, is the list of igneous minerals in the section: alkali feldspars, plagioclase feldspars, composite quartz, chlorite, trachyte, and olivine. These are common in suites of minerals in Western Texas, perhaps as far as the Eastern Trans Pecos. The section lacks the tuffs common in the Jackson Group, 22.4 miles southeast of the Jenkins site.

Section P-3. In contrast to the other sections, this section is distinctive for having significant amounts of volcanic tuff in sizes suggestive of addition as a tempering material. Of greater distinction, the silt fraction is quartz particles and even larger amounts of glass particles. The glass and quartz silt give the

paste brownish and grayish-green colors in plane polarized light (ppl). The glass particles are derived from tuffs, found bedded in numerous deposits with nearby clay beds in the Manning formation and other formations of the Eocene Jackson Group (Sellards, Adkins, and Plummer 1932: 677-699). Ferric and Ferrous hematite particles are co-temperers with quartz and the volcanic tuffs. Additional igneous bodies and features are plagioclase feldspars, volcanic rock fragments, trachyte, and volcanic quartz. Mica, typically a common companion of volcanic-derived deposits, is lacking in the section as is bone temper.

Section P-4. The section is tempered with bone and sand. The sand is a combination of common quartz, quartzite, chert, and composite quartz. The section has trace amounts of igneous bodies: alkali feldspars, orthopyroxene, trachyte, felsite, and a single grain of an unidentified volcanic rock fragment. The section is distinctive from all the other sherds in having smaller bone particles, reddish brown paste and abundant voids in wavy strips that significantly outline the aplastic inclusions.

Section P-5. The sherd varies from the other sections by having the least number of kinds of aplastic inclusions. Particles are dominated by the bone and sand temperers. Other bodies are a few particles of chert and ferrous hematite. This paste is typical of Leon plain ceramics found to the west and north of Atascosa County.

Section P-6. The paste has many traits of Caddo pottery even though it lacks grog temper. The section is heavily bone tempered and has pronounced greenish-gray paste in ppl. In cross polarized light (xpl) the paste, termed the b-fabric, turns from black to a grayish gold and back again when the stage is

rotated. This quality indicates the clay fabric of the matrix is of anisotropic mineralogy. Anisotropic pastes are occasionally found among Caddo wares. Other Caddo-suggestive traits are the presence of mica in the paste and iron in the form of ferric hematite. Also, a few voids of irregular shape have remnant organic masses in them where twigs and sticks have burned out during the firing, leaving a void. One void is of special note, a void in approximate rectangular shape and 0.85 mm long. This may also be an organic remnant, where a plant seed in the paste burned out during firing. These bodies are known from the Caddo region, where they are sometimes termed "hex" voids for their elongated, often hexagonal, shape in thin section.

Summary and conclusions

The collection is notable for having specimens originating in distant regions, particularly the Caddo region of Northeast Texas (section P-6). Section P-1 may have originated in areas to the north of Atascosa County, by virtue of the presence of the rare mineral olivine, which may be found in the Llano Uplift. Section P-2 has a strong volcanic character in addition to bone temper, but it lacks volcanic tuffs; this paste matrix is relatively common in West Texas ceramics of the Leon Plain ware. Section P-3 is heavily tuffaceous in addition to having abundant small glass particles derived from tuffs, possibly indurated beds of tuffs. The section lacks bone temper, the only section in the collection so lacking, but this fact does not disqualify it from the highly variable Leon Plain ware as currently defined. The bone tempered Section P-4 also has a suite of volcanic materials typical of West Texas. Section P-5 is distinctive for having no volcanics at all, but copious bone temper and common quartz as a co-temper.

The Eocene Jackson Group is a series of named formations, almost all of which are clays, tuffs, and tuffaceous deposits, including indurated tuffs in the Manning formation. Exploitable clay deposits anywhere in the territory covered by the Jackson Group may be expected to contain telltale volcanic tuffs. As noted, the Jackson Group outcrops lying nearest to site 41AT287 are 22.4 miles to the southeast. By contrast, the extensive Carrizo sand on which the site actually sits is described as having medium to coarse sands and sandstones. Extensive large-sized quartz grains and sandstone particles were not found in the collection. These findings and contrasts in materials suggest strongly that the Jenkins site was one of the import and export of ceramics, but not a place of manufacture of the regional pottery, unless, of course, other sherds in the ceramic assemblage apart from the study collection are found to have abundant sandstones in them.

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