Stone pipe bowls, although rare in most areas of Texas, occur most frequently along the coastal margin of south Texas (Jackson 1940; Hester 1969). Tubular stone pipe bowls have been documented from Cameron, Kleberg, Nueces, San Patricio, and Aransas Counties along the Coastal Bend and southern Texas coast. Inland examples have been recovered from Atascosa, Goliad, Live Oak, Webb, Zapata, and Zavala Counties. Most of these occurrences, like the Hinojosa site example, are from surface contexts and, thus, lack good chronological control. There are indications that tubular stone pipes date to both the Archaic and the Late Prehistoric in southern Texas.

The 41 JW 8 artifact, while found on the surface, is almost certainly a Late Prehistoric artifact. Several of the coastal examples were found in apparent association with ceramics and arrow points (Jackson 1940). Sayles (1935) assigned tubular stone pipes to his Rockport phase. Tubular stone pipe fragments made of soapstone and white sandstone have been found in Zavala County in association with Late Prehistoric ceramics (Hill 1978). In addition, fragments of a reddish sandstone pipe were found at the Berclair site, a Late Prehistoric site in Goliad County (Hester and Parker 1970).

Campbell (1947, 1958:162) cited several examples of Archaic associations and assigned tubular stone pipes to the Aransas complex. More recently, nine tubular stone pipes were found at the Loma Sandia site, 41 LK 28, an Archaic cemetery site in Live Oak County (H. W. Wooldridge, personal communication). One of the 41 LK 28 tubular stone pipes with a bone mouth piece still in place is illustrated by Hester (1980a:116). Jackson (1940) and Campbell (1958) cite other examples of tubular stone pipes with bone mouth pieces from burial and midden contexts.

Decorated tubular stone pipes are very uncommon in Texas. A pipe found in northwestern Zapata County that had asphaltum on one side of the exterior surface was reported by Jackson (1940:104). He also cites examples from central and west Texas with incised decorations. One tubular stone pipe from Bowie County in east Texas had "the remains of red pigment on the exterior" (Jackson 1940:114).

PREHISTORIC CERAMICS

A total of 711 prehistoric ceramics was recovered from 41 JW 8 during the 1981-1982 field season. This total ranks as one of the larger samples of prehistoric ceramics recovered from a single site in southern Texas. Unfortunately, the sample is characterized by tiny, eroded sherds which are often less than 2 cm in diameter. Larger, better-preserved sherds are by far the exception. Given the large sample size and poor condition of most sherds, the ceramic analysis is limited to a select sample of the better-preserved sherds. The prehistoric ceramics from 41 JW 8 can be strongly identified with the bone-tempered ceramic tradition in southern Texas (Hester and Hill 1971; Hall, Black, and Graves 1982; Hall, Hester, and Black 1986). Decorative techniques suggest contact with coastal groups who are known for **Rockport** ware ceramics (Campbell 1962).

METHODS

The analytical techniques chosen to examine the 41 JW 8 ceramics were largely based on the author's experience gained during his analysis of prehistoric ceramics on the Nueces River Project (Hall, Black, and Graves 1982; Hall, Hester, and Black 1986). The poor condition of most the Hinojosa site prehistoric ceramics and the extreme fragmentation of all vessels ruled out any hope of vessel reconstruction such as Highley's (1986) work with the 41 LK 201 collection. A preliminary examination of several dozen sherds revealed a high degree of homogeneity in the 41 JW 8 assemblage. Given the large sample size, high degree of homogeneity, and the poor condition of the majority of the collection, it was decided to concentrate on a detailed analysis of a select sample. One hundred of the better-preserved sherds were carefully examined microscopically.

The 100 sherd sample represents the larger and better-preserved sherds, rim sherds, decorated sherds, and other atypical specimens. Each lot bag was examined by the author for evidence of sherds with preserved surface finishes. Thus many smaller sherds not suffering from extreme weathering were also examined. Often a lot bag would contain two to five sherds from a single vessel (i.e., the sherds were identical in surface and paste characteristics). In these cases a maximum of two identical sherds was examined from a single lot. The 100 sherd sample was selected from 36 lot bags.

The select sample, while not statistically representative of the 41 JW 8 ceramic assemblage, does contain examples of virtually all variations observed within the total sample. Unusual sherds are overrepresented in the select sample. However, since decorative techniques only appear on a few of the sherds from a given vessel and some forms of decoration are extremely ephemeral, the percentage of decorated vessels estimated by the select sample ratios is probably too low. The sampling technique is felt to be adequate for the purposes of describing the ceramic assemblage and comparing it with regional ceramic assemblages.

ATTRIBUTE DEFINITIONS

For each sherd the following attributes were examined: exterior surface treatment, postfiring decoration, interior surface treatment, paste matrix, paste inclusions, sherd thickness, and vessel fragment. Due to the small size of even the larger fragments, vessel form can only be guessed at in most cases. Each attribute is defined and described next.

Exterior Surface Treatment

Exterior surface treatment describes the vessel surface treatment prior to firing. The Hinojosa site assemblage is characterized by extremely standardized exterior surface treatment. Virtually all sherds have well-smoothed exterior surfaces which have been floated to bring fine clay particles to the surface, thus concealing sand and bone particles and providing a surface which can be polished. Eight percent of the select sample lacks exterior burnishing (polishing). Thirty-three percent have

highly burnished exterior surfaces, and 58% have lightly burnished exterior surfaces. One sherd does not have a preserved exterior surface. Highly burnished surfaces have a highly reflective, even surface, marred only by postdepositional scratching or weathering. Lightly burnished surfaces have low luster and/or uneven polishing. Unburnished surfaces have no visible surface luster. This attribute can usually be determined macroscopically. Postdepositional weathering undoubtedly effects the luster of the surface finish. Where possible, this factor was taken into consideration (i.e., if a sherd had a remnant of a highly polished surface surrounded by an eroded matte surface it was considered highly burnished).

Postfiring Decoration

Only two forms of decoration were observed, fugitive red filming and asphaltum painting. Twelve percent of the select sample have traces of asphaltum adhering to the exterior. Only one sherd has asphaltum connected with a broken edge (edge mending). The other 11 sherds have either asphaltum lines of various widths or merely traces of asphaltum in small areas. It appears the asphaltum was applied in molten form after the vessel was fired. Four sherds have fugitive red film on the exterior surface. One of these, a small rim sherd, also has fugitive red film on the rim and the interior surface. Fugitive red film is believed to be iron mineral pigment such as earthy hematite (red ochre; Hall, Black, and Graves 1982). Fugitive red is always applied to burnished surfaces. The exact mechanism of application is unknown but it appears to be a postfiring decoration. Microscopic examination and chemical testing are often necessary to spot and confirm postfiring decorative techniques. The "Lewis Method" was used to positively identify asphaltum. This chemical test involves placing drops of two chemicals (isopentane and Toluene) on small amounts of scrapings of suspected asphaltum. Isopentane will not dissolve asphaltum while Toluene will (see Hall, Black, and Graves [1982:445] for a detailed explanation).

Interior Surface Treatment

Twenty-two of the sherds have burnished interiors, 31 have wet-brushed interiors, 32 have smoothed interiors, and 12 have uneven surfaces, two sherds do not have preserved interior surfaces, and the handle fragment has no interior surface. Wet-brushed surfaces exhibit a series of parallel ridges and furrows created by a brush (frayed stick?) while the clay was still wet (Hall, Black, and Graves 1982:444). The wet brushing serves to make the surface even, cover coil welds, and perhaps texture the surface.

Smoothed surfaces are those that lack brush marks and burnishing but have tactually smooth, even surfaces. These surfaces are probably created with a wet finger after the vessel has been formed. The final surface treatment type, uneven surfaces, describes essentially unfinished surfaces that lack smoothing, burnishing, or wet brushing. Coil lines, surface lumps, and finger indentations are commonly visible. As will be discussed, the interior surface treatment is often related to vessel form and function. Interior surface treatment can usually be determined macroscopically, however, microscopic examination with oblique lighting is often useful.

Paste Matrix

All ceramics are composed of various constituents, including clay, silt, and sand as well as intentionally added inclusions such as bone. The term "paste matrix" refers to the texture and grain size of the ceramic mixture excluding the intentionally added nonplastic inclusions. In other words, the paste matrix is used here to refer to the clay mixture derived from natural sources. Three types of paste matrices are defined: fine, silty pastes (24 sherds); coarse, silty pastes (32 sherds); and sandy pastes (44 sherds). The paste matrix must be evaluated by examining a fresh sherd break microscopically. The author used a variable-powered Olympus binocular microscope fitted with a micrometer in one eyepiece. The micrometer was calibrated for 30X. At 30X, fine silt particles (less than 0.0156 mm) are not visible while coarse silt particles (0.031-0.0625 mm) appear as distinguishable particles. Sand grains are easily visible at 30X.

Fine, silty pastes are very fine grained and are typically not very reflective. Coarse, silty pastes are relatively fine grained and usually reflective. Sandy pastes are usually very coarse grained and highly reflective. Silty pastes contain comparatively little sand by definition. Sandy pastes may have moderate to profuse sand quantities. Of course, sandy pastes also have silt and clay particles that appear as a finer grain matrix around and between the individual sand grains. Thus the term "paste matrix" is herein used to refer to the dominant paste constituent other than added temper. Sand is assumed to be an unintentional paste inclusion. The three paste matrix types are obviously derived from differing clay sources as will be discussed.

Paste Inclusions

Crushed bone was added to all but four of the select sample. The quantity of bone was estimated by examining the fresh break microscopically under 10-20X. The author developed considerable skill in estimating inclusion density during the Choke Canyon study (see Hall, Black, and Graves 1982:399; Hall, Hester, and Black 1986). Three quantity values were used: profuse (over 25% by volume), moderate (5-25%), and sparse (>5%). Profuse quantities of bone occurred in 16 sherds, moderate quantities in 53 sherds, and sparse quantities in the remaining 27 sherds that contained bone. The particle size of the crushed bone typically varied in each sherd from very fine (<.125 mm) to granular (>2 mm).

Sand grains were observed in all but five of the select sample sherds. As mentioned, sand is assumed to be an unintentional inclusion owing to the difficulty of distinguishing between naturally occurring sand present in the clay and intentionally added sand. Most of the sand grains were subangular to subrounded in morphological shape. Occasionally sherds were examined with predominately well-rounded or predominately angular sand grains. The author has previously argued that variation in sand grain morphology suggests differing clay sources (Hall, Black, and Graves 1982).

A few other paste inclusion types were observed, including hematite, quartzite fragments, resin bubbles, and untempered clay spheres. These are

considered unintentional inclusions. Small particles of hematite were observed in only three sherds. Resin bubbles were observed in 11 sherds. Quartzite and untempered clay spheres were each observed in four sherds. In addition, two sherds had coarse to granular-sized white inclusions of unknown composition (caliche?). These incidental inclusions have been documented in south Texas ceramics and have been discussed in some detail by Hall, Black, and Graves (1982:442-443) and Hall, Hester, and Black (1986:381-382).

Sherd Thickness

The maximum thickness of each sherd was measured to the nearest millimeter using a pair of vernier calipers. The 99 rim and body sherds have an average thickness of 6.1 mm and range between 3 and 12 mm. The thickness of the sandy paste sherds (44) averages 6.7 mm while the silty paste sherds average 5.7 mm.

Vessel Fragment

The term "vessel fragment" refers to the section of the vessel from where a given fragment originated. The select sample consisted of seven rim sherds, one handle fragment, and 92 body sherds. Three of the body sherds appear to be fragments of pipe bowls. These sherds have small diameter curvatures, thick walls, and charred interior surfaces. Similar attributes were associated with pipe fragments recovered from Choke Canyon Reservoir (Hall, Black, and Graves 1982; Highley 1986).

Vessel Forms

Vessel form could not be determined for most of the ceramic fragments recovered from 41 JW 8 due to the extremely fragmented nature of the collection. The rim sherds, a few unusual sherds, and inferences from the surface treatment allow some speculation on vessel form. Bowl forms are suggested by certain rim sherds (Fig. 10,a-e), and by the fact that 22% of the select sample have burnished interior surfaces. A well-finished, polished interior surface suggests an open vessel form (bowl). Constricted neck vessels, such as ollas, are suggested by rim sherds (Fig. 10,f), a single handle fragment, and the fact that many sherds are noticeably finished more poorly on the interior. At Choke Canyon Reservoir, the olla forms had poorly finished interiors (Hall, Black, and Graves 1982). Certain rim forms (Fig. 10,g) appear to be from partially constricted neck forms such as jars. A final vessel form represented at 41 JW 8 is the pipe bowl.

Thus the ceramic assemblage from the Hinojosa site represents a very limited and simple range of functional vessel forms. Cooking, water storage, food storage, and smoking are functions of the inferred vessel forms. The figurine fragment discussed next is the only nonutilitarian ceramic form found at 41 JW 8.

CERAMIC FIGURINE FRAGMENT

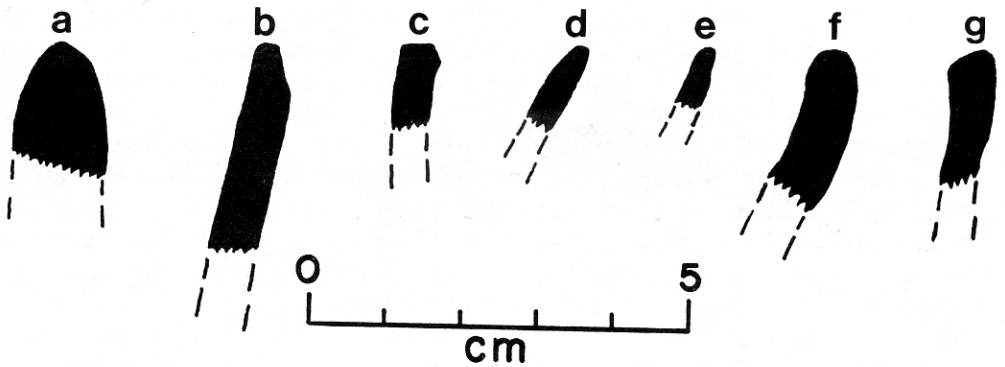
One unusual ceramic object recovered from 41 JW 8 appears to be a fragment of a figurine (Fig. 10,h,h'). This artifact was not included in the select sample. The object is 3.7 x 1.65 x 1.45 cm and weighs 9 g. The cigar or thumb-shaped object is gray tan in color. The surface has been smoothed and very lightly polished. Design elements include tiny punctations, a shallow groove, and several wavey incised lines. Due to the unusual nature of the artifact, it was not broken to examine the paste. Based only on surface examination, the object appears to be made from a sandy paste with some bone temper. In other words, the object appears to be made from the same materials as many of the other ceramic fragments at the Hinojosa site. This may suggest that the figurine is a locally made artifact.

Ceramic figurine fragments are known from several sites in southern Texas and along the Texas Gulf coast (Chandler 1978). The specimen from 41 JW 8 most closely resembles a figurine found at a site in San Patricio County (Chandler 1978:344). The complete form and the function of these rare artifacts are not known. They may represent some type of effigy object or fetish.

CERAMIC SUMMARY AND DISCUSSION

The prehistoric ceramic materials from 41 JW 8 form a large collection of small fragments. The average weight per sherd of the ceramics recovered from the Wagon Trail Area is only 1.16 g. Many of the sherds are so badly weathered that surface treatment could not be determined. The collection is fairly homogeneous in most characteristics. Surface colors range from tan to gray to flesh. Fire clouds are common, especially on the exterior surfaces. Most exterior surfaces, unless clouded, are clearer and brighter in color (better oxidized) than the interior surfaces. Exterior surfaces are almost always smoothed, floated, and burnished. Interior surfaces are usually less well finished and often smoothed with an implement that left brush marks (a frayed stick?). Vessel forms are limited to simple, functional forms such as bowls, ollas, and jars except as noted. It is estimated that one-fifth to one-fourth of the vessels represented by the collection were decorated. Asphaltum lines are the dominant form of decoration although fugitive red filmed vessels are present. Much of the variation noted within the collection can be correlated with paste composition.

Several interesting differences are noted between the silty paste ceramics and the slightly less numerous sandy paste ceramics. Based on the select sample attributes, these differences include sherd thickness, surface finish, and surface color. The silty paste sherds average 1 mm less in thickness than the sandy paste sherds (5.7 vs. 6.7 mm). Silty paste sherds tend to be highly burnished more often than the sandy paste sherds. The surface color of the silty paste sherds tend to be flesh colored while the sandy paste sherds tend to be tan colored. It was also observed that the silty paste sherds are stronger than the friable sandy paste sherds. Silty paste sherds tend to have moderate to profuse quantities of bone while sandy paste sherds tend to have sparse to moderate bone quantities.



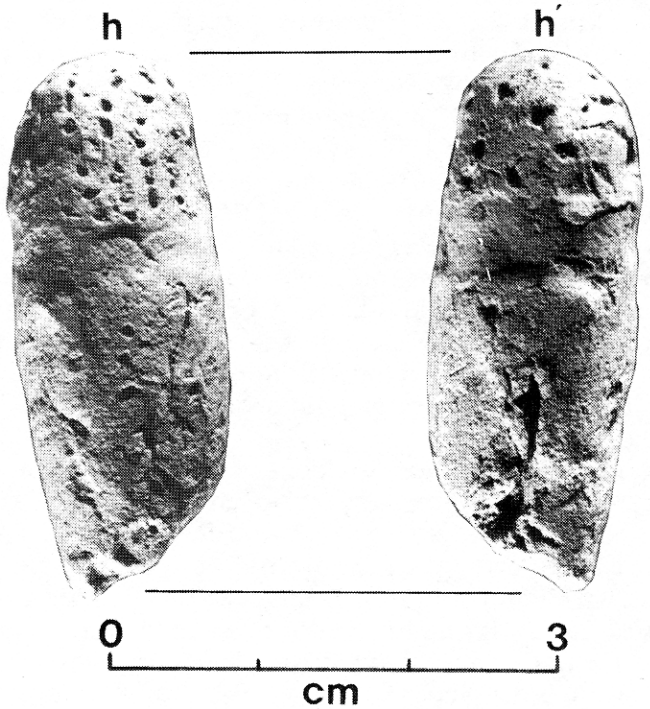


Figure 10. **Ceramic Artifacts.** a-g, rim sherd profiles (interior surfaces on the right); h,h´, figurine fragment. Lot numbers: a, 459-1; b, 110; c, 448; d, 281; e, 441; f, 61; g, 384; h, 516.

The observed differences are interpreted as technological rather than cultural in nature. Silty pastes with bone temper allow the construction of stronger vessels with relatively thin walls. Silty paste vessel surfaces take a higher polish because the fine-grained paste compacts and covers inclusions better than the coarser grain sandy pastes. Sandy pastes need less bone temper, but must be thicker than silty paste vessels to make a durable vessel. Interestingly, asphaltum and fugitive red decoration occur in equal quantities on silty and sandy paste ceramics. It is suggested that the observed differences simply reflect the fact that prehistoric potters had to use slightly different techniques when using a sandy paste clay than they would have used with a silty paste clay. It is predicted that a study of reconstructed vessels from south Texas would reveal differences in vessel form that could be correlated with paste characteristics. Olla and jar forms are more likely to have been made from silty pastes with bone temper. Sandy pastes are probably better suited for bowl forms and possibly pipe bowls.

In the report on the 1975 field work at 41 JW 8, "one possible **Rockport** ware sherd" was noted (Hester 1977:26). The present analysis did not find any clear examples of **Rockport** ware. **Rockport** ware ceramics are typically thin, sandy paste sherds that are gray to tan in color and often have asphaltum decoration (Suhm and Jelks 1962; Campbell 1962). As mentioned, most of the sandy paste ceramics at 41 JW 8 are thicker than the silty paste sherds, and virtually all of the select sample have bone temper. **Rockport** ware ceramics are usually identified on the basis of surface characteristics such as color and asphaltum decoration and their general sandy paste. Careful studies of the pastes are few in number. Perhaps the most important is a paste study done by Story (1968) of the Ingleside Cove ceramics (**Rockport** ware). Story's careful microscopic examination revealed a great deal of paste variation. It is interesting to note that bone temper was present in a significantly large percentage of the sherds and that bone-tempered, sandy paste sherds constituted one of the most numerous paste groups at the site.

This author has noted the presence of bone tempering in a number of collections of sandy paste coastal pottery from the Freeport area (Black and Cox 1983) to the Corpus Christi area (Mokry and Black ms.). It is argued here that the sandy paste ceramics of the Coastal Bend region and the bone-tempered ceramics of inland south Texas commonly share attributes (sandy paste, bone temper, and asphaltum decoration) and are both basically functional pottery with limited variation in form (water jugs or ollas are the most common form in both areas). The most important difference is herein seen as the original clay source. The sandy clay of the coastal area is seen as a superior raw material that allowed the creation of thin-walled vessels. Sandy paste clay from inland sources is more likely to be an alluvial material that has coarser grain clay and larger sand size, hence could not be used to form thin-walled vessels. The finer grain inland clays, on the other hand, were used in conjunction with massive amounts of bone temper to create vessels as thin as the coastal wares.

The most important point of this discussion is that many of the differences between the coastal and inland ceramic traditions in southern Texas are seen as more a factor of raw material availability than cultural preference. The numerous shared attributes and the overall similarity in basic form and

function suggest that the two traditions may share a common origin. There are significant differences, such as the form variation and the decorative motifs. Thus, the two traditions are distinct, however, they overlap in many attributes, as the Hinojosa sample attests.

BAKED CLAY LUMPS

Small, irregularly shaped lumps of baked clay were recovered in moderate quantities from 41 JW 8. These lumps range from tennis ball size to pea-sized with most lumps less than golf ball size. The baked clay lumps, while irregularly shaped, are generally rounded and oval to spherical. No evidence of purposeful shaping, smoothing, or manufacture was observed. Surface colors are tan to orange to yellow and usually obscured by thin, light gray, calcareous coatings. Fresh breaks reveal the same tan-orange-yellow-colored matrix in most lumps, although a few have darker, incompletely oxidized, gray cores. A number of the baked clay objects are broken and were examined microscopically. Virtually all have a very sandy clay matrix with occasional voids, pebbles, and root impressions. No trace was observed of bone, flakes, or snails.

Baked clay lumps (objects, balls, or nodules) are very common constituents in South Texas Gulf Coastal Plain site deposits. Various explanations have been advanced to explain these lumps as Black (1978) and more recently Smith (1982) have reviewed. Both authors agree with Corbin's (1963) explanation that most baked or burned clay objects result from building an open fire on a clay-rich soil surface. The heat of the fire "bakes" the underlying clay-rich soil, thus forming small hardened lumps. Smith (1982:36) concludes: "It now seems clear that many south Texas soils contain one or more chemical compounds that respond to the heat of a fire such that the matrix is bound up and hardened. . . ." It is suggested here that the "chemical compounds" are nothing more than the various clay minerals present in most soils within the South Texas Gulf Coastal Plain. One of the properties of clay is that when heated, the water within the clay is removed, leaving a hardened durable substance, ceramic material.

Several aspects of the baked clay lumps from 41 JW 8 remain puzzling. First, the baked clay lumps appear far sandier than the typical soil matrix at the site. Second, the absence of any flakes, bone, or snail shell fragments in any of the examined lumps is surprising in view of the frequency of these materials within the soils at the site. No explanation for these inconsistencies with the site soil matrix is immediately apparent.

MODIFIED BONE AND SHELL

Each of the bone and shell items, which have been modified by cutting, grinding, smoothing, and incising to form tools or ornaments, is discussed in the following few pages. The bone items are ulna tools, a bone needle, and bone beads. Both mussel shell and marine shell were modified.