

# Archeological Investigations at Mission Espíritu Santo (41GD1), Goliad County, Texas

*by*

Kristi M. Ulrich, Antonia L. Figueroa, Jennifer L. Thompson, Anne A. Fox,  
Johanna M. Hunziker, Steve A. Tomka, and Cynthia M. Muñoz

*with an Appendix by A. T. Jackson*

## *Excavation of Aranama Mound Located Immediately West of the Yard of Aranama (Espíritu Santo) Mission*

Archival Series 3

Texas Archeological Research Laboratory, The University of Texas at Austin



Archaeological Report, No. 356

Center for Archaeological Research, The University of Texas at San Antonio

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Archival Series 3  
Texas Archeological Research Laboratory  
The University of Texas at Austin

*Prepared for*  
Texas Parks and Wildlife Department  
4200 Smith School Road  
Austin, Texas

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Texas Antiquities Committee Permit No. 3593

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Principal Investigators

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Cover photo: View of the front of Mission Espíritu Santo during restoration in 1933. Courtesy of the Texas Archeological Research Laboratory, The University of Texas at Austin. Photo 41GD1-19.

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## **Abstract:**

Excavations were carried out at Mission Nuestra Señora del Espíritu Santo de Zuñiga (41GD1) in November of 2004 and February of 2005 by the Center for Archaeological Research of The University of Texas at San Antonio under contract with the Texas Parks and Wildlife Department. The work was conducted in advance of the planned construction of a French drain system. Shovel tests, 1-x-1-meter test units, and controlled backhoe trenches were used to explore areas that would be impacted by the proposed drainage system along the northern walls of the chapel and museum (granary) and across the center of the courtyard. Based on the findings of the shovel tests, test units, and trenching, three areas with significant deposits were identified. The first area is associated with a probable midden deposit located in the northwest section of the mission, the second is located along the northern wall of the granary (museum), adjacent to the priest's quarters, while the third consists of two colonial-period features located west of the present-day workshop. Although at the start of the fieldwork it was assumed that no intact cultural deposits survived within the courtyard of the mission, the excavations revealed that selected areas do retain intact colonial-age deposits with significant research potential. These areas should be more fully delimited and explored as future opportunities for their investigations arise.

The fieldwork was conducted under Texas Antiquities Permit No. 3593 with Antonia Figueroa and Jennifer Thompson serving as co-Principal Investigators. All artifacts collected were processed in the Center for Archaeological Research laboratory and transferred to Texas Parks and Wildlife for permanent curation.

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The field crew was composed of Leonard Kemp (Crew Chief), Claudia Branton, Brian Davis-Brothers, Roman Clem, Jon Dowling, Lynn Eschenbaum, Maggie Moore, Bryant Saner, and Andy Speer. They all deserve special recognition in the success of the project. Jennifer Thompson and Antonia Figueroa served as Principal Investigators for the project and Kristi Ulrich served as Project Archeologist. Thanks to Bruce Moses for the mapping work conducted in the field and producing the graphics, along with Rick Young, for this report. Johanna Hunziker prepared the final report. Also thanks to Dr. Steve Tomka, CAR Director, and Dr. Raymond Mauldin, CAR Assistant Director, for their guidance and support during the course of this project.



# Chapter 1: Introduction, Background, and Previous Archeological Investigations at Mission Espíritu Santo

## Introduction

The Center for Archaeological Research (CAR) at The University of Texas at San Antonio was contracted by the Texas Parks and Wildlife Department (TPWD) to conduct a data recovery project in the courtyard of Mission Nuestra Señora del Espíritu Santo de Zuñiga (41GD1) located within Goliad State Historic Site. The work was performed in advance of the planned installation of a subsurface drain system intended to alleviate the surface pooling of water and ground saturation following heavy rains that are slowly damaging the walls of the mission structures. Kristi Ulrich directed field excavations on November 3–12, 2004, and February 2–4, 8, and 11, 2005. The investigations were conducted under Texas Antiquities Committee permit number 3593. Antonia Figueroa and Jennifer Thompson served as co-Principal Investigators.

## Report Organization

This report consists of five chapters and three appendices. The remainder of this chapter continues with a brief discussion of the physical setting of the mission, a presentation of the history of the mission, and a review of previous archeological investigations carried out within its walls. Chapter 2 presents the scope of work and the field and laboratory procedures followed. Chapter 3 discusses the materials recovered from excavations and Chapter 4 presents the analyses conducted on the ceramics, faunal remains, and lithic materials recovered. Chapter 5 presents a summary of the fieldwork and analyses and provides recommendations for additional work. Appendix A presents A. T. Jackson's manuscript on the 1933 University of Texas at Austin (UT-Austin) excavations at the mission. Minimal formatting and grammatical changes to the original manuscript have been made. In some cases, when artifacts could be relocated, new photographs of the artifacts have replaced originals and figure numbers and captions have been added and referenced in the text. Appendix B presents the attributes recorded during the Native American ceramic analysis and the final appendix (Appendix C) discusses the small number of human remains recovered during excavation.

## Physical Setting

Goliad State Park is located one-quarter mile south of the town of Goliad in Goliad County, Texas, on the San Antonio River. The park occupies 178 acres in the South Texas Brush Country Natural Region and the Coastal Prairies Province of the Gulf Coastal Plains Physiographic Region within the San Antonio River Basin. Figure 1-1 shows the location on the 1962 *Goliad, Texas*, USGS 7.5' topographic quadrangle. The park's main feature and the subject of this study is the historic site of Mission Nuestra Señora del Espíritu Santo de Zuñiga. The mission complex sits on the second terrace approximately 200 meters due east of the active river channel at an elevation of 150 feet above mean sea level (AMSL).

Soils at the park are shallow to moderately deep, loamy surface layers with clayey subsoils (Godfrey et al. 1973). Indurated caliche occurs at varying depths throughout the area. Vegetation includes a mix of oak-hickory forests and tall-grass prairie characteristic of the Texas Province and the mesquite-thorny brush of the Tamaulipan Province. Common species include post oak, blackjack oak, hickory, mesquite, black bush, Texas persimmon, huisache, and prickly pear (Blair 1950).

## History of Mission Espíritu Santo on the San Antonio River

Mission Nuestra Señora del Espíritu Santo de Zuñiga, first founded in 1722 in modern Victoria County, occupied three locations before it was secularized during the 1790s. Political maneuvering by the Spanish government to halt French and English encroachment on Spanish land north of the Rio Grande led to the relocation of the mission and its presidio (La Bahía) to the banks of the San Antonio River in 1749. The Spanish hoped this location would protect a portion of the *Camino de en Medio* linking Mexico with East Texas.

There are various and at times contradictory accounts about the native populations that lived at or in the vicinity of Mission Espíritu Santo and the Presidio de la Bahía (Chipman 1992;

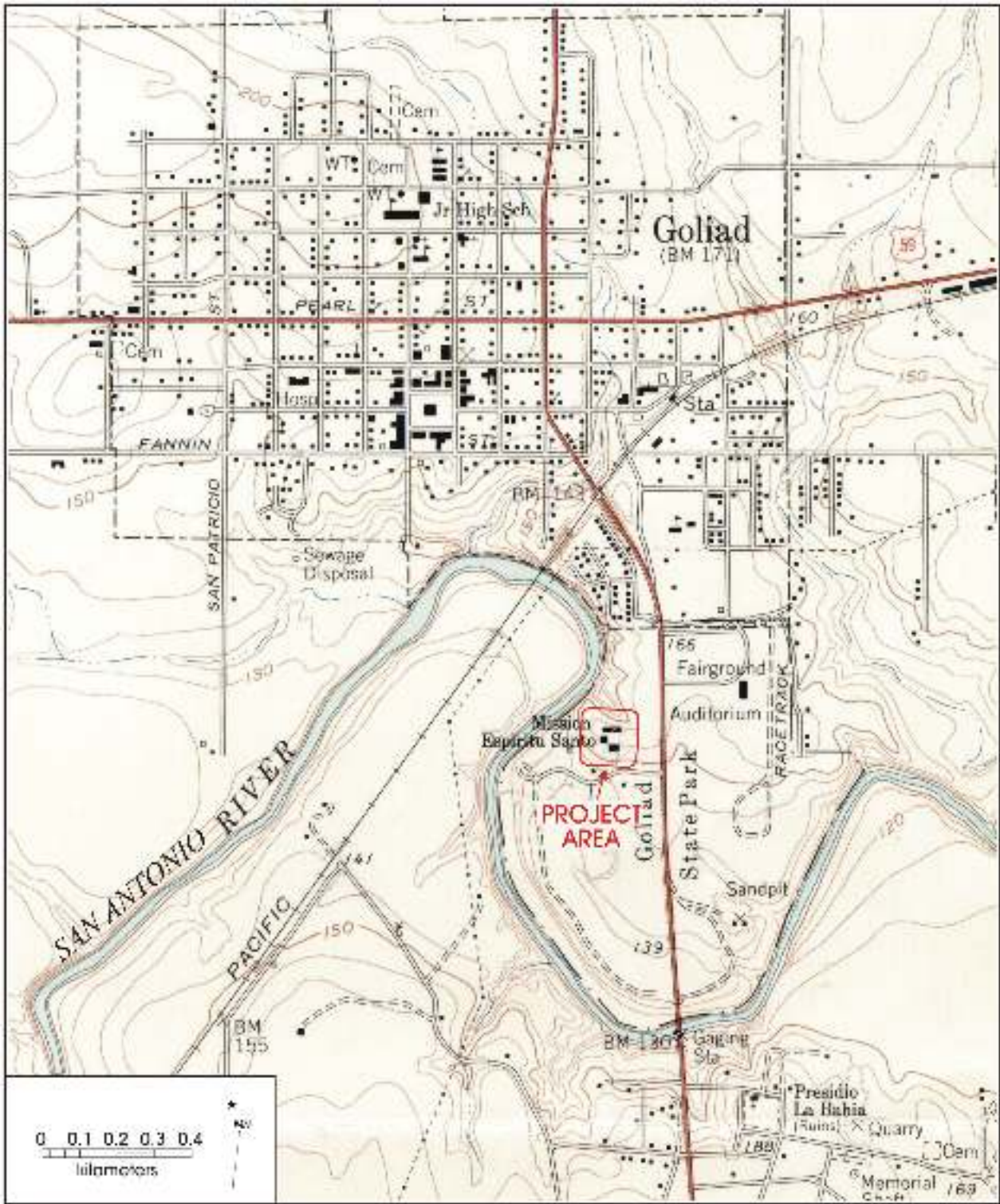


Figure 1-1. The 1962 Goliad, Texas, USGS quad map showing the city of Goliad and the location of Mission Nuestra Señora del Espíritu Santo de Zuñiga (41GD1).

Himmel 1999; Mounger 1959; Newcomb 1961; Oliver 1931; Ramsdell 1938). In general, the list of named groups that are noted to have resided at some time within Mission Espíritu Santo includes the Karankawan (Cocos, Copanes, Carancaquacas) and the Coahuiltecan (of which the Aranama may be associated linguistically; Bolton 1914:27) cultural groups. Although there are some indications that both Karankawan and Coahuiltecan groups may have lived at the original location of Espíritu Santo in Victoria County, it is by no means clear if these groups inhabited the mission simultaneously or at different times. For instance, Ramsdell (1938:18) suggests that the Karankawan were persuaded to come to Mission Espíritu Santo only after its establishment and remained there only a short time. By 1754, the Karankawan population living at Espíritu Santo was relocated to a new mission, Nuestra Señora del Rosario, in order to separate them from the Aranama (Himmel 1999:15). Chipman (1992:168) notes that Mission Rosario was established for the Karankawa.

Similarly, while Coahuiltecan groups made up the bulk of mission Indians in South Texas (Mounger 1959:72), little is known about the Aranama Indians that lived at Espíritu Santo (Ramsdell 1938:9). While they may have been one of the earliest inhabitants of the mission at its final location, it appears that they were in no way permanent residents, often leaving the mission for several months at a time or abandoning it for several years at a time. The Aranama may have entirely deserted the mission from 1761 to 1769, when Father Garza “brought them back from the Tehucan (or Tawakoni) villages (near modern Waco)” (Ramsdell 1938:19). They fled once again and were returned by Father Garza in 1791 (Mounger 1959:71).

Following its move to the banks of the San Antonio River, many of the newly built structures were temporary *jacales* made of vertical poles covered with mud. By 1758, many of the temporary buildings began to be replaced by permanent structures made of stone. The first stone structures at the mission were the stone church and the *convento* (friary). At that time, the native population of Aranama, Tamique, Tawakoni, and Tonkawa groups consisted of 178 women, warriors and children. They continued to live in *jacales*. In the same year, Governor Barrios y Jauregui reports that 499 baptisms had been performed and the mission boasted of having 32,000 head of cattle and 120 horses (National Park Service [NPS] n.d.).

Espíritu Santo’s ranchlands continued to prosper at the new location and all reports from the priests to the governor were positive throughout the mission’s early years. A report from Father José de Solís’ visit to the mission in 1768 describes more improvements to the mission compound with the complete replacement of the wooden structures with stone buildings. He compared Espíritu Santo to the sturdy missions of San Antonio with buildings of mortar and stone (NPS n.d.). It was during these years, the late 1760s, that the mission thrived and boasted the most successful ranching operation in Texas. A 1786 report from Fr. José Francisco Lopez notes the good conditions of the stone buildings as well, adding that the native huts were also made of stone with flat, beamed roofs of adobe or thatch. The Indian housing was situated immediately inside a stone wall that surrounded the *convento*, workshops, granary, and the church and sacristy arranged “in an irregular group around the patio” (Mounger 1959:33).

New branding laws for cattle, Apache raids, and political pressure from the secular population to roundup cattle on mission lands began to hurt the mission’s economic stability during the 1770s. Continued raiding by hostile native groups on wandering herds and isolated ranches, coupled with the 1778 order declaring any unbranded cattle property of the crown, ended the prosperous years at Espíritu Santo. As a result, by the 1780s, the mission’s holdings were reduced to one-third of what they were in 1760. The great loss of cattle meant reduction in the food available to feed the native groups residing in the mission. Without guarantee of protection from the Apaches, and decreases in food supplies, neophytes began deserting the mission and populations dropped rapidly.

By 1790, the mission no longer served its initial function of Christianizing the natives and guarding the road from encroaching French and English interests. The Spanish government no longer needed the missions to convert the native populations as part of their strategy for colonization because they had won the French and Indian War and gained Louisiana from France. Spain no longer needed Texas to serve as a buffer against a French force. Native converts were dwindling from high infant mortality rates, the introduction of European disease, and the ever-present depredations by hostile native groups. Furthermore, the area was not the deserted outpost on the Spanish frontier that it once was. Retired soldiers and their families had contributed

considerably to the growing secular population and formed prosperous communities in the vicinity of Presidio La Bahía as well as San Antonio de Bexar. The Franciscans had turned their attentions and their resources to missions on the west coast and left the buildings of the mission to deteriorate.

After the mid 1790s, the secularization of Texas missions was well underway, but the governor of La Bahía recommended that the missionaries receive a five-year extension to address the “backward condition of the Indians at Espíritu Santo” in hopes that the mission could be transferred to them when they were “able” (Mounger 1959:45). During the five-year extension and well into the nineteenth century, the mission saw boom and bust and was never able to gain full control over the native coastal groups. The mission struggled along without support through various raids and sieges until it finally collapsed after 109 years. An inventory made in 1830, when the mission was secularized, lists six rooms within the missionary’s stone residence, all collapsed. The rooms included a living room, pantry, bedroom, kitchen, and granary, with a patio surrounded by a wall (NPS n.d.).

In February of 1849, the remaining mission structures and grounds were utilized by Hillyer Female College, which had been established by a Baptist minister, John F. Hillyer. The college focused on providing young women education in Greek, Latin, piano, painting and needlework (Roell 1996a). Hillyer continued to run the Hillyer College for three years, then aided in the conversion of the establishment into a men’s college. In September of 1852, the Presbyterian Church used the grounds as the campus location of Aranama College, established to serve the Mexican male population in the area (Roell 1996b). The college remained open until the student body left to fight with the Confederate Army during the Civil War. The college buildings were utilized by the Southern and Northern armies during the course of the war. After the war had ended, Aranama College was never able to regain enrollment and the school building that was constructed on the grounds was destroyed by a hurricane in 1866 (Roell 1996b). Ownership of the property eventually was assumed by the city of Goliad. The county and the city of Goliad donated lands for the park in 1931 before transferring them to the State Parks Board in 1949. The mission was reconstructed in the 1930s by the Civilian Conservation Corps (CCC) and the Works Progress Administration (WPA), and has been administered as an historic and recreational park by TPWD since that time (Hunziker and Fox 1998; O’Connor 1966). On August 22, 1977, the mission was listed on the National Register of Historic Places (Clark 1976).

## Previous Archeological Research

Prior to the current project, at least five formal archeological excavations have taken place at 41GD1 since the early 1930s. These include work conducted by A. T. Jackson of the University of Texas at Austin, work by the Civilian Works Administration (CWA) and the CCC, limited testing and monitoring by TPWD in the mid 1970s, shovel testing by CAR in the mid 1990s, and work by Coastal Archeological Research, Inc. in the late 1990s. Figure 1-2 presents a summary of several of these previous excavations. Each of these projects is briefly summarized below.

### The A. T. Jackson Investigations

A. T. Jackson of UT-Austin conducted one of the first systematic archeological investigations at the site in 1933. While archeological investigations may have preceded the Jackson work, no published information exists on these efforts and neither the timing nor the extent of these investigations is known. Jackson’s excavations focused on a refuse midden outside of the compound’s western wall adjacent its southwest corner (Figure 1-3). Jackson recovered a large sample of artifacts, including over 22,000 pieces of Goliad ware ceramics (Mounger 1959:163), lithics, and a variety of metal artifacts (Figure 1-4).

The midden deposit was only 100 yards from the river on a second terrace. Jackson concluded that the refuse was the product of a Native American occupation and suggested that the mission-period Indians lived just outside the compound. He estimates the dimensions of the mound at 85 feet east-west by 75 feet north-south. The height of the midden was 11<sup>2</sup>/<sub>3</sub> feet at its highest. Jackson located the base of the wall 40 inches below the midden surface, making the wall seven feet, two inches tall. In the months following the excavations, Jackson produced a manuscript detailing the results of his work, complete with photographs and other illustrations. The original manuscript is on file at the Texas Archeological Research Laboratory (TARL), UT-Austin, and is published as Appendix A of this report with the permission of TARL and TPWD. While the bulk of the manuscript focuses on artifact descriptions and lacks detailed descriptions of field methods and excavation locations, it represents an important historical record of the earliest systematic excavations performed at the site. In publishing the manuscript, CAR chose not to alter the text of the original document beyond minor editorial changes and instead present it as a historical document. Where available, the original photographs in the manuscript were scanned and used in this publication, and



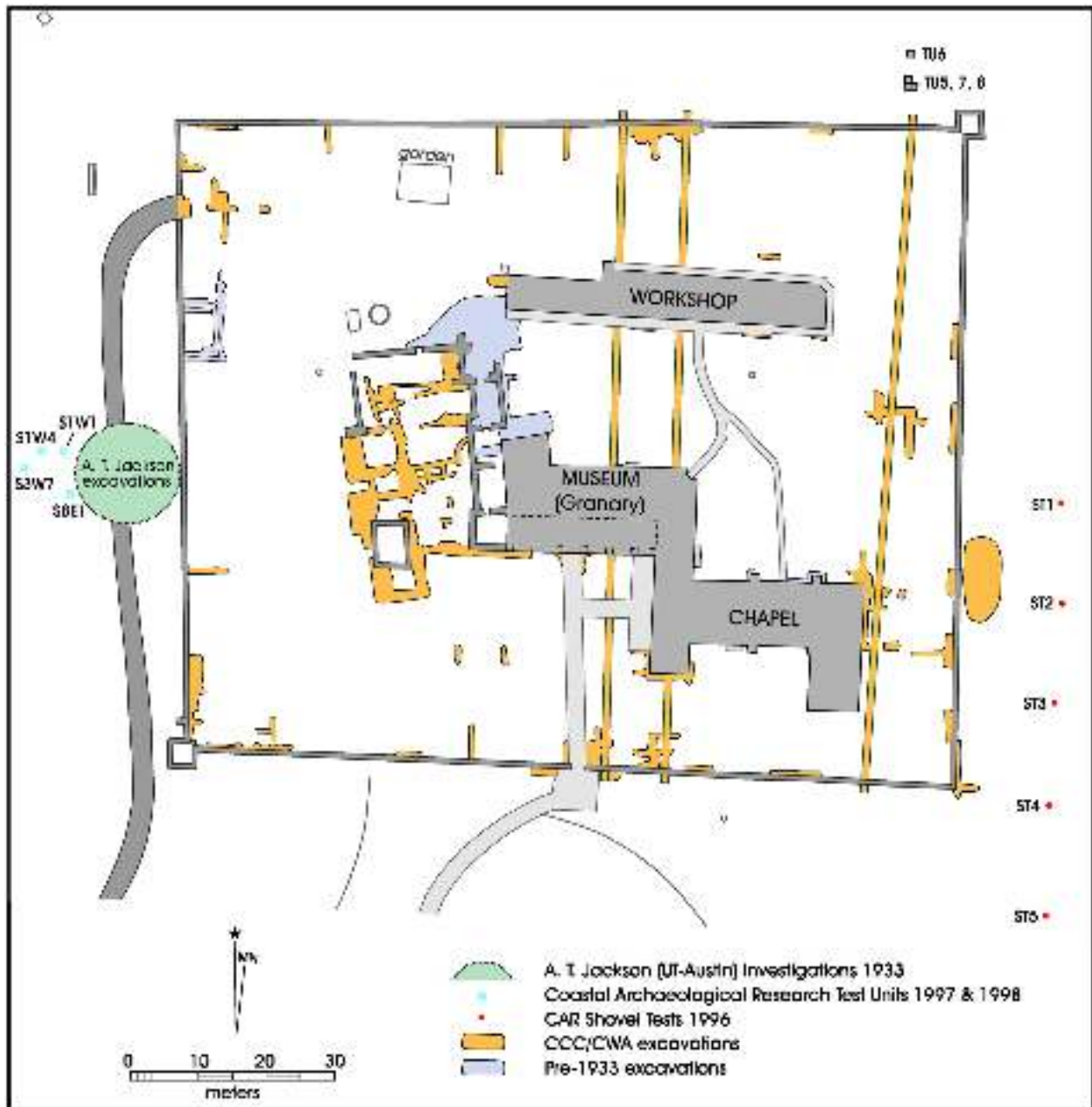


Figure 1-2. Previous archeological investigations at Mission Espíritu Santo (41GD1).



Figure 1-3. Location of the 1933 University of Texas at Austin excavations by A. T. Jackson at Mission Espiritu Santo. Courtesy TARL, UT-Austin, photo 41GD1-31.

when artifacts could be relocated, they were scanned to replace black and white photos or line drawings present in the original manuscript.

At the same time that the UT-Austin investigations were occurring, Judge J. A. White (County Judge of Goliad County), representing the Goliad State Park, furnished another crew for the clearing of many of the rooms of the mission. The artifacts recovered by the Goliad crew were intended for display in the planned museum at the mission. All of the Goliad crew's finds were kept separate, though A. T. Jackson was allowed to document some of the interesting recoveries. While the artifacts collected by Jackson's crew were stored at UT-Austin, the Goliad crew's artifacts were stored in one of the rooms at the mission (Mounger 1959). On several occasions, the room was subjected to theft, leaving only a small portion of the artifact assemblage. In 1949, the remaining artifacts from the Goliad crew's excavations not housed at the museum were transferred to UT-Austin (Mounger 1959). No publications of the investigations conducted by the Goliad crew exist.

## Reconstruction, the CWA and the CCC

Following the UT-Austin excavations, the CWA completed restoration of one building at the mission. Though they actually restored the granary, they thought that they had

uncovered the chapel and proceeded to rebuild it as such (Mounger 1959:130). No records of their work are available aside from what is mentioned in Mounger's 1959 thesis.

Restoration work at the mission was continued by the National Park Service between 1935 and 1940. The purpose of the excavations was to determine the floor plan of the buildings, retrieve any architectural data that would aid in the mission's reconstruction, and to recover artifacts documenting the various aspects of mission life. The CCC, under the direction of Roland Beard, provided the labor force until the project was shut down after U.S. involvement in World War II.

To discern the layout of the mission, Beard directed the excavation of a series of trenches beginning at known locations of buildings. Perpendicular to the building walls, he excavated trenches extending 30 to 40 feet and reaching the depth of "original undisturbed earth" (NPS n.d.:6). Other trenches were also excavated parallel to known walls to expose foundations. With the buildings outlined, Beard began excavating within the rooms by stratum. In each room, a section of the floor was excavated to examine its construction and the type of underlying foundation. Where no buildings were located, the dirt was removed in strata until the occupation level of the mission was reached, judging by the types and ages of the artifacts encountered (NPS n.d.:6).

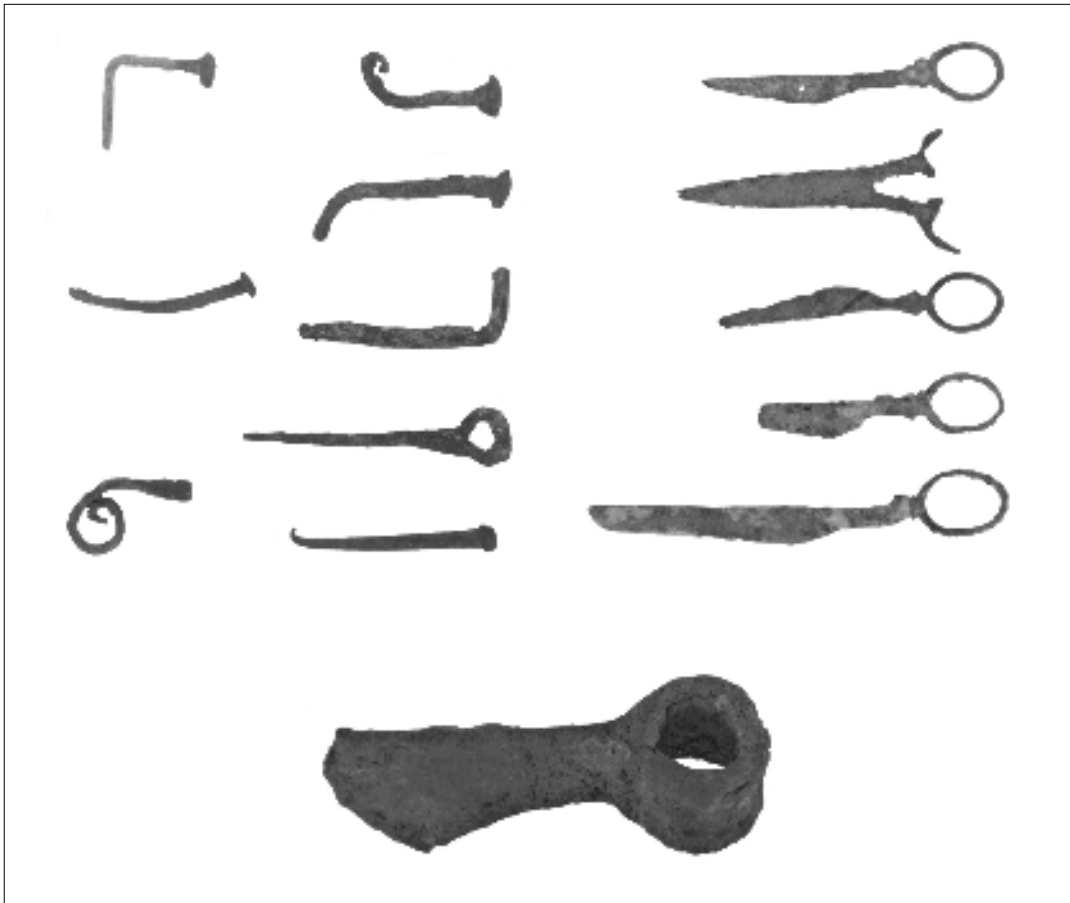


Figure 1-4. Various metal artifacts recovered during the 1933 UT-Austin excavations. Courtesy TARL, UT-Austin, photos 41GD-71, -72, -74.

From these excavations, Beard was able to reconstruct the construction history of Espíritu Santo. Wooden structures were initially built after the arrival of the missionaries to the San Antonio River. These wooden structures were enclosed by a double-walled wooden stockade measuring 100 varas square. (One vara equals approximately  $33\frac{1}{3}$  inches [Tyler 1996:710]). When the replacement of the temporary mission buildings with stone structures began, the buildings were aligned with the wooden stockade. However, as reconstruction continued, the newly built stone walls were oriented with the cardinal directions rather than the wooden stockade. Therefore, the stone structures of the mission were not all oriented in the same direction (Mounger 1959).

At several locations, the CCC excavated foundations and rebuilt walls atop new concrete footers. At least four buildings (units) were reconstructed before World War II

halted these efforts. At least 75 human burials were encountered, with most being removed (Mounger 1959).

Restoration of Unit I was completed in December of 1937. The unit was thought to have been that of the *majordomo's* office and the school building. The unit had already been excavated by the CWA, so the CCC workers found very little above floor level. Unit I was reconstructed with textured local gray sandstone laid in cement, lime and mortar similar to the masonry found in the surviving walls of the mission. The cement was sometimes tempered with Spanish moss and caliche that served as a strengthening agent. Afterward, the stonework was coated with thin lime-cement stucco colored to match the finish of many Spanish missions in Texas. In general, all efforts were made to reproduce elements typical of the time and proportional to the rest of the structures.

Unit II, the chapel, was restored next. Generally speaking, the structure was easily recognizable and its elements well documented in the ruins from many examples of chapels at other Spanish missions in Texas. Again, all efforts were made to reconstruct the chapel and rooms in Unit II in proportion to the rest of the buildings and typical to the time.

The restoration of Unit V, the granary, was completed in 1940. Staying true to its original design proved most problematic in this case because it had seen three previous renovations. The first occurred in 1780, when the church roof collapsed and the granary was used for the priests' quarters. The second was in 1856, when Aranama College remodeled the building. Finally, the granary was renovated in 1931 when the CWA restored it thinking it was the chapel.

## **Texas Parks and Wildlife**

A memo dated May 16, 1977, from Robert Burnett, TPWD Archeologist, briefly discusses the monitoring of trench excavation for a French drain along a portion of the reconstructed mission. He encountered the trench from the CWA and CCC projects and recovered "many cow bones, one majolica sherd and two Indian sherds" in addition to a brass nail and kerosene lamp part found "in other areas" (Burnett 1977). Burnett observed loose foundation stones, poor drainage, and clay soils that served to hold water. He recommended changes to the drainage plan and water-proofing across the bottom of the trench. This memo is on file at Goliad State Park. A copy is also on file at the Center for Archaeological Research.

## **Center for Archaeological Research**

In 1996, CAR excavated 32 shovel tests associated with the replacement of water and electrical lines (Hunziker and Fox 1998). This work recovered Spanish colonial ceramics, stone tools and debitage, and large quantities of animal bone. Excavation occurred along a proposed utility trench to extend between the mission compound and the camping area (Figure 1-2). The majority of the artifacts were recovered from shovel tests excavated near the mission wall, suggesting that they represented discarded refuse.

## **Coastal Archaeological Research, Inc.**

In 1997 and 1998, excavations were conducted by Coastal Archaeological Research, Inc. in two refuse midden deposits at the site (Ricklis 2000). The research goals of this project were to understand the contributions of various wild and domestic foods to the diet of mission residents, to study the acculturation process, to identify the ethnicity of native residents and to highlight changes in the material culture at the mission. Eight 1-x-1-m units were excavated within two separate midden deposits at 41GD1 (Figure 1-2). Four of these were adjacent to the work A. T. Jackson performed on the midden outside the western wall and four were near the northeast corner of the compound, outside the wall. That work produced over 4,600 colonial-period artifacts, including almost 2,800 native ceramic sherds, 1,260 pieces of debitage, and over 100 flaked stone tools. In addition, about 64 kilograms of bone, 320 specimens of shell, and several charred macrobotanical samples, including a maize cob fragment, were recovered (Ricklis 2000).

It is clear from this summary that numerous archeological investigations have taken place within and outside the compound wall at Mission Espíritu Santo. Unfortunately, the early investigations were not well documented and our knowledge of the precise locations of previously excavated areas is tenuous. The excavations that most affect the current project are those of the CWA and CCC, since the herein reported investigations carried out by CAR took place in areas adjacent to the CWA and CCC reconstructions of the 1930s, as well as the work by TPWD.

## Chapter 2: Scope of Work and Summary of Fieldwork and Laboratory Procedures

### Scope of Work

The installation of the proposed French drain system was to impact an estimated 740 square feet within site 41GD1. Much of the impact was to derive from backhoe trenching for drainage pipe installation. A smaller area was to be impacted by re-contouring to modify existing grade for appropriate drainage. Specifically, four distinct areas of the site were to be impacted. In Area 1, the project called for the excavation of trenches along portions of the north wall of the chapel and the east and north walls of the museum (granary) to install drainpipes (Figure 2-1). In Area 2, a long backhoe trench was needed across the central and western portions of the mission courtyard to house the main drainpipe that is to lead the water outside of the walled courtyard. For ease of reference, this trench is divided into six sections (Sections 1–6) from east to west across the courtyard. The third area (Area 3) of impact was near the southeastern corner of the mission where a north-south oriented backhoe trench was needed to install a drainage pipe to divert water to the outside of the compound wall. To provide the appropriate drainage, it will be necessary to re-contour the area where the main drainpipe is to empty immediately outside of the west wall of the mission (Area 4).

CAR proposed the excavation of four 1-x-1-m test units to investigate buried deposits along the walls of the chapel and museum (granary) in Area 1. The first test unit (TU 1) was to be placed at the L formed by the eastern wall of the northern extension of the chapel and the northern wall of the main body of the chapel. At the request of Richard Mahoney, TPWD Cultural Resource Coordinator, TU 1 was moved to explore the building sequence between the eastern extension of the museum and the northern extension of the chapel (Figure 2-1). Test Unit 2 was to be excavated along the northern side of the museum, while TU 3 was to be placed at the L formed by the eastern wall of the museum and the northern wall of the main body of the granary (Figure 2-1). Finally, TU 4 was to be placed at the L formed by the eastern wall of the “ruins” and the northern wall of the northern extension of the granary (“MUSEUM” in Figure 2-1).

CAR also proposed the monitoring of the excavation of the long backhoe trench in Area 2 across the central and western

portions of the courtyard and the smaller trench adjacent the southeastern corner of the compound in Area 3. The excavation of the trench was to occur by scraping in 10-cm levels along the alignments of the drainpipes. In addition, because little was known about the types of subsurface architectural remains between the southwestern corner of the workshop and the northeast corner of the priest’s quarters, TPWD requested the excavation of two adjoining 1-x-1-m units (TUs 5 and 6) in this location (i.e., Section 5 of the trench; Figure 2-1).

To investigate the nature of the deposits found outside of the courtyard walls in the area of the planned re-contouring efforts (Area 4), CAR proposed to excavate six shovel tests. The shovel tests were to be excavated in a small, roughly 6-x-6-m area located across the wall from a rectangular structure situated just south of the west gate.

As often happens during the monitoring of construction activities, unexpected finds require modifications in the scope of work to allow for necessary changes in design and installation/construction. As the shovel testing proceeded along the west wall, it became clear that the shovel tests were being excavated in an artifact-rich midden deposit. In addition, a possible feature was encountered shortly after the beginning of the backhoe trenching adjacent the southeast corner of the compound. To explore this possible feature, Richard Mahoney requested the excavation of an additional shovel test (ST 7) in Area 3. Finally, to search for an alternate outlet for the drainpipe, Mahoney requested the excavation of one more shovel test (ST 8) near the northwest corner of the compound. The last modification to the scope of work came in early February 2005, when during backhoe trenching to deepen and enlarge the western end of Section 5 of the trench, the contractor, under the monitoring of state park staff, exposed what appeared to be a heavy concentration of charcoal containing a mix of animal bone and Native American and colonial ceramics. Mahoney was called to the scene and established that additional manual excavations would be necessary to investigate the extent and other characteristics of the feature. CAR staff were asked to investigate the feature by excavating two 1-x-1-m test units (TUs 7 and 8) off the walls of the trench. These excavations were carried out over five days.

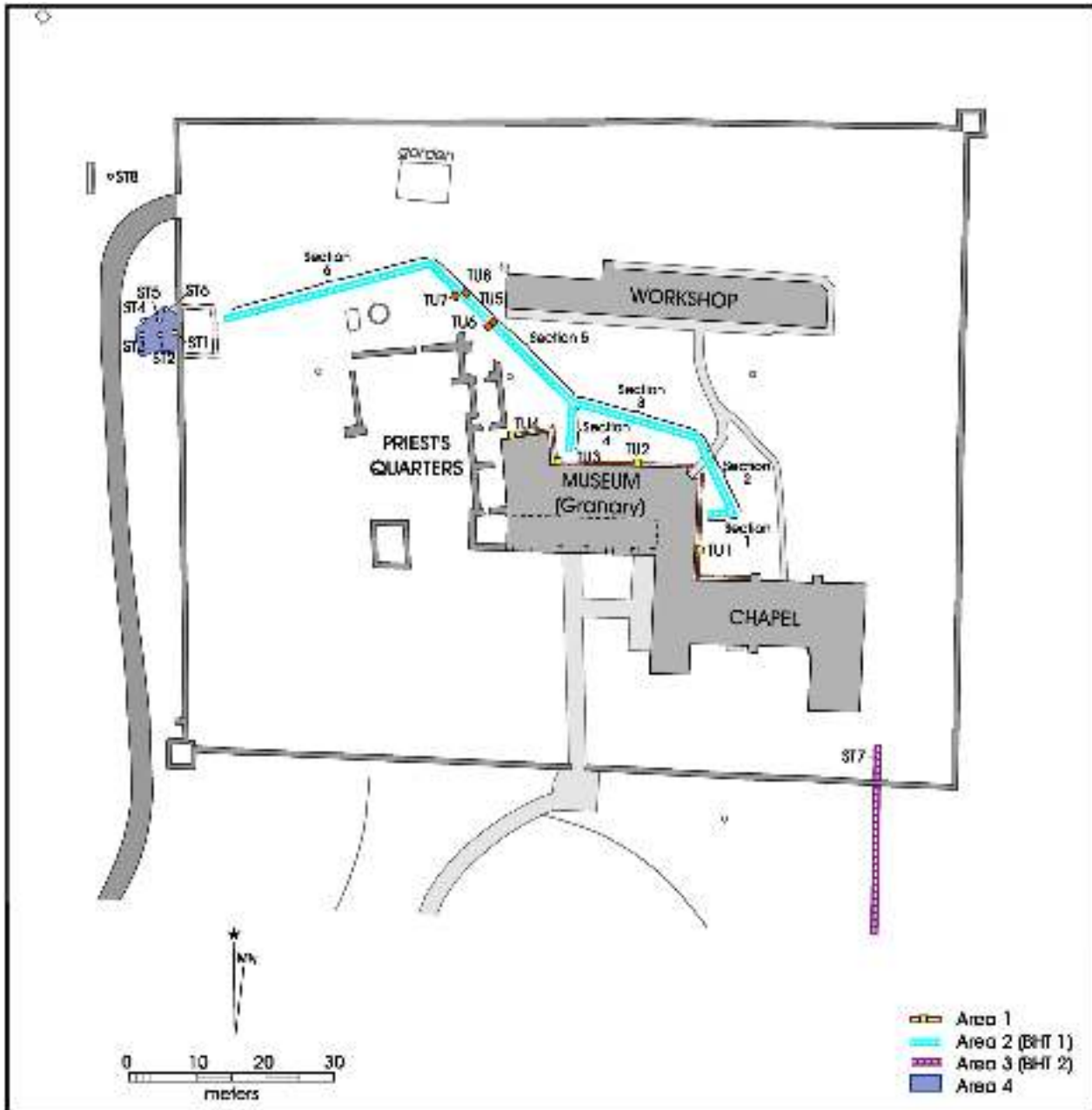


Figure 2-1. Map of Mission Espiritu Santo (4IGD1) showing locations of shovel tests, test units, and backhoe trenches.

## Summary of Fieldwork Performed

The fieldwork conducted by CAR at Espiritu Santo occurred during two distinct periods. Much of the fieldwork associated with the original scope of work was carried out between November 3 and 12, 2004. The discovery of a charcoal-rich feature by the construction crew during the expansion of the west end of Section 5 of the main trench (Backhoe Trench [BHT] 1) resulted in a second phase of archeological work, associated with the excavation of two units on February 2–4, 8, and 11, 2005.

Field work associated with the initial phase consisted of the controlled excavation of four 1-x-1-m units (TUs 1–4) along the north and west walls of the structures (Area 1), the excavation of two 1-x-1-m units (TUs 5 and 6) at the west end of Section 5 of BHT 1 (Area 2), the mechanical scraping of roughly 413 linear feet of trench to identify cultural features and delimit areas of previous disturbances in Areas 2 and 3, and the excavation of six shovel tests (STs 1–6) in Area 4 (Figure 2-1). Two additional shovel tests (STs 7 and 8) were excavated during the first phase of work at the site. Two additional 1-x-1-m units (TUs 7 and 8; Section 5 of Area 2) were excavated during the second phase.

All 1-x-1-m units, shovel tests, and scraping activities were conducted in levels not exceeding 10 cm in thickness. With the exception of deposits associated with the mechanical scraping, all deposits were screened through ¼-inch mesh.

## Shovel Tests

Eight shovel tests were excavated at the site (Figure 2-1). Six shovel tests (STs 1–6) were located in Area 4. The purpose of these six shovel tests was to determine the density, depth, and nature of the deposits in this area. This information was critical for planning data recovery efforts in this portion of the site. Shovel Test 7 was excavated in Area 3, south of the mission compound, to verify the presence of a feature. Shovel Test 8 was located west of the gate entrance in anticipation of the possible realignment of the westernmost portion of BHT 1 (Section 6). All shovel tests were 30 cm in diameter and excavated in 10-cm levels. All shovel tests were excavated to a depth not exceeding 60 cm below surface (cmb). Because cultural deposits were still present at 60 cmb in the shovel tests, a three-inch auger bore was inserted to a depth of 10 cm below the bottom of three shovel tests (STs 3, 4 and 6) to discern whether cultural deposits extended to 70 cmb. All deposits from the shovel tests were

screened through ¼-inch mesh. The total amount of soil removed from shovel tests was approximately 0.35 m<sup>3</sup>.

## Test Units 1–8

Eight test units were excavated during field investigations (Figure 2-1). Test Units 1–4 were excavated to assess the nature of the deposits and the impact of the work conducted by the CCC along the museum and chapel. A 1-x-2-m area (TUs 5 and 6) was excavated in Section 5 of BHT 1 in an area that was initially thought to have high potential for features. Test Units 1–6 were 1-x-1-m units excavated in 10-cm levels, though in several cases the unit size was reduced as a function of concrete footers or other intrusions into the units. Test Units 7 and 8 were excavated in February of 2005 to determine the extent and depth of a charcoal feature encountered during the excavation of a drainage trench.

All soil matrix was screened through ¼-inch mesh. Soil samples were taken from every level of each unit. Roughly 8.27 m<sup>3</sup> of sediment was removed from the test units.

### Test Unit 1

TU 1 was placed at the junction of the chapel and granary walls. The datum was established on the northeast corner of TU 1 (49.554 m AMSL). TU 1 was excavated to a depth of 165 cm below datum (cmbd; 47.90 m AMSL). A volume of approximately 1.35 m<sup>3</sup> of soil was removed and screened. The majority of the unit (approximately 2/3 of the unit) had been disturbed by a French drain system originally installed in 1977 (Figures 2-2, 2-3, and 2-4). Approximately 50–60% of the unit (predominantly the western portion) consisted of pea gravel fill that extended to a depth of approximately 82 cmbd. The French drain was encountered at 66 cmbd and was 11 cm in diameter. The remains of a builder's trench (10–12 cm wide) were evident at approximately 82 cmbd below the gravel fill. The fill within the builder's trench was yellow-brown silty sand. The top of the concrete reinforcement was reached at 140 cmbd and continued to a depth of 160 cmbd.

### Test Unit 2

TU 2 was located along the northern side of the museum with the southern portion of the unit abutting the museum building. A datum was established on the northeast corner of the unit (49.434 m AMSL). The unit was excavated to a depth of 115 cmbd (48.27 m AMSL) and a volume of roughly 0.99 m<sup>3</sup> of sediment was screened from this excavation.





Figure 2-2. Test Unit 1, after completion of excavation.



Figure 2-3. Test Unit 1. Note gravel in profile.



Several large concrete incursions reduced the overall volume of sediment excavated from the unit. A CCC builder's trench was evident in much of TU 2 (Figure 2-5).

### Test Unit 3

TU 3 was located at the L formed by the eastern wall of the northern extension of the museum and the northern wall of the main body of the granary. The datum was located on the northwest corner of the unit (49.434 m AMSL). TU 3 was excavated to a depth of 145 cmbd (47.98 m AMSL), and a volume of roughly 1.28 m<sup>3</sup> was removed and screened from the excavation.

### Test Unit 4

TU 4 was placed at the L formed by the eastern wall of the "ruins" and the northern wall of the northern extension of the granary. The purpose for the placement of this unit was to determine the extent of the granary wall foundation. The datum was located on the northwest corner of the unit (49.65 m AMSL). The walls of this portion of the granary were original, according to several of the park employees (Figure 2-6). The unit was excavated to a depth of 110 cmbd (48.55 m AMSL) before revealing the bottom of the foundation (Figure 2-7). A volume of approximately 0.96 m<sup>3</sup> of sediment was removed and screened from this unit.

### Test Unit 5

TU 5 was located southwest of the workshop and northeast of the priest's quarters (Figure 2-1). TUs 5 and 6 shared a west wall (Figure 2-8) and the units were orientated in a southwest-northeast direction. The datum was located 42 cm northwest of TU 6 (49.203 m AMSL) and was used for both units. TU 5 was excavated to a depth of 80 cmbd (48.403 m AMSL), and a total volume of roughly 0.55 m<sup>3</sup> of sediment was removed and screened from this unit.

### Test Unit 6

TU 6 was located directly southwest of TU 5. TU 6 was excavated to a depth of 81 cmbd (48.403 m AMSL; Figure 2-8). Roughly 0.64 m<sup>3</sup> of sediment was removed and screened from this unit.

### Test Unit 7

TU 7 was located within Section 5 of BHT 1 which was initially monitored by CAR during the 2004 testing. TU 7 was placed west of the charcoal feature encountered within the trench cut by the TPWD crew (Figures 2-1 and 2-9). TU 7 was excavated to a depth of 120 cmbd. Roughly 1.2 m<sup>3</sup> of

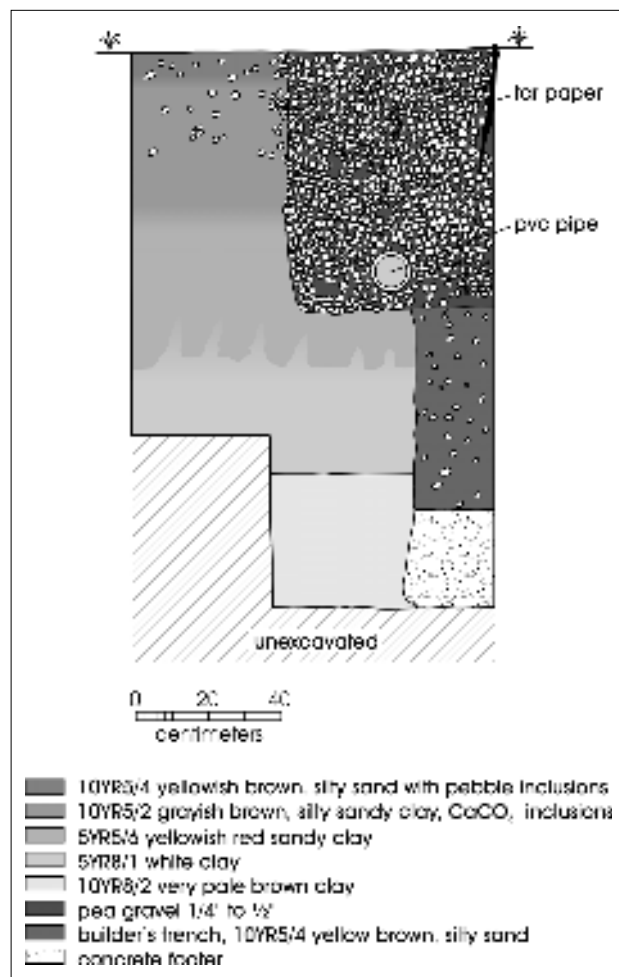


Figure 2-4. Test Unit 1, south wall profile.

sediment was removed from this unit. TU 7 was excavated in 10-cm levels that were later grouped into five analytical units (AUs) representing separate depositional episodes.

### Test Unit 8

TU 8 was placed north of the trench cut by the French drain installation crew. Prior to excavation, approximately 10–15 cm of soil from the surface was removed to reveal a surface or layer of limestone cobbles. Approximately 80 cm of matrix were removed before encountering the charcoal layer noted during the trenching process. Larger matrix samples (three bags, each roughly 4.5 liters in volume, per level) were collected from the last three levels of excavation. Six of these nine samples were floated in hopes of retrieving botanical remains. TU 8 was excavated to a depth of 144

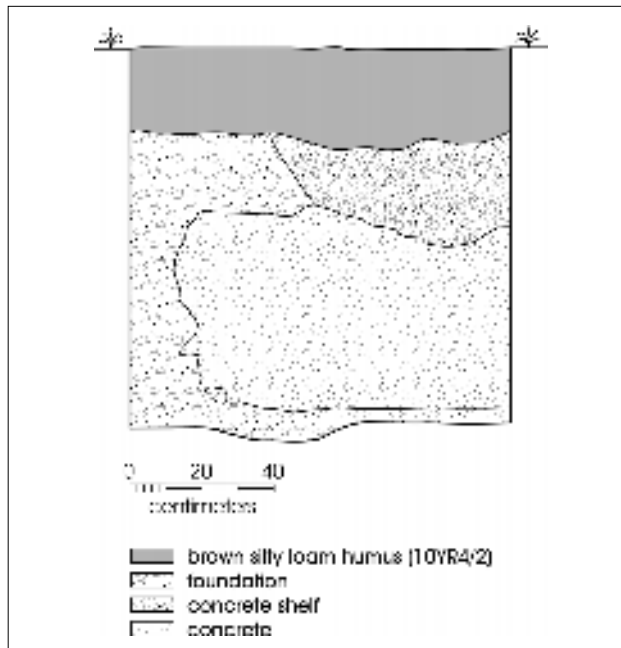


Figure 2-5. Test Unit 2, south wall profile.



Figure 2-6. Test Unit 4 after excavation. Note structure wall.

cmbd before termination. The 13 levels excavated in TU 8 were grouped into analytical units corresponding to those used in TU 7. Only four analytical units were defined in TU 8 (Figures 2-1, 2-10, and 2-11). Roughly 1.3 m<sup>3</sup> of matrix was removed.

## Backhoe Trenches

The installation of drainage pipes called for the excavation of two trenches, the longer main trench was to cross the courtyard from east to west (Area 2), while the shorter one was located perpendicular to the south wall of the compound adjacent to its southeast corner (Area 3; Figure 2-1). The scraping was carried out in 10-cm levels. To minimize the impact of heavy machinery, a rubber-tired standard backhoe was used. The backhoe had a clean-out plate fitted along the leader surface of the bucket, producing a clean cut of the ground surface. The width of the trench was the width of the bucket (1.0 m) and the depth was determined by the incline of the proposed pipeline. The trench was lined with yellow caution tape before backfilling. This was done to ensure that when the drainage pipe is installed the depth of the trenching done during this project could be seen.

Because of numerous turns and twists along its route, the excavation of BHT 1 was divided into six segments (Figure 2-1). Section 1 was located perpendicular to the exterior of the museum's east wall. Section 1 ran east-west approximately 3.4 m. The trench was started approximately one meter from the building wall so as to not cause any damage to the wall or its foundation. Section 1 was scraped in 10-cm increments to a depth of 62 cm below surface. At approximately 2.6 m from the museum wall and 20 cm below surface, a gray cable line was encountered. Parks personnel speculated that the cable could be part of an old alarm system that was no longer in use. The soils viewed in Section 1 consisted of topsoil that extended to a depth of 10–15 cm below surface. An abrupt change occurred at this point to orange clay with large mottles of white that continued throughout the remainder of the trench. No cultural material was encountered in this section of BHT 1.

Section 2 of BHT 1 extended northwest approximately 12.5 m from the east end of Section 1. Soils encountered in this section of the trench were similar to Section 1. Figure 2-12 presents a representative profile of a section of the trench. The topsoil was composed of silty sandy clay that extended to a depth of 10 cm below surface. Below the topsoil was the orange mottled clay. No artifacts were observed in this section. At the northeast corner of the museum, a stone

walkway was present that connected the museum doorway to the workshop. The walkway bisected the path of the trench. Rather than tear up a portion of the walkway, the trench skipped over this portion. Section 2 was scraped along the grade of the proposed drainage pipe, approximately 62 cm deep at the southern portion to 65 cm in the northern portion of the trench section.

Section 3 of BHT 1 extended northwest at a slight angle from the north end of Section 2. This section of the trench was 17.9 m in length. Soil layers were consistent with previous sections. The brown silty sandy clay extended approximately 10 cm below surface, followed by the orange mottled clay. At approximately 8.4 m from the walkway, a one-inch steel line was encountered at a depth of 30 cm below surface. The line appeared to run from the museum to the workshop, bisecting Section 3 of BHT 1. At approximately 11.3 m west of walkway, and 25 to 30 cm below surface, the outline of a previous trench was encountered. Within that trench was a PVC pipe running from the northeast corner of the museum. This is part of the same pipe encountered in TU 1, TU 6, and Sections 5 and 6 of BHT 1. Section 3 was scraped to 65 cm below surface in the east part of the trench, dipped down to 71 cm and then up to 63 cm below surface in the center of the trench segment. From the center of Section 3, moving west, the trench was excavated to 65 cm below surface to 78 cm at the west end of the section. A small portion of Section 3 was dug to approximately 160 cm to reveal the stratigraphy. Figure 2-13 provides a profile of this section of the trench. The top layer of soil consisted of a silty sandy loam (10YR 3/3) that extended approximately 10 cm below surface. Beneath the top layer, a transition layer 3 cm thick was encountered. The soil transitioned into the orange and white marly sandy clay. A caliche underlay this clay layer.

Section 4 of BHT 1 was located perpendicular to the north wall of the museum. This segment of the trench was approximately 7.4 m in length, with the north end meeting Section 3's west end. The south end of Section 4 began approximately 1 to 1.5 m from the museum wall. Two gray cables were encountered 3 m from the museum's north wall, 10 to 15 cm below surface. These cables were similar to the one located in Section 1. The top layer of soil extended 30 cm below surface, at which point it changed to orange and white marly clay (Figure 2-14).

The beginning of Section 5 of BHT 1 was located at the intersection of Sections 3 and 4. The trench extended northwest approximately 29.3 m. A small portion (possibly

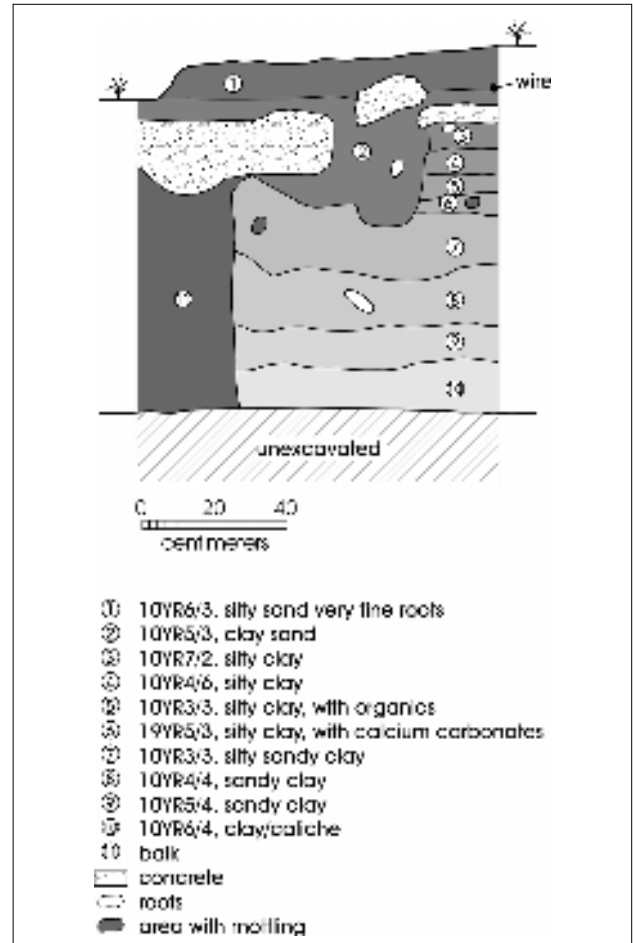


Figure 2-7. Test Unit 4, east wall profile.

3 m in length) was not trenched in order to skip over work in progress in TUs 5 and 6, and to miss the electrical lines that ran from the workshop. The PVC pipe was encountered approximately 40 cm below surface near TUs 5 and 6. A one-inch metal line was encountered beneath the PVC pipe 80 cm from the southern wall of the test units. The trench was only scraped to 40 cm below surface for the remainder of Section 5 so as to not hit either pipe. The portion of Section 5 to the west of TUs 5 and 6 encountered the PVC pipe approximately 6 m from the units. At 7.2 m from the units, the backhoe revealed that the PVC pipe had a bend (initially believed to be a Y hooked in with the wastewater from the restrooms in the workshop) that diverted the rainwater toward the gate in the west wall.

Section 6 of BHT 1 extended 32.2 m west of Section 5. The trench was stopped approximately 1 m from the wall of the

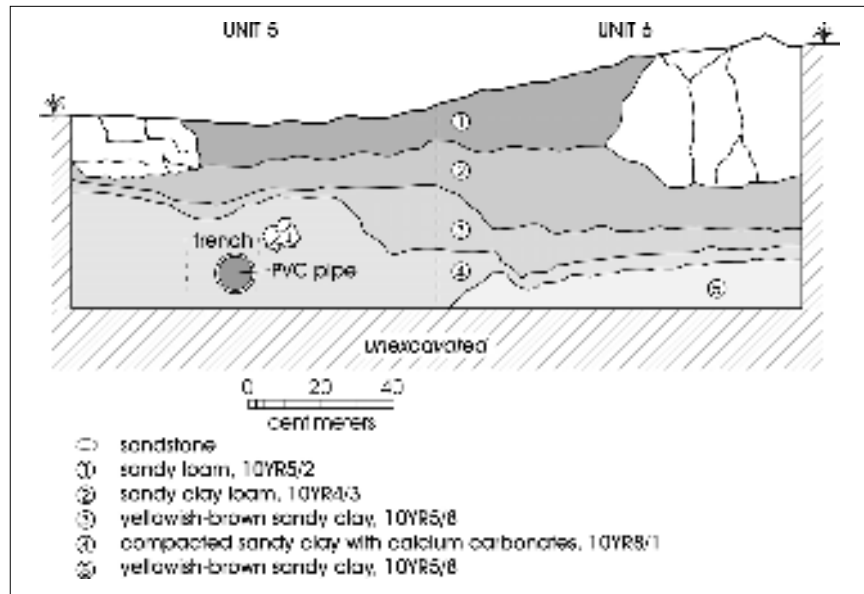


Figure 2-8. Test Unit 5 and Test Unit 6, south wall profile.

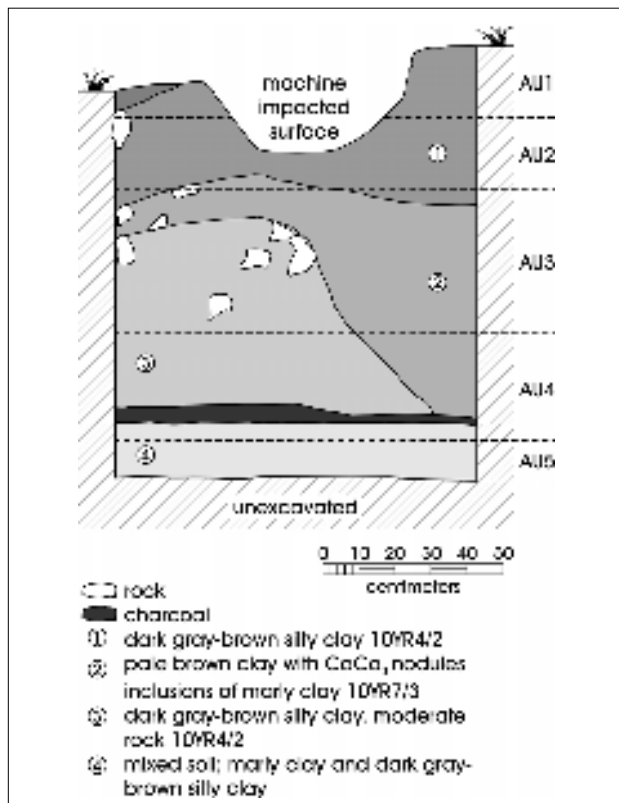
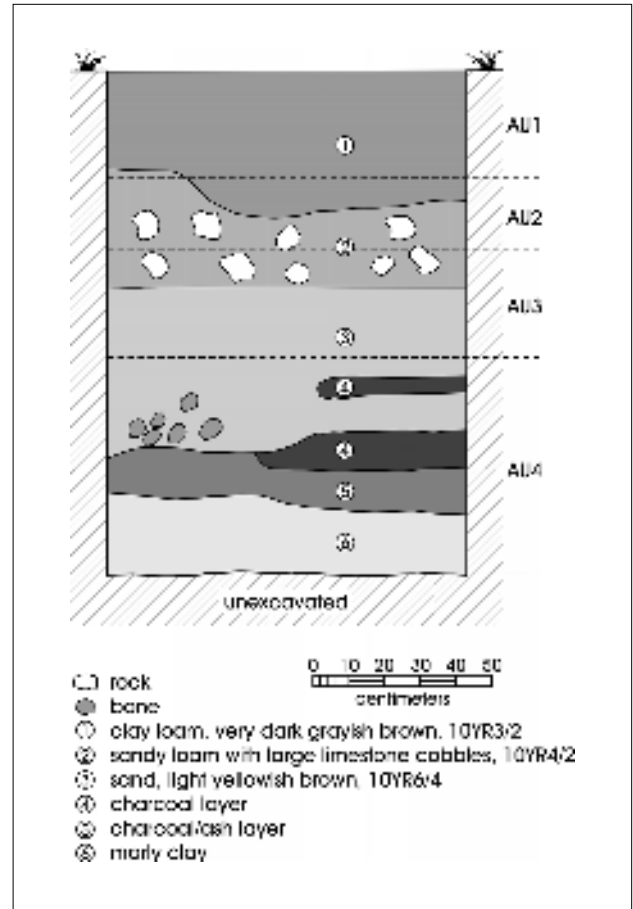
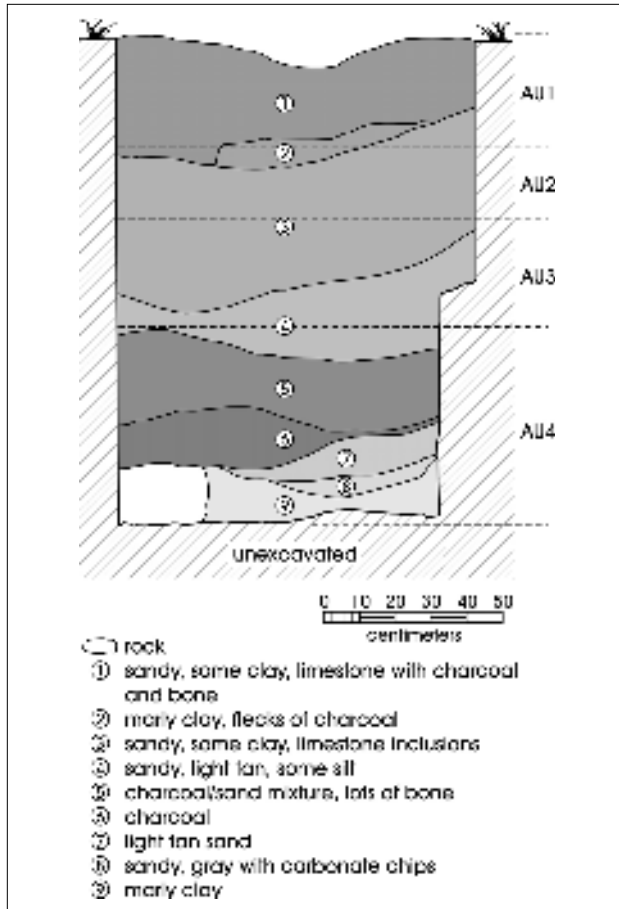


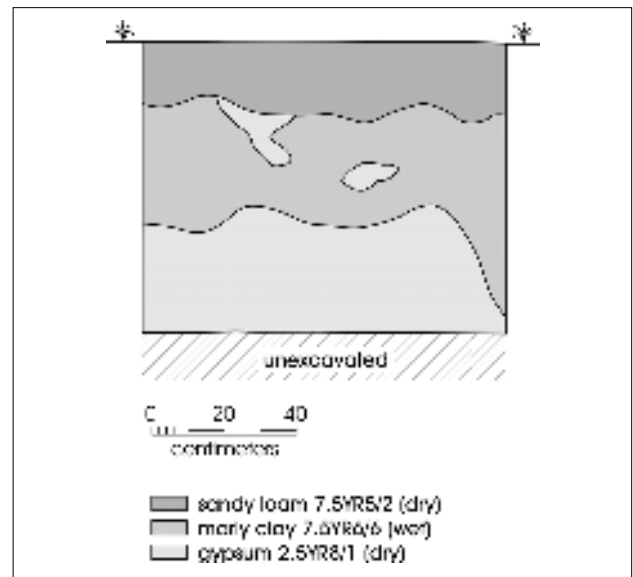
Figure 2-9. Test Unit 7, east wall profile.

structure located along the west compound wall (Figure 2-1). The initial path of the trench was to run through the room located along the west wall, but was not conducted for fear of damaging the structure wall foundations. Further investigation is recommended for this area. Outside of the structure, a possible feature was encountered approximately 40 cm below surface and extended between 5.7 to 10 m from the mission compound’s west wall. A scattering of large animal bone, mussel shell, ceramics, and glass was observed. Figure 2-15 provides a representative profile of this section of the trench. This trench section was scraped to level, approximately 43 cm below surface, without removing the entire concentration. Further investigations are recommended for this area before installation of drainage. At the east end of Section 6, PVC pipe was encountered and broken by the backhoe. The PVC pipe was initially believed to be part of the wastewater drainage from the restrooms in the workshop. As fieldwork progressed, it became evident that the pipe was part of a French drain installed in 1977.

The second backhoe trench (BHT 2) was located in Area 3 near the southeastern corner of the walled compound (Figure 2-1). It was excavated in two portions, a segment located perpendicular to the interior of the compound’s south wall and another perpendicular to the exterior of the south wall. The exterior trench extended approximately 21.8 m south



of the wall, with approximately 80 cm left undisturbed between the wall and the beginning of the trench. At approximately 2 m from the south wall a steel water line was encountered running parallel to the wall. The exterior portion of the trench was scraped to a depth of 1.1 m nearest the wall and followed the proposed grade of the pipeline to a depth of 0.3 m at the southern end of the trench. Figure 2-16 provides a representative profile of this section of the trench. Cultural material noted in the trench backdirt included large mammal bone and Native American pottery. No material was collected and no part of this section was thought to be a feature. The interior segment was approximately 4.3 m in length. A section 80 cm in length from the interior of the wall was left unscraped so as to not cause damage to the wall. Initial scraping of this section produced a concentration of bone, charcoal, and ceramic fragments approximately 10 to 15 cm below surface. The concentration was noted in the trench approximately 0.8 m from the interior of the south wall and extended to 5.3 m. Mechanical scraping



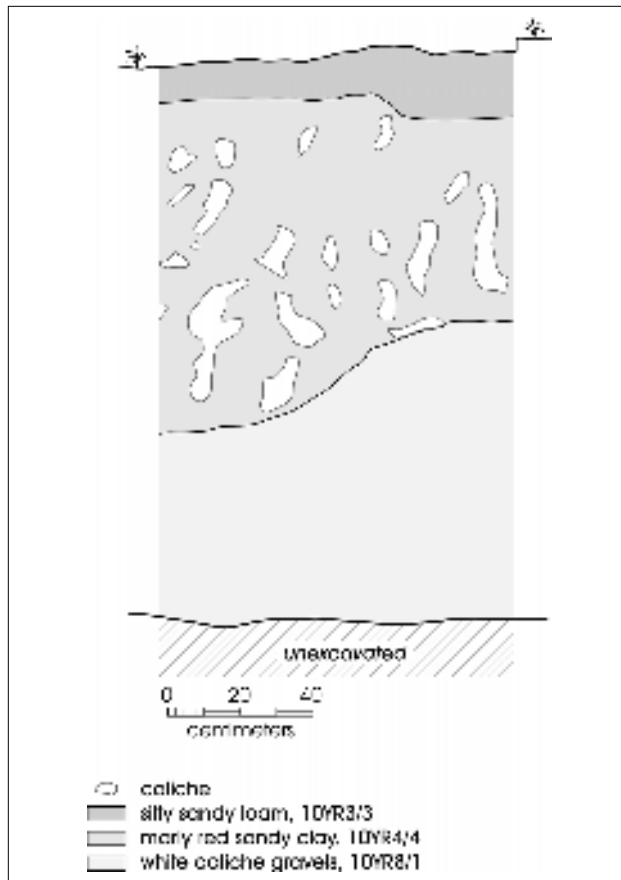


Figure 2-13. Backhoe Trench 1, Section 3 profile.

was ceased at this point until Shovel Test 7 was excavated. This shovel test produced a large quantity of bone in the first level, with the density of material dramatically declining for the remainder on the test. Scraping resumed in the trench after completion of Shovel Test 7. The trench was taken to a depth of 1.1 m, at which point sterile caliche was encountered and, in consultation with TPWD archeologist Richard Mahoney, CAR stopped further trenching. Other than items collected from Shovel Test 7, no cultural material was saved from this trench. Both sections of BHT 2 were lined with yellow caution tape before backfilling.

## Laboratory Procedures

Following the completion of fieldwork, all collected artifacts, faunal material, and soil samples were returned to the CAR laboratory for initial processing. All artifacts were washed, counted and catalogued by gross material classes (e.g., Native American ceramics, colonial ceramics,

debitage, etc.). All material was bagged with appropriate provenience information. All faunal material was scanned for the presence of human remains. Such remains were encountered from Shovel Test 1, Level 6, as well as from Test Unit 2, Levels 3 and 6. In all, two human bones and a single human tooth was recovered (see Appendix C). These remains were separated from the remaining material and returned to TPWD prior to the remainder of the collection.

All artifacts recovered during both phases of excavation were processed according to standards laid out in the Texas Parks and Wildlife Department Archeological Lab Manual. All artifacts and records are permanently curated at the TPWD Archeology Laboratory.

The excavations summarized in the previous section produced a variety of artifacts, including a moderate sample of Native American ceramics,debitage, faunal material, soil samples, and associated records. Artifacts of particular interest, especially those from TUs 7 and 8, underwent additional analyses to determine dates of deposition and the characteristics of features encountered during the investigations. Anne Fox completed the classification of all of the ceramic sherds from the entire project. After identification, Kristi Ulrich was given the native ceramics from TUs 7 and 8 for attribute analysis. The analytical attributes employed were those used by Ricklis (2000) and Pertulla (2002) so that the available comparative database could be further increased. Johanna Hunziker analyzed a sample of the faunal remains from TUs 7 and 8. Steve Tomka reviewed thedebitage retrieved from TUs 7 and 8.

Initially, only a preliminary scan and rough classification of the recovered materials was accomplished. Artifacts from TUs 7 and 8 were further classified at a basic level (e.g., chipped stone, utilized flakes, colonial ceramics) and a catalog produced. Next, we conducted a basic descriptive analysis of collected artifacts from TUs 7 and 8. For ceramics, this descriptive analysis included the assignment of sherds to specific types (e.g., colonial ware, Guanajuato) to define the ages of the assemblages. The chipped stone analysis focused on characterizing the lithicdebitage and the few marginally retouched artifacts. For metal artifacts, basic description included the type of item represented (e.g., cut nails) as well as the material (e.g., copper, iron). A sample of vertebrate faunal material from TUs 7 and 8 were subjected to more detailed analysis including the classification of identifiable specimens to the species level, when possible, as well as classification of the element represented. Analysis of the faunal remains also included gathering





Figure 2-14. Photo of Backhoe Trench 1, Section 4.

information concerning butchering techniques and degree of burning. Mussel shell fragments and umbos were identified and weighed.

The analysis of the collection of Native American ceramics recovered from TUs 7 and 8 during this investigation provides an opportunity to explore vessel types represented in the collections, the overall size of the vessels by type, and the characteristics of the vessels, including thickness and tempering type and relative quantity. All of these characteristics have direct implication for determining the vessel's use (e.g., direct fire cooking, storage, serving).

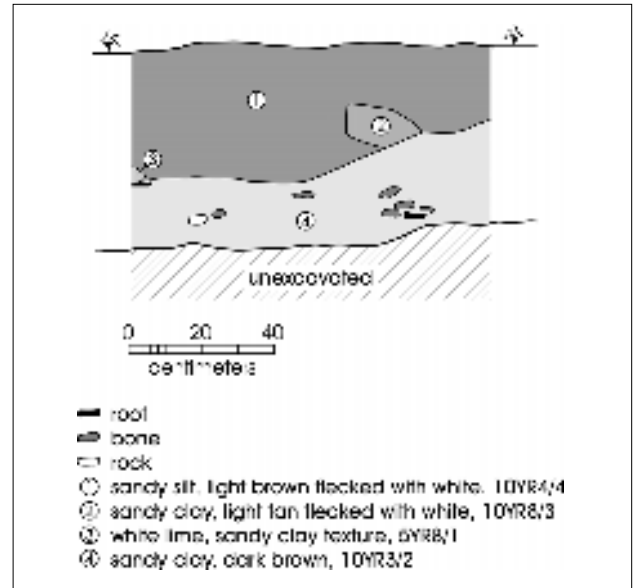


Figure 2-15. Backhoe Trench 1, Section 6 profile.

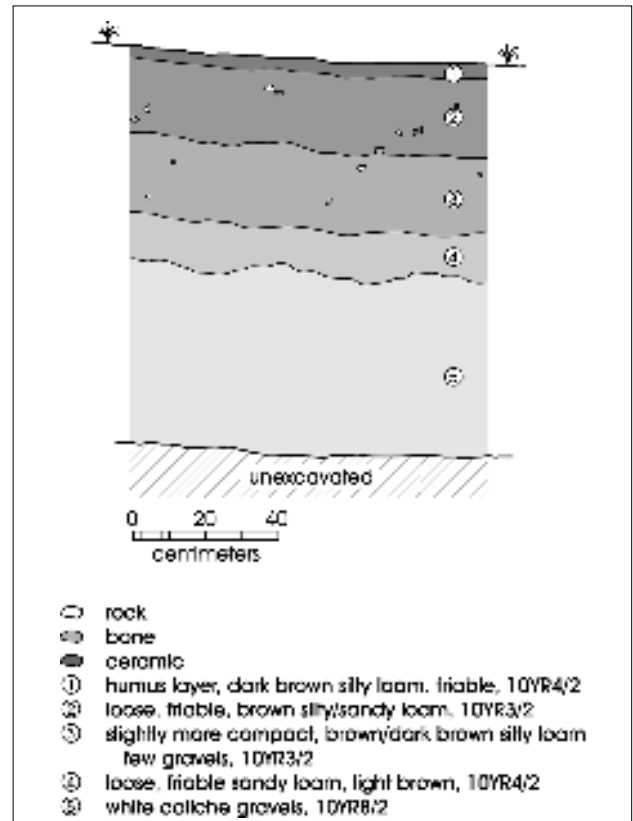


Figure 2-16. Backhoe Trench 2, exterior portion of trench south of compound wall.





## Chapter 3: Materials Recovered

Although no artifacts were recovered during the mechanical trenching, the shovel tests and 1-x-1-m test units yielded a large number of artifacts. This chapter summarizes the recovered artifacts.

### Materials from Shovel Tests

The six shovel tests that were excavated in Area 4 contained cultural materials (Table 3-1). Soil from Level 1 (0–10 cmbs) of the shovel tests consisted of a brown silty clay that contained gravel and pebble inclusions. Artifacts recovered included Native American ceramics (n=25), colonial ceramics (n=1), faunal bone (n=250), glass (n=2), chipped stone (n=9), snail shells, mussel shell fragments, charcoal, and rocks. Level 2 (10–20 cmbs) of the shovel tests consisted of a brown silty clay that included Native American ceramics (n=33), colonial ceramics (n=1), faunal bone (n=240), glass (n=1), chipped stone (n=5), snail shells, mussel shell fragments, charcoal, and other rock. Cultural materials

retrieved from the silty clay matrix of Level 3 (20–30 cmbs) of the shovel tests included Native American ceramics (n=30), faunal bone (343), glass (n=1), chipped stone (n=4), mussel shell fragments, charcoal, and other rock. Level 4 (30–40 cmbs) contained Native American ceramics (n=35), colonial ceramics (n=1), faunal bone (n=426), metal (n=1), glass (n=2), chipped stone (n=4), one mussel umbo, snail shells, mussel shell fragments, charcoal, and other rock. Both Levels 5 and 6 contained a brown silty clay with caliche inclusions. There was a slight increase of artifacts in Level 5 that included Native American ceramics (n=29), one colonial ceramic, faunal bone (n=451), metal (n=2), chipped stone (n=8), mussel shell umbos (n=2), and the building material. Cultural material from Level 6 included one human vertebra, Native American ceramics (n=7), faunal bone (n=243), glass (n=2), chipped stone (n=3), mussel shell fragments, charcoal, and other rock. No cultural materials were recovered below 60 cm during the auger testing of Shovel Tests 3, 4 and 6 (Table 3-1).

Table 3-1. Artifacts Recovered from Shovel Tests 1 through 6

Level (cm below surface)	Native American Ceramic	Colonial Ceramic	Faunal Bone	Ferrous Metal	Flat Glass	Container Glass	Chipped Stone	Mussel Umbo	Human Remains	Snail (1=present)	Mussel Fragments (1=present)	Charcoal (1=present)	Other Rock (1=present)	Building Material (1=present)	Grand Total
1 (0-10)	25	1	250		1	1	9			1	1	1	1		
2 (10-20)	33	1	240		1		5	1		1	1	1	1		
3 (20-30)	30		343		1		4				1	1	1		
4 (30-40)	35	1	426	1	2		4	1		1	1	1	1		
5 (40-50)	29	1	451	2			8	2						1	
6 (50-60)	7		243		2		3		1		1	1	1		
7 (60-70)*															
<b>Total</b>	<b>159</b>	<b>4</b>	<b>1953</b>	<b>3</b>	<b>7</b>	<b>1</b>	<b>33</b>	<b>4</b>	<b>1</b>						<b>2165</b>

\* Auger tests in selected shovel tests.

While the vertical distribution of artifacts and faunal material shown in Table 3-1 appears fairly uniform down through Level 5. Figure 3-1 shows plots the distribution of the three largest classes of material (vertebrate faunal remains, ceramics, and chipped stone debitage). The figure hints at an increase in material between 30 and 50 cmbs. Here, we have also included the negative auger results from three of the shovel tests in the figure. While the increased occurrence of materials in the 30–50 cm range is suggestive of a buried occupation level, the lack of clear separation of these levels is more consistent with changes in the intensity of deposition. In any event, the figure clearly suggests that below Level 5, materials decline significantly. Any future testing in this area, then, could be limited to the upper 60 cm of the deposit.

Shovel Test 7 was excavated in BHT 2, in the southeast of the mission compound, to determine if a feature was present. The shovel test was excavated from Level 1 (ca. 10 cmbs) in the backhoe trench. The soil from the shovel test consisted of a brown sandy clay. Cultural materials were recovered from Levels 1 (0–10 cmbs, ca. 10–20 cmbs), 3, 5 and 6 (Table 3-2). Note that the majority of the material was collected from the initial level, suggesting that the deposit was confined to the upper 20 cm in the trench.

In anticipation of a possible realignment of the trench in the western portion of the compound, Shovel Test 8 was located outside the gate area. The soil from this shovel test contained a large quantity of gravels and calcium carbonates. Artifacts were recovered from Levels 4, 5 and 6 (Table 3-2). Note that the recovery was confined to glass, metal, and mortar; no historic ceramics, debitage, or faunal material was present at these depths in this location.

## Materials from Test Units

### Test Unit 1

Forty-seven artifacts were recovered from TU 1 (Table 3-3). The eastern portion of the unit produced very little cultural material. The first two levels consisted of silty sand with some pebble inclusions. Artifacts were few in this level and consisted of faunal bone, metal, glass, chipped stone and building material (Table 3-3). Levels 3 and 4 consisted of a silty clay matrix with a Native American ceramic, faunal bone, metal, chipped stone, mussel shell fragments, charcoal and building material (Table 3-3). In Levels 5 through 8 the soil consisted of yellowish red clay. Levels 5 and 6 contained

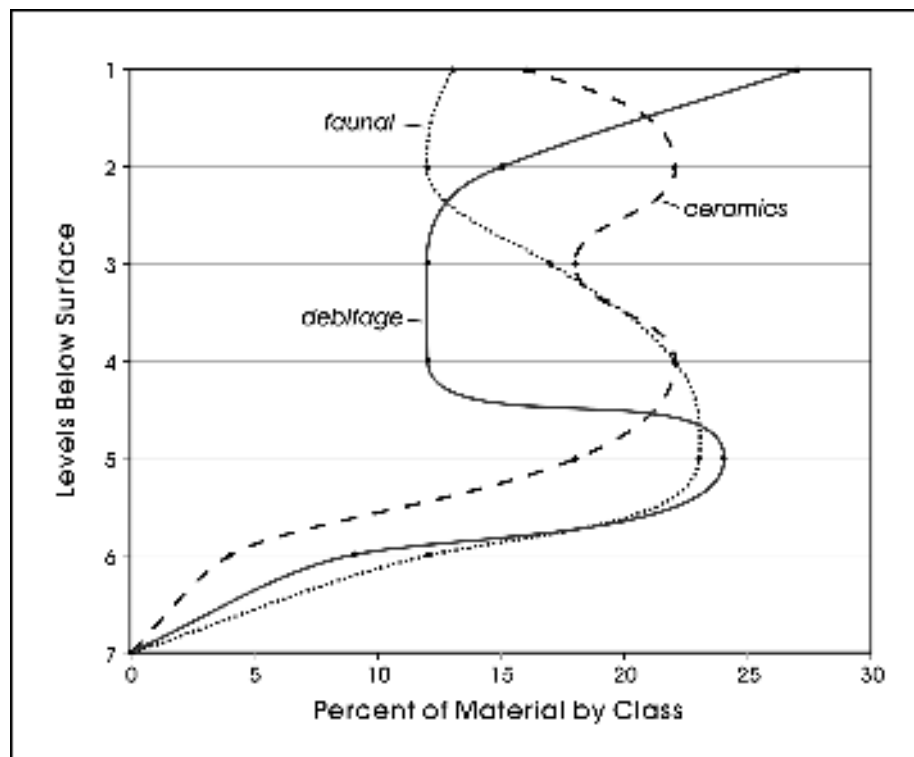


Figure 3-1. Graph of percentage of materials collected from Shovel Tests 1 through 6.

Table 3-2. Artifacts Recovered from Shovel Tests 7 and 8

Shovel Test #	Level	Artifact	Count
7	1	Native American Ceramic	2
7	1	Faunal bone	55
7	3	Faunal bone	1
7	5	Faunal bone	2
7	6	Faunal bone	1
8	4	Glass	2
8	5	Metal	3
8	5	Mortar	3
8	6	Glass	2
<b>Total</b>			<b>71</b>

Table 3-3. Artifacts Recovered from Test Unit 1

Level (cm below datum)	Native American Ceramic	Faunal Bone	Ferrous Metal	Flat Glass	Container Glass	Chipped Stone	Mussel Umbo	Mussel Fragments (1=present)	Charcoal (1=present)	Building Material (1=present)	Grand Total
1 (0-10)		1	1			1				1	3
2 (10-20)			2		2	2				1	6
3 (20-30)	1		1			15		1	1	1	17
4 (30-40)		1		4				1	1		5
5 (40-50)	2	2				1	1				6
6 (50-60)			1			1		1			2
7-12 (60-120)											0
13 (120-130)*						3				1	3
14 (130-140)*						3				1	3
15 (140-150)*						1					1
16 (150-165)*						1					1
<b>Total</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>4</b>	<b>2</b>	<b>28</b>	<b>1</b>				<b>47</b>

\* represents 1-m-x-50-cm excavation

Native American ceramics, faunal bone, metal, chipped stone, snail shell, a mussel shell umbo and mussel shell fragments (Table 3-3). No artifacts were recovered from Levels 7–12. The soil became increasingly hard in Level 9 and there was an abundance of calcium carbonate inclusions. The remaining levels ranged from a yellowish red to pale brown clay with an abundance of calcium carbonate inclusions. Chipped stone and building material were recovered from the lower portions of the unit, which consisted of Levels 13–16. Below Level 13, only one-half of the unit (50-cm-x-1-m) was excavated.

## Test Unit 2

Five hundred twenty artifacts were recovered from TU 2 (Table 3-4). Levels 1 and 2 (0–20 cmbd) consisted of a brown, loose silty loam humus matrix. These two levels contained a mixture of artifacts that consisted of Native American ceramics, faunal bone, ferrous and cuprous metal, glass, chipped stone, a mussel umbo, charcoal, building material, and modern material. A concrete shelf associated

with the work performed by the CCC was encountered protruding out of the south wall at a depth of 20 cmbd (Figure 3-2). Level 3 (20–30 cmbd) consisted of a mottled, compact sandy clay loam with a high concentration of gravels (50%) that contained one human tooth, Native American ceramics, a colonial ceramic, a nineteenth-century ceramic, metal, glass, chipped stone, charcoal, building material and modern material (Table 3-4). The remainder of the concrete reinforcement was fully exposed at 30 cmbd. The matrix composing Levels 4 and 5 (30–50 cmbd) consisted of a compact sandy clay loam that was reddish brown with orange and black mottling. Cultural materials recovered from Levels 4 and 5 consisted of Native American ceramics, faunal bone, glass, chipped stone, charcoal, and building material. A second shelf of concrete was encountered and exposed at the bottom of Level 5 and protruded out approximately 16 cm north of the south wall. The base of the concrete reinforcement was revealed in Level 6. In Levels 6 (50–60 cmbd) and 7 (60–70 cmbd) the soil was compact and consisted of an orange-red clay with black mottles. There was a significant decrease of cultural material in Levels 6

Table 3-4. Artifacts Recovered from Test Unit 2

Level (cm below datum)	Native American Ceramic	Colonial Ceramic	19th Century Ceramic	Faunal Bone	Ferrous Metal	Cuprous Metal	Flat Glass	Container Glass	Chipped Stone	Mussel Umbo	Human Remains	Modern	Charcoal (1=present)	Building Material (1=present)	Grand Total
1 (0-10)									2				1	1	
2 (10-20)	2			12	10	1	49	6	98	1		1	1	1	182
3 (20-30)	4	1	1	75	16		26	2	12		1		1	1	138
4 (30-40)	2			14	6		4		8					1	34
5 (40-50)	3			25	6		2	2	5				1	1	43
6 (50-60)	3			11	7	1	6		8	4	1	1	1	1	42
7 (60-70)					13				1	6			1	1	20
8 (70-80)					4		1		9	1			1	1	15
9 (80-90)					8		1		3	2			1		14
10 (90-100)				4	16				1	1					22
11 (100-115)*				4	6								1		10
<b>Total</b>	<b>14</b>	<b>1</b>	<b>1</b>	<b>145</b>	<b>92</b>	<b>2</b>	<b>89</b>	<b>10</b>	<b>147</b>	<b>15</b>	<b>2</b>	<b>2</b>			<b>520</b>

\* represents 1-m-x-50-cm excavation

and 7 (Table 3-4), though Level 6 did produce a human phalanx. The CCC builder's trench was evident by Level 8, with a dramatic contrast between the matrix from the northern and southern portions of the unit. The sterile matrix from the northern portion of the unit consisted of a reddish brown clay mottled with a high percentage (>50%) of calcium carbonate. The dark gray sandy clay representing the builder's trench continued to produce artifacts and extended through Levels 9 (80–90 cmbd) and 10 (90–100 cmbd). The base of the concrete reinforcement was encountered at 107 cmbd. Gravel and construction fill from under the reinforcement was removed and the unit was terminated at 115 cmbd. Note that the last level of the excavation, Level 11, only consisted of a 1-m-x-50-cm trench. Artifacts recovered decreased substantially (Table 3-4).

### Test Unit 3

Two hundred twenty-eight artifacts were recovered from this TU 3 (Table 3-5). Approximately 40–50% of the unit had been disturbed by the CCC builder's trench (Figure 3-3). Levels 1 and 2 (0–20 cmbd) were comprised of a humus layer with gravel inclusions and produced Native American ceramics, nineteenth-century ceramics, faunal bone, metal, glass, chipped stone, mussel umbos, charcoal, building material and modern material (Table 3-5). Levels 3 and 4 (20–40 cmbd) had an increase of gravel inclusions and the soil consisted of a mixture of brown sandy loam and marly clay. Cultural material from Levels 3 and 4 were a Native American ceramic, faunal bone, glass, chipped stone, and building material. In Level 5 (40–50 cmbd) there was a decrease of inclusions and the builder's trench became very distinct by the end of this level. Faunal bone, glass, and building material was recovered from Level 5. The northern portion of the unit was comprised of a gray-brown sandy clay with caliche inclusions, while the southern half was a brown, compact silty clay with calcium carbonate inclusions. The distinction between the two soils remained continuous through Levels 6–8. Cultural material was recovered only in the builder's trench and included a Native American ceramic, nineteenth-century ceramics, faunal bone, metal, glass, chipped stone, a .45-caliber cartridge casing, charcoal, and building material (Table 3-5). The original foundation ended directly above the concrete reinforcement. The original foundation was not completely intact and was reinforced with concrete in the lower portions (Figure 3-4). At approximately 95 cmbd (Level 9), the base of the concrete reinforcement became evident, jutting out of the south wall of the unit 23 cm to the north. At the depth of 130 cmbd, only the CCC builder's trench continued to be excavated.



Figure 3-2. Plan view photo of Test Unit 2, showing concrete shelf and reinforcement.

Artifacts in the remainder of the builder's trench consisted of faunal bone, metal, glass, chipped stone, mussel shell fragments, charcoal, and building material (Table 3-5). A secondary footer was encountered at 135–138 cmbd (Figure 3-4). TU 3 was terminated at the base of the secondary footer (145 cmbd). Note that the bottom two levels, Levels 13 and 14, did not involve the removal of the entire 1-x-1-m area because of the presence of the footers.

### Test Unit 4

Material was collected from each level of TU 4, although the density of cultural material decreased in lower levels (Table 3-6). The first two levels of excavation (11–30 cmbd) were composed of a very loose, silty matrix mixed with layers of discoloration and a moderate amount of gravel (10–20%). Artifacts collected from Level 1 (11–20 cmbd) included a colonial ceramic, glass fragments, chipped stone, an animal bone fragment, metal, building material, and

Table 3-5. Artifacts Recovered from Test Unit 3

Level (cm below datum)	Native American Ceramic	19th Century Ceramic	Faunal Bone	Ferrous Metal	Flat Glass	Container Glass	Chipped Stone	Mussel Umbo	Cartridge Casing	Modern	Mussel Fragments (1=present)	Charcoal (1=present)	Building Material (1=present)	Grand Total
1 (0-10)					1					1			1	2
2 (10-20)	2	2	4	5	61	5	6	4		1		1	1	90
3 (20-30)	1												1	1
4 (30-40)			10		4		3						1	17
5 (40-50)			2		2								1	4
6 (50-60)			2	1	3				1					7
7 (60-70)		1		1		1						1	1	3
8 (70-80)	1	1		7	5		2					1	1	16
9 (80-90)			5	22	5	3	2					1	1	37
10 (90-100)				6								1	1	6
11 (100-110)				9	5						1	1	1	14
12 (110-120)				2	3		1					1	1	6
13 (120-130)*			1	4	6	1	2					1	1	14
14 (130-145)*			1	7			3				1		1	11
<b>Total</b>	<b>4</b>	<b>4</b>	<b>25</b>	<b>64</b>	<b>95</b>	<b>10</b>	<b>19</b>	<b>4</b>	<b>1</b>	<b>2</b>				<b>228</b>

\* represents partial unit only

modern materials including bullet casings. Level 2 (20–30 cmbd) revealed a gray cable along the base of the granary wall and produced a collection of bullets exhibiting varied degrees of impact. The cable appeared to be similar to that uncovered in Sections 1 and 4 of BHT 1. A total of 12 bullets was recovered from Level 2. Two of these are lead round nose bullets for a .22-caliber firearm. Three specimens are for a .38 Special and date to the early 1900s. The remaining seven are unidentified. None of the bullets encountered were manufactured during the colonial period, and those identified appear to be produced post Civil War. The remainder of the artifact assemblage from Level 2 consisted of bone fragments, native ceramic sherds, glass fragments, metal, building material, a mussel umbo, and lithic material. The surface of a possible mortared walkway feature was revealed at the bottom of Level 3 (30–40 cmbd), extending to the south approximately 30 cm. A 1938 CCC archeological drawing of the mission compound shows stones in that area abutting the granary wall. The stones may represent a walkway or path. The stones were left in place for the

remainder of the excavation of TU 4. Soils from this level ranged from a silty sand to a silty clay matrix. Artifacts collected from Level 3 included chipped stone, mussel umbos, native and colonial ceramic sherds, bone fragments and material associated with construction (Table 3-6). During the excavation of Level 4 (40–50 cmbd), stones that did not appear to be mortared together were removed. The remaining stones ran east-west in the northern portion of unit. The soil matrix of Level 4 consisted of soft sandy clay with limestone inclusions. A rodent hole was present in the southwest corner of unit. The soil in the rodent hole was very soft and loose. Artifacts recovered from this level were mussel shell, bone fragments, and chipped stone. The soil in Level 5 (50–60 cmbd) consisted of silty, sandy clay with a large amount of calcium carbonate nodules. The rodent hole was still present throughout the extent of the level. Native and nineteenth-century ceramic sherds, bone fragments, metal, glass, and chipped stone were also present in this level (Table 3-6). Level 5 exhibited an increase in the density of mussel shell recovered. Level 6 (60–70 cmbd)

consisted of compact sandy clay with stream-rolled pebbles and calcium carbonate nodules. The rodent hole was still present in the southwest corner. A dramatic increase was seen in mussel shell and lithic material (Table 3-6). Level 7 (70–80 cmbd) exhibited a transition in soil to compact, reddish brown clay with gravel and calcium carbonate inclusions. Material collected included mussel shell, chipped stone, and building material. Level 8 (80–90 cmbd) continued with similar sediments as those in Level 7. The rodent hole was still present, and may have produced the two fragments of native pottery collected. Artifact density exhibited a dramatic decline in this level. Other material collected included debitage and mussel shell. Level 9 (90–100 cmbd) exhibited two soil types. The southeast quadrant was composed of light brown caliche, while the northwest was hard, reddish brown clay. Only one artifact, a chert flake, was collected from this level (Table 3-6). During the excavation of Level 10 (100–110 cmbd), the base of the wall foundation was encountered at 102 cmbd. Soil from this level was similar to that in Level 9. A single piece of chipped stone was recovered from the extreme northwest corner, in which an auger was used to excavate due to the small space between the wall of the unit and the stone alignment located in Level 3. The excavation of Test Unit 4 was terminated at the completion of Level 10 (Figure 3-5).

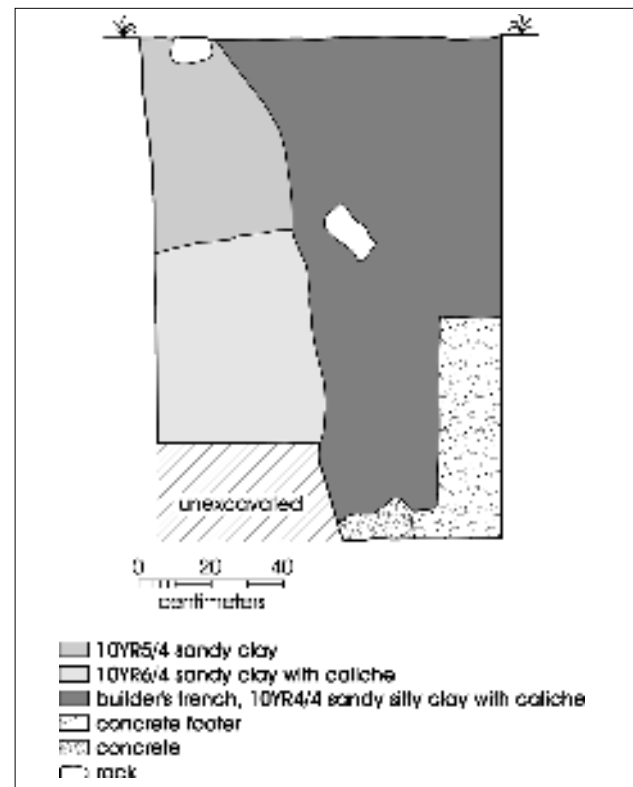


Figure 3-3. Test Unit 3, east wall profile.



Figure 3-4. Test Unit 3 after excavation. Note original wall foundation and concrete footer.



Table 3-6. Artifacts Recovered from Test Unit 4

Level (cm below datum)	Native American Ceramic	Colonial Ceramic	19th Century Ceramic	Unknown Ceramic	Cuprous Metal	Ferrous Metal	Large Mammal/Bovoid Bone	Other Faunal Bone	Flat Glass	Container glass	Chipped Stone	Mussel Fragment (1=present)	Mussel Umbo	Building Material (1=present)	Bullet/Casings	Modern (1=present)	Grand Total
1 (11-20)			1		1			1		18	7			1	3	1	31
2 (20-30)	4				1			30	5	31	22		1	1	12		106
3 (30-40)	1	2	1				1	27			9		2	1			43
4 (40-50)								13			13	1	1				27
5 (50-60)	3		1	1	1	1		7	1		16		10	1			41
6 (60-70)								2	3		45		129				179
7 (70-80)											19		50	1			69
8 (80-90)	2										4		3				9
9 (90-100)											1						1
10 (100-110)											1						1
<b>Total</b>	<b>10</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>80</b>	<b>9</b>	<b>49</b>	<b>137</b>		<b>196</b>		<b>15</b>		<b>507</b>



Figure 3-5. Test Unit 4, after excavation.

### Test Unit 5

Figure 2-8 presented a profile of both TUs 5 and 6. Level 1 (24–30 cmbd) in TU 5 consisted of loose, light brown sand with a moderate amount of gravel (30%). Artifacts retrieved from Level 1 revealed this disturbance with the presence of plastic, modern glass and metal. Other material collected included native ceramics, charcoal, lithics and bone (Table 3-7). Several large rocks were observed at the bottom of this level. Level 2 (30–40 cmbd) was composed of soft, medium tan sandy matrix mottled with sandy clay and a moderate amount of gravel (30%). The artifact density dramatically increased in Level 2 (Table 3-7). In the northwest corner of the unit, a horizontal band of charcoal was observed near the top of Level 2. Bone appeared to be concentrated in the northwest and northeast corners of the unit. A large alignment of rock was observed in this level. After determining the rocks were not part of a wall foundation, they were removed during the excavation of Level 3 (40–50 cmbd). Sediment in Level 3 was composed of compact sand with clay mottles. Cultural materials collected included ceramic (native and colonial), metal, chipped stone, mussel shell, metal, mortar and bone fragments (Table 3-7). Evidence of a previous trench became evident in Level 4 (50–60 cmbd). The trench ran north-south approximately 30 to 58 cm from the unit’s west wall. The



Table 3-7. Artifacts Recovered from Test Unit 5

Level (cm below datum)	Native Ceramic	Colonial Ceramic	Ferrous Metal	Large Mammal/Bovoid Bone	Other Bone	Flat Glass	Container glass	Charcoal (I=present)	Chipped Stone	Other Rock (I=present)	Mussel Umbo	Building Material (I=present)	Modern (I=present)	Grand Total
1 (24-30)	1		3	2	8	4	1	1	18	1		1	1	38
2 (30-40)	13	1	4	6	30			1	4	1	2	1		61
3 (40-50)	19	5	1	3	112			1	10	1	1	1	1	152
4 (50-60)	3		1	1	49	1		1	4			1		60
5 (60-70)	2		3	2	14	1	1	1	2		1			27
6 (70-80)					4			1	2			1		7
<b>Total</b>	<b>38</b>	<b>6</b>	<b>12</b>	<b>14</b>	<b>217</b>	<b>6</b>	<b>2</b>	<b>6</b>	<b>40</b>		<b>4</b>			<b>345</b>

trench matrix was composed of loose, dark brown silty sand. The soil on either side of the trench consisted of compact sandy clay with calcium carbonate inclusions. The two soil types were excavated separately. Material collected included native ceramics, metal, glass, bone, and mussel shell (Table 3-7). A large PVC pipe was encountered during the excavation of Level 5 (60–70 cmbd) in the eastern portion of the trench at approximately 63 cmbd (Figure 3-6). The pipe was part of a French drain that was installed in 1977. Trench soil was excavated separately from the remainder of the unit, producing ceramic sherds, glass, bone, metal, mussel shell, and lithics. Level 6 (70–80 cmbd) exhibited dense, sterile orange-red clay with limestone inclusions. The trench soil continued to be excavated separately from the sterile soil. The bottom of the PVC pipe was encountered at approximately 73 cmbd. The trench terminated between 75 and 79 cmbd. Few artifacts were collected from the trench fill (Table 3-7). Soils from beneath the trench lacked cultural material. TU 5 was terminated at the completion of Level 6 (80 cmbd).

## Test Unit 6

The beginning of Level 1 (13–20 cmbd) in TU 6 was riddled with large stones that appeared to be wall fall from the northeast corner of the priest's quarters. Soil was removed from around the stones to determine whether they formed a wall foundation. Soil matrix consisted of soft, dark brown

humus with silty clay inclusions, sandstone fragments and gravel (2%). Cultural material collected included bone fragments, chipped stone, metal, and glass (Table 3-8). Level 2 (20–30 cmbd) matrix was composed of soft, dark brown silty clay. The large stones were left *in situ* during the excavation of this level. Cultural material encountered consisted of native ceramics, metal items, bone, glass, chipped stone, mussel shell, and building material (Table 3-8). During the excavation of Level 3 (30–40 cmbd), a few of the large stones that did not appear to be part of a wall foundation were removed. The remaining stones did not appear to have been mortared together, though removal would have compromised the walls of the unit. Sediments were similar to those in the previous level. A cuprous metal door ornament was collected and is similar to one on display in the mission museum. Other items collected included native and colonial ceramics, bone, chipped stone, and mussel shell (Table 3-8). Levels 4 (40–50 cmbd) and 5 (50–60 cmbd) exhibited an increase in the quantity of bone and ceramic sherds (Table 3-8). The clay content of the soil and the density of gravels (15%) increased toward the bottom of Level 5. There was a decrease in the number of artifacts recovered in Level 6 (60–70 cmbd). The soil from Level 6 consisted of compact red-orange clay, also present in TU 5 along the pipe trench. Cultural material collected included native ceramic sherds, bone fragments, chipped lithics, mussel shell, and building material. Level 7 (70–80 cmbd) consisted of sterile clay and the unit was terminated at 81 cmbd (Figure 3-7).



Figure 3-6. Test Unit 5 after excavation. Note PVC pipe.

Table 3-8. Artifacts Recovered from Test Unit 6

Level (cm below datum)	Native Ceramic	Colonial Ceramic	19th Century Ceramic	Cuprous Metal	Ferrous Metal	Large Mammal/Bovoid Bone	Other Bone	Flat Glass	Container glass	Charcoal (1=present)	Chipped Stone	Mussel Fragment (1=present)	Mussel Umbo	Building Material (1=present)	Grand Total
1 (13-20)					3		16		1	1	2				22
2 (20-30)	8				4	3	91	4		1	12		2	1	124
3 (30-40)	4	1		1		1	16				1		3		27
4 (40-50)	12					20	72				6	1			110
5 (50-60)	15	2	2			19	23				10		4		75
6 (60-70)	5					2	3				2		1	1	13
7 (70-81)															
<b>Total</b>	<b>44</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>7</b>	<b>45</b>	<b>221</b>	<b>4</b>	<b>1</b>		<b>33</b>		<b>10</b>		<b>371</b>



Figure 3-7. Test Units 5 and 6 after excavation.

### Defining Analytical Units in Test Unit 7 and Test Unit 8

Test Units 7 and 8 revealed two sequential cultural zones that did not appear disturbed. In addition, other depositional zones occurred above and below these cultural deposits. These depositional zones are identified as Analytical Units 1–5 (see Figures 2-9 through 2-11). Analytical Unit 1 (AU 1), the uppermost zone, consisted of a dark brown silty clay loam that extended throughout the entire courtyard. This matrix sat atop a layer of limestone cobbles. AU 1 encompasses Levels 1–2 (0–20 cmbs) in TU 7, and Levels 1–2 (10–30 cmbs) in TU 8. Below the limestone cobble layer, a zone of cultural material was identified above a second limestone cobble layer. This zone of cultural material was defined as Analytical Unit 2 and consisted of a pale brown sand matrix. AU 2 includes Levels 3–4 (20–40 cmbs) in TU 7 and Levels 3–4 (30–50 cmbs) in TU 8. Analytical Unit 3 was a zone of cultural material contained in a yellowish brown sandy matrix that underlies the second cobble layer and occurred above the charcoal deposit. As such, this material seemed to represent a depositional zone that will be referred to as Feature 1. In TU 7, AU 3 includes Levels 5–8 (40–80 cmbs), while in TU 8, AU 3 includes

Levels 5–7 (50–80 cmbs). The top of the charcoal-rich zone represents the top of the feature and the top of Analytical Unit 4 (Feature 2). In TU 7, AU 4 consists of Levels 9–11 (80–110 cmbs), while in TU 8, AU 4 includes Levels 8–13 (80–144 cmbs). Soil samples were taken from each level.

#### *Test Unit 7*

Levels 1 (0–10 cmbs) and 2 (10–20 cmbs) comprise AU 1 in TU 7. Level 1 (0–10 cmbs) contained dark brown sandy clay with large limestone cobbles. The limestone cobbles appeared not to be burned. Material recovered from this level included Red Burnished ware and Galera ceramic fragments, plastic, mussel shell, aqua glass, debitage, bone, and charcoal. Level 2 (10–20 cmbs) was composed of dark brown sandy clay intermixed with limestone cobbles. The bottom of this level consisted entirely of small and large limestone cobbles. Artifacts recovered included bone, metal fragments, colonial and native ceramics, glass, debitage and charcoal (Table 3-9).

Levels 3 (20–30 cmbs) and 4 (30–40 cmbs) comprised AU 2 in TU 7. Level 3 excavations continued into the rock layer observed at the base of Level 2. Sediments encountered were composed of compact silty clay. The rock density

Table 3-9. Artifacts Recovered from Test Unit 7

Analytical Unit	Level (cm below datum)	Bone	Burned Bone	Burned Rock	Ceramics: Colonial	Ceramics: Earthenware	Ceramics: Native	Ceramics: Stoneware	Charcoal and Macrobotanical	Debitage	Glass: Flat	Glass: Unknown	Metal: Other Items	Metal: Scrap	Metal: Unidentified	Mussel (1=present)	Other Items	Other Rock	Plastics	Total
AU 1	1 (0-10)				2				1	3	3					1		7	1	17
	2 (10-20)	41	6		4		3		1	1	7		5		1			20		89
AU 2	3 (20-30)	230	6	6			15		1	3	5		14	3		1		30		313
	4 (30-40)	264		1	1		21	1	2	1		1				1		24		316
AU 3	5 (40-50)	116		13		1	10		1	3	2					1		35		181
	6 (50-60)		1	6	1	2	4		1	4					1	1	2	5		27
	7 (60-70)	16	1				2		1	3					1	1		4		28
	8 (70-80)				2		5		1	2								3		13
AU 4	9 (80-90)	37	14	4			1		2	1					1		2	1		63
	10 (90-100)	37	74	3					1						1	1		6		122
	11 (100-110)	31	12	3					1	5			1			1				53
AU 5	12 (110-120)						2			5					1	1		10		18
<b>Total</b>		<b>772</b>	<b>114</b>	<b>36</b>	<b>10</b>	<b>3</b>	<b>63</b>	<b>1</b>	<b>13</b>	<b>31</b>	<b>17</b>	<b>1</b>	<b>20</b>	<b>3</b>	<b>6</b>		<b>4</b>	<b>145</b>	<b>1</b>	<b>1240</b>

dramatically increased, with rock sizes ranging from 4 cm to greater than 10 cm in length. Cultural material collected included cut nails, debitage, bone, burned rock, metal fragments, colonial and native ceramics, and flat glass. Charcoal and mussel shell fragments were also collected from Level 3. Level 4 exhibited a decrease in the amount of limestone cobbles encountered. The matrix of Level 4 consisted of a mixture of silty clay and compact sandy clay. Level 4 also exhibited an increase in the density of faunal remains collected. Other material collected included debitage, colonial and native ceramics, stoneware, mussel shell, charcoal, glass, and burned rock.

Analytical Unit 3 (Feature 1) of TU 7 is composed of Levels 5 through 8 (40–80 cmbd). The matrix of Level 5 (40–50 cmbd) consisted of two distinct types. The western portion of the unit was composed of the orange marly clay that produced very few artifacts. The artifacts that were encountered in this region came from along the margin of the soil type change. The eastern portion of the unit consisted of the dark brown silty clay and produced the majority of the artifacts collected. Material recovered consisted of native

and post-colonial ceramics, bone, glass, debitage, mussel shell, charcoal, and burned rock. Level 5 continued to contain limestone, but in smaller amounts than the previous level. Level 6 (50–60 cmbd) continued to exhibit the two separate soil types as in the previous level. Artifacts collected included bone, burned rock, mussel shell, native, colonial and post-colonial ceramics, metal fragments, and charcoal. The two soil types continued in Level 7 (60–70 cmbd), though the orange marly clay accounted for a larger portion of this level. Material recovered included debitage, bone, metal fragments, native ceramics, charcoal, and mussel shell. Level 8 (70–80 cmbd) also exhibited the two soil types present in the previous levels. The artifact-rich, dark brown silty clay comprised only one-third of the level's plan view. The orange marly clay was sterile. Artifacts recovered from this level included debitage, native and colonial ceramics, and charcoal.

Analytical Unit 4 (Feature 2) consisted of Levels 9 through 11 (80–110 cmbd). Feature 2, found in both TUs 7 and 8, was encountered in this analytical unit. Excavation of Level 9 (80–90 cmbd) revealed a large charcoal stain along the

southeast portion of the unit. The two soil areas were present in this level, though the marly clay region receded, composing approximately one-half of the unit. Artifact density in this level decreased from the previous level. Material collected included bone, charcoal, burned rock, metal fragments, debitage, and native ceramics. Level 10 (90–100 cmbd) exhibited a dramatic change in the matrix. The charcoal stain became larger, but by the end of the level it appeared in two areas; one along the south wall of the unit and the other in the western region. Only a very small section of the orange marly clay remained along the west wall of the unit. Burned rock was encountered in this level, but in no pattern to suggest intentional placement. Material recovered included charcoal, bone, mussel shell, and metal fragments. The charcoal stain continued approximately 5 cm into Level 11 (100–110 cmbd). Bone, mussel shell, debitage, charcoal, and metal fragments were recovered from this level. At the end of excavation of this level, dark gray silty clay was encountered, along with pockets of the orange marly clay. Level 11 appeared to contain the base of Feature 2 found in both TU 7 and TU 8.

Analytical Unit 5 is composed of Level 12 (110–120 cmbs) in TU 7 and is the sediment directly beneath Feature 2. Level 12 produced some artifacts, though the quantity was not as great as the level above in AU 4. The matrix consisted of dark grayish-brown silty clay mottled with the orange marly clay. Material collected included native ceramics, mussel shell, metal fragments, and debitage. Excavation in this unit was terminated at the bottom of Level 12 due to time constraints and the fact that installation of the French drain would not impact beyond this point.

### ***Test Unit 8***

Analytical Unit 1 of TU 8 consisted of Levels 1 and 2 (10–30 cmbd). Level 1 (10–20 cmbd) contained dark grayish brown clay loam with fist-sized and smaller limestone fragments. An abundant amount of artifacts were recovered from Level 1 including native, colonial, and post-colonial ceramics, as well as metal fragments, flat glass, debitage, and mussel shell (Table 3-10). Level 1 possessed a total of 20 nails, three of these are wire nails and the remainder are cut nails. Cut nails were utilized from ca. 1800 to 1888 (Mercer 1924:1), before wire nails became the popular variety (Nelson 1968). Level 2 (20–30 cmbd) exhibited an increase in the amount of limestone encountered. Artifact density also increased throughout this level. Material collected included debitage, mussel shell, metal fragments, native, colonial and post-colonial ceramics, burned rock, animal bone, and mortar.

Analytical Unit 2 consisted of Levels 3 and 4 (30–50 cmbd) in TU 8. Level 3 (30–40 cmbd) matrix was composed of a soft sandy clay that was rich with artifacts. Material collected included bone, mussel shell, metal, burned rock, colonial and native ceramics, debitage, mussel shell, and charcoal. One nail recovered from Level 3 may be hand-forged, dating prior to the 1800s when cut nails became more widely used (Mercer 1924). Level 3 also exhibited pockets of light tan sandy soil with white inclusions. Level 4 (40–50 cmbd) exhibited an increase in limestone cobbles and a decrease in the amount of cultural material from the previous level. The PVC pipe from the original French drain was encountered in the southwest corner of the unit. Material recovered consisted of mussel shell, debitage, charcoal, burned rock, metal fragments, and colonial and native ceramics.

Analytical Unit 3 (Feature 1) was composed of Levels 5 through 7 (50–80 cmbd). The upper portion of the matrix of Level 5 (50–60 cmbd) still contained a high concentration of limestone cobbles, though by the end of the level the density began to decrease. Fewer artifacts were collected than from previous levels. Material recovered consisted of burned rock, debitage, and native ceramics. Level 6 (60–70 cmbd) still contained a fair amount of limestone, but also exhibited an increase in cultural material. The eastern portion of Level 6 consisted of a very loose, sandy matrix with a small concentration of charcoal. The remainder of the level was composed of compact sandy clay. Artifacts collected included bone, burned rock, mussel shell, metal fragments, charcoal, debitage, and native and post-colonial ceramics. The matrix of Level 7 (70–80 cmbd) became much looser and sandier during excavation. Limestone was still present, though in lesser quantities than in the previous level. Charcoal staining became evident at approximately 76 cmbd. Material collected from Level 7 included bone, mussel shell, burned rock, debitage, a metal fragment, native ceramics, and charcoal. One possibly hand-forged nail was recovered from this level, though the heavy rust makes it difficult to be certain.

Analytical Unit 4 consists of the levels associated with Feature 2. Feature 2 consisted mainly of burned bone, charcoal and native ceramics. Levels 8 through 13 (80–144 cmbd) compose AU 4. Level 8 (80–90 cmbd) consisted of a very soft, sandy matrix. The southeast portion of unit was stained heavily with charcoal. Artifact density dramatically increased throughout this level. Material collected included debitage, lithic tools, bone (burned and unburned), burned rock, charcoal, native and colonial ceramics, marine and mussel shell, and metal fragments. Level 8 also produced a

Table 3-10. Artifacts Recovered from Test Unit 8

Analytical Unit	Level (cm below datum)	Artifacts																Grand Total								
		Unburned Bone	Burned Bone	Burned Clay	Burned Rock	Ceramics: Colonial	Ceramics: Earthenware	Ceramics: Native	Charcoal and Macrobotanical	Charcoal and Macrobotanical; Corn Cob	Charcoal and Macrobotanical; Corn Kernel	Debitage	Glass: Container	Glass: Flat	Lithic tools and cores	Marine Shell (1=present)	Metal: Fasteners		Metal: Other Items	Metal: Scrap	Metal: Unidentified	Mortar	Mussel Shell (1=present)	Other Items	Other Rock	Rock/Mortar
AU 1	1 (10-20)	229				3	1	22			12							22							25	321
	2 (20-30)	356	295		1	7	2	46	1		11									2		1			38	760
AU 2	3 (30-40)	411			5	4		65	1		7							1							27	521
	4 (40-50)				3	2		3	1		3							2							6	20
AU 3	5 (50-60)				11			1			2														12	26
	6 (60-70)	116			8		1	14	2		2									2				5	150	
	7 (70-80)	211			21			10	4		12									1				10	269	
	8 (80-90)	582	172		9	2		29	1		21				2	1	1								827	
	9 (90-100)	592	994		2	31	1	24	1	1	14	1													33	1698
	10 (100-110)	418	2030		37	4		15	3		20				1									119	2648	
AU 4	11 (110-120)	191	2972		50			21	1		10												1	8	3253	
	12 (120-130)	307	475		2	2		5	1		1														794	
	13 (130-144)	30	211		3			3	1		5											3	1		256	
<b>Total</b>		<b>3443</b>	<b>7149</b>	<b>2</b>	<b>181</b>	<b>25</b>	<b>4</b>	<b>258</b>	<b>17</b>	<b>1</b>	<b>120</b>	<b>1</b>	<b>8</b>	<b>2</b>		<b>1</b>	<b>25</b>	<b>4</b>	<b>7</b>	<b>11</b>		<b>8</b>		<b>242</b>	<b>33</b>	<b>11543</b>

possible forged nail. Level 9 (90–100 cmbd) continued to have very loose, sandy soil. The southeast portion of unit still contained charcoal, though by the end of excavating this level, the charcoal composed approximately two-thirds of the unit. The charcoal area contained an abundance of bone, native ceramics, and debitage. The northern portion of the unit not part of the charcoal concentration contained bone and charcoal flecking. Material collected from Level 9 included a corn cob, a corn kernel, bone (burned and unburned), burned clay, burned rock, colonial and native ceramics, debitage, a glass fragment (olive), marine and mussel shell, mortar, metal fragments, and a rolled cuprous sheet. Level 10 (100–110 cmbd) exhibited three separate types of matrix. In the north portion of the unit (approximately one-fourth of the unit), the soil consisted of very loose, tan sand. The southwest corner was composed of gray ash with charcoal nodules. The remainder of the unit was composed of charcoal. Artifacts were recovered in all areas. Material collected included charcoal, bone (burned and unburned), copper vessel fragments, debitage, marine and mussel shell, burned rock, and native and colonial ceramics. Level 11 (110–120 cmbd) continued with loose matrix. The three distinctions made in the previous level spread to different areas by the end of Level 11. The charcoal area occupied the west half of the unit. The gray ash with charcoal flecks appeared only in the easternmost portion of the unit. The remainder of the unit was composed of gray and yellowish brown matrix with streaks of charcoal. Three bags of matrix sample (approximately 4.5 liters each) were taken from this level for flotation processing. Artifact density appeared to decrease, except for bone, throughout this level. Material collected included bone (burned and unburned), debitage, burned rock, native ceramics, and mussel shell. Level 12 (120–130 cmbd) matrix remained loose and sandy, though pockets of clay began to appear. The charcoal area was found in the western half of the unit, though began receding towards the end of the level. Areas of marly clay were located in the eastern portion of the unit. A small number of artifacts were recovered from the marly clay region, but may have worked their way down from the feature above. Three bags of matrix were collected from this level, totaling approximately 13.5 liters in volume. Material recovered from Level 12 included bone (burned and unburned), charcoal, debitage, burned rock, colonial and native ceramics, mussel shell, and glass. Of interest is one burned chert stone in a natural pestle shape exhibiting battering at one. Level 13 (130–144 cmbd) was excavated until the top of the marly clay was evident. The matrix at the beginning of the level was soft and sandy to

approximately 135 cmbd. The remainder of the level became increasingly compact when moving into the clay. Three bags of matrix, approximately 4.5 liters each, were taken from Level 13. Material collected included bone (burned and unburned), debitage, burned rock, charcoal, native ceramics, mortar, and mussel shell. The unit was excavated to 144 cmbd in the northwest portion of the unit to reach the bottom of the charcoal. Artifacts may be present in the marly clay beneath the charcoal, but due to time restraints no further excavation was done. Excavation was terminated at the bottom of Level 13.

Test Units 7 and 8 revealed the southwestern portion of Features 1 and 2. The extent of the features to the north and east is not known.





## Chapter 4: Results of Analyses

In this chapter we discuss the results of ceramic analyses, the outcome of the study of a sample of vertebrate faunal remains, a cursory analysis of the freshwater mussel and marine shells, and the patterns evident in the small sample of lithic artifacts recovered from the site. The small number of human remains precludes a detailed analysis; a brief discussion is provided in Appendix C.

The first section of the chapter looks at all of the ceramics from the site to identify the types of ceramics present in the sample. These types are then used to define the age range of the analytical units defined in the excavation of TUs 7 and 8. Next, the sub-sample of specimens from TUs 7 and 8 was subjected to a detailed attribute analysis to characterize them in terms of a limited number of formal, technological and stylistic attributes. Some comparisons are made to the findings from Ricklis' (1999, 2000) previous studies of ceramic samples from missions Espíritu Santo and Rosario.

The study of the faunal remains focuses on a sub-sample of the animal bones recovered from the analytical units identified in TUs 7 and 8. The analyses performed are concerned with identifying the taxa represented in the sample, possible evidence of changes in diet through time, and evidence of the use or nature of Features 1 and 2 identified in these units.

Finally, the analysis of the small sample of recovered lithics is concerned with defining the general technological characteristics of the debitage and the raw material reduction strategies employed. The trends are compared to patterns noted in other mission-period assemblages from the state.

### Definition of Mission Espíritu Santo Ceramic Types

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The following section is a discussion of all of the ceramic sherds recovered from CAR's excavations at Mission Espíritu Santo. The ceramic sherds were initially sorted into general categories (i.e., native, colonial, English) upon arrival to the laboratory and then later broken down into

types. A total of 664 ceramic sherds was examined. The locations of sherds recovered from shovel tests and test units can be found in Table 4-1. The remaining sherds (n=21) were surface finds (all Goliad ware).

### Native American Ceramics

#### *Goliad Plain (n=578)*

This ceramic type was first identified and named in 1959 during analysis of ceramics from Mission Espíritu Santo (Mounger 1959:164). Vessels of this type were hand-built and bone-tempered. The color of the surfaces of the sherds varies from grayish tan to red-orange, while the color of the interior is gray to black, indicating that the vessels were fired in the uncontrolled environment of an open fire.

#### *Rockport Ware (n=2)*

Both sherds of Rockport, with a grayish brown surface and a black core, have the sandy paste typical of this type (Suhm and Jelks 1962:131). One sherd bears small traces of asphaltum decoration on one side and is completely coated with asphaltum on the other. The other sherd is plain. This type of ceramic was made by coastal Indians and may indicate visits from or trade with them.

### Unglazed Colonial Types

#### *Tonalá Burnished Ware (n=1)*

The town of Tonalá in western Mexico produced a molded, tan-bodied ware with a burnished tan slip painted with delicate red and black designs (Charlton and Katz 1979). When damp, the paste has a distinctly sweet odor. This type was made from 1650 to 1810.

#### *Red Burnished Ware (n=1)*

This type has a fine-grained red paste and has highly burnished surfaces. It is found on most eighteenth-century mission sites in Texas.

#### *Unidentified Unglazed Wares (n=13)*

None of these 13 sherds can be confidently identified to type. Nine are small, thin fragments of sherds that have been split horizontally, which is most unusual for colonial ceramic

Table 4-1. Ceramics Recovered from Test Units and Shovel Tests at Mission Espiritu Santo

Level	Type Name	Test Unit								Shovel Test						Total
		1	2	3	4	5	6	7	8	1	2	3	4	6		
1	Galera							1			1				2	
	Goliad							2	12	11	8	7	6	46		
	Porcelain				1									1		
	Red Burnished							1						1		
	Sandy Paste Lead Glaze								5					5		
	Transfer ware								1					1		
	Undecorated Tin Glaze								1					1		
	Unidentified Native Ceramic								5					5		
1 Total				1			4	24		12	8	7	6	62		
2	Black Luster							1						1		
	Galera							2					1	3		
	Goliad		2	24	1	20	5	3	33		2	10	14	1	115	
	Huejotzingo								2					2		
	Olive Jar					1								1		
	Sandy Paste Lead Glaze								1					1		
	Tonala								1					1		
	Tumacacori								1					1		
	Undecorated Lead Glaze								1					1		
	Undecorated Tin Glaze							1	2					3		
	Undecorated White Earthenware			1										1		
	Unidentified Native Ceramic								5					5		
Unidentified Native Sandy Ware						2							2			
2 Total		2	25	1	21	7	7	46		2	10	14	2	137		
3	Brown on Yellow Lead Glaze					1								1		
	Galera					1	1		2			1		5		
	Goliad	1			2	24	4	15	65	1	10	8	3	2	135	
	Redware				1				1					2		
	Sandy Paste Lead Glaze								1			1		2		
	Tumacacori					1								1		
	Undecorated Tin Glaze				1	2								3		
	Unidentified Blue on White				1									1		
3 Total	1			5	29	5	15	69	1	10	10	3	2	150		
4	Galera							1						1		
	Goliad		2		3	24	11	21	3		9	3	2	3	81	
	San Agustin								1					1		
	Sandy Paste Lead Glaze												1	1		
	Stoneware							1						1		
	Unidentified Blue on White								1					1		
4 Total		2		3	24	11	23	5		9	3	2	4	86		
5	Chinese Porcelain				1									1		
	Galera							1						1		
	Goliad	2	2		3	7	15	9	1	3	5	6	4	1	58	
	Huejotzingo							1						1		
	Redware											1		1		
	Sandy Paste Lead Glaze							1						1		
	Undecorated Tin Glaze							1						1		
	Unidentified							1						1		
Unidentified Blue on White							1						1			
5 Total	2	2		4	7	19	11	1	3	5	6	5	1	66		

Table 4-1. continued...

Level	Type Name	Test Unit								Shovel Test						Total
		1	2	3	4	5	6	7	8	1	2	3	4	6		
6	Galera							1							1	
	Goliad		3				4	4	14		1		2	5	33	
	Rockport									1					1	
	Undecorated Tin Glaze							2	1						3	
6 Total		3				4	7	15		2		2	5	38		
7	Goliad							2	10						12	
	Ironstone			1											1	
7 Total			1					2	10						13	
8	Goliad			1	2			5	4						12	
	Ironstone			1											1	
	San Agustin							2	2						4	
	Unidentified Unglazed Earthenware								1						1	
8 Total			2	2			7	7							18	
9	Goliad							1	24						25	
	San Agustin								1						1	
9 Total								1	25						26	
10	Goliad								16						16	
	San Agustin								3						3	
	Unidentified Blue on White								1						1	
10 Total									20						20	
11	Goliad		2												2	
11 Total			2												2	
12	Goliad							2	18						20	
	Unidentified Blue on White								2						2	
12 Total								2	20						22	
13	Goliad								3						3	
13 Total									3						3	
Grand Total		3	11	28	16	81	46	79	245	4	40	37	33	20	643	

types. One is a tan, thin, untempered, hand-molded sherd that may represent a very small pot. One is a small fragment of a handle from an otherwise unidentified vessel. Two thick, gray, sandy sherds seem to represent a heavy vessel such as a pitcher.

## Lead-glazed Wares

### *Sandy Paste (n=6)*

Wheel-turned bowls and pitchers of this type usually have a yellow or yellow and green lead glaze. They were made in Mexico throughout the eighteenth century.

### *Galera Ware (n=14)*

Thin, molded vessels of this type have a red body and a thin lead glaze. They are usually decorated with brown, green, and yellow or cream-colored designs. This ware is

recovered from Texas sites dating to the last half of the eighteenth century.

### *Brown on Yellow (n=1)*

This type has a tan to yellow paste with a yellow lead glaze. Sherds are decorated with linear brown swirls. The type appears in Texas starting in the second half of the eighteenth century.

### *Black Luster (n=1)*

This sherd has a terracotta paste covered with a black, lustrous lead glaze. According to Schuetz (1969:52), this ware was made in Puebla. However, Barnes (1980:100) suggests that black luster glazed ceramics with a terracotta body were made in Santa Fe, Michoacan, between 1750 and 1850.

***Redware (n=3)***

These sherds of a fine-paste redware are glazed with a clear lead glaze. They average 3 mm in thickness and the vessel represented has a direct rim. To date, sherds of this type have not been noted on other colonial sites in Texas.

***Olive Jar (n=1)***

Large, heavy jars were used to ship wine and olive oil during the colonial period. The sherd in this collection is 11 mm thick and has a very thin, pale green lead glaze on one side.

**Tin-glazed Wares*****Unidentified Blue on White (n=6)***

Fragments that have only touches of blue on an otherwise white tin glaze are probably parts of Blue on White or other blue-decorated ceramics manufactured throughout the eighteenth century.

***San Agustín Blue on White (n=9)***

This type has a blue floral decoration with lighter blue touches. On the reverse side of plates are interlocking blue loops. This type is tentatively dated from 1700–1780 in Texas, with the possibility of narrowing the range to 1700–1750.

***Huejotzingo (n=4)***

Decoration of this type is limited to a simple band of color at the rim. In this collection, one sherd has a blue band and the others have a pale green band. This type appears on Texas colonial sites dating from throughout the eighteenth and nineteenth centuries.

***Tumacacori Polychrome (n=2)***

Both sides of these sherds are covered with a pale blue glaze. They can be dated roughly from ca. 1810 to 1860.

***Undecorated (n=11)***

These sherds may be parts of otherwise decorated types or they may represent plain white majolicas that were made in Mexico in the eighteenth century (Lister and Lister 1974:30).

**Oriental Ware*****Porcelain (n=1)***

Chinese porcelain was imported to Mexico from the Philippines on the Manila Galleons throughout the eighteenth

century. It can be separated from European porcelains by the very pale blue background color of the sherds.

**Refined English Wares*****Whiteware (n=8)***

In the early nineteenth century, English ceramics began to come into Texas, either through Mexico or as contraband through the Texas coastal ports. The earlier types represented here are either undecorated (n=4), transfer printed (n=1) or hand-painted (n=1). Slightly later, English ironstone ceramics (n=2) arrived in Texas.

**Other Ceramic Types*****Stoneware (n=1)***

The single sherd of stoneware in this collection was probably made in Europe in the early nineteenth century. It resembles sherds of stoneware bottles recovered from nineteenth-century sites in the Caribbean.

***Late Porcelain (n=1)***

This very small sherd appears to be nineteenth-century or later European porcelain. It has a scarlet glaze on one side of an otherwise pure white body. To date, nothing even remotely similar to this sherd has turned up on colonial sites in the San Antonio River Valley.

**Ceramics from Test Units 7 and 8**

The ceramics from TUs 7 and 8 were examined according to the analytical units designated in Chapter 2. A total of 324 ceramics was collected from these two units.

***Test Unit 7***

TU 7 consisted of five analytical units. Analytical Unit 1 of TU 7 produced 11 ceramic sherds. Five (45%) of these are Goliad sherds. The remaining six sherds are a mixture of colonial ceramics and one fragment each of Tumacacori majolica, Red Burnished ware, Galera lead-glazed, Tonalá Burnished, Black Luster ware, and an undecorated majolica. All of the ceramics from AU 1 date to the eighteenth century.

Analytical Unit 2 produced 38 ceramic fragments. Approximately 95% (n=36) of the sherds are Goliad ware. One sherd was identified as Galera lead-glazed and the other

is a lead-glazed stoneware. The stoneware fragment dates to the early nineteenth century.

Analytical Unit 3 produced 27 ceramic sherds. Of these 27, 20 (74%) are Goliad ware sherds. Five sherds are colonial tin-glazed wares. Two of these were identified as San Agustín majolica, which dates between 1700 and 1780. The other three majolica sherds also date to the eighteenth century. One fragment of Galera lead-glazed was recovered from AU 3. This type was common during the later half of the eighteenth century. One unidentified ceramic sherd was also recovered from AU 3.

Analytical Unit 4 only produced one ceramic sherd. Three levels composed AU 4, in which one Goliad ware body sherd was recovered. Analytical Unit 5, consisting of Level 12, produced two fragments of Goliad ware.

### ***Test Unit 8***

TU 8 was composed of four analytical units. Within Analytical Unit 1 (Levels 1 and 2), 70 ceramic sherds were collected. Goliad wares comprised approximately 64% (n=45) of the ceramics collected from AU 1. Ten fragments (14%) of unidentified, unglazed native or colonial ware were recovered. Eight colonial lead-glazed sherds were collected from AU 1. Two of these fragments are Galera ware, which was common in Texas during the second half of the eighteenth century. Of the five majolicas collected from this zone, two have decoration identified as Huejotzingo. Two fragments of white earthenware were recovered, one is undecorated and the other exhibits a transfer print decoration. The combination of these ceramics types within AU 1 indicates that the sediment was deposited during the late eighteenth and early nineteenth centuries.

Analytical Unit 2 consists of Levels 3 and 4 (30–50 cmbd) and produced 74 ceramic sherds. Sixty-eight (92%) of the sherds are identified as Goliad ware. Two fragments of majolica were identified, one as Blue on White and the other as San Agustín. Four colonial lead-glazed sherds were recovered, two are Galera, one is a redware, and the last is sandy paste. The ceramics all consistently date to the eighteenth century, though the presence of the Galera may indicate the later half of the eighteenth century.

Analytical Unit 3 is composed of Levels 5 through 7 (50–80 cmbd) and contained 26 ceramic fragments. Twenty-five (96%) of these sherds are identified as Goliad ware. The

remaining sherd is an undecorated tin-glazed ware. This analytical unit provides very little information from which a date can be determined, but can be tentatively placed within the eighteenth century.

Analytical Unit 4 consists of the remaining levels of TU 8 (Levels 8–13). Seventy-five (75) ceramic sherds were recovered from AU 4. Sixty-five (87%) of these sherds are Goliad ware. Nine sherds of tin-glazed wares were collected; six of these are identified as San Agustín. The remaining three majolica sherds are unidentified Blue on White. One fragment of an unidentified, unglazed ware was recovered from AU 4. The San Agustín majolica (ca. 1700–1780) provides the only real possibility of connecting a date to the analytical unit.

## **Formal, Technological, and Stylistic Analysis of Goliad Ceramics**

**Kristi M. Ulrich**

This section discusses the results of analysis conducted on the native ceramics recovered from Mission Espiritu Santo. Goliad ceramics represent the bulk of the ceramic sample from TUs 7 and 8. At the present time, historic archeologists lump all mission-derived ceramics into a single catch-all Goliad ware or type. This is done even though the Goliad collections derive from several distinct missions spread throughout Texas, and in many cases the missions were inhabited by ethnically distinct groups and represent anywhere from 15–60 years of occupation, or even longer during the eighteenth and early nineteenth centuries. Given this variability in geographic location, ethnic composition of populations, and length of occupation, it would be expected that a significant degree of variation exists within the Goliad type. Yet, to date, very little careful characterization of Goliad ceramics has been conducted to determine the degree of variability within this broadly inclusive type (cf. Perttula 2002; Ricklis 1999, 2000). The causes of any observable variability may be somewhat difficult to explain given that variability within local clays, technological variability related to form and function, and variability related to cultural/ethnic traditions of manufacture could all contribute to the pattern. Nonetheless, at the present time, only a limited detailed knowledge of the characteristics of Goliad wares exists. Paralleling these broad research interests are specific suggestions from the ethnohistoric record (Cardenas 1783) that Aranama potters from Mission

Espiritu Santo may have made and furnished wares to other missions including Rosario and Refugio (Perttula 2002; Ricklis 1999, 2000). To add to the currently available characterization of Goliad ceramics, a detailed attribute analysis of the native ceramics from TUs 7 and 8 was conducted.

## Analytical Methods

Though most analyses conducted on native ceramics focus on rim sherd samples, all fragments larger than 10 mm in maximum dimension were examined for this analysis. Rim sherds provide more information concerning vessel form and use than body sherds, but the lack of rim sherds from TUs 7 and 8 created the need for a sample that would provide a better evaluation of attributes. By including all sherd types, tempering, thickness, and surface treatment information became the predominate attributes recorded with the hopes of providing insight into variability in manufacturing techniques and perhaps changes through time.

A total of 183 sherds from TUs 7 and 8 was used for analysis. The analytical units defined in Chapter 3 were utilized as analytical groups. The attributes recorded on each sherd are listed in Table 4-2. Each sherd's attributes were recorded on a prepared data sheet. The term "unknown" was used when a specific attribute on a sherd could not be placed into the defined list of attributes.

### Formal Attributes

Formal attributes recorded included characteristics concerning vessel form, size and wall thickness. Body and base sherds of native ceramics usually convey very little information concerning vessel form, therefore, rim sherds were more comprehensively examined with respect to vessel form. Rim form was recorded as either everted, inverted or straight (Figure 4-1). Typically, vessel forms can be inferred based on the rim sherd form and degree of curvature. Everted rims are characteristic of ollas and jars. Inverted rims usually indicate neckless jars and certain bowl forms. Straight rims are indicative of tall jars and bottles. Shallow and deep bowls are distinguished by the degree of curvature on the rim. A downward curve greater than 25 degrees from a perpendicular plane can be classed as a shallow bowl, whereas a degree of curvature less than 25 degrees is considered a deep bowl (Figures 4-1 and 4-2; Ricklis 2000). When rim sherds were too small to determine rim or vessel form, and for all body and base sherds, they were coded as "unknown."

Lip form was another attribute recorded for rim sherds. Three lip form categories were used: pointed, round, and flat

(Figure 4-1). Lip form may be an indicator of the style of an individual or of cultural groups of potters. Orifice diameter was recorded for rim sherds that were large enough to determine the rim arc. To determine vessel orifice diameter, the sherd was placed rim down on a concentric circle template, positioning the sherd so that the lip rested on the flat surface. The concentric circle template was composed of graduated 1-cm rings, and the rim sherd was fitted to the closest diameter.

Thickness was recorded for all sherds examined during this analysis. Maximum thickness of each sherd was taken in millimeters using manual calipers. Thicker walls increased the impact resistance of the vessel, which is important for vessels that are moved often. Thinner walls increase thermal shock resistance (the ability to withstand heating and cooling periods before cracking), which is a benefit for vessels that are consistently used for cooking (Rice 1987; Ulrich 2004:46).

### Technological Attributes

Technological attributes refer to characteristics associated with the preparation of clays and the firing of the vessel. Information recorded included the type of aplastic inclusions, the relative quantity of the inclusions, and the firing atmosphere of the vessel.

Aplastic inclusions consist of particles present in the clay body. The inclusions may or may not represent purposeful additives or temper to the clay (Rice 1987). In some instances, such as sand, it is difficult to a priori identify whether the sand represents a purposefully added tempering agent or sand that is contained within the parent source of the clay. Aplastic inclusions seen in the sample include crushed bone, sand grains, burned sandstone fragments, and plant fiber. Each sherd was freshly broken allowing for a clean view of the interior of the sherd. The sherd was then examined under 40X microscopy to view the type and density of the aplastic inclusions. In keeping with the guidelines set by other investigations concerning Toyah (Black 1986), Rockport (Ricklis 1995), and Goliad (Ricklis 2000) ceramics, sparse presence of inclusions was estimated at less than 5% of the clay body, between 5% and 25% was considered moderate, and abundant was greater than 25%.

The color of the interior surface, exterior surface and core of each sherd was examined to help determine the firing atmosphere of the vessel. Colors that fell in the range of buff to red-orange were recorded as oxidized. If the sherds contained shades of gray to black, they were recorded as

Table 4-2. Ceramic Analysis Attributes for Native American Wares

<b>Sherd Type</b>	<b>Surface Treatment of:</b>
base	<b>Exterior</b>
body	brushed
body w/ handle frag	floated
handle	polished
rim	rough
	smooth
<b>Rim Form</b>	smooth polished
deep bowl	uneven
shallow bowl	<b>Interior</b>
straight	brushed
unknown	floated
	rough
<b>Lip Form</b>	smooth
flattened	smooth polished
point	uneven
round	
tapered	<b>Decoration of:</b>
	<b>Exterior</b>
<b>Vessel Form</b>	asphaltum
bottle	asphaltum line
deep bowl	none
shallow bowl	self slipped
unknown	smudge
	<b>Interior</b>
<b>Temper Type</b>	asphaltum
bone	none
bone/sand	self slipped
	smudge
<b>Temper Density</b>	
abundant	
moderate	Thickness
sparse	Orifice Diameter
	Weight
<b>Firing Atmosphere of:</b>	
<b>Core</b>	
oxidized	
reduced	
zoned	
<b>Interior</b>	
fireclouded	
oxidized	
reduced	
<b>Exterior</b>	
fireclouded	
oxidized	
reduced	



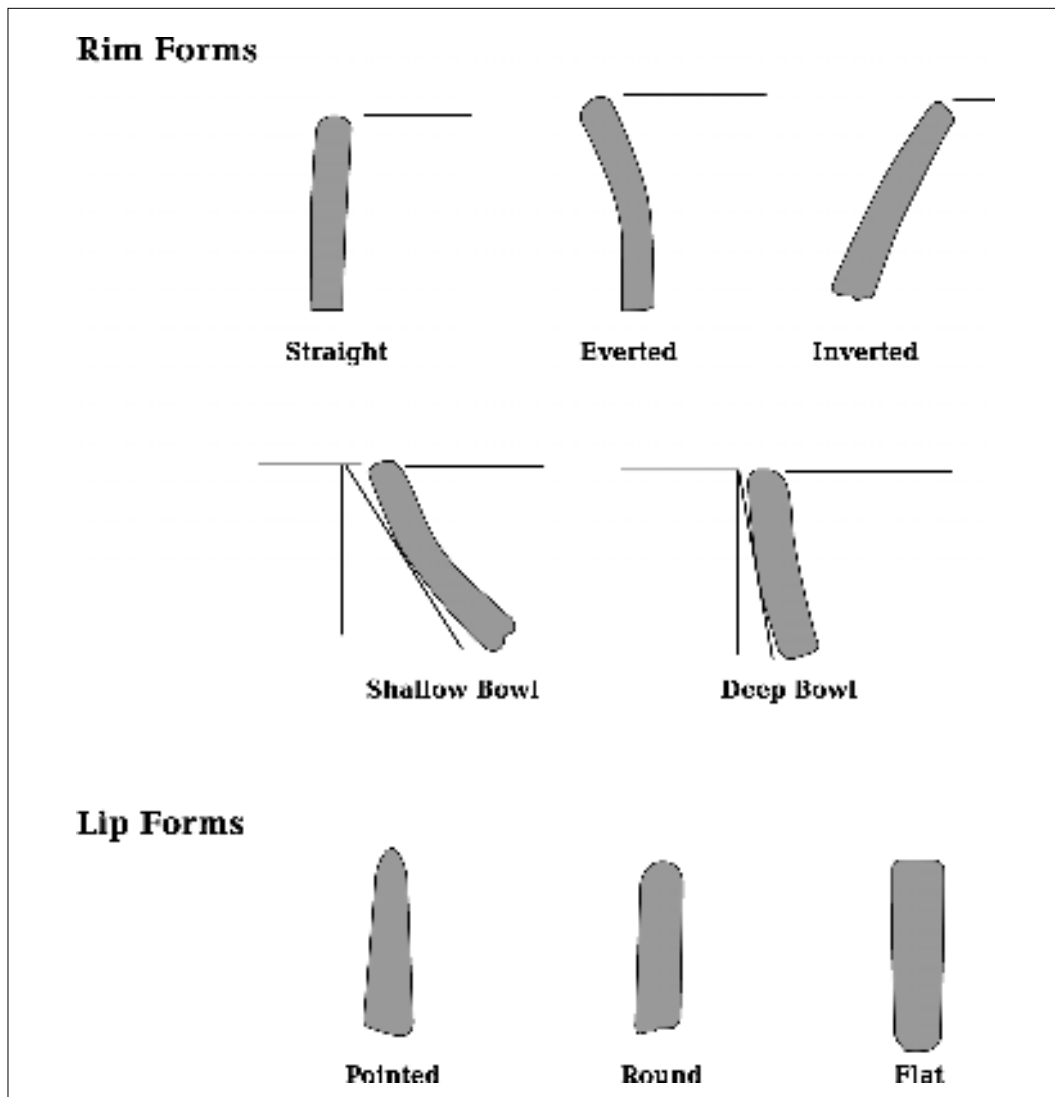


Figure 4-1. Rim and lip forms used in ceramic analysis.

reduced. Fireclouding, the result of uneven firing, vessels touching during firing or organic materials in contact with the vessel during firing, were also recorded as a firing atmosphere attribute.

### *Stylistic Attributes*

Stylistic attributes refer to surface treatments and decorations occurring on the ceramic sherds. Surface finish and decoration were the two types of stylistic attributes recorded. Surface finish categories included smooth, rough, smooth polished, and floated. Categories of potential decoration included burnishing and the application of asphaltum

decorations. The presence of these stylistic attributes was recorded for both the interior and exterior surfaces of all sherds.

### **Discussion of Results**

The attributes recorded on the native ceramics recovered from TUs 7 and 8 are presented in Appendix B. The data for each sherd and its provenience by analytical unit is presented. The rim sherd data, though small in this instance, has been compared to the data collected by Ricklis (2000) from missions Rosario and Espiritu Santo.

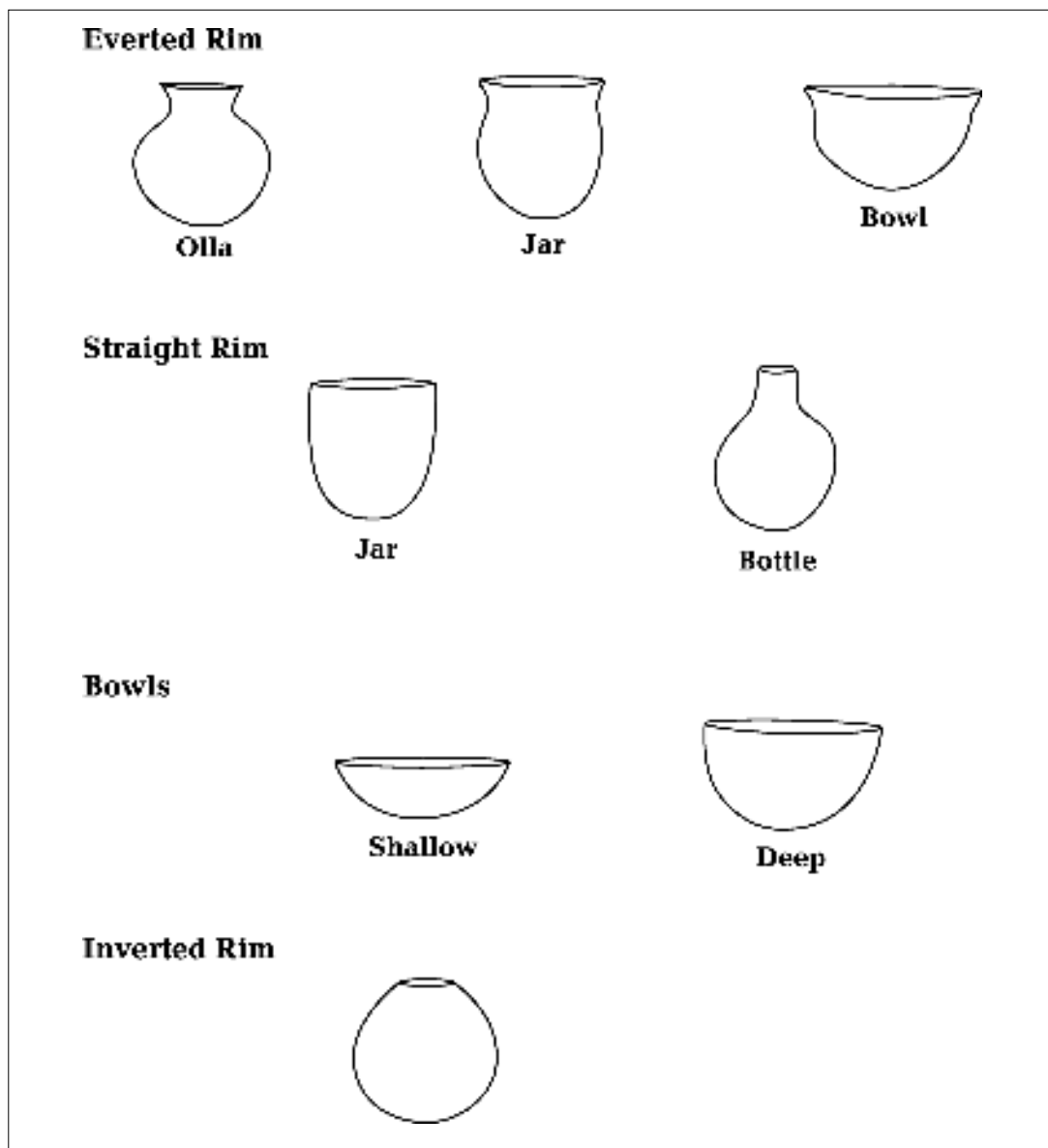


Figure 4-2. Vessel forms used in ceramic analysis.

### ***Thickness***

The average thickness of the sherds recovered from TUs 7 and 8 is approximately 7 mm. Sherd thickness was broken down by analytical units (Table 4-3) to determine if trends were present. Analytical Unit 5, containing only one sherd, does not provide enough data concerning thickness variation. Interestingly, though, ceramic sherds recovered from Feature 2 (AU 4) have an average thickness of 7.4 mm, nearly half a millimeter thicker than the previous analytical unit (AU 3, average = 6.75 mm). The base sherds exhibit thicker walls

than other types of sherds with an average thickness of 9.8 mm. The rim sherd thickness data reveals that rim sherds excavated from TUs 7 and 8 are on average thicker (7 mm) than Goliad rim sherds from Mission Rosario (5.47 mm) and those recovered by Ricklis (2000) at Espíritu Santo (5.99 mm). This trend is even more pronounced when examining rim sherds within AUs 3 and 4, which have an average thickness of 7.18 mm for the two features. Feature 1, located within AU 3, is more consistent with Ricklis' findings with an average of 6 mm, but Feature 2, located in AU 4, reveals

Table 4-3. Thickness of Native Ceramic Sherds (Goliad ware only)

Thickness (mm)	Analytical Unit					Total
	1	2	3	4	5	
4	2					2
5	3	4		2		9
5.5	2	8	2	2		14
6	5	10	13	17	1	46
6.5	3	10	5	3		21
7	2	9	7	14		32
7.5	1	9		4		14
8		1	1	13		15
8.5		3		5		8
9		2	1	5		8
9.5	2	1		1		4
10				2		2
10.5				1		1
11.5				1		1
12				1		1
13		3				3
15			1			1
Grand Total	20	60	30	71	1	182
Average Thickness	6.07 mm	6.99 mm	6.75 mm	7.4 mm	6 mm	7 mm

a dramatic increase in average rim sherd thickness (7.86 mm). It is possible that the decrease in rim sherd thickness between analytical units signifies a change in manufacturing technique or perhaps changes in vessel size since wall thickness may also correlate with shock resistance. Thinner-walled vessels withstand the changes caused by consistent heating and cooling periods better than their thicker-walled counterparts (Ulrich 2004:46). Also, thinner-walled vessels promote uniform heating, cutting cooking time and often dramatically reducing the amount of fuel required (Rice 1987). A change in ceramic manufacturing may have occurred to accommodate the different needs of food processing due to the addition of new food sources (i.e., corn, beans, etc.) to the diet of the native inhabitants at the mission.

### *Aplastic Inclusions*

The inclusions were grouped into the following categories: bone, bone/sand, and other. The “other” category consisted of infrequently identified materials and their presence was noted simply as observations in the comments. While it is assumed that bone is a purposeful tempering additive, the same cannot be established with certainty about sand or the other less frequently noted materials. Therefore, we chose to refer to sherds containing sand particles as bone-tempered

sandy paste wares. The results of this examination can be found in Figure 4-3.

### Bone-tempered Ceramics

The most common inclusion in the clay matrix was calcined bone. Of the 183 sherds examined, 182 contained crushed bone. The density of bone did vary, and the presence of sand created a division within this grouping. Approximately 55% of the sample (n=100) contained crushed bone but no sand. Within these 100 sherds, 35 were considered as containing an abundant amount of bone, 43 contained a moderate amount, and 22 were deemed sparse.

### Bone-tempered Sandy Paste Ceramics

Approximately 44% (n=81) of the 182 sherds examined contained a mix of bone and sand within the clay matrix. Again, however, while we assume that the bone is a purposeful additive, it is not clear whether the sand is a natural component of the clays employed in making the vessels or whether the sand is a tempering agent. Regardless, the presence of sand does influence the ability of vessels to withstand thermal shock (Rice 1987). In addition, although we did note sand within the clay matrix, the individual sand grains were relatively small and bone seemed to constitute

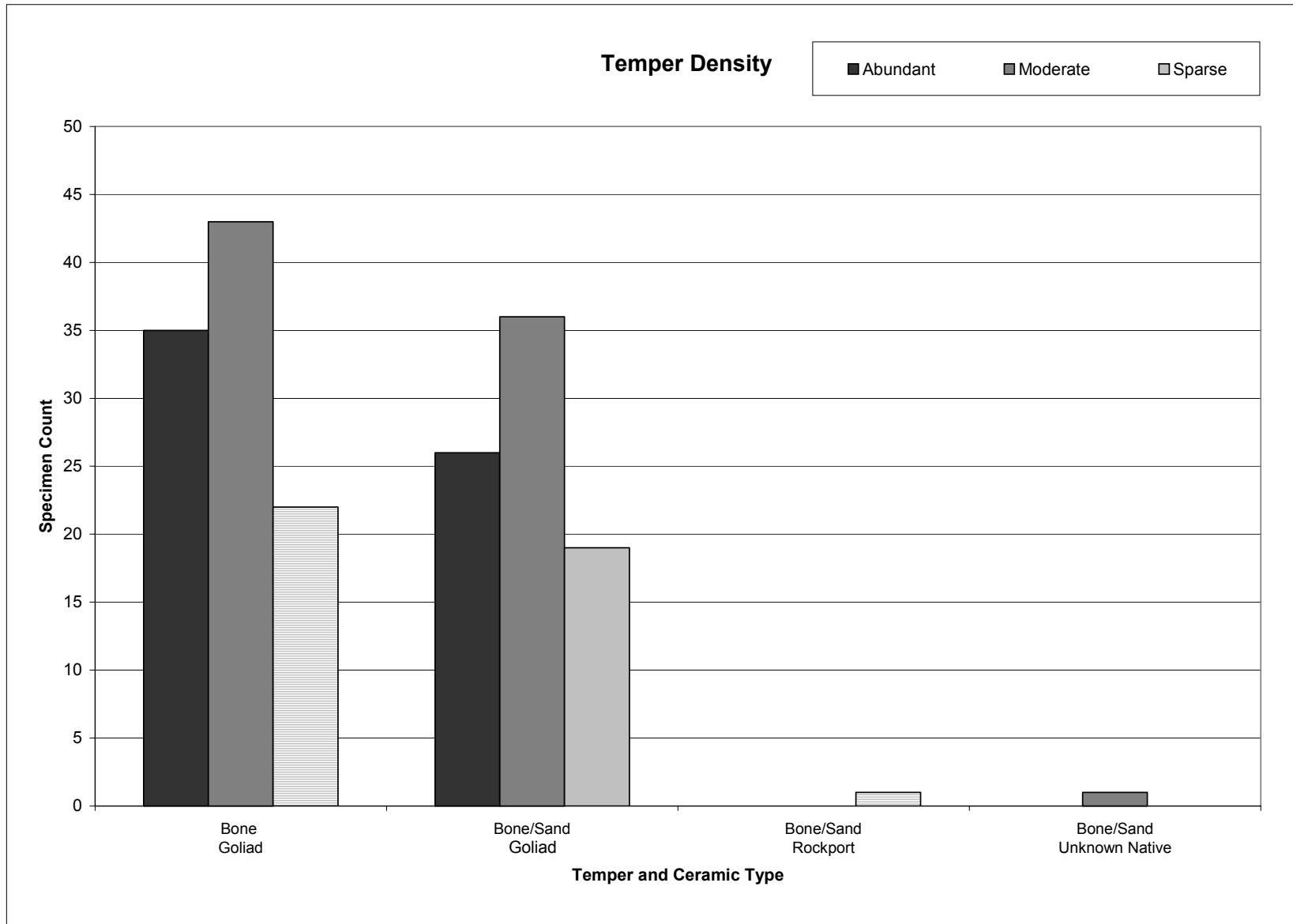


Figure 4-3. Temper density of Goliad and Rockport ceramics.

a much higher proportion of the aplastic inclusions compared to sand.

The results of the attribute analysis indicated that moderate amounts of temper were present in 44% of the 81 bone-tempered sandy paste sherds, whereas abundant amounts of temper were seen in 32%. The remaining 24% of the sherds contained sparse amounts of bone and sand temper, including the one sherd of Rockport ceramic. The proportion of sand inclusions in this specimen was much higher than in the other 80 specimens, and in contrast, the proportion of bone tempering was much lower than in the other bone-tempered sandy past ceramics. This pattern suggests that sand was a purposeful tempering additive in the case of the Rockport specimen. Another instance of greater sand to bone inclusions was noted in an unknown native ceramic sherd. This sherd exhibited a very sandy paste, with little burned bone tempering. Other inclusions noted included chert fragments and burned sandstone nodules. At this time, the sherd can not be identified as Goliad or Rockport due to the differences in tempering agents and the platy nature of the sherd, though characteristically it is more similar to Rockport.

### Other Inclusions

Other inclusions noted in several sherds included plant fiber, burned sandstone, feldspar, and grog (crushed fired pottery). The substance that was described as plant fiber appeared in the sherd as very fine, amber-colored threads. Some examples had small, amber-colored spheres attached to the fibers. The presence of the fiber may or may not have been purposely added to the clay as a tempering agent. Due to the few specimens identified (n=2), it is likely that it was an unintentional addition. Burned sandstone appeared as soft, bright red-orange, grainy nodules within the ceramic paste. The presence of sandstone was noted in seven sherds. Feldspar was identified as hard, tan-colored nodules with a slight iridescence. Feldspar was identified in five specimens. One case of grog tempering was identified in the sample.

### Firing Atmosphere

Information collected concerning firing atmosphere suggests that the ceramics utilized at Espíritu Santo were fired for shorter periods of time than needed for complete oxidization of the clay. This same trend was noted in ceramics collected from previous excavations at Espíritu Santo, and within samples from Mission Rosario (Ricklis 2000). Rosario specimens exhibited a higher percentage of oxidized sherds, but this could be due, in part, to the fact that the ceramics produced at Rosario were thinner-walled. Several of the specimens from the sample exhibited a reduced core when

viewed with the naked eye, but were found to be oxidized when viewed under the microscope. These sherds contained enough crushed burned bone as temper so as to create the appearance of reduction. Table 4-4 presents the firing atmosphere data collected from each of the analytical units.

Oxidized surfaces and reduced cores are common in the sherds from TUs 7 and 8. Analytical Unit 4 revealed an interesting difference, in that the percentage of fully reduced sherds increased in these levels.

Fireclouding was noted on both the interior and exterior of some of the examined sherds. Fireclouding occurred more frequently on the exterior (n=32, 17% of sample) than on the interior (n=16, 8% of sample) of vessels. As mentioned before, fireclouding is a result of the uneven firing characteristic of open firing (Rice 1987).

### Surface Finish and Decorations

Most sherds exhibited some level of smoothness. A few specimens (n=8) were recorded as having “rough” surfaces, though it is possible this “roughening” was due to erosion of the sherd rather than a purposeful finishing technique used by the potter. The remainder of the sherds fell into the “smooth” category with different degrees of smoothness. No highly burnished fragments were identified, however, a few fragments are smoothed to the point of polishing and were recorded as “smooth polished.” Several specimens exhibited “floating,” the act of rubbing the surface of the vessel in a leather hard state (partially dried) to bring small particles to the surface, on one or both surfaces of the sherds. These were recorded as “floated.”

Very few instances of decoration were noted in this sample of ceramics (Table 4-5). One body sherd exhibits a true applied asphaltum decoration in the form of a line applied to the exterior of the sherd. This sherd was recovered from Analytical Unit 4. Several other sherds exhibit asphaltum surface treatments and smudging (asphaltum in the pores of the sherds appearing to have been rubbed in). No sherds exhibit applied slips, though several appear to have a self-slip, possibly produced by additional polishing while the vessel was in the leather hard state, though not to the state of burnishing. These findings are consistent with Ricklis’ (2000) analysis conducted on Espíritu Santo and Mission Rosario ceramics. The ceramics recovered from Espíritu Santo rarely exhibit applied decoration, whereas those from Rosario commonly have asphaltum decoration. This may be due, in part, to cultural differences between the groups of natives residing at each mission.

Table 4-4. Firing Atmosphere of Native Ceramics

	Analytical Units					Total
	1	2	3	4	5	
<b>Firing of Core</b>						
Oxidized	2 (9%)*	7 (12%)	1 (3%)	2 (2.5%)		12
Reduced	18 (86%)	53 (88%)	29 (94%)	65 (92%)	1 (100%)	166
Zoned	1 (5%)			4 (5.5%)		5
<b>Grand Total</b>	<b>21</b>	<b>60</b>	<b>30</b>	<b>71</b>	<b>1</b>	<b>183</b>
<b>Firing of Exterior</b>						
Fireclouded	6 (29%)	10 (17%)	6 (20%)	10 (14%)		32
Oxidized	9 (43%)	30 (50%)	18 (60%)	21 (30%)	1 (100%)	79
Reduced	6 (29%)	19 (32%)	6 (20%)	40 (56%)		71
Unidentified		1 (2%)				1
<b>Grand Total</b>	<b>21</b>	<b>60</b>	<b>30</b>	<b>71</b>	<b>1</b>	<b>183</b>
<b>Firing of Interior</b>						
Fireclouded	3 (14%)	5 (8%)	3 (10%)	5 (7%)		16
Oxidized	13 (62%)	30 (50%)	17 (57%)	22 (31%)	1 (100%)	83
Reduced	4 (19%)	25 (42%)	10 (33%)	44 (62%)		83
Unidentified	1 (5%)					1
<b>Grand Total</b>	<b>21</b>	<b>60</b>	<b>30</b>	<b>71</b>	<b>1</b>	<b>183</b>

\*Percentages are based per analytical unit.

Table 4-5. Decoration on Native Ceramics

	Analytical Units					Total
	1	2	3	4	5	
<b>Interior Decoration</b>						
asphaltum			2	1	1	4
none	20	57	26	70		173
self slipped		2				2
smudge		1	2			3
missing	1					1
<b>Grand Total</b>	<b>21</b>	<b>60</b>	<b>30</b>	<b>71</b>	<b>1</b>	<b>183</b>
<b>Exterior Decoration</b>						
asphaltum		2	1			3
asphaltum line				1		1
none	20	46	29	61	1	157
self slipped		2				2
smudge	1	10		9		20
<b>Grand Total</b>	<b>21</b>	<b>60</b>	<b>30</b>	<b>71</b>	<b>1</b>	<b>183</b>

## Summary of Ceramic Analysis

These differences between the bone-tempered and bone-tempered sandy paste Goliad sherds and the Rockport sherd suggest that the ceramic sample from TUs 7 and 8 represent three distinct approaches to ceramic manufacture. One approach relies primarily on the use of calcined crushed bone as the principal tempering agent for clays that contain no sand inclusions. The second approach relies on clays that contain sand but in small proportions. It is unclear whether the sand is added as a purposeful tempering agent or is a natural component of the clays used in making these vessels. Regardless, the influence of the inclusions in terms of vessel performance is the same. Calcined crushed bone is added to the sandy clays as a tempering agent creating a vessel that is different in performance than a purely bone-tempered vessel. The third approach appears to begin with sandy clays to which additional sand is added as a tempering agent.

We do not know whether these approaches to ceramic manufacture represent functional differences between vessels or manufacturing traditions underlain by cultural norms and perspectives on ceramic manufacture, or both. The presence of bone tempering in the Goliad sherds collected from Mission Espiritu Santo supports Ricklis' (2000) claim that "tempering was almost consistently accomplished by adding crushed bone to the clay body." Ricklis notes, though, that the majority of the vessels from Mission Espiritu Santo lack any sort of sand inclusion to the paste. Findings from this examination reveal that there are quite a few examples of sand appearing in the clay matrix. Given the predominance of bone tempering in these specimens, and the low proportion of sand within the clays, we suspect that sandy paste clay is being employed rather than the sand being purposefully added to the clay. Bone tempering was utilized in the majority of the sample at the mission, continuing to support the idea of the persistence of the Toyah Phase ceramic tradition (Ricklis 2000).

The Goliad ceramics examined during the course of this analysis fall consistently within the findings recorded by Ricklis (2000) concerning the ceramics recovered at Espiritu Santo. Overall, the sherds collected are thicker than the average thickness of Mission Rosario sherds, though this may be due to the inclusion of body sherds in the analysis rather than exclusively rim sherds. The patterns in temper type and density remain consistent with Ricklis' findings from Espiritu Santo, demonstrating regular use of burned bone as a tempering agent in both analyses. By supporting

Ricklis' findings, one can easily assume that missions Espiritu Santo and Rosario housed two separate cultural groups who had different ceramic manufacturing traditions. Possibly due to the use of higher magnification, the presence of sand in the clay matrix was noted more often in this investigation than in the collection from Espiritu Santo used by Ricklis.

Examining the sherds by analytical units revealed that the average sherd thickness fluctuates between analytical units, with a marked difference in AU 4. It is possible that dietary constraints created a need to modify the cooking vessels, leading to thinner vessel walls found in later levels. Firing atmospheres are very similar between the analytical units, but an increase of completely reduced sherds was noted in AU 4. This could be related to the evidence of charcoal and other burned material in AU 4. It is possible that the sherds were reduced not during firing, but were burned at a later time, possibly with the bone that was also recovered from AU 4.

## Vertebrate Faunal Analysis

Johanna M. Hunziker

### Methods

A total of 11,323 pieces of animal bone weighing 17,614.46 grams was recovered from the excavation of TUs 7 and 8. Approximate 25% samples of the bone from AUs 2, 3, and 4 from TUs 7 and 8 were selected for analysis to investigate aspects of diet—specifically changes in the relative dependence of mission inhabitants on wild and domesticated taxa. In addition, it was hoped that certain aspects of the faunal remains (i.e., burning) would inform us about the use of Feature 2, specifically, whether it represented a hearth where large numbers of bones were burned or a secondary dump where bones burned in other features were discarded. The sample consisted of 247 specimens from AU 2 in TU 7, 113 from AU 3 in TU 8, and 85 and 2,108 from AU 4 in TUs 7 and 8, respectively, for a total of 2,553 specimens weighing 5,232.63 grams (Table 4-6).

Each specimen was identified to the lowest taxonomic level possible using the CAR comparative collection and identification manuals (Balkwill and Cumbaa 1992; Brown and Gustafson 1979; Gilbert 1990; Hildebrand 1955; Olsen 1964, 1968, 1969; Sobolik and Steele 1996).



Table 4-6. Vertebrate Faunal Samples Selected for Analysis

Analytical Unit	Level	Test Unit		Total
		7	8	
2	3	247		247
3	6		113	113
4	8		158	158
	9	46	604	650
	10		834	834
	11	39		39
	12		296	296
	13		216	216
<b>Total</b>		<b>332</b>	<b>2221</b>	<b>2553</b>

The observations made on each specimen included element, portion, side, fusion of epiphyses, burning, breaks, and modification. For each specimen, the area of the element represented by the fragment was recorded using the diagrams in Figures 4-4 and 4-5. If two pieces of an element could be refit, it was counted as a single specimen. The degree of burning was recorded as unburned, partially burned, burned, and calcined. Modifications recorded include saw marks, cut marks, chop marks, and impact fractures. Carnivore chewing was also noted. The type of break the specimen resulted from was also recorded. These included green/spiral breaks, recent breaks that were a result of excavation or bagging, and “historic” breaks. Historic breaks were defined as fragments that had no indication of spiral breaks nor were the result of excavation. It was assumed these breaks occurred prior to deposition in the feature or by post-depositional factors within the feature.

Much of the burned bone had a black, shiny residue on the exterior of the fragments. Within the analyzed sample, one unburned specimen, 40 partially burned, 73 completely burned, and 5 calcined specimens exhibited this residue. It is unclear what this residue is. Figure 4-6 shows a partially burned rib from Level 8 in TU 8 with black residue on the surface.

## Results

### Identified Taxa

Table 4-7 lists the identified taxa in the sample. Approximately 6% by count and 38% by weight of the analyzed bone could be identified to at least the family level. The majority of the bone was fragmented and could only be identified

as large, medium, or unidentified mammal. The highly fragmented nature of the assemblage may be due to extensive burning. Thirty-eight percent (n=962) of the analyzed specimens were burned and these specimens account for 60% (3149.83 grams) of the analyzed sample weight.

A total of 148 specimens was identified to at least the family taxonomic level, and of these, 72.3% (n=107) are bovid. An attempt was made to distinguish bison from cattle, but due to the similarities between the two species (Balkwill and Cumbaa 1992), many elements were coded simply as Bovidae. Only two elements were considered to possibly be bison: a patella and a fragment of an ileum with very pronounced muscle attachments. Bovid bones were by far the most common taxa identified within each analytical unit. Of the specimens identified to at least the family level, 100% (n=6) in AU 2 are bovid, 67% (n=4) in AU 3 are bovid, and 71% (n=97) in AU 4 are bovid. Four of the six bovid bones in AU 2 could be positively identified as cattle, while only one of four and seven of 97 could be positively identified as cattle in AUs 3 and 4, respectively. While no bovid specimens were positively identified as bison, there is a likelihood that some of the bovid specimens in AU 4 may be bison.

The next most common identified taxa were artiodactyls smaller than cattle/bison in size. This included deer, pronghorn antelope, and potentially sheep/goat, though no elements were unequivocally identified as sheep/goat. Deer/sheep/goat make up 17% (n=1) of the taxa identified in AU 3 and 18% (n=25) in AU 4.

Wild species (discounting the Bovidae and Artiodactyla categories) make up six of the eight identified taxa in AU 4. No unequivocally wild taxa were identified in AUs 2 and 3.

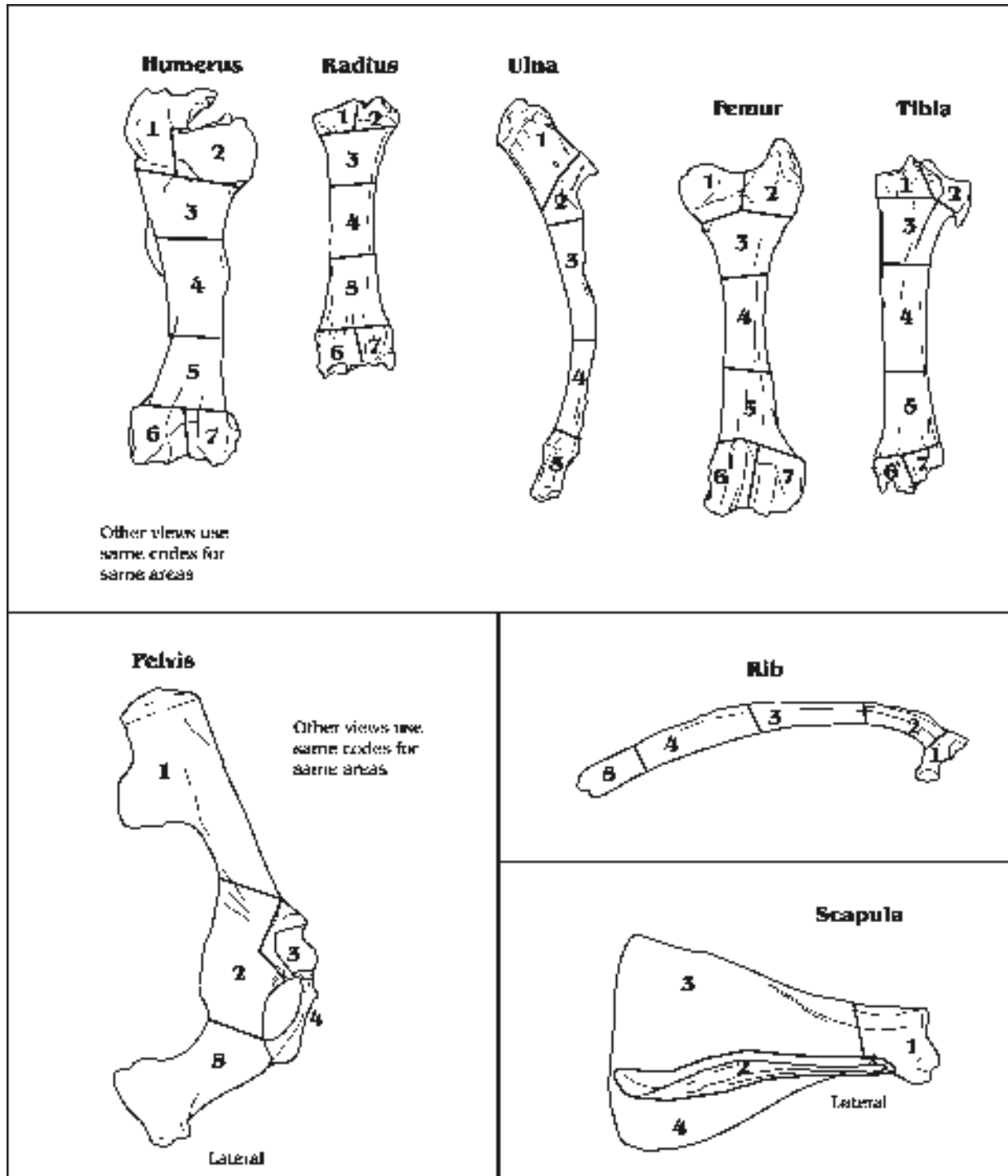


Figure 4-4. Area of element present codes used for long bones, pelvis, ribs and scapula.

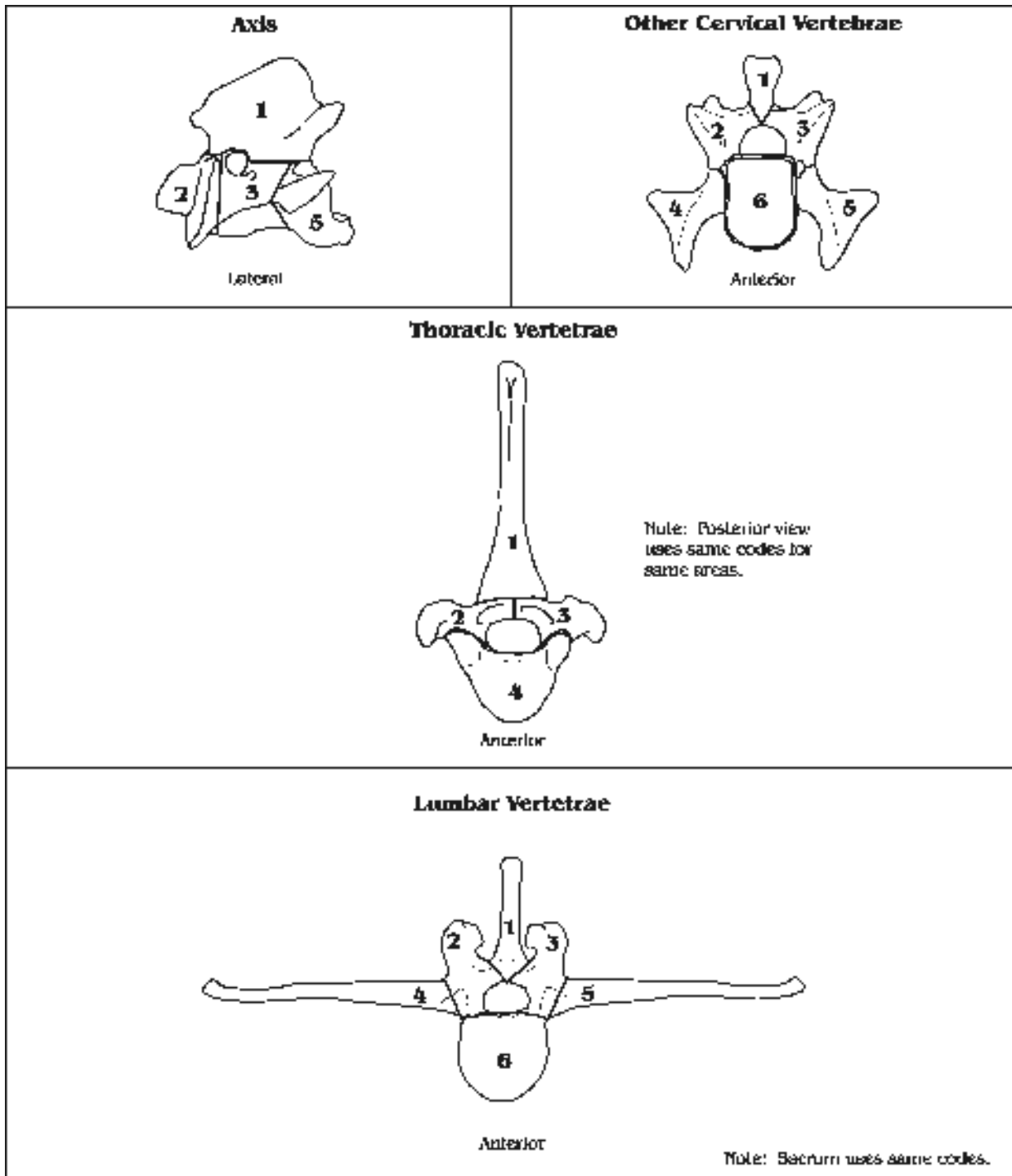


Figure 4-5. Area of element present codes used for vertebrae.



Figure 4-6. Example of black residue on bones from Feature 2.

### ***Elements Identified***

The most common elements identified were vertebrae (n=94), ribs (n=75), and long bones (i.e., femur, humerus, radius, ulna, tibia, metapodials; n=83). The long bone category included items for which the specific element could not be identified but there was enough of the shaft present to indicate it was a long bone.

Of the identifiable paired elements, the femur, humerus and radius were the most common with 8, 9 and 7 specimens, respectively. These represent unidentifiable artiodactyl, unidentifiable bovid, cattle, turkey, white-tailed deer, and soft-shelled turtle. Due to the small sample size, determining the minimum number of individuals (MNI) for the assemblage is meaningless.

The only complete elements consist of deer phalanges (n=2) and a single carpal and tarsal; cattle/bovid phalanges (n=3) and a tarsal, patella and caudal vertebra; one artiodactyl phalanx; and a catfish articular. All of the complete distal limb elements have little meat or grease utility and would likely not have been processed for marrow or grease extraction (Speth 1983:87–94).

### ***Burning***

Considering the entire collection of animal bone from TUs 7 and 8, 66% by weight of the bone from TU 8 and 15% by weight of the bone from TU 7 is burned. The majority of the burned bone (97%) was recovered from Feature 2 (AU 4). Bone weight is used here rather than count because it more accurately portrays the amount of bone present—a single bone can break into many pieces resulting in a high count not reflective of the true quantity of bone.

This pattern of burning is dramatically different from that of the proportion of burned bone in the rest of the site as derived from the shovel tests and TUs 1–6. In the animal bone collection from the rest of the site, unburned bone represents 94% (by weight) of all of the bone recovered. This difference does indicate that Feature 2 is rather unique when it comes not only to the quantity of bones present in the feature but also in terms of the proportion of burned bone contained in the sample.

Nearly 38% (n=962) of the analyzed bone was burned to some degree. Prior to analysis, the initial laboratory processing separated the burned and unburned bone into different lot numbers. The sampling for analysis resulted in some of the levels not being represented by both burned and unburned lots. The following summary will look at the burned bone by analytical unit, not by level.

Analytical Unit 2 contained 2.4% burned bone, all of which was calcined (Table 4-8). Analytical Unit 3 had no burned bone. Analytical Unit 4 contained 44% burned bone. Of the burned bone in AU 4, 18% was calcined, 64% was completely burned, and 18% was partially burned.

The degree of burning among axial and limb elements is compared for AU 4 only, since this analytical unit contained both burned and unburned samples from the same levels. The total number of medium and large mammal axial elements (vertebrae, ribs, inominates) is 167 (Table 4-9). Unburned bone comprises 43% (n=72) of the total. Of the burned bone (n=95), 33% is partially burned, 64% is completely burned, and only 3% is calcined. All of the calcined pieces are thoracic vertebrae.

Table 4-7. Identified Taxa from Test Units 7 and 8

Scientific Name	Common Name	Count by Analytical Unit			Count	% Total ID Count	Weight (g)
		2	3	4			
<i>Antilocapra/Odocoileus</i>	Pronghorn Antelope/Deer			1	1	0.68	11.64
Artiodactyla	Deer/Goat/Sheep		1	8	9	6.10	57.06
<i>Bos taurus</i>	Cattle	4	1	7	12	8.00	258.69
Bovidae	Cattle/Bison	2	3	90	95	64.20	1404.90
<i>Canis</i> sp.	Dog/Coyote/Wolf			1	1	0.68	3.47
Cervidae	Deer			8	8	5.40	111.57
Emydidae	Turtle			1	1	0.68	4.03
Equus?	Horse			1	1	0.68	19.04
<i>Ictalurus</i> sp.	Catfish			5	5	3.40	2.47
<i>Meleagris gallopavo</i>	Turkey			3	3	2.00	9.83
<i>Odocoileus</i> sp.	White-tailed/Mule Deer			2	2	1.40	16.90
<i>Odocoileus virginianus</i>	White-tailed Deer			6	6	4.10	70.21
<i>Sylvilagus</i> sp.	Cottontail Rabbit			1	1	0.68	1.39
<i>Trionyx</i> sp.	Soft-shelled Turtle		1	2	3	2.00	12.27
<b>Total</b>		<b>6</b>	<b>6</b>	<b>136</b>	<b>148</b>	<b>100.00</b>	<b>1983.47</b>
Unidentified Bird			1	12	13		4.48
Unidentified Fish				18	18		4.44
Unidentified Large Mammal		38	32	304	374		1789.55
Unidentified Medium Mammal		1		35	35		118.39
Unidentified Mammal		200	72	1620	1892		1296.91
Unidentified		2	2	69	73		35.39
<b>Total</b>		<b>241</b>	<b>107</b>	<b>2058</b>	<b>2405</b>		<b>3249.16</b>
<b>Grand Total</b>		<b>247</b>	<b>113</b>	<b>2194</b>	<b>2553</b>		<b>5232.63</b>

Table 4-8. Degree of Burning by Analytical Unit

AU	Unburned	Partially Burned	Completely Burned	Calcined	Total
2	241			6	247
3	113				113
4	1237	173	608	175	2193
Total	1591	173	608	181	2553

Of the medium and large mammal limb elements (n=100), 24% are unburned (Table 4-9). Of the burned specimens (n=76), 5% are partially burned, 42% are completely burned, and 53% are calcined. All of the calcined bone is unidentified mammal long bone.

### Modifications

There are 109 specimens with identifiable human modification to the bone (Table 4-10). The worked bone listed in Table 4-10 appears to be the handle of a utensil. The bone is thin and has been polished and the edges worked so that they are straight (Figure 4-7). The remaining modified specimens are the result of butchering or food preparation.

### Sawed Bone

The sawed bone consists of one cattle humerus and five very weathered fragments of large mammal bone. All of the sawed bone was recovered from Level 3 (20–30 cmbd) in TU 7, and all was unburned.

### Chopped bone

Nineteen (48%) of the 40 chopped elements are vertebrae, nine (23%) are ribs, two (0.05%) are ischia, two (0.05%) are ulnae, and the remaining are unidentifiable elements.

The ischia are both bovid and are chopped near the acetabulum in order to split the inominate apart and remove the hind leg. One of the ulnae is bovid and the other is artiodactyl. Both are chopped near the proximal end.

Six of the vertebral chop marks are on the transverse processes of lumbar vertebrae resulting in the removal of the process. Five of the vertebral chop marks are on thoracic vertebrae resulting in the removal of the neural arch and spinous process. The majority of the chop marks on the ribs occur on the distal portions of the rib as a result of removing the sternum; only two chops occur on the articular end and may be the result of removing the rib from the vertebra. All of the chopped vertebrae and ribs were Artiodactyla, Bovidae, possible horse, and unidentified large mammal.

Table 4-9. Burning on Axial and Limb Elements for Medium and Large Mammals

Axial Elements						
Taxon	Element	Unburned	Partially Burned	Completely Burned	Calcined	Total
Artiodactyla	lumbar vertebra		1	1		2
Bovidae	axis			1		1
	caudal vertebra	2		1		3
	cervical vertebra	1		3		4
	ischium		2	1		3
	lumbar vertebra	10	4	2		16
	pubis	1		1		2
	rib	6	4	9		19
	sacrum		1			1
	thoracic vertebra	7	1	8	1	17
	unidentified vertebra	4				4
<i>Equus</i> ?	unidentified vertebra			1		1
large mammal	ilium	2		1		3
	lumbar vertebra	1				1
	rib	15	8	23		46
	thoracic vertebra	1	2		1	4
	unidentified vertebra	18	6	5		29
medium mammal	lumbar vertebra	1				1
	rib	1	1	1		3
	thoracic vertebra			1	1	2
	Scapula		1	1		2
	vertebra	1		2		3
Total		72	31	61	3	167

Table 4-9. continued...

Limb Elements						
Taxon	Element	Unburned	Partially Burned	Completely Burned	Calcined	Total
<i>Antilocapra / Odocoileus</i>	astragalus			1		1
Artiodactyla	calcaneum			1		1
	distal phalanx			1		1
	femur	1				1
	metapodial	1				1
	ulna			1		1
<i>Bos taurus</i>	distal phalanx			1		1
	lateral malleolus	1				1
	middle phalanx			1		1
	proximal phalanx	2	1	1		4
Bovidae	astragalus		1			1
	calcaneum	1				1
	femur		1			1
	humerus			1		1
	metapodial			1		1
	middle phalanx	2		1		3
	patella		1	3		4
	proximal phalanx	3		1		4
	radial carpal			1		1
	radius			2		2
	ulna	1				1
Cervidae	central + 4th tarsal	1				1
	metatarsal	2				2
	middle phalanx	1				1
	proximal phalanx	2				2
	radius	1				1
	ulna	1				1
<i>Odocoileus</i> sp.	carpal 2+3			1		1
	humerus	1		2		3
	femur			1		1
	radius	1		2		3
large mammal	humerus			1		1
	long bone			6	34	40
medium mammal	long bone	1		2	6	9
	tibia?	1				1
Total		24	4	32	40	100

Table 4-10. Number of Elements with Modifications, by Unit and Level

Modification	Test Unit 7		Test Unit 8						Total
	Lev. 3	Lev. 9	Lev. 6	Lev. 8	Lev. 9	Lev. 10	Lev. 12	Lev. 13	
chop			1	3	12	17	4	2	39
chop, cut					1				1
cut	1	3	5	7	6	15	4	1	42
impact	1		1	7	1	8	1	1	20
sawed	6								6
worked				1					1
Total	8	3	7	18	20	40	9	4	109

### Cut Bone

Cut marks occurred on large mammal ribs (n=5) and vertebrae (n=7); a turkey humerus (n=1) and radius (n=1); white-tailed deer humeri (n=2) and a radius (n=1); the proximal phalanx (n=1), pubis (n=2), and ulna (n=1) of a bovid; and an unidentified mammal long bone (n=1). Many of the pieces with cut marks had multiple cuts.

On the thoracic vertebrae with cut marks (n=5), all of the cuts occur along the spinous process. This pattern is indicative of the removal of the tenderloin (Binford 1981: 111–112). Cuts on ribs occur along the entire length of the element. The cut marks on the two white-tailed deer humeri are located on the distal condyles on both specimens. The cuts on the white-tailed deer radius are also located on the distal epiphysis. The cut marks on the bovid ulna are on the olecranon. There are 28 cut marks in this location as well as a chop, removing the proximal end of the ulna.

### Impact Fractures

Impact scars were recorded on a cattle metatarsal, a bovid radius, a deer humerus, 16 indeterminate long bone fragments of large mammals, and one indeterminate mammal

bone. The cattle metatarsal and deer humerus, as well as seven of the indeterminate specimens, were unburned. The remaining specimens were completely burned (n=9) or calcined (n=4).

### Discussion

Since only a small sample of the total bone assemblage was analyzed, interpretations of species richness, meat utility, and degree of processing are limited. The bone preservation in TUs 7 and 8 was relatively good. Within the analyzed sample, only five (0.2%) specimens were severely weathered and three others (0.1%) showed differential weathering on opposite sides. This is likely an indication that the bones in the feature were deposited and covered with additional midden material relatively quickly.

The only sawed bones were recovered from Level 3 (AU 2) in TU 7. The remainder of the modified bone is reflective of prehistoric butchering patterns (Binford 1981, 1984; Speth 1983). Only one cervical vertebrae and one axis fragment were identified, the remainder of the identified elements were posterior axial elements and limb elements.



Figure 4-7. Worked and polished bone from Level 8 in Test Unit 8. Approximately 3 inches long.



The lack of cranial elements and caudal vertebrae suggests that the feature bone represents disposal as a result of consumption and/or secondary butchering. Of the 83 long bone fragments, 18 (22%) have some sort of modification (chop marks, cut marks, impact fractures) and 10 of these are impact scars. The intensity of bone processing for marrow can not be inferred based on the small sample size, but analysis of the complete assemblage may provide additional information regarding the degree of processing.

Bovidae and unidentified large mammal bone fragments dominate the analyzed samples of each analytical unit and the largest sample of faunal remains is from AU 4. Within the analyzed sample, wild taxa occur only in AUs 3 and 4. Deer, rabbit, turkey, turtle and fish were identified in AU 4. The only wild taxa identified in AU 3 was turtle, although the unidentified *Artiodatyla* may be deer. If the scarcity and absence of wild taxa in AUs 3 and 2, respectively, are not due to the influence of sample size on species richness, the patterns suggest that there was a relatively strong reliance on wild taxa immediately after the mission was founded but this reliance lessened with time as the cattle herds of the mission became established. This interpretation also assumes that the *Artiodatyla* specimens represent deer and antelope rather than sheep and goats. Given that no clearly identifiable sheep/goat skeletal elements were noted in the analyzed sample, this may be a reasonable assumption.

Though preservation was good, the assemblage was highly fragmented, with an average weight of 1.6 grams per bone. Since so little of the analyzed bone was severely weathered, it was hoped that recording the fragments that were the result of recent (excavation) breaks, as opposed to those with green or "historic" breaks, would serve as a gauge of the amount of processing which had occurred. Figure 4-8 shows the average weight of specimens that are the result of green or "historic" breaks (or are complete) by level for all medium and large body sized mammals from Feature 2 (AU 4) in TU 8. The average weight per bone fragment decreases slightly above Level 13 and stays relatively constant through Level 9 followed by a sharp increase in the average weight of the specimens in Level 8.

More than 50% of all of the AU 4 bone by weight in Levels 9–13 of TU 8 is burned (Figure 4-9). The high frequency of burned bone in the lower levels may be due to the clean-up and disposal of hearth material into the pit or a result of burning within the pit after disposal. If the degree of burning reflects events prior to disposal in the pit, it may reflect the use of bone as fuel for hearths. Unfortunately there is no

way to distinguish between these two events. Using the same data as in Figure 4-8, Figure 4-10 shows the frequency of burning (by weight) for all medium- and large-sized mammals in Feature 2, TU 8. These would be the animals that would have contributed the vast majority of meat consumed and their bones would be the most likely to be processed for marrow/grease extraction. The frequency of burning increases substantially in Levels 10, 9, and 8. In the analyzed sample, there does not appear to be a correlation between the degree of processing and the frequency of burning.

An additional explanation for the degree of burned bone may be related to the manufacture of ceramics at the site. Over 99% of the analyzed native ceramics (Goliad and Rockport wares) recovered from TUs 7 and 8 are tempered with calcined bone. Of all of the ceramics recovered from AU 4 (Feature 2) in TU 8 (n=78), 87% are bone-tempered native wares. Figure 4-11 shows the frequency of native wares by level. If bone was being intentionally burned and crushed for use as temper, it would contribute to the highly fragmented and burned nature of the faunal assemblage.

In addition, informal experiments in calcining bone for temper suggest that while any bone can be burned and calcined to create bone temper similar to that noted within the Goliad ceramics, calcined cortical bone fragments replicate most accurately the look of the bone temper seen in the sherds. While vertebrae and the articular ends of long bones and ribs can be readily calcined, the thinner bones such as ribs and the spongy articular ends tend to burn rather extensively in hot fires. When excessively burned they tend to powder when ground rather than survive in fine granules, and when insufficiently burned, such bones are somewhat harder to reduce into small ground fragments.

These informal experiments suggest that cortical bone fragments could potentially have been the preferred elements used in tempering ceramic vessels. This would explain why the proportion of calcined bone fragments is higher among cortical long bone splinters than axial elements (Table 4-9).

Finally, the attributes analyzed on the sample of bone from AUs 2, 3, and 4 could not definitively answer the question of whether Feature 2 was a hearth where bones were discarded and later burned or whether it was simply a discard location for bones burned in other features. However, given that only 8% of the 2,193 bones from AU 4 (see Table 4-8) are calcined suggests that the 64-cm-thick deposit of burned bone and charcoal noted in TU 8 was not itself the location of repeated burning episodes. Given the density of bones

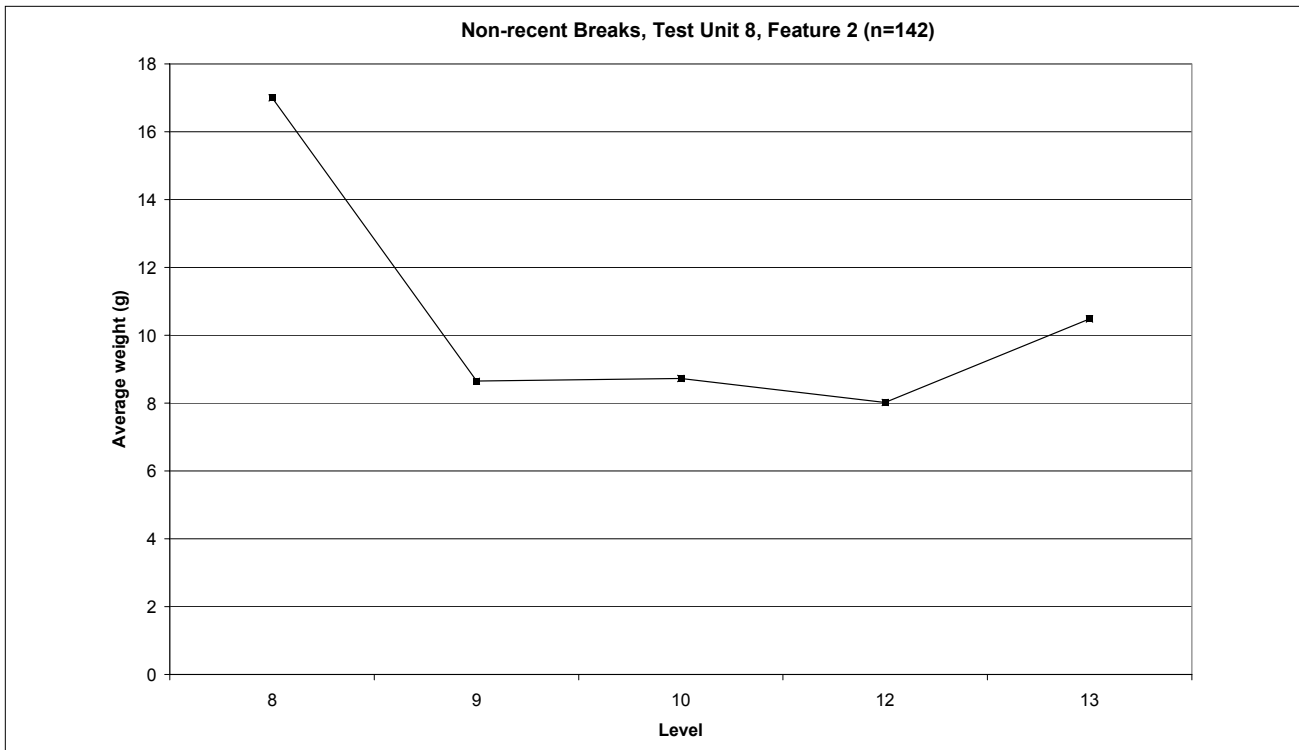


Figure 4-8. Average weight of specimens resulting from green/historic breaks in Feature 2 (AU 4), Test Unit 8.

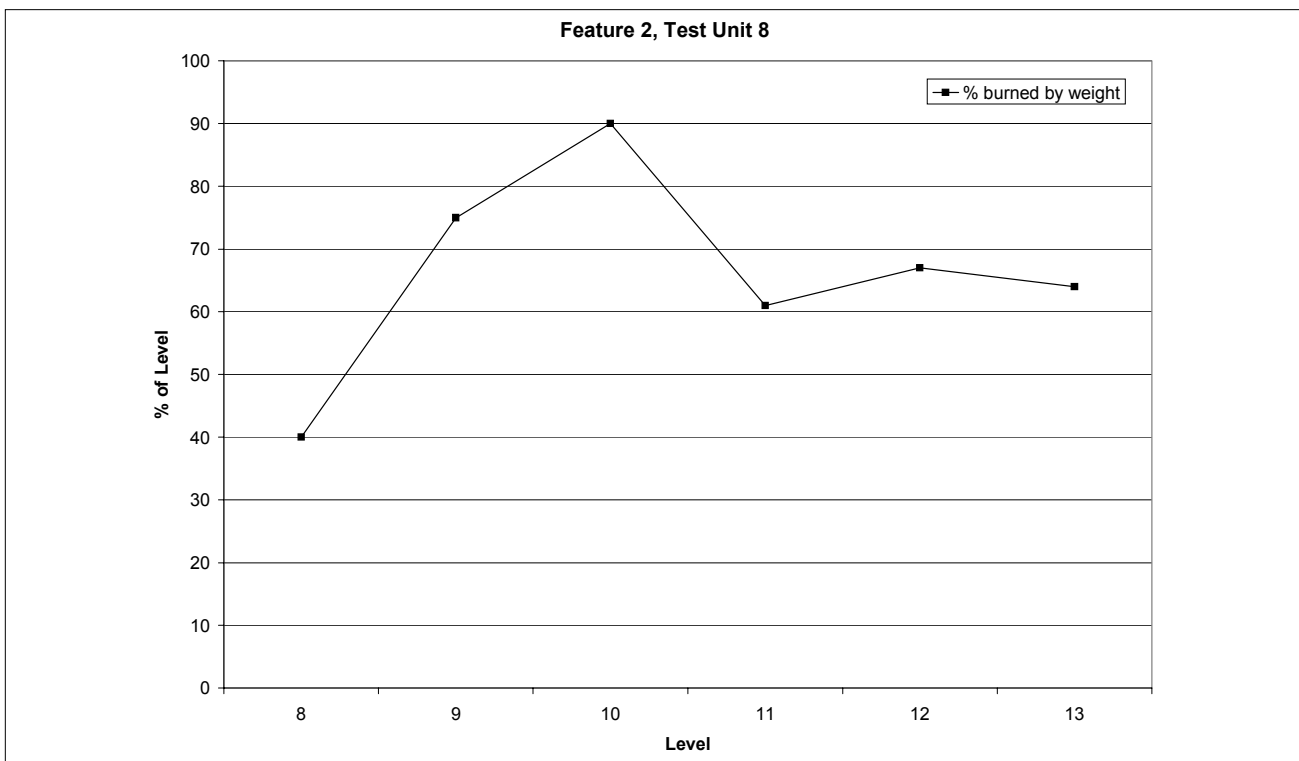


Figure 4-9. Frequency of all burned bone by weight in Feature 2 (AU 4), Test Unit 8.

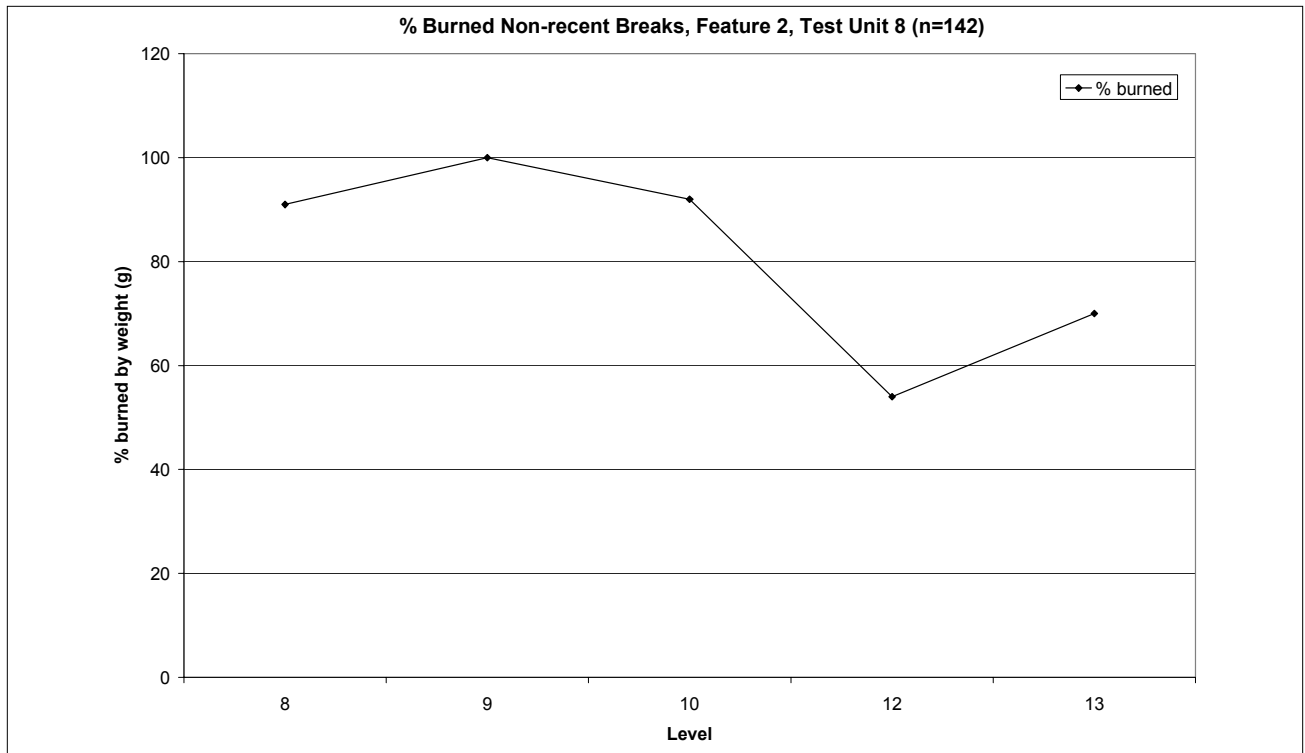


Figure 4-10. Percentage of burned bone resulting from green/historic breaks in Feature 2 (AU 4), Test Unit 8.

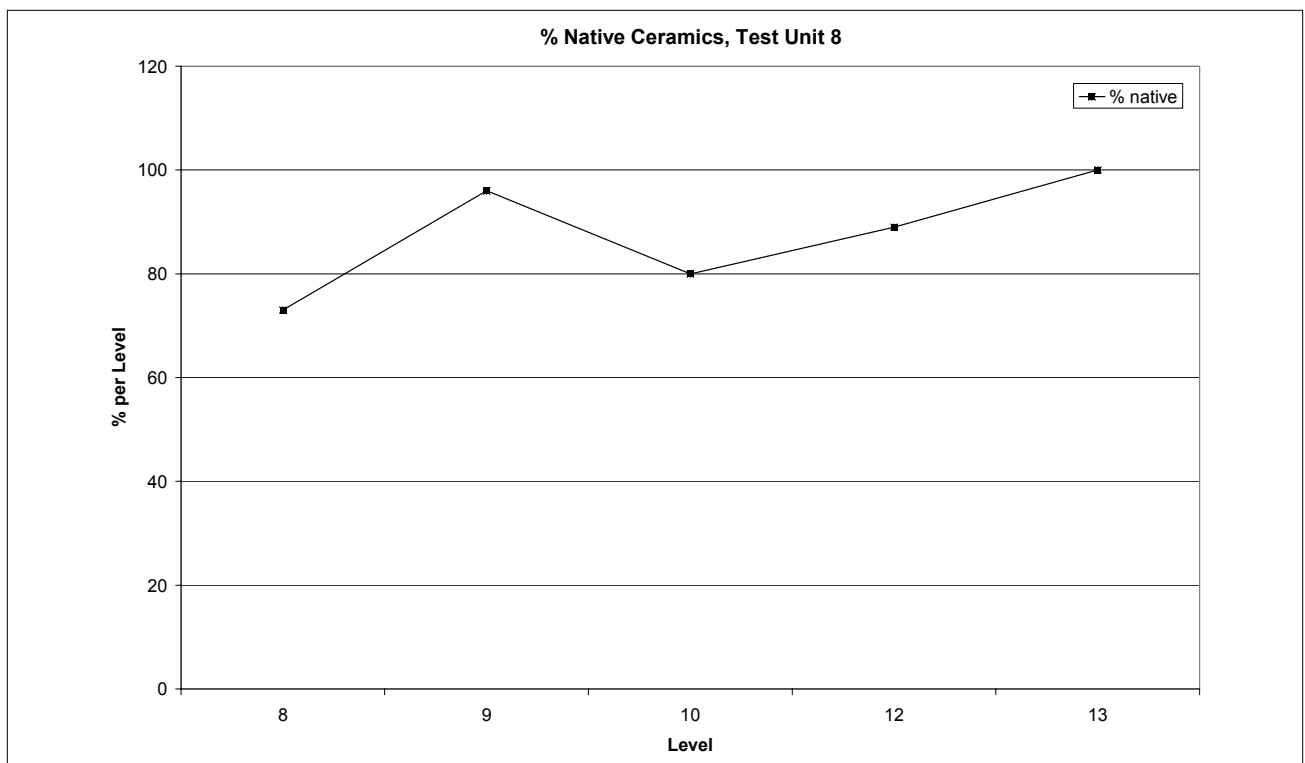


Figure 4-11. Frequency of bone-tempered ceramics in analyzed sample from AU 4, Test Unit 8.

recovered from the feature, it would be expected that calcined bone would make up a much higher proportion of the sample if fires were repeatedly built within the pit to burn refuse, including bone. Unfortunately, the relative scarcity of calcined bone from Feature 2 may imply the use of the feature as a secondary dump, however, it could also be explained by the differential culling of calcined bone from the pit for bone temper. If such culling focused on cortical bone fragments, a large number of calcined rib and articular fragments should have remained in the feature. However, this is not the case, calcined cortical limb bones are more numerous than other calcined elements.

All of these conclusions are based on a very small sample of analyzed material from the faunal assemblage. The size of the sample and the method of sample selection most certainly have biased the data used above. Analysis of the complete assemblage would provide a much better understanding of the degree of butchering and bone processing, and may contribute to an understanding of why such a high percentage of the assemblage from AU 4 is burned.

## Invertebrate Faunal Remains

Kristi M. Ulrich

The mussel shell fragments from the excavations at Mission Espiritu Santo were examined to identify the species present in the collection. The comparative mussel shell collection used for this purpose was provided to CAR by Robert G. Howells, who also instructed CAR staff in species identification techniques and diagnostic traits. All of the mussel shell umbos and other valve fragments were inspected and the diagnostic specimens identified to species.

The mussel shell assemblage consisted of shell fragments as well as umbos. Shell umbos are much more useful for species identification. Many of the umbos in the assemblage were too small or weathered for identification. Similar to the findings of Ricklis (2000), the predominant species (n=45) of mussel at the site is Threeridge (*Amblema plicata*). Threeridge are common to the San Antonio and Guadalupe river systems (Howells et al. 1996) and would have been readily available to the inhabitants of Espiritu Santo. Threeridge specimens were recovered from TUs 1, 3, 4, 5, 6, 7 and 8. Another species identified (n=3) was Yellow Sandshell (*Lampsilis teres*), recovered from Levels 2, 7, and 9 of TU 8. Yellow Sandshell are found in all major river systems in Texas (Howells et al. 1996). Southern Mapleleaf

(*Quadrula apiculata*) have been recorded in the area previously, and two specimens were recovered from TU 8, Levels 6 and 7. Test Units 4 and 6 each produced a specimen of Smooth Pimpleback (*Quadrula houstonensis*). Smooth Pimpleback is commonly found within the Colorado, Brazos, and San Jacinto drainage basins (Howells et al. 1996). Evidence of the presence of Pistolgrip (*Tritogonia verrucosa*) was found in TUs 5 and 8. Pistolgrip is a freshwater mussel species common to the San Antonio River, as well as areas to the north and east (Howells et al. 1996). One specimen of Washboard mussel (*Megaloniais nervosa*) was recovered from Level 12 in TU 7. The Washboard variety can be found in all major river systems in Texas.

As previously noted, Analytical Unit 3 in TU 8 produced several fragments of marine shell. The fragments were found in Levels 8 through 10. Upon further examination, the fragments were found to refit to form a large portion of a single shell. Interestingly, the fragments recovered from Levels 9 and 10 exhibit signs of burning, whereas the Level 8 fragments are unburned. The shell was identified as *Laevicardium (Dinocardium) robustum* (Giant Atlantic Cockle), which has a habitat range from Virginia to Northern Florida, Texas, and Campeche, Mexico. Along the Texas coast, the juveniles are commonly found near Aransas Pass, while the adults are more often found at San Luis Pass (Andrews 1977). The Giant Atlantic Cockle is the largest cockleshell found along the Texas Gulf Coast. This specimen was fairly large, with an estimated span of 10 cm.

## Lithic Analysis

Steve A. Tomka

A total of 590 chipped stone artifacts was recovered during the two stages of fieldwork at Mission Espiritu Santo. The majority of these came from disturbed contexts identified in Test Units 1–3, 5 and 6. While Shovel Tests 1–6 were located within the midden, and this provenience was not disturbed, the number of debitage recovered was small and insufficient for technological characterization.

Given that analytical units could be defined in TUs 7 and 8, much of this discussion focuses on the sample of lithic artifacts recovered from these two units (n=102). In addition, because TU 4 appeared to contain less disturbed cultural remains, and at the request of Richard Mahoney of TPWD, the TU 4 sample (n=90) of lithics also was analyzed.

The recorded analysis attributes focused on providing information on two aspects of the lithic assemblage: 1) the approaches employed by colonial-period flintknappers to reduce lithic materials; and 2) any clues that the lithics may offer regarding the use of Feature 2 in Analytical Unit 4 present in TUs 7 and 8. To address the aspects of lithic raw material reduction, we coded the platform-bearing lithic debitage based on platform faceting (i.e., corticated, single-faceted, multi-faceted). All debitage also was categorized according to cortex category into primary, secondary, and tertiary specimens. The first category contained flakes with 100% corticated dorsal faces. Secondary flakes had from 1% to 99% cortex on their dorsal faces, while tertiary flakes and fragments lacked cortex on their dorsal faces.

Informal observations noted as comments also were made regarding the general type of reduction represented by the debitage (i.e., uniface retouch flakes, biface rejuvenation or retouch flakes, blades). Experimental tool manufacture has shown that uniface manufacture and rejuvenation flakes tend to have single-faceted platforms, have trapezoidal shapes, have a slight longitudinal curvature near their distal ends and retain small step fracture scars immediately behind the platform on their dorsal faces. Biface rejuvenation/retouch flakes are 10–15-mm-long, parallel-sided, relatively narrow (5–7 mm) flakes with multiple platform facets. They tend to have slight longitudinal curvature and dorsal flake scars that are parallel to the longitudinal axis of the flake. The presence of these two flake types within a collection is

indicative of tool manufacture and rejuvenation. Blades are flakes that are at least twice as long as they are wide and tend to have parallel margins and slight longitudinal curvature either along their entire length or just near their distal ends. The manufacture of blades and blade-like flakes was common during the colonial period but is by no means the only time when they were produced in quantity (Hester 1977).

To ascertain the use of Feature 2, and in particular whether the feature represents a thermal feature or a secondary dump of burned materials, we scanned all chipped lithics recovered from each provenience for presence of heat spalling. We also considered small fragments of angular fire-cracked rock as evidence of exposure to high temperatures, and most likely direct fire. We assumed that high ratios of heat-spalled or fire-cracked rock fragments in the lithic collection would signify the use of Feature 2 as a location where artifacts were regularly exposed to direct heating or fire. The absence or low counts of heat-damaged specimens would be interpreted as indicative of a non-thermal use of the feature.

## Results of the Lithic Analysis

Tables 4-11 and 4-12 show the results of the analyses by test unit (7 and 8) broken down by analytical unit. In TU 7, platform-bearing flakes (i.e., complete flakes and proximal fragments) with single-faceted striking platforms are as numerous as flakes with multi-faceted platforms (Table 4-11). In terms of cortex categories, tertiary flakes are nearly

Table 4-11. Selected Technological Attributes of Lithic Debitage from Test Unit 7

Analytical Unit	Platform Faceting				Total
	Corticate	Single	Multiple	Chip	
AU 1 (Lev. 1-2)		2		1	3
AU 2 (Lev. 3-4)			1		1
AU 3 (Lev. 5-8)	2		2	5	9
AU 4 (Lev. 9-11)	1	1	2		4
AU 5 (Lev. 12)		2		1	3
Total	3	5	5	7	20
Analytical Unit	Cortex Category			Total	
	Primary	Secondary	Tertiary		
AU 1 (Lev. 1-2)		1	2	3	
AU 2 (Lev. 3-4)		1		1	
AU 3 (Lev. 5-8)		1	8	9	
AU 4 (Lev. 9-11)		2	2	4	
AU 5 (Lev. 12)		2	1	3	
Total	0	7	13	20	

Table 4-12. Selected Technological Attributes of Lithic Debitage from Test Unit 8

Analytical Unit	Platform Faceting				Total
	Corticate	Single	Multiple	Chip	
AU 1 (Lev. 1-2)	1	3	5	2	11
AU 2 (Lev. 3-4)		2		5	7
AU 3 (Lev. 5-7)		2	3	6	11
AU 4 (Lev. 8-13)	3	20	13	17	53
Total	4	27	21	30	82
Analytical Unit	Cortex Category			Total	
	Primary	Secondary	Tertiary		
AU 1 (Lev. 1-2)		6	5	11	
AU 2 (Lev. 3-4)			7	7	
AU 3 (Lev. 5-7)		1	10	11	
AU 4 (Lev. 8-13)	1	6	46	53	
Total	1	13	68	82	

twice as common as secondary flakes in TU 7. In the TU 8 sample, single-faceted platform-bearing flakes are more common than multi-faceted flakes (Table 4-12). In addition, in the TU 8 sample, tertiary flakes and fragments are significantly more common than secondary specimens in the overall sample and within AUs 2–4.

While the number of lithics increases with increasing depth within TU 8, no such trend is notable within the smaller collection for TU 7. The count of chipped lithic artifacts also increases with depth in TU 4. In this unit, however, lithic counts peak in Level 6, and decrease thereafter in the two deepest levels (Table 4-13). As in the case of the TU 8 sample, the TU 4 collection of platform-bearing flakes is also dominated by single-faceted flakes, and tertiary flakes and fragments are much more prevalent than secondary specimens.

The increase in debitage with depth may indicate that the manufacture of stone tools was more prevalent during the earlier occupation of the mission and decreased over time. While such a trend is notable in the TU 4 and TU 8 collections, it is not present in the smaller TU 7 sample (Table 4-14). The other trend that is visible in Table 4-14 is that the number of heat-damaged (i.e., heat-spalled or crazed) lithic artifacts increases with depth as the sample size increases. Interestingly, 17% of all of the lithic artifacts recovered from TU 4 exhibit evidence of heat damage. No evidence of a thermal feature has been noted in TU 4, therefore, it is reasonable to assume that in general, roughly 17% of the debitage encountered within the mission courtyard may be

found to exhibit heat damage. Somewhat surprisingly, the identical 17% of all the lithic artifacts recovered from TUs 7 and 8 combined are heat-damaged. The fact that the two figures are identical indicates that Feature 2 does not have a significantly higher percentage of heat damaged lithic artifacts compared to the non-thermal feature contexts, as exemplified by the materials from TU 4.

Although observations on flake types were not recorded as attributes, during the lithic analysis it was noted that several proveniences (i.e., TU 8, Level 9; TU 7, Levels 11 and 12; TU 4, Levels 4, 5, and 7) contained from one to three flakes that were uniface manufacture and/or rejuvenation flakes. In addition, some proveniences (TU 7, Levels 7 and 11; and TU 4, Level 3) also contained small flakes that resembled biface rejuvenation flakes. These uniface and biface manufacture and rejuvenation flakes complement the reconstruction of stone tool manufacture activities occurring at the site. While the large number of debitage represents primarily debris from core reduction, the uniface and biface rejuvenation flakes are a testament to the range of lithic reduction activities carried out at the site.

Finally, seven tools were identified in the small collection of lithics recovered by CAR from the site. Three of the seven tools are expedient scrapers, meaning they represent the use of flakes/blades to perform scraping tasks without prior modifications of their edges. One of the two specimens (TU 8, Level 10) is a blade with uniaxially beveled distal and proximal ends that exhibit no use wear under 40X

Table 4-13. Selected Technological Attributes of Lithic Debitage from Test Unit 4

<b>Platform Faceting</b>					
<b>Level</b>	<b>Corticate</b>	<b>Single</b>	<b>Multiple</b>	<b>Chip</b>	<b>Total</b>
1				1	1
2	1	1		8	10
3			2	2	4
4	1	2	2	8	13
5		8	2	5	15
6		12	1	21	34
7	1	5	3	3	12
8				1	1
Total	3	28	10	49	90
<b>Cortex Category</b>					
<b>Level</b>	<b>Primary</b>	<b>Secondary</b>	<b>Tertiary</b>	<b>Total</b>	
1			1	1	
2		3	7	10	
3			4	4	
4		3	10	13	
5		9	6	15	
6		5	29	34	
7		2	10	12	
8			1	1	
Total	0	22	68	90	

Table 4-14. Distribution of Debitage and Chipped Lithic Tools, and Heat-damaged Lithic Artifacts by Test Unit and Level

<b>Level</b>	<b>Test Unit 4</b>		<b>Test Unit 7</b>		<b>Test Unit 8</b>	
	<b>Debitage/ Tools</b>	<b>Heat-damaged Lithics</b>	<b>Debitage/ Tools</b>	<b>Heat-damaged Lithics</b>	<b>Debitage/ Tools</b>	<b>Heat-damaged Lithics</b>
1	1		3		5	
2	10	1			6	1
3	4		1		4	
4	13	4			3	1
5	15		3		1	
6	34	7	2		1	1
7	12	1	3		9	
8	1	2	1		18	
9			1		12	
10					13	6
11			3	1	6	4
12			3	1	1	
13					3	2
Total	90	15	20	2	82	15

magnification. On the other hand, portions of the two lateral edges, measuring 33 mm and 14 mm, respectively, exhibit a series of small (1–2 mm) uniaxially distributed micro-flake scars along their lengths. The longer edge also exhibits slightly longer (2.4–2.6 mm) flake scars that may represent either purposeful retouch to resharpen the edge or more likely post-depositional scarring unrelated to use or resharpening. The second expedient scraper (TU 7, Level 12) is a tertiary chip with a collapsed striking platform. One of its lateral edges contains a segment measuring 21 mm in length that exhibits 0.5–0.7 mm of uniaxially distributed micro-flaking characteristic of scraping use. The third and final expedient scraper is a single-faceted secondary blade with a hinged termination. One edge of the flake has minute (1–2 mm long) flake scars that extend for 24 mm from the distal end toward the platform. The flake scars are on the dorsal face of the specimen.

Two of the final four tools are minimally retouched flakes/blades that exhibit some degree of resharpening of a worn tool edge or shaping of the flake edges prior to use. Both specimens are from TU 8, Level 8. One is an oval tertiary flake with a single-faceted platform. A portion (22 mm) of the distal end and a segment (15 mm) of one lateral edge have been uniaxially retouched. The edge angle on the longer segment is rather acute (36–37 degrees) and could have resulted from the resharpening of a worn cutting edge. No traces of microwear were noted on the edges of the flake under 40X magnification. The second minimally retouched tool is a 61-mm-long blade with a single-faceted platform. Both of the blade's margins, for a distance of 38 and 24 mm, respectively, have been uniaxially and irregularly serrated. Although no use wear was noted on the two edges under 40X magnification, it is assumed that the specimen represents a minimally retouched cutting tool.

The sixth tool (TU 4, Level 8) is a medial fragment of a biface made of chalcedony. The specimen represents an early reduction stage biface manufacture failure. It measures 28 mm in maximum length and 15 mm in maximum width. It is 4 mm in maximum thickness. White patina is present on one of the two faces of the specimen.

The seventh and final tool is an elongated (145 x 63 x 65 mm) chert cobble with six heat-spalled scars on one end and extensive battering on the opposite end (Figure 4-12). A small area of battering measuring 20 mm in length is also visible along one edge of the cobble. In both instances, the

battering occurs along natural ridges on the cobble. With the exception of the battering and heat-spall scars, no additional modifications to the specimen are visible. The cobble weighs 520 grams. It was recovered from TU 8, Level 12.

In general, the lithic tools fit the characteristics of other lithic tools recovered from colonial occupations in Texas. They are made on flakes or blades and represent expedient or minimal effort manufacture and use. A variety of other tools, including gunflints and dart and arrow points, have been recovered from the site during other investigations (see Appendix A). Although we cannot be sure of their exact provenience, it is clear that these artifacts suggest that both prehistoric and colonial components are present at the site; therefore, we cannot be certain whether the seven specimens described here necessarily represent prehistoric or colonial tools. The formal characteristics of the tools fit with the general characteristics of other lithic tools recovered from missions across the state (Fox 1979; Hester 1977).

## Discussion of Lithic Analysis Results

Overall, the recovery of chipped lithic artifacts from Mission Espíritu Santo suggests that such artifacts are more common in the deeper levels of excavation. This pattern may be indicative of greater reliance on stone tools during the earlier years of occupation. Unfortunately, we cannot be absolutely certain that all of the materials are associated with the colonial-period use of the site, given that Archaic dart points have also been recovered from the site. Unidirectional or multidirectional flake removals seem to be the preferred methods of core reduction, given the predominance of single-faceted debitage. The abundance of tertiary debitage also seems to imply that many of the cores being reduced may have been prepared (i.e., shaped) resulting in the removal of cortex from their outer surfaces. Alternatively, the predominance of tertiary debitage may signal that they represent the products of tool rejuvenation. The presence of uniface and biface rejuvenation debitage in the collection does support this conclusion.

Finally, the similarity in the percentages of heat-damaged lithic artifacts from two distinct recovery contexts (Feature 2 versus a non-feature) is intriguing. The pattern suggests that the building of fires and burning of residue within Feature 2 was not a common event. Rather than representing a hearth, Feature 2 may be the location of discarded debris derived from other thermal features.





Figure 4-12. Chert cobble with battering and heat spalling recovered from Level 12 in Test Unit 8.



## Chapter 5: Summary and Recommendations

This chapter provides a summary of the work accomplished, and outlines recommendations for additional fieldwork and analysis at Mission Espíritu Santo (41GD1). After the excavation of eight shovel tests, eight test units, and the scraping of 413 linear feet of trench, several areas have been identified that have the potential for producing significant cultural deposits with good integrity. Should future work be conducted, these areas would be adversely impacted by construction.

### Summary of Fieldwork

The six shovel tests located just outside of the west compound wall (Area 4; see Figure 2-1) appear to have high potential for producing a variety of significant deposits with direct information regarding an assortment of broad research concerns, including mission subsistence and acculturation processes. The deposits appear to reflect primarily Native American materials, with over 97% of the 163 ceramics recovered classified as Native American. The shovel tests also produced over 1,900 vertebrate faunal remains, a small amount of chipped stone, and a variety of other material, including mussel shell, snail shell, and charcoal. In addition, one human bone was recovered from this area. These deposits probably reflect midden accumulations associated with Native American living quarters located just inside the mission wall. Jackson (1933; Appendix A) and Ricklis (2000) both document and discuss midden deposits located along the mission compound wall, supporting the idea that the shovel tested area could produce a variety of deposits with significant research potential. The results of the shovel testing suggest that the deposits represent an accumulation similar to that documented by Ricklis (2000) and Jackson (1933). The materials recovered in these six tests further suggest that the deposits have not been significantly disturbed by subsequent activities.

Five of the eight test units excavated by CAR at 41GD1 appear to have been located in disturbed areas of the mission complex. Each unit displayed different degrees of disturbance, offering insight to the activities of the CCC and Texas Parks and Wildlife Department, as well as providing information on Native American activities at the mission.

Test Unit 1, placed along the east wall of the mission museum, revealed a French drain system installed in 1977

by TPWD. Approximately two-thirds of the unit was composed of gravels that allowed water to seep down to the PVC pipe drilled with holes that would move water away from the structure walls. At the time of its original installation, it was suggested that this French drain would not alleviate the drainage problem. Park employees had tended the area by keeping the path free of grasses and weeds until sometime in the mid-1990s. Within the past ten years, TPWD personnel have removed and power-washed the gravel, and then returned it to the French drain (Leah Huth, TPWD, personal communication 2004) in hopes of allowing water to flow to the drainpipe. The French drain had not been located on maps given to CAR or TPWD Cultural Resources Coordinator Richard Mahoney. The French drain was discussed in two brief memos, one dated May 16, 1977, and a second dated August 11, 1977. Both memos were located during the course of the fieldwork. Below the French drain, evidence of the stabilization of the wall foundation was encountered. The CCC had dug a trench to pour concrete alongside the foundation. A low density of artifacts was present within this unit.

Test Unit 2 showed evidence of the stabilization activity by the CCC with the presence of a concrete foundation reinforcement and flows of concrete in the top levels of excavation. A trench, which contained cultural material throughout, had been dug to reach the base of the foundation. However, the surrounding intact soil proved to be sterile, and almost certainly represents fill brought in after the native soil had been removed. Directly beneath the concrete stabilization, it appeared that a layer of rocks had been placed to support the concrete. Test Unit 2 produced a slightly higher density of artifacts, including two pieces of human bone. However, these artifacts are certainly from a secondary context.

The wall foundation of Test Unit 3 did not appear intact or stable until the concrete support was located approximately 95 cm below datum. Soil could be extracted from in-between the original foundation stone in excess of 20 cm into the wall in certain areas. All of the loose soil was not excavated from between stones in fear that the wall stability would be compromised. The trench that was excavated by the CCC produced the artifact assemblage from this unit, while surrounding soils were sterile. As with TUs 1 and 2, the material recovered from this excavation is clearly in a secondary context.

Test Unit 4 was located in an area that appears not to have been disturbed by reconstruction activity. No apparent building trench was evident during excavation, and there was no concrete support along the structure foundation. Disturbance was limited to a rodent hole and the installation of a cable line at 20–30 cm below datum. While artifact densities within this excavation were not high, Native American ceramics, vertebrate faunal material, debitage, and a collection of mussel shell dominate the recovery, especially below Level 2. It is likely that this area has significant, intact deposits present.

Test Unit 5 exhibited a high level of disturbance with the presence of the French drain pipe extension. The unit was also in a low-lying area affected by water runoff from the courtyard. Test Unit 6, located adjacent TU 5, appears to be less disturbed than TU 5, though the upper levels of the unit contained a variety of recent material. This unit was not directly in the path of the water runoff, and there was no French drain present in TU 6. Wall fall was present in the first levels of excavation, but the artifact assemblage stayed consistent with colonial deposits. Native American ceramics, vertebrate faunal remains, and chipped stone dominate the artifacts recovered from TU 6.

Test Units 7 and 8 revealed the presence of two intact features located beneath the original French drain installation. The upper levels of the units produced an interesting artifact-rich zone sandwiched between two layers of construction rubble. This zone was defined as Analytical Unit 2. Below the deeper unit of construction rubble, a mounded layer of matrix (AU 3) contained unburned artifacts. This mounded zone of debris was identified as Feature 1. At approximately 115 cm below surface, TU 7 appears to have uncovered the base and southeast edge of a burned pit (Feature 2; AU 4). The area uncovered by trenching activity conducted by TPWD also revealed the south edge of the pit. TU 8 was located within the feature and no pit edges were visible within the walls of the unit suggesting that the feature extends to the north, east and west of the unit. Both TU 7 and TU 8 produced an abundant collection of faunal remains, colonial and native ceramics, and lithic material.

The trenches provided the most insight into the extent of activity conducted by the CCC. The trenches located inside the courtyard (Sections 1–5 of Backhoe Trench 1; see Figure 2-1) revealed two main sediment layers, a humus-rich topsoil and an orange and white marly clay. Both sediment layers

lacked cultural material. This suggests that the courtyard had been scraped to sterile, intact soil during the period of reconstruction. This interpretation was supported by a statement within the 1937 Goliad State Park Master Plan: “In area which showed no buildings, the dirt was removed in strata until the occupation level of the mission period was reached.” Alternatively, however, it is also possible that the orange and white marly clay represents fill that was introduced over the courtyard either during the 1930s CCC and CWA work or perhaps even prior to this during the original construction of the mission. This possibility is raised by the fact that Features 1 and 2 defined in TUs 7 and 8 seem to underlie or lie within the marly clay zone yet the artifacts contained within the feature are clearly colonial in age.

Section 6 of BHT 1, closest to the west compound wall, exposed an area that may have little disturbance. Also, the area within the structure located along the west wall has significant potential for undisturbed deposits.

The exterior section of Backhoe Trench 2, excavated near the southeast corner of the compound (Area 3; see Figure 2-1), appears to have revealed disturbance the entire length of the segment. In contrast, the interior section exhibited a shallow layer of bone and ceramics that could have been associated with midden deposits. Shovel Test 7, placed within the interior trench, revealed that the deposits are limited in vertical extent. Further trenching in this section confirmed the shallow nature of the deposits. Note also that the backhoe was not able to excavate the soil closest to the wall, exterior and interior. This area has potential for producing intact deposits and should be approached with caution during future activities.

## Summary of the Results of Analyses

Samples of three artifact categories recovered from Feature 2 were subjected to more detailed analyses to define the age of the feature, its use, and also better characterize the variability within these artifact classes. The artifact categories included a 100% sample of the Goliad ceramics, a 25% sample of faunal remains from AUs 2, 3, and 4 identified in TUs 7 and 8, and all of the chipped lithic artifacts from TUs 4, 7, and 8. The technological analysis of the Goliad ceramics revealed two principal groups of ceramics: bone-tempered specimens, which dominate the collection, and bone-tempered sandy paste specimens. Rockport ceramics and an unknown type of sandy past, bone-tempered ceramic fragment were also present in the

collection. The two most common groups may represent the use of distinct clay sources or different technological approaches to ceramic manufacture. Examining the sherds by analytical units revealed that the average sherd thickness fluctuates between analytical units, with a marked difference in AU 4. It is possible that changes in the diet of native inhabitants may have lead to the manufacture of thinner-walled vessels to increase thermal conductivity and more efficient cooking.

The faunal analysis revealed an interesting increase in the proportion of wild species in the diet with increasing depth, suggesting perhaps that during the early days of mission occupation the inhabitants relied on wild species relatively heavily, and that this reliance may have decreased over time. The analysis of burning on the faunal remains suggests that although Feature 2 contained much charcoal and burned bone, the feature may simply represent the discard of hearth contents rather than the primary location of thermal activities. The presence of a higher number of calcined long bone fragments, and the predominance of calcined bone used for tempering the Goliad ceramics, also suggest that long bone splinter fragments may have been purposefully selected as sources of temper.

The analysis of the sample of lithic artifacts indicated that the debitage is primarily the product of unidirectional core reduction and the making of blades and blade-like flakes. Some of the debitage also derives from unifacial and bifacial tool rejuvenation. Both the expedient and minimally retouched tools identified in the small collection as well as the technological characteristics of the debitage are similar to other mission-period lithic assemblages. It, however, cannot be ignored that previous work at the mission also identified Archaic-age materials, and with the exception of the lithic sample from TUs 7 and 8, we cannot be confident about the age of other lithics recovered from the site during the CAR excavations. Finally, the inspection of heat-damaged lithics also supports the likelihood that Feature 2 represents a dump of materials burned in other locations rather than a thermal feature.

Though the analysis of certain classes of artifacts from TUs 7 and 8 provided much useful information concerning Feature 2, the reason for its location still poses a problem. Typically, large refuse middens at missions are located outside the compound walls. The location of Feature 2 is within the compound wall, near the convento and the present-day workshop. Unfortunately, at this time we do not know

how large Feature 2 is and whether it would have constituted a large obstructing feature to courtyard activities. Also, we do not have sufficient information concerning the shape and size of the feature to speculate about its relationship to adjacent structures. Often on prehistoric and historic sites, pits dug for one purpose were reused for an entirely different purpose over time. For instance, a pit dug to obtain clay may be refilled with refuse to level out an activity area for later use. The variety of artifacts present in Feature 2 suggests that it is the locus of a secondary dump. The fact that the feature does not appear to be a thermal facility suggests that the pit was used as a convenient place for discard rather than having been dug expressly for this purpose. In addition, the presence of a cap-like zone (Feature 1) of distinct materials on top of Feature 2 may indicate that the pit was purposely capped once full of debris. Based on the available evidence, and until further investigations, it may be hypothesized that Feature 2 represents the secondary use of a pit as a refuse discard location.

Given that the location of Feature 2 is relatively central to the courtyard and in an area that may witness future impacts, it is recommended that as soon as future needs dictate, additional 1-x-1-m units be excavated in the vicinity of Feature 2 to determine its extent and recover a larger sample of artifacts that may categorically date the feature. In addition, Test Unit 8 indicated that the feature extends to 144 cm below surface in the northwest corner, leaving the possibility that it could extend even deeper in other areas. Therefore, it is recommended that at the earliest opportunity, additional investigations be conducted in the vicinity of Feature 2 to fully define its basic characteristics, including its size and depth.

## **Recommendations for Additional Fieldwork**

Given the results summarized above, CAR suggests that three areas containing potentially intact deposits with significant research potential should be given special attention if future improvement activities occur in these zones. These are identified in blue in Figure 5-1. Conversely, no significant or potentially significant deposits were identified in the remainder of the project area. These areas are identified in brown in Figure 5-1. CAR recommends that the construction of the French drain, and associated drainage pipes, be allowed to proceed in those areas identified in Figure 5-1 as lacking significant deposits.

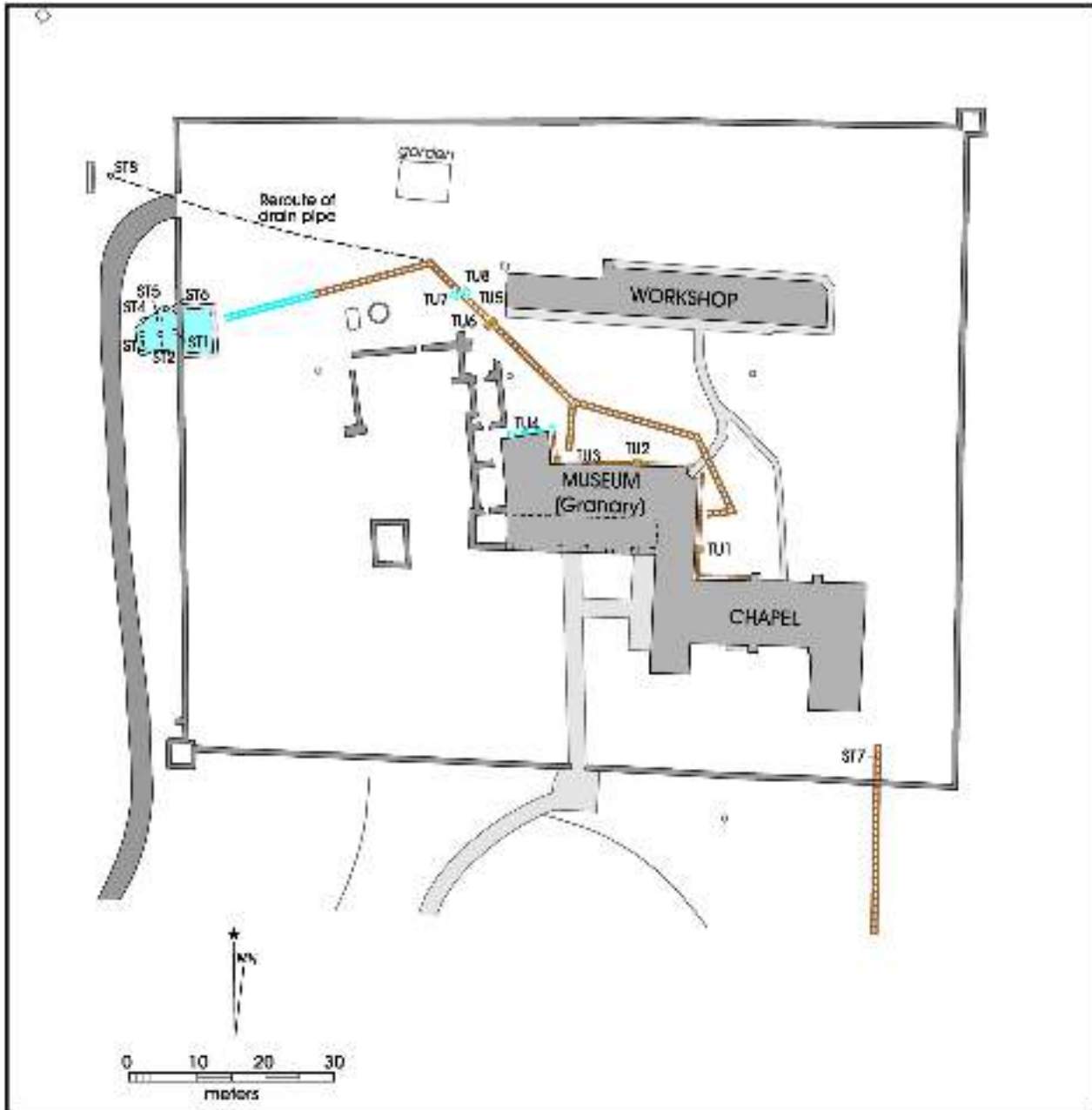


Figure 5-1. Areas with potentially significant deposits (blue) and areas with deposits lacking research value (brown).

The first area identified as potentially significant is located along the northern wall of the granary (museum), adjacent the ruins of the priest's quarters. Test Unit 4 sampled this area. The area appears to contain the original foundation construction, left untouched by CCC and CWA activities in the 1930s, and these deposits appear to be intact. CAR recommends that prior to future disturbances in this area, additional 1-x-1-m units should be excavated to gather information associated with the construction and use of the mission.

The second area identified as significant includes the single room abutting the western wall of the compound, as well as the external area investigated by shovel testing. Additional investigations in this area are recommended if improvement activities are planned in the future. Testing units should be placed outside the compound wall in this area (Area 4 in Figure 2-1) to sample the midden deposit. These tests should be excavated at least to 70 cm below surface. Also, additional 1-x-1-m units should be placed within the room to identify any intact deposits. While we lack information on the depths of the deposits in the room, we anticipate that the overall depth of excavation would not exceed 60 cm below surface in any of these units.

The third area identified as significant is located west of the present workshop and north of the French drainpipe line. The deposits located within Test Units 7 and 8 appear to be intact, with minimal disturbance due to the French drain installed in the 1970s. The impacts of the CCC and CWA projects cannot be seen in this area. Additional 1-x-1-m units should be placed in the area to determine the extent of the features and to recover a more representative sample of artifacts, particularly from Feature 2, to more firmly date the depositional sequences noted within the midden. Test Unit 8 indicated the depth of the feature extended to 144 cm below surface in the northwest corner, leaving the possibility that it could extend deeper in other areas.

## **Recommendations for Further Analyses**

The study of the variability in Goliad ceramics has identified two principal groups that may represent either distinct technological traditions or different sources of clay. Further ceramic analyses, including petrographic and Instrumental Neutron Activation Analysis, could provide additional information that would shed light on the manufacturing of Goliad ware over the course of the mission occupation. Research conducted on the ceramic sherds recovered from Mission Refugio by Pertulla (2002) utilized both such means of analysis, and therefore would serve as a good comparative database for other native ceramic collections. Because this research has not been conducted at other Texas missions, including Espíritu Santo, the information that could be gained by comparing the chemical profiles of the native ceramics remains unknown.

The location of clay sources at each mission site is an important piece of information that could shed light on the characteristics of local clay, as well as providing answers to questions concerning locations of manufacture and in tracing ceramic exchange or provisioning routes. Were the ceramics produced at the mission, or were they brought in from other areas? Where ceramics from this mission traded or sent to other missions? The implication that the women of Mission Espíritu Santo were skilled potters who supplied other missions with their ware could be explored if these types of investigations were conducted.

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## Appendix A

**Excavation of Aranama Mound Located Immediately West of the Yard of Aranama (Espíritu Santo) Mission, on the East Bank of San Antonio River, 1½ Miles S.E. of Goliad, in what is now Goliad State Park, Goliad County, Texas. One-half Mile N. of La Bahia Mission.**

**Excavated July 19 to August 14, 1933  
By A. T. Jackson and Crew**

**Anthropology Dept. University of Texas Austin**

**J. E. Pearce – Head of Dept.  
A. T. Jackson – Field Foreman**

[Minimal formatting and grammatical changes to A. T. Jackson's original manuscript have been made. In some cases, when artifacts could be relocated, new photographs of the artifacts have replaced originals. Several sketches of artifacts recovered by the Goliad crew have been reproduced as they appear in the original manuscript. Figure numbers and captions have been added and referenced in the text. Handwritten notes that appear on the original (presumably added by Jackson) have been included in this reproduction.]

## Appendix A: Excavation of Aranama Mound

### A. T. Jackson

The mission was founded by Padre Antonio Margil, a Franciscan, in 1717 in what is now Victoria County, Texas, and moved to its present location in 1749. Tribes of Indians at the mission were: Taranames, Tamiques, Piquianes and Manos de Perro. The latter name means “hands of the dog.” Mission named for Taranama Indians.

The mound was built up on the sloping side of the second terrace from the river channel. The western edge of the mound is approximately 100 yards from the river. The eastern edge is bounded by the western wall of the stone fence that encloses the mission. It would thus seem that the Indians, during the mission period, lived just outside the mission confines.

The length of the mound from east to west is slightly over 85 feet; the width, north to south, approximately 75 feet; height at tallest point, 11<sup>2</sup>/<sub>3</sub> feet. Of this elevation, 7 feet represent a natural knoll [Figure A-1].

Surface potsherds, flint chips and occasional artifacts are present around and within the mission yard; but are much

more abundant on the mound. Among the surface finds on the mound were a metal arrowpoint, handle from a vessel of Indian manufacture, fragments of European pottery with glaze and painted designs, and a flint for flint-lock gun.

Since the mission environs, including the midden mound, are within the Goliad State Park, care was taken not to uproot any of the trees in the work of excavating [Figure A-2].

### Midden Finds

A piece of glazed ware, perhaps the bottom of European cup, came from midden deposit 12 feet west of the pipe (Photo 395-B [photo could not be located]). In blue was imprinted a potter’s mark, or other label, as follows:



Figure A-1. Midden mound just outside the yard of Aranama Mission, and about 300 feet from San Antonio River. The midden deposit was built up on a natural elevation or hillside. Courtesy TARL, UT-Austin, photo 41GD1-4.

Among the miscellaneous small articles found in the midden are a small copper wire with a loop at one end; a brass button the size of our 5¢ piece; molded lead balls; sheet brass; metal gouge or awl; square nails; a few small blue glass beads (the latter found by Goliad crew).

According to agreement entered into between U. of T. and Judge J. A. White, the latter representing the Goliad Park, the two were to furnish crews that would keep all finds separately, each to keep what found. The U. of T., however, was to be permitted to take notes and photograph all finds of importance made by the local Goliad crew.

At a depth of 12", near the central part of the outer (western) edge of the mound were two large fragments of sheet copper. One was roughly circular, 5" to 5½" in diameter; the other was 26" long and ranged in width from 3" to 6". Near one end of the strip is a patch of the same material, bradded in place. These fragments perhaps come from a large copper vessel.

At a depth of 28" was a bar of hammered copper some ½" wide, ¼" thick, and 4" long. It was sharpened at one end and battered at the other, apparently having been used as a chisel.

Two small fragments of stones, rubbed smooth on one side, came from near the surface of the mound. These seem to have been from metates; despite the fact that the Solis Diary of 1767 states that the mission Indians here did "not make tortillas for want of metates with which to grind the corn and of comales "(earthen pan)" in which to cook it. Both of these articles are very scarce, each metate costing twenty-five pesos" (from the Solis Diary of 1767, translated by Rev. Peter P. Forrestal, Preliminary Studies of the Texas Catholic Historical Society, page 14, Austin, Texas).

An old spur, minus the rowel (and of course the straps) came from southwest edge of the mound at a depth of 5".

A brass finger ring, with six small blue sets (3 on each side) and a large central set of transparent glass-like material, was found at a depth of 20". It is tarnished, but in a good state of preservation [Figure A-3].

Metal hook, or door latch, from 26" depth. Resembles a fishhook, except has no barb.

A small mussel shell pierced for hafting.

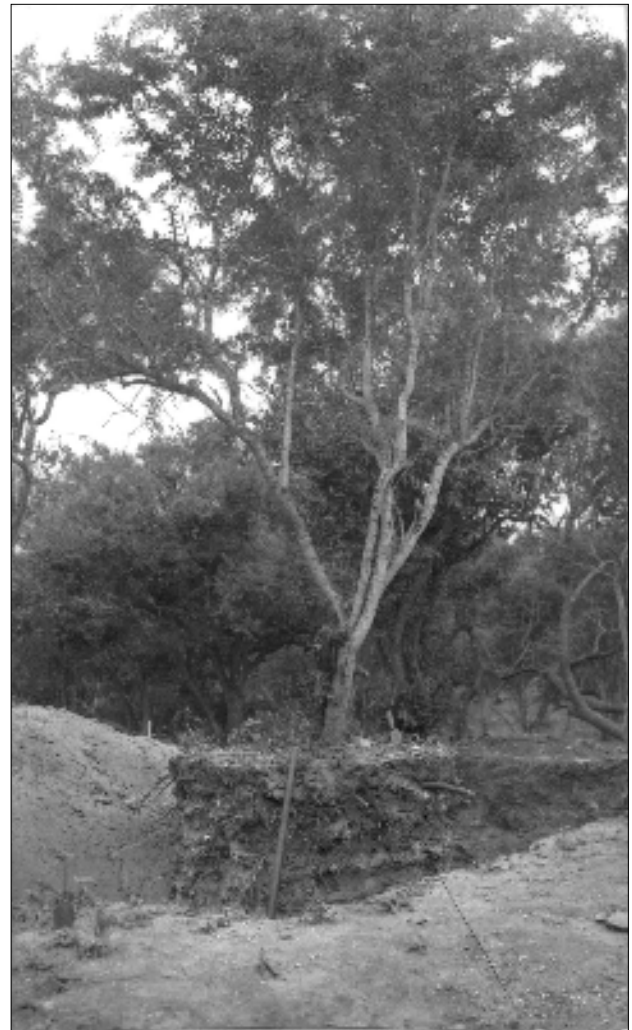


Figure A-2. Excavation of the midden around trees. Courtesy TARL, UT-Austin, photo 41GD1-5.



Figure A-3. Brass ring with blue and transparent sets. Courtesy TARL, UT-Austin (no catalog number).

Brass buttons, about size of our dime, with an eye at back.

Needle-like article of silver or nickel shaped as follows:



Goliad Crew

Depth 2". Probably part of decoration of a priest.

At a depth of 8", in N.W. edge of the mound, was discovered a small, thin coin or button top. It bore no superscription or design of any kind on one side; this, coupled with its extreme thinness, causes a question as to whether or not it was a coin. On the stamped side, encircling the head of a man, appeared the following: "JOSEPH US II". No date was visible. The specimen seemed to be made of copper or bronze (found by Goliad crew). It was slightly smaller than our dime.

At a depth of 8" in the extreme S.W. edge of the mound was a small brass crucifix, with six glass sets.

A metal trigger-guard, bearing an engraved design, came from the midden deposit near the pipe later described (Photo 395-A [photo could not be located]).

The gold-plated top of a button came from the same portion of the midden.

Several small pieces of mica were discovered in the deposit.

A piece of red ocher some 3" x 2" x 1½", with a depression worn in one side, came from a depth of 10" in S.W. part of the mound [Figure A-4].

Flint scrapers were fairly common in the deposit. Some were of the "duck-bill" or end-scraper type, while others were made from thin flakes merely by some secondary chipping along one or both sides.

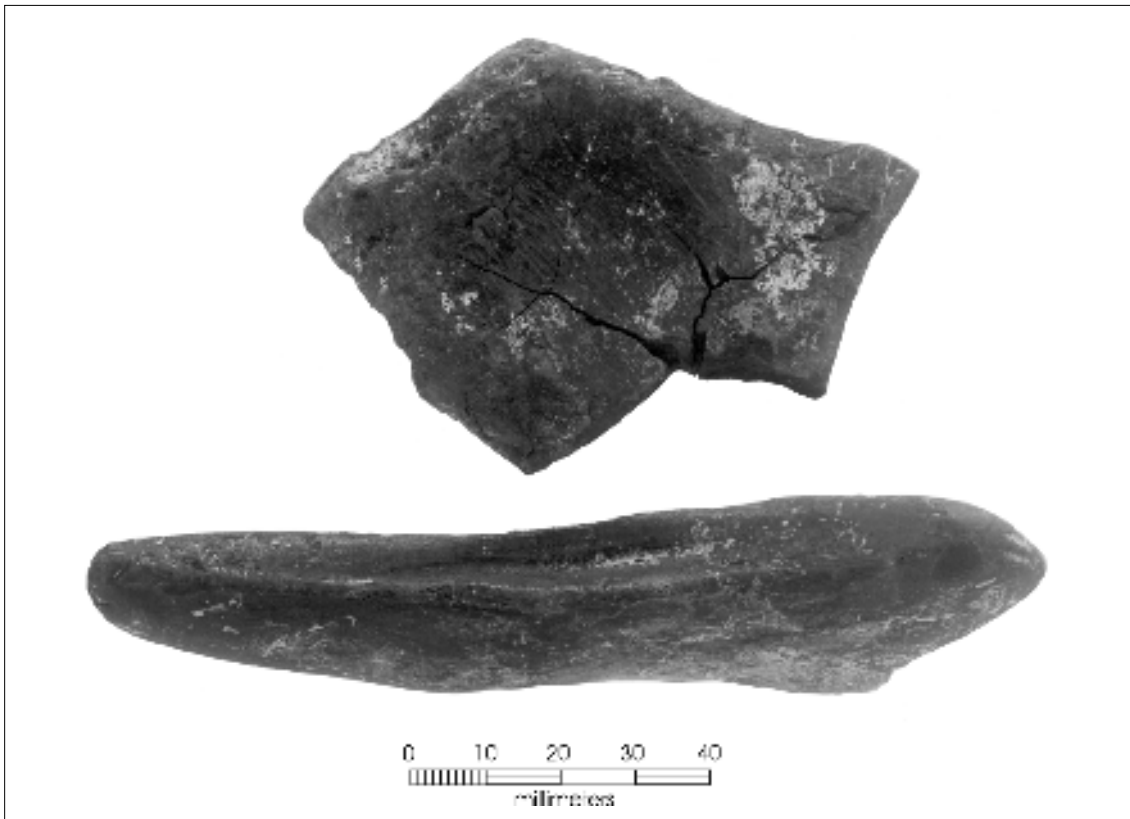


Figure A-4. Red ocher showing depressions worn by grinding powder for use as paint. Courtesy TARL, UT-Austin, photo 41GD1-46.



But the tiny flint scrapers, such as are found along the coast (Webb Island, Nueces Co., for instance) and at San Rosario Mission, two miles S.W. of Goliad, are very scarce at Aranama (Espiritu Santo) Mission.

From a depth of 12" came two small metal "powder-spoons." They lay side by side in the central part of the mound about 20 feet from the western edge. They were of about the following shape and size:



(Found by Goliad crew)

At several places in the northwestern part of the midden were small chunks of lime plaster bearing a coat of red paint. They came from depths of 6" to 11". The remains of a similar plaster may still be seen at two spots on the wall of the mission. One of these, on the unroofed wall where it is exposed to sun, wind and rain, is white and shows no trace of red paint. The other spot of plaster, in the N.W. corner of the south room and from 6" to 18" above the dirt floor, is better protected from the weather and still retains a dim to deep red color, several shades darker than that recovered from the midden deposit.

This, then, would seem to be the origin of the painted plaster excavated. Perhaps when the red plaster scaled from the wall, the Indians' love of red caused them to take the flakes as charms or good luck pieces. Or possibly they chipped the plaster from the wall. Or it may have been gathered up with the mission rubbish and piled on the refuse heap. (See samples from midden and from the mission wall.)

The badly rusted blade of a butcher knife was found on the bottom of the mound, at a depth of 47", 23½ feet inward from the center of the western edge. This, together with similar finds, seems to show that the entire mound was built up during the mission period.

An identical knife blade came from a depth of 20" and 6 feet northward.

A bone bead 2¼" long and ⅛" in diameter was at a depth of 14" in S.W. corner of mound. The ends were ground smooth.

Half of a pair of small scissors were dug out from a depth of 15".

Eleven gar scales were found at a depth of 18". But since they were together and showed no evidence of having been worked, it is not likely that they were used for arrowpoints—as was sometimes the case on the coast. Later, three other gar scales that seemed to have been ground around the edges came to light. It is possible that they may have been used as arrowpoints.

A large glass bead (¾" long and ¼" in diameter) was found 21 feet inward from western edge and near central part of mound (Goliad crew). Bead came from a depth of 24".

From a depth of 26", and 22 feet inward from western edge near center, came an unusual type of chain. It seemed to be of iron and consisted of three solid bars 1" long and ⅜" wide, with a hole ⅒" in diameter drilled at each end, and small rings ¼" in diameter inserted in the holes to bind the bars together. A fragment of a longer chain (found by Goliad crew). Another of four links from depth of 25" found by U. of T. crew.

An extremely thin sheet of copper was uncovered at a depth of 41" and 23 feet inward from central-western edge.

The preserving qualities of copper were illustrated by the finding of a cloth-covered button from a depth of 16", with the cloth preserved by the copper.

In one case, a fragment of sheet copper was bent around a cow rib, with the result that the bone bore a green color.

Several flakes (about 1" x 1½" x ¼") of gypsum came from the midden deposit at depths near two feet.

An amusing specimen was a badly corroded Jew's harp of the small size. It was discovered at a depth of 42" and about 22 feet inward from the central-western edge of the mound. Although it probably was secured, along with other trinkets, from the Spaniards at the mission, the find calls to mind accounts of early traders who brought in large supplies of Jew's harps, beads, pipes, etc., for exchange with Indians for furs, etc.

A leather boot heel was at a depth of 25", about 20 feet inward from the southwest corner of the excavation.

A few small glass beads were screened from the dirt about 3 feet from the boot heel. Blue and white in color. Depths 3" to 12".

At a depth of 15" was unearthed what appeared to be a copper or brass celt, made from some engraved article of European manufacture. It is 1½" long and 1" wide, ground at one end (and on only one side) to a cutting edge, with the other end slightly rounded.

A flint knife, 2<sup>5</sup>/<sub>8</sub>" long, was discovered at a depth of 4". The scarcity of flint knives here is accounted for by the presence of steel knife blades.

The bottom from what seems to have been a small chinaware cup bore a mark, in red, as follows: [floret shaped].

A piece of "metal-cloth" 7¾" long and 1¼" wide was uncovered at a depth of 10". It has a selvage along each edge that suggests its use in some such manner as for a belt, hat or head band. The strip or band is of a fairly coarse weave and seems to have had a thin copperized covering applied after woven. This covering of metal is to be seen in the form of a thin coating of green. The copper covering tended to preserve the cloth (found by Goliad crew but presented to U. of T.).

A small mano or rubbing stone came from a depth of 16" in the midden. Another at 43".

A number of so-called bone crushers, chipped from flint, were found at various depths [Figure A-5].

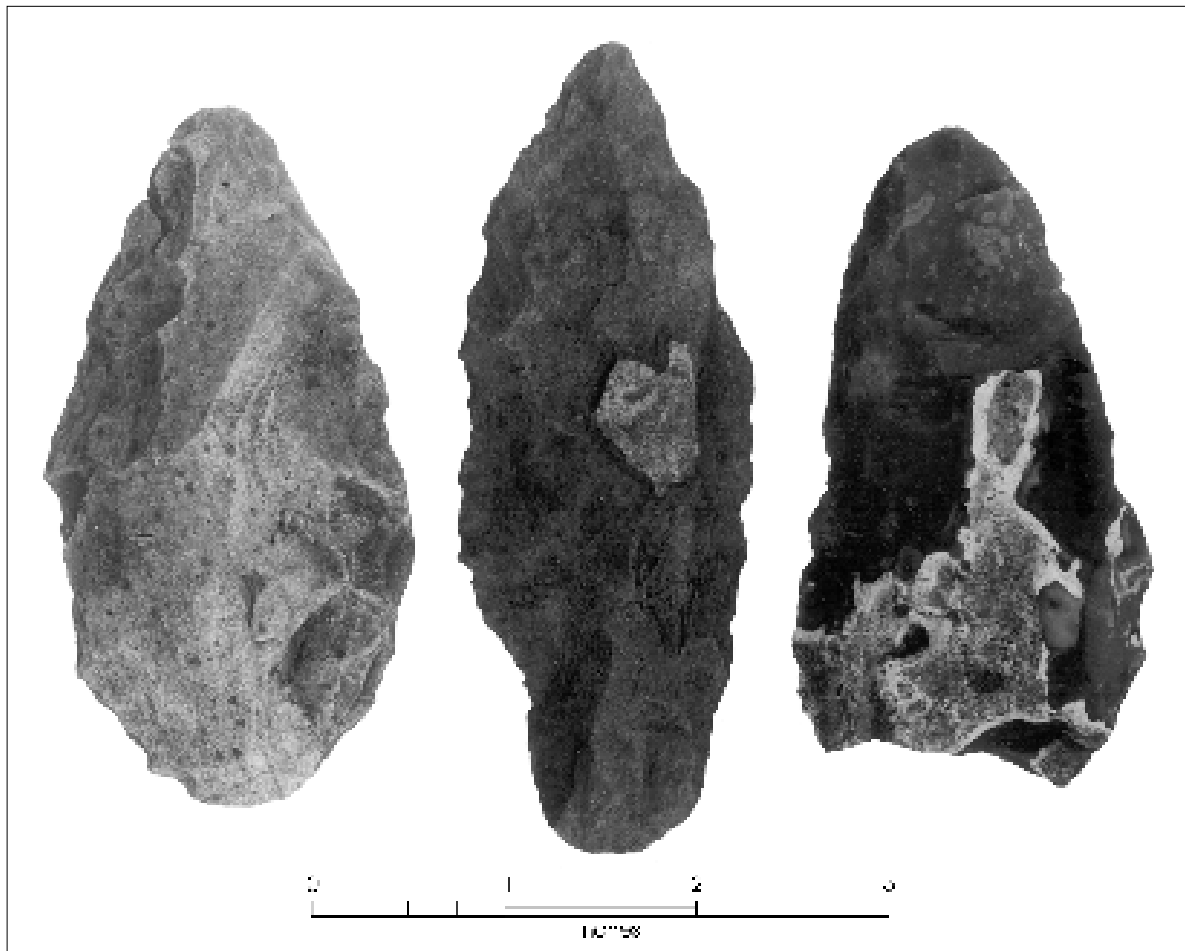


Figure A-5. *Flint bone crushers or crude axes.* Courtesy TARL, UT-Austin, photo 41GD1-55.

A brass strip (bearing engraved design) from a gun came from a depth of 12" at the northern edge of the mound.

A small Spanish "tear-cup" came from a depth of 38". It has a part of the bowl missing but can be reconstructed. It is 1½" high and about 1" in diameter.

A small shell pendant or bead made from freshwater mussel shell was shaped as follows: [see Figure A-6]. It bore two drilled holes near one edge. Found at a depth of 10". Another found by Goliad crew.

Shell beads of various kinds [Figure A-7].

Another rusty butcher knife blade came from a depth of 32" in southern edge of mound.

Eleven additional trade beads were found in southern part of mound at depths ranging from 22" to 25". The colors are red, white and blue.

Some 50 lumps of red and yellow ocher, most of which showed no evidence of having been ground on for making paint, were found in the north-central part of the mound at depths ranging from 15" to 36".

A shell bead of the type included in A. R. Shearer Collection in Anthropology Department Museum from Chambers County, Texas, was found (by Goliad crew) at a depth of

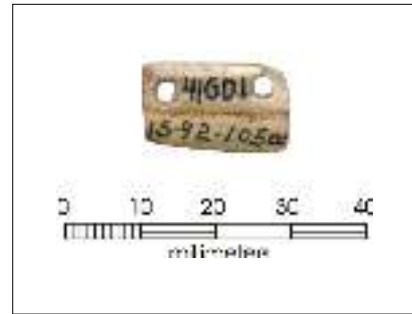


Figure A-6. Pendant or bead made from freshwater mussel shell. Courtesy TARL, UT-Austin, cat. number 1S-92-105A.

15". *Panoma* or *Olivia* shell. A long bone bead, like one previously reported, came from a depth of 4". Also the point of a bone awl. (Both of latter found by Goliad crew.)

Flint knives were shaped as follows: [see Figure A-8].

Miscellaneous finds in northern part of mound were:

- Four-pronged fork
- Engraved buckle
- Copper disc, with hole in center
- Gun hammer
- Gunflint [Figure A-9]
- Mano stone, small
- Bone crusher
- Bone bead 4<sup>9</sup>/<sub>16</sub>" long



Figure A-7. Shell beads recovered from midden. Courtesy TARL, UT-Austin, cat. numbers, left to right, 1S-92-101B, -101C, -101E.



Figure A-8. Flint knife recovered from midden. Courtesy TARL, UT-Austin, cat. number 1S-92-28A.

#### Goliad crew:

- End of bone awl
- 2 Panoma shell beads

Two buttons bearing eagle such as on U.S. Army buttons. One says (on back) "Waterbury Button Co."; other reads "Scovill Mfg. Co., Waterbury". Found at depth of 6" in northern part of mound (Goliad crew). Another found by U. of T. crew.

The mouthpiece of a trumpet or bugle came from a depth of 8" (Goliad crew). Another Jew's harp, slightly larger than other and in somewhat better condition. Found at depth of 18" (Goliad crew).

Miscellaneous small finds in southern part of trench were: arrowpoint; scrapers; spoke shaves; flint knives and gouge; small brass pendant with blue glass set, depths 3" to 21". Hand-hammered copper hook. A fragment of a long, square pestle or grinding stone of volcanic rock came from 20" in south edge of mound. It is 4" long and 2" square.

A tiny copper container, with about the same capacity as a tablespoon, but with a band bearing holes for attachment to wall, came from 26", northern edge.

Copper hooks, that appear to have come from rims of vessels, were found at various depths. They bear a flat base, with two holes for bradding to vessel rim, are curved and have a slightly sharpened and rounded end to the hook—resembling modern clothes hooks used in closets. The copper hooks probably served to fasten a circular wire and bail by which the vessel was suspended.

More than half the flint scrapers are of the end type, many of them long and narrow. Some are circular and used all around. Others are side scrapers.

At a depth of 16" near center of mound was the torso of a small figurine saint. Arms and head broken off; also below waist. Spanish origin. Length 1¾"; width across shoulders 1½". Black inside and red outside; no tempering material. The figure has a cape or mantle over shoulders (Goliad crew).

A small straight pin, with a head slightly larger than our modern brass pin, came from a depth of 24", in south edge of mound.

From a depth of 15", near center of the mound, came a well-made bone awl 3⅞" long, ¼" thick and of an average width of ½". In the large or butt end is a notch ⅛" deep. The implement seems to have been made from the cannon bone of a deer. Bone awl 3" long from depth of 3", south edge of mound. The sharp end of another bone awl came from a depth of 12" in south edge of the mound. These bone awls are thicker, the points are not so sharp nor are they as well polished as the awls from Site #1 Seminole Canyon, Val Verde Co., TX (see Bul. 3327 U. of T.).

Two additional fragments of pestle stones of volcanic material came from 10" and 25" in south edge of mound.

A fragment of a watch case of the closed-face type came from a depth of 33".

A freshwater mussel shell roughly chipped to a point at the small end suggests its use as a spoon. It came from a depth of 17" in south edge of mound.

From a depth of 6" was uncovered a small silver coin (about the size of our dime). On one side was a coat of arms, still



Figure A-9. Gunflints of various sizes recovered from midden. Courtesy TARL, UT-Austin, cat. numbers, left to right, (top) 1S-92-69B, -70T, -69D, (bottom) -69C, -70P, -69A.

very legible, and encircling it was, as nearly as can be deciphered, the following: "Hispana Ind. R.M." On the other side was a superscription accompanied by the following: "Dei Gratia Carolos III" [Figure A-10a].

Two extremely thin, circular, coin-like objects (found by the Goliad crew) were much like one previously described, except that the wording was different. These two had small hole punched in center of each—perhaps for converting them into beads. On one of them was: "D.G. Rex"; on the other one was: "I.C. Relc", also head. Depths 30" and 26".

A metal dagger or knife, with a part of the wooden (?) handle intact, came from a depth of 26", in south part of mound.

A brass breast pin with 4 sets came from a depth of 18". A round lead medallion with a hole at edge and bearing a coat

of arms, came from a depth of 32". A large iron door key, 6½" long, came from a depth of 36"; and was exchanged to Goliad crew for short pieces of fiber cordage.

The cordage, from a depth of 31", was of the 4-strand braided type of workmanship. Seems to have been made from a large fiber or grass-like material. The combined length of three fragments is 5". Possibly lechuguilla fiber, but that plant does not grow here. The fiber is larger than that of the Spanish dagger which grows locally. The fiber may be from local bull nettle plants.

A number of long bone beads, or possible pipe stems, came from depths ranging from 25" to 44". They vary in length from 2<sup>5</sup>/<sub>8</sub>" to 4<sup>3</sup>/<sub>8</sub>" and are about ¼" in diameter. They were cut and smoothed at the ends. They appear to be from bird bones [Figure A-11].

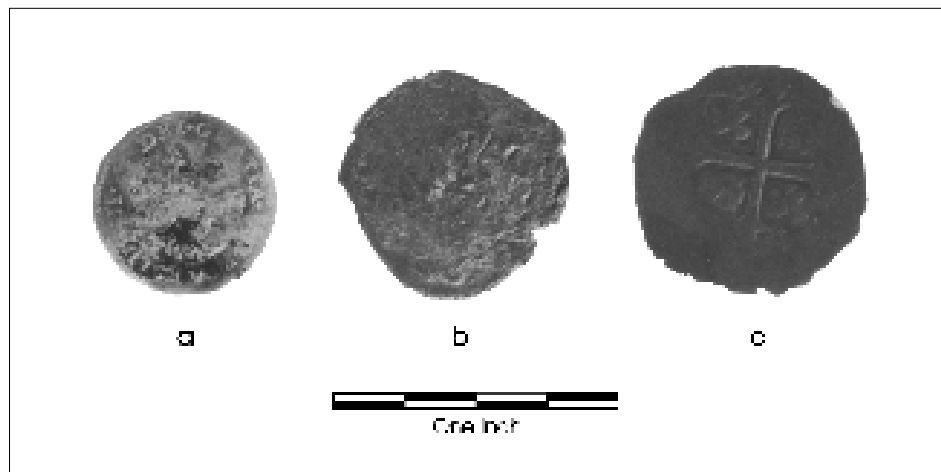


Figure A-10. Coins from *Espiritu Santo Mission and Webb Island, Nueces County*. (a) Spanish one real piece of Charles III, 176–1788. Found at a depth of six inches in midden deposit at *Espiritu Santo Mission*. (b) Poorly preserved, unidentifiable coin from Webb Island, Nueces County, Texas. (c) Spanish coin of uncertain date but probably struck about 1700. From Webb Island. Coins identified by Mr. Belote, Curator of U.S. National Museum, Division of History, Washington, D.C. (memorandum from Mr. Belote to Mr. Setzler, February 21, 1934). Courtesy TARL, UT-Austin, photo 41GD1-60.

The pointed end of a well-chipped glass arrowpoint was found at a depth of 22". It is made of green bottle glass. It, at present, measures  $1\frac{3}{16}$ " long and  $\frac{3}{4}$ " wide where broken. This find tends to verify reported finds of glass arrowpoints on the Gulf Coast.

A bone awl, from a depth of 30", bore a well-marked point and was made from the rib of a cow. The awl is 5" long [Figure A-12].

A fragment of a sandstone metate came from a depth of 31". It is one of the few metates from this site made of local stone.

Among miscellaneous metal articles were a brass belt buckle; part of candle snuffers or scissors; and two small brass vessel-like objects,  $2\frac{1}{2}$ " in diameter, with hole in bottom and two projections or knobs on rim. Also several articles of brass jewelry with glass sets, at depths of 18" to 24".

A flint knife,  $5" \times 1\frac{3}{4}" \times \frac{1}{2}"$ , was found at a depth of 32" (by Goliad crew). From a thickness of  $\frac{1}{2}"$  in the central part, the blade was chipped down to very sharp edges. The flaking was well done and is the outstanding piece of flintwork at this site. It tapered toward each end.

At a depth of 10" were found fragments of a Spanish plate of a gaudy combination of colors. Enough of the parts were present to reconstruct. Diameter of the plate was  $8\frac{3}{8}"$  and the depth was approximately 2" (found by Goliad crew).

At a depth of 48" was found (by Goliad crew) a complete spur rowel of six points and  $3\frac{3}{4}"$  in diameter.

Several large glass beads, one slightly over  $\frac{1}{4}"$  in diameter, were found at depths ranging from 18" to 40". These large beads were almost round.

The sharp end of a bone awl ( $1\frac{1}{4}"$  long) was unusual in that it was square instead of round. It came to a very sharp point and was well worked. Found (by Goliad crew) at a depth of 24". Another bone awl,  $2\frac{1}{8}"$  long and  $\frac{5}{8}"$  wide, came from a depth of 25".

A small brass thimble, still in good condition, was found at a depth 11" in the S.E. part of the mound, some 15 feet west of wall [Figure A-13].

The finding of numerous flint scrapers would seem to indicate that the primitive method of scraping hides was still practiced by these Indians [Figure A-14].

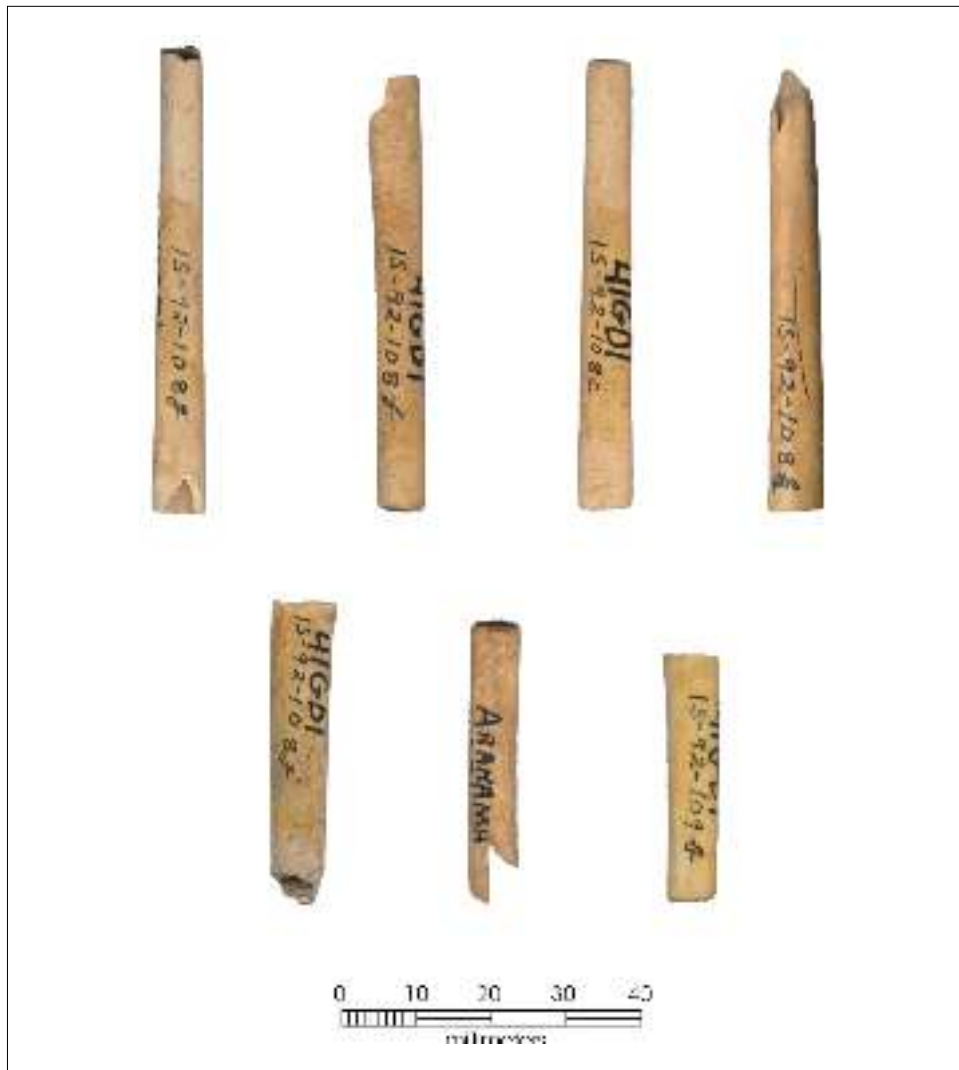


Figure A-11. Bone beads with ends ground smooth. Courtesy TARL, UT-Austin, cat. numbers, left to right, (top) 1S-92-108G, - 108F, -108C, -108K, (bottom) -108J, no cat. number, -109B.

[Figures A-15 and A-16 show additional lithic tools presented in original manuscript.]

The presence of a number of bone awls likewise showed a tendency to continue the use of certain other Indian-made implements.

A matted ball of small tinsel-like flat wire (some  $\frac{1}{16}$ " wide) was found in the east-central part of the mound at a depth of 18".

Three links of iron chain were found (by Goliad crew) at a depth of 6". Each link was in the form of the figure "8".

Several disc beads, from  $\frac{1}{2}$ " to  $\frac{3}{4}$ " in diameter, made of mussel shell, and very thin, were found at depths of 16" to 40" in the midden deposit [Figure A-17]. One hole in center.

A few *Panoma (Olivia?)* shells were found. Most of them had been ground off on the closed end and had a groove ground through near the other end, converting them into beads. Found at various depths in the mound.



Figure A-12. Bone awls. It will be noted that all these awls are crude and show very poor workmanship. This is in striking contrast to the beautifully made bone awls found in prehistoric rockshelters in the Pecos-Rio Grande region of West Texas. Courtesy TARL, UT-Austin, cat. numbers, left to right, 1A-92-112A, -114E, -113B, -112B.



Figure A-13. Brass thimble recovered from midden. Courtesy TARL, UT-Austin, no cat. number.





Figure A-14. *Small flint scrapers recovered from midden.* Courtesy TARL, UT-Austin, cat. numbers, left to right, 1S-92-57J, no number, -58C.

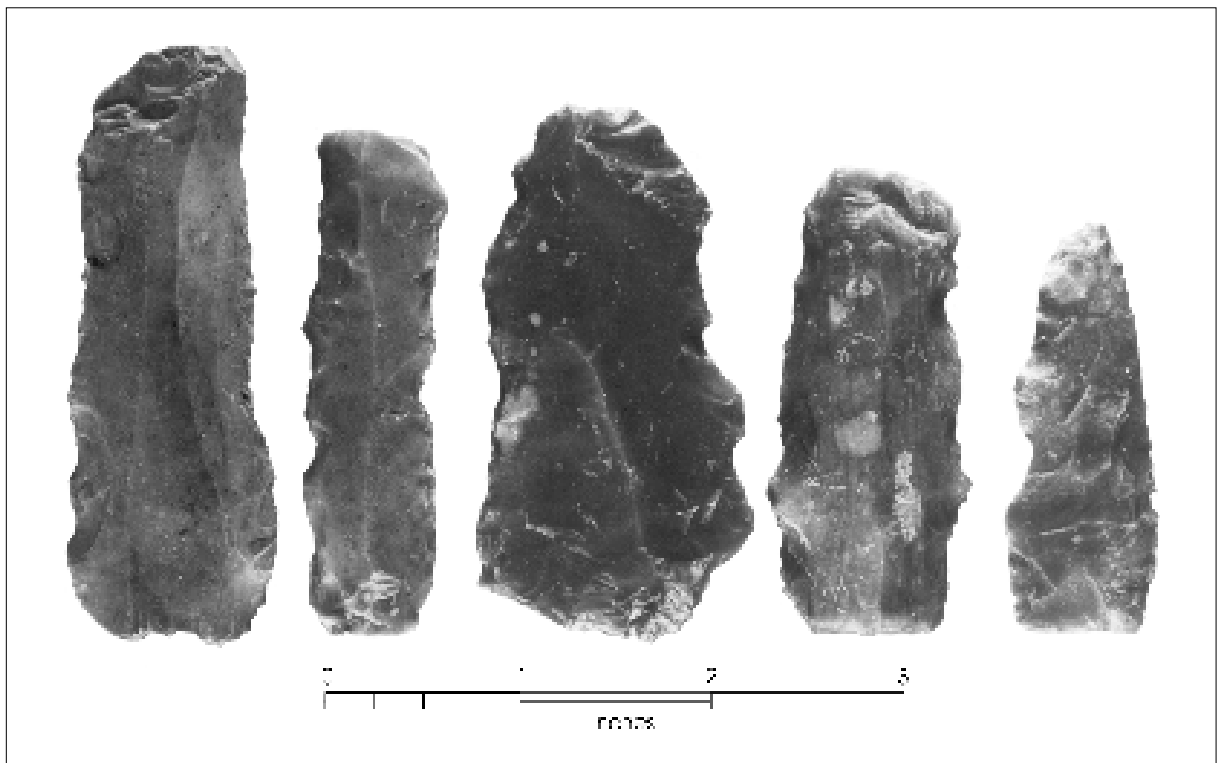


Figure A-15. *Flint spoke shaves or drawing knives.* Courtesy TARL, UT-Austin, photo 41GD1-50.

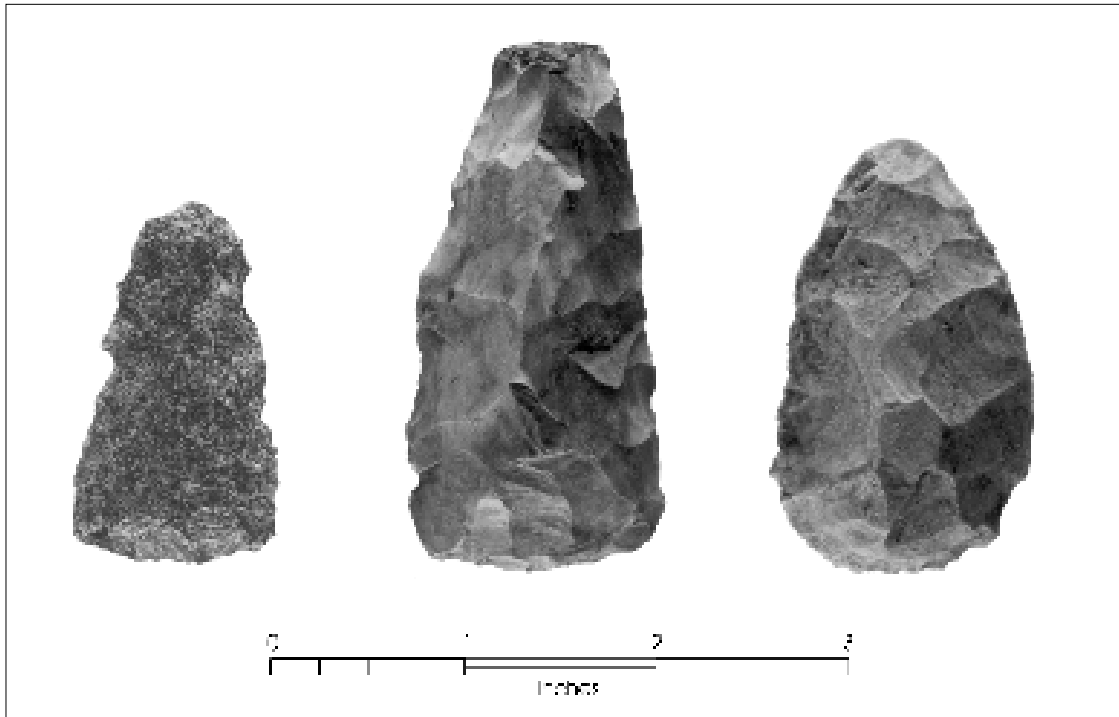


Figure A-16. Flint spoke shaves or adzes. Courtesy TARL, UT-Austin, photo 41GD1-51.

Brass buttons, both large and small, turned up in considerable numbers and from all depths. Some were decorated; others plain.

A small, flat metal insignia shaped to represent a bugle was found near the surface (by Goliad crew). Extreme length is 5½" and width is 1½".



Figure A-17. Drilled disc beads made from mussel shell recovered from midden. Courtesy TARL, UT-Austin, cat. numbers, left to right, ATJ 876, 1S-92-105B.

The upper metal portion of a badge, with small ring at top and "teeth" for securing a ribbon beneath, came from a depth of 22".

Another small "bugle," a duplicate of the one [recovered by the Goliad crew], came from a depth of 3" in north edge of the mound [Figure A-18].

At a depth of 12", in eastern part of the mound, was found a small chipped flint ax, notched around center for hafting. It was shaped as illustrated in photograph, "a" [Figure A-19].

This specimen greatly resembles certain double-bit, chipped axes from Bowie County, Texas; Miller County, Arkansas; and adjoining regions.

From a depth of 38" there were screened, along with glass beads, a jet set about ¼" square and ⅛" thick. Two holes ran at angles across corners of the stone.

A crudely made rib-bone awl came from a depth of 11". The point was rounded but not sharp. Part of the upper end was missing.



Figure A-18. Flat, metal bugle insignia recovered from midden. Courtesy TARL, UT-Austin, cat. number 1S-92-143.

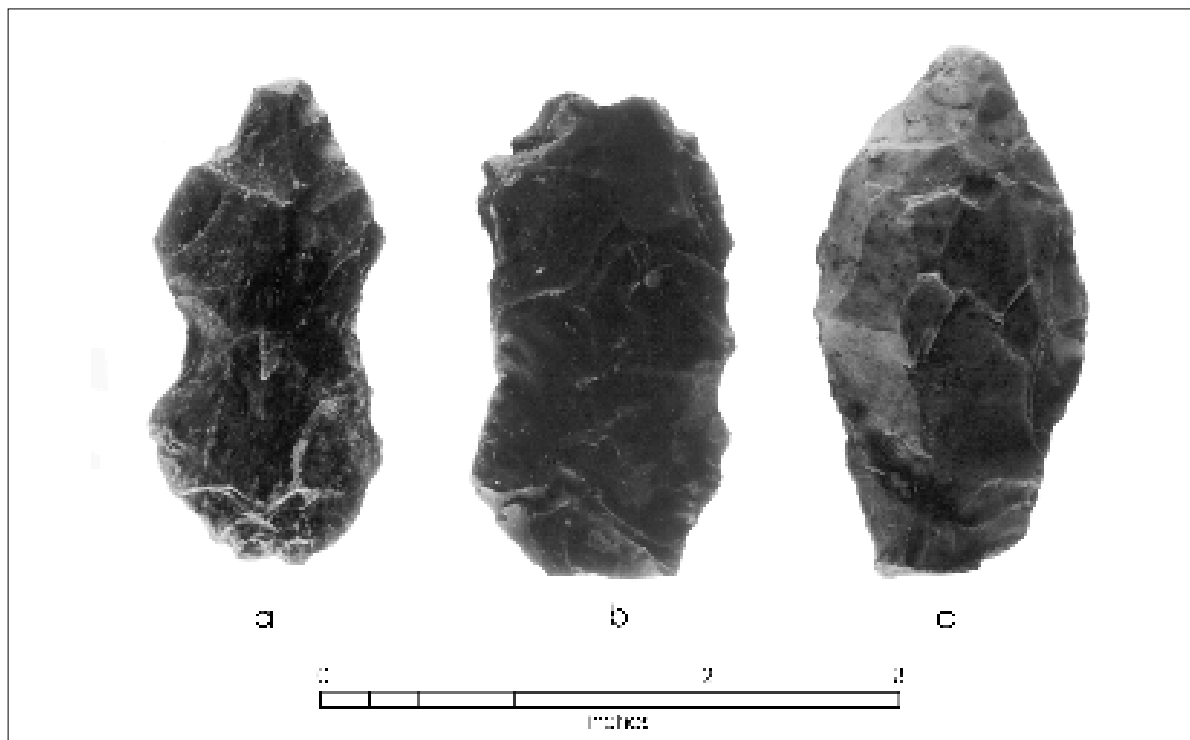


Figure A-19. Flint blades, probably hafted for use as axes. Courtesy TARL, UT-Austin, photo 41GD1-53.

Several mussel shells, some pierced and others not pierced for hafting, show signs of use as hoes or digging implements. This in spite of the fact that hoes were furnished by the mission. Contrary to the case in N.E. Texas, the mussel shells at Goliad that show most unmistakable evidence of use for digging are the ones that were not pierced for hafting—although they were large shells. The ones that have holes punched in them near the center are almost invariably medium-sized shells and show only slight wear at the sharp end. They may have been strung for use as rattles.

A small abrading or grinding stone, of fine, hard sandstone, came from a depth of 18". It is approximately 3¼" x 2½" x 1¼", and bears 21 grooves or abraded lines. These probably were worn in the stone incident to sharpening bone awls, etc. [Figure A-20].

What appeared to be the remains of metal cloth came from a depth of 24" in the midden deposit. Unlike the other metal cloth found at this site, these fragments show a foundation of flat, thin copper spring-like wire, with the remains of cloth over it. The fragments are in a very bad state of preservation.

Half of the iron bit from a bridle had been ground down to a sharp point, apparently for use as an awl or punch. The other end has the small loop or ring intact.

From a depth of 19" came a copper tube 3" long, ¾" in diameter at one end, and coming to a slightly and crudely sharpened point at the other. This probably was used as a spear tip, in lieu of a flint spearhead. Similar specimens were found in historic site at Garrett Bluff on Red River, Lamar County, Texas.

A pair of small scissors, complete except for part of the finger loops, came from 29".

At a depth of 34" was a strip of metal cloth or ribbon, measuring 62" in length and 1¼" wide. It was wound about and in a fragmentary condition—part of it resting on a cow bone [Figure A-21]. At 29" another strip 7" long was found.

A small glass pendent, with hole lengthwise through the center, was found at a depth of 16". A brass breaststrip, with 5 glass sets, came from 25". A small, crudely bent brass

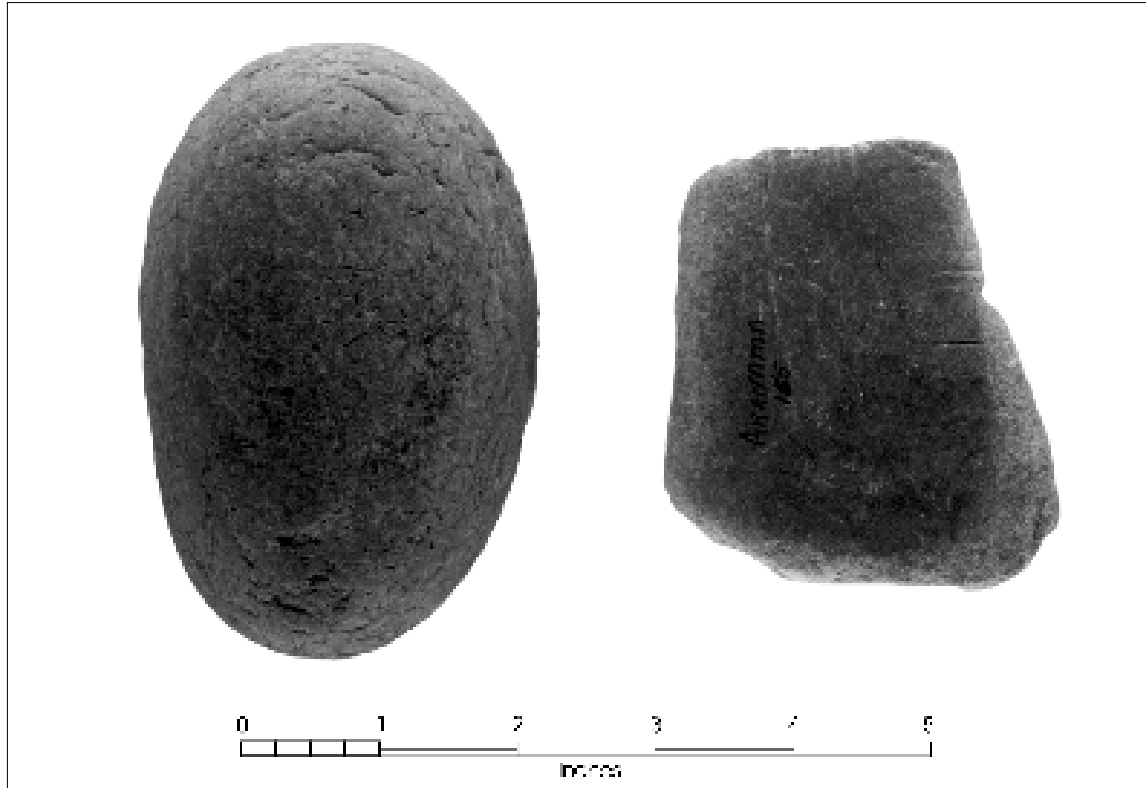


Figure A-20. *Mano stones. Note the carved notches on the rectangular stone.* Courtesy TARL, UT-Austin, photo 41GD1-59.

ring was unearthed at 10". Inside diameter was only  $\frac{3}{8}$ ". Width  $\frac{7}{16}$ ". All at S.E. edge.

At N.W. edge, nearest river, from depth of 3" came a brass finger ring and a metal "butcher" knife, blade  $7\frac{3}{4}$ " long and  $1\frac{1}{4}$ " wide. The ring was a plain band, without set, with inside diameter of  $\frac{5}{8}$ ". Near the ring was a well-chipped flint spearhead.

In the eastern edge of the mound was found a large spur rowel with six long shanks [Figure A-22]. Depth 40". (Much like one found by Goliad crew.) Diameter of rowel was  $3\frac{3}{4}$ ".

At a depth at 36" was a small lump of sulphur, about  $\frac{3}{4}$ " square. This may have been used by the Spaniards in the manufacture of gunpowder.

At a depth of 32" in S.E. part of mound was encountered top of a hand-hammered copper chisel or dagger-like implement. The top was battered from driving blows and the sharpened lower end was imbedded  $2\frac{1}{2}$ " in the limestone shale of bedrock. It bore two holes near the center.

A fragment of an old-fashioned slate came from a depth of 14".

At a depth of 25" was found an alligator's tooth, ground off at the root end, hollowed out, and a small hole drilled through one side—thus forming a tooth-pendent (Goliad crew). Length,  $1\frac{7}{16}$ ", diameter at cut end,  $\frac{3}{8}$ ".

From a depth of 30" came a small strip of metal cloth. This, however, is different from the other metal cloth in that the metal is silver instead of copper. Bad condition.

Several rifle shells and a few so-called "Minnie balls" came from the upper 8" in various parts of the mound.

A complete pair of scissors, badly corroded, came from east-central part of the mound (found by Goliad crew).

From a depth of 5" came an article of hammered steel  $\frac{1}{16}$ " thick,  $4\frac{1}{4}$ " long and  $2\frac{3}{8}$ " wide, shaped like the figure "8". Possibly used for striking fire with flint; or may have been a link in a large chain (Goliad crew).

Many fragments of what appeared to be parts of copper vessels, some bearing brads or brad holes, were found at all depths. Also numerous small scraps of copper. These



Figure A-21. Metal cloth in place in midden mound at a depth of 34". Note bone. Courtesy TARL, UT-Austin, photo 41GD1-6.

latter were not cataloged and no record kept as to the exact number found.

A knife, chipped from petrified wood, came from a depth of 30" in the east-central part of the mound.

Several large square nails had been flattened at the lower end and ground sharp, probably for use as an awl or gouge.

A well-shaped mano of the kidney type, split in two lengthwise, came from a depth of 24". It is much like ones found in burnt rock mounds of Central Texas.



Figure A-22. Large spur rowel recovered from midden. Courtesy TARL, UT-Austin, cat. number 1S-92-204.

Another spur rowel, depth 19", was smaller than others; being six-pointed, but only 3" in diameter. The Indians were learning to ride and become vaqueros.

An iron pin 6" long, with a 1" ring at top and other end sharp, came from a depth of 19".

Intermixed in the dirt along the N.E. edge of the mound were many glass trade beads—more than found in any other portion of the mound. The beads were red, white, blue, green and various other hues [Figure A-23]. They ranged in size from ones so tiny that a single strand of fine thread would scarcely penetrate the holes to ones as large as a black-eyed pea. There were, however, very few of the large beads.

At a depth of 30" was uncovered a badly rusted steel ax. It was like the ax part of the modern grubbing hoe, but did not have any hoe attachment on opposite side. Length of blade 4", width 2½".

An iron spike, sharp at both ends, and 7" long, came from a depth of 30". It had 4 flat sides and tapered in size gradually from center to each end.



Figure A-23. Glass trade beads of various colors recovered from the midden. Courtesy TARL, UT-Austin, cat. number 1S-92-107B.

A brass letter "H", 1" high and 1" wide, came from a depth of 18" in N.E. part of mound.

A Mexican pestle or rubbing rock of volcanic stone, with one end broken off, was found at a depth of 26". It is 4½" long, 2¼" wide, and 1½" thick, with two pits on each edge, two on one side and one on the other, making a total of 7 pits, ½" in diameter and ¼" deep [Figure A-24].

Flakes of gypsum, ranging in size from 1" x ½" x ⅛" to 2" x 4" x ½", came from various depths in east part of the mound.

An unusual object, broken from a vessel or pipe, came from a depth of 30". It may have been a pitcher spout, or possibly a pipe stem. It is 1¾" long, tapers in size from 1" to ⅜" and has a small hole running through it. Does not seem to be of Indian manufacture.

About ⅓ of a small Spanish bowl bearing a glaze was found at a depth of 23" in southeast part of mound, some three feet west of stone fence.

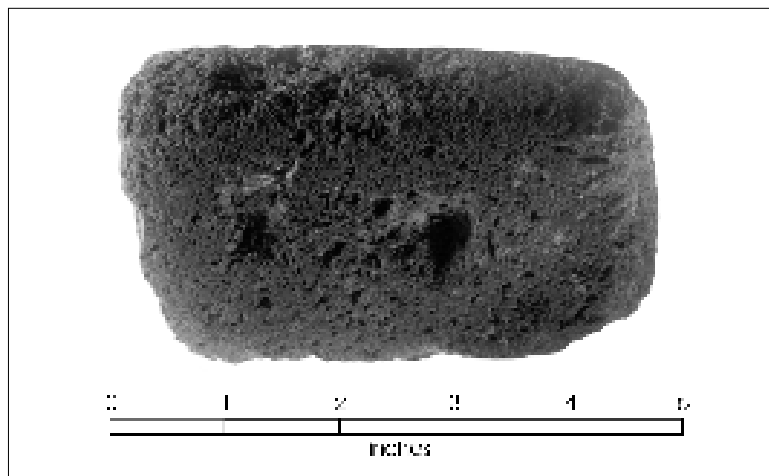


Figure A-24. *Pitted rubbing stone of Spanish or Mexican origin.* Courtesy TARL, UT-Austin, photo 41GD1-40.

## Jewelry and Ornaments

The Indians' love for personal adornment is strikingly illustrated by many finds in the camp refuse at this mission site. Chief among these were beads, buttons, finger rings, pendants, etc. Many of the articles were of European manufacture; but others represented the primitive arts. They are discussed in connection with midden finds.

## Earthenware Specimens

The ceramic art seems to have been practiced quite extensively by these mission Indians. Among specimens of this type are pipes, bowls, a ladle, a vessel rest or stand, a candle holder, pot handles, pottery discs and pottery game pieces.

**Pipes:** The mission Indians at Aranama were smokers. This is proved by the finding in the camp refuse of seven clay and one stone pipe—all in certain degrees of breakage. In addition to these Indian pipes there were fragments of three stems from trade pipes.

At a depth of 7", near the southwestern edge of the mound, was found an earthenware pipe with most of the stem missing. The bowl, in good condition, measures  $1\frac{3}{8}$ " outside and  $1\frac{1}{16}$ " inside diameter; height,  $2\frac{1}{8}$ ". Pipe undoubtedly of Indian manufacture. Somewhat crude, and slightly resembles

the heavy elbow pipes of the Red River region of N.E. Texas. Shell tempered. A rubbed polish, but no glaze. Very heavy due to the thickness ( $\frac{3}{8}$ ") of the bowl wall. There is a trace of asphalt on the outside of the bowl [Figure A-25]. A rough sketch of the bowl is shown below:

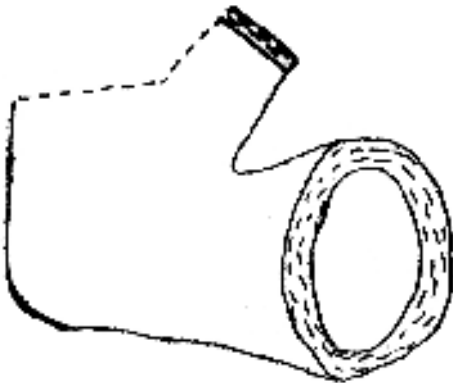


At a depth of 30", and some halfway between the center and southern edge in the western part of the mound, was a clay pipe. The specimen was restored, since all the stem and enough of the bowl to show its length and size remained. The stem flares outward at the end; is  $1\frac{3}{4}$ " long, has an outer diameter of  $1\frac{1}{16}$ " and inner diameter of  $\frac{5}{8}$ ". The specimen is rather crudely made and shows shell tempering material. The portion of the bowl that is intact shows it to



Figure A-25. Clay pipe of unusual thickness. Restored. Note the tempering material. Courtesy TARL, UT-Austin, cat. number 1S-92-119A.

have flared somewhat and that the rim of the bowl was only  $\frac{7}{16}$ " from the upper rim of the stem. The stem hole is conical and would not seem to readily lend itself to the insertion of a reed or other separate item. On the other hand, the stem is so shaped that it could scarcely have been smoked without an auxiliary stem. A rough sketch of the pipe follows.



The stem of a trade pipe was also found nearby.

At a depth of 19" in north edge of the mound was a clay pipe of the elbow type. No decoration; shell tempered. The diameter of the bowl was as follows: outside, 1"; inside,  $\frac{9}{16}$ ". Stem partly missing, so that length uncertain. Bowl and stem approximately same size. Shaped like certain elbow pipes from Wood County, Texas (found by Goliad crew).



At a depth of 18" was a pipe made of steatite or soapstone of a grayish color [Figure A-26]. A piece was missing from the bowl and another from the stem, but the specimen was easily reconstructed in the field. The pipe has a round, half-spool shaped bowl and a triangular stem with the rear end curved upward like the bow of a boat. Height,  $2\frac{3}{8}$ "; length,  $1\frac{3}{4}$ ". Diameter of bowl outside,  $1\frac{1}{4}$ "; diameter of stem, 1". Stem hole,  $\frac{9}{16}$ " in diameter. The shape slightly resembles that of a metal tomahawk pipe. Probably Indian workmanship; but faint striations suggest the use of metal tools.

At a depth of 40", in the N.E. part of the mound, was the bowl of a clay pipe of the elbow type. The clay was heavily tempered with shell. Outside diameter of bowl was  $1\frac{5}{16}$ "; inside diameter,  $\frac{5}{8}$ ". The wall is quite a bit thicker than those of the other pipes from this site. The bowl-hole was conical. Stem missing. (Specimen found by the Goliad crew.)

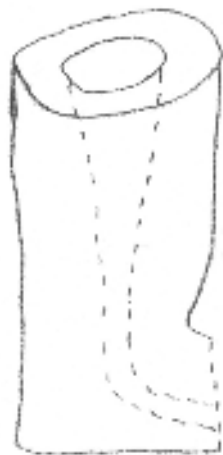
Another bowl of a clay pipe came from a depth of 22" (found by Goliad crew). Height of bowl, 2"; outside diameter at top,  $1\frac{7}{16}$ "; inside diameter,  $\frac{5}{8}$ ". Shell tempered. Apparently of elbow type. No encrustation or other evidence of smoking.





Figure A-26. Pipe made of soapstone (steatite) of a grayish color. Found at a depth of 18 inches in the midden deposit. The marks of metal tools may be seen. The shape slightly resembles that of a metal "tomahawk pipe" used by traders in some regions. Courtesy TARL, UT-Austin, cat. number 1S-92-122.

From a depth of 25" came part of a pipe stem  $1\frac{1}{2}$ " long and 1" in diameter. Shell tempered. Part of another stem and most of a pipe bowl, found near eastern edge of the mound, were also shell tempered.



At a depth of 16" was found a clay pipe with most of the bowl missing. It is of Indian manufacture, shell tempered, no decoration and somewhat crudely made. The broken bowl reveals a black encrustation about  $\frac{1}{16}$ " in thickness. The large stem is complete and strikingly like those of certain pipes found in N.E. Texas. Outside diameter of the stem is  $1\frac{1}{8}$ " and inside is  $\frac{11}{16}$ ". The stem hole maintains approximately the same size for a distance of  $\frac{13}{16}$ ", at which point it abruptly decreases to  $\frac{1}{8}$ ". At the base of the bowl is a ridge running halfway around and protruding  $\frac{1}{8}$ ". The shape of the stem was as follows:



There is evidence of asphalt on the outer surface [Figure A-27].

At a depth of 29" was another clay pipe, small and slightly trumpet-shaped. It is whole except for about  $\frac{1}{4}$  of the stem which has been reconstructed. Height,  $1\frac{1}{2}$ "; length,  $1\frac{1}{2}$ "; outside diameter of bowl,  $\frac{7}{8}$ "; inside,  $\frac{5}{8}$ "; outside diameter of stem,  $\frac{13}{16}$ "; inside,  $\frac{3}{8}$ ". Shell tempered and fairly well-made. It gives the impression of having been made in tubular form and then bent while still plastic [Figure A-28]. Inside



Figure A-27. *Crudely made, shell tempered, clay pipe (restored). Black encrustation in bowl.* Courtesy TARL, UT-Austin, cat. number 1S-92-119B.



Figure A-28. *Small clay pipe, slightly trumpet-shaped. Shell tempered and fairly well made. Black encrustation in bowl of pipe.* Courtesy TARL, UT-Austin, cat. number 1S-92-120B.

the bowl is an encrustation of black material, resulting, no doubt, from continued smoking.

What appears to be the bowl of a tiny pipe was found at a depth of 6". It is made of clay, shell tempered. The back and sides are flattened; and an incised line runs around the bowl  $\frac{1}{4}$ " from rim. Height of bowl,  $1\frac{1}{16}$ "; outside diameter  $\frac{3}{4}$ "; inside,  $\frac{3}{8}$ ".

Bowls: Judging from fragmentary vessels recovered, and from potsherds observed, it would seem that the bowl was the most common type of earthenware vessel of Indian manufacture at Aranama Mission. Of five broken bowls found was one easily restorable. The others have numerous parts missing. The finds of earthenware vessels of Spanish manufacture are recounted elsewhere in this report.

Near the northwestern edge of the mound were found (by the Goliad crew) some 12 or 15 small fragments of the same vessel. The thing of interest about the find was the presence of two large handles. One, complete and attached to a fragment of the vessel, was about  $\frac{3}{4}$ " in diameter, semi-circular in shape and attached to the body of the vessel after the manner in which handles appear on modern cups. The ware was of yellow clay, shell tempered, crudely made and not polished or glazed. The heap of potsherds rested immediately beneath a pile of buffalo bones, at a depth of 10". The second handle was broken, but all present. All the fragments found would not combine to make more than one-fourth of the original vessel.

The most unusual and important find made at this site consisted of a badly broken bowl; found at a depth of 18", with fragments scattered for a distance of some two feet [Figure A-29]. In a fire pit, with charred bone adhering to a few sherds. Shell tempered. The vessel was reconstructed in the field [Figure A-30]. It is  $8\frac{1}{2}$ " in diameter and  $4\frac{1}{2}$ " tall. No decoration. It is of a fairly well-fired, blackish clay. It bears a resemblance to certain undecorated vessels from burial sites in Northeast Texas.

About  $\frac{2}{3}$  of a tiny but thick bowl of yellow clay came from a depth of 18". From 15" came about  $\frac{1}{2}$  of another tiny bowl.

About  $\frac{1}{2}$  of a medium-sized bowl was found inverted and crushed, at a depth of 6" in north side of mound (Goliad crew).

A badly fragmented bowl or pot was encountered at a depth of 25" [Figure A-31]. The fragments (several hundreds in



Figure A-29. An earthenware bowl, broken and scattered, as found at a depth of 18 inches in excavations. Note the animal bones at the extreme right. Courtesy TARL, UT-Austin, photo 41GD1-7.

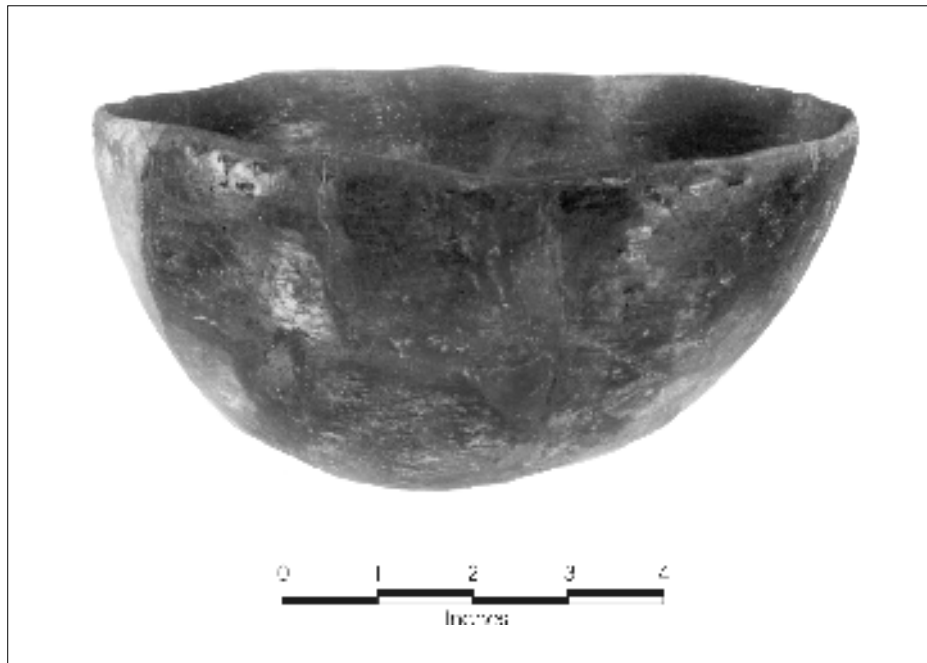


Figure A-30. Earthenware bowl restored from fragments. Found at a depth of 18 inches in midden deposit. Courtesy TARL, UT-Austin, photo 41GD1-39.



Figure A-31. *A badly fragmented vessel in midden deposit at depth of 25 inches.* Courtesy TARL, UT-Austin, photo 41GD1-8.

number) were very small, the largest being some 2" x 3" and the average about 1" x 1". It has two handles, one of which was unbroken. It appears that about one-half of the vessel is missing.

**Potsherds:** The potsherds in the midden deposit here are very numerous, the quantity per square yard being about the same as in the average N.E. Texas midden deposit at a large campsite. The quantity here, however, is not as great

as at the L. L. Winterbauer site, Wood Co.; A. C. Saunders site, Anderson Co.; or Mrs. Minnie Garrison site, Wood Co., Texas. Unlike the coastal region, the potsherds here in the Aranama midden are not so small and badly fragmented. Their average size is about 2½" x 3½" with many as large as 4" x 5". This situation also corresponds closely with that in N.E. Texas.

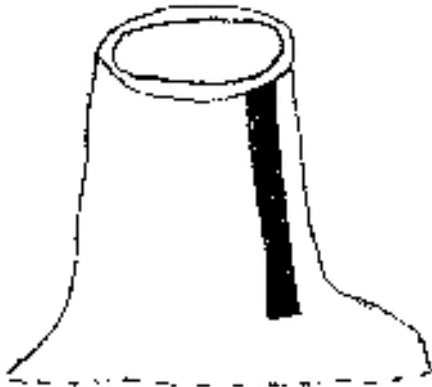
In addition to European pottery bearing a glaze on both sides, there appear occasional potsherds bearing a glaze on one side only; the other side appearing identical with pottery of Indian manufacture. This combination raises a question as to whether or not the Spaniards taught the Indian potters the art of glazing, and whether, in applying the newly acquired technique, the Indian potters retained a part of their old methods.

Two potsherds bearing holes drilled halfway through suggest two possibilities: (1) The sherds broke and the drilling was abandoned; (2) Holes purposely drilled halfway for inserting a bail to the vessel, perhaps using a bail from a Spanish bucket.

It is also worthy of note that very few potsherds found in the Aranama mound bear asphalt; while a considerable number of those found at San Rosario Mission, only a few miles distant, have a coating of asphalt on one or both sides—just as is the case at Webb Island and many other Texas coastal sites.

A probable explanation of the differences lies in the fact that the Karankawas (Carancoguaes), who are credited with having made the small scrapers and the coastal pottery that bears asphalt, had a number of members of their tribe in the San Rosario Mission, while none of them was in Aranama (Espíritu Santo) Mission.

From a depth of 10" came the neck of an earthenware bottle. The neck, which is 1¼" long, is crudely made of yellow clay, tempered with shell. The outside diameter at the rim of the neck is 1"; but the neck flares rapidly as it goes down. At the point where the neck broke there is evidence of a handle on each side. Running vertically from just above the handle to the rim was a stripe or band painted in asphalt. There was a like stripe on the other side. (Goliad crew). The shape of this clay bottle neck is suggestive of a modern glass bottle neck.



The white, flaky tempering material, which shows so prominently in many sherds, was at first thought to be crushed shell. But, on more careful examination under a small 10x glass, it seems probable that the temper may be bone or crushed limestone. Some of the Spanish bricks from this and the San José Mission at San Antonio disclose the same small white lumps as found in the pottery. This would seem to suggest crushed limestone—as the Europeans likely would not have used shell or bone. A fairly white limestone is to be found along the river bank near the mission. Laboratory tests should be made to determine definitely whether this tempering material is shell, bone or limestone.

The finding of Spanish influence in the ceramic art as practiced by the Indians at this mission causes one to wonder if the nomadic, non-pottery-making Indians served by the San Saba Mission, near the present town of Menard, may have been taught by the Spaniards to make pottery. (A survey of San Saba Mission and test trenches in the midden there would show whether they made pottery and answer the question.)

Note: A surface survey at San Saba Mission, made 8/17/34, showed potsherds of both Indian and Spanish origin and some evidence of partly glazed ware. But no pot handles were found at San Saba Mission. [signed A.T.J.]

Handles on Vessels: Vessels with handles seem to have been more numerous here than in most parts of northeast Texas. This statement is based on the relative number of handles to potsherds here as compared with other sites. The handles here tend toward the semi-circular “tea-cup type” of modern times; and strongly suggest Spanish influence, although the workmanship is unquestionably Indian.

The handles show to have been attached by pressing the ends of the handle through, or almost through, the side of the vessel; then flattening or “bradding” the ends of the handle and smoothing the spot over, while the clay was slightly plastic. Several handles with the ends stripped and a rim fragment showing the hole from which a handle was removed by breakage of the vessel all confirm the use of this method of attachment of handles. The handles vary from  $\frac{1}{4}$ " to  $\frac{3}{4}$ " in diameter and from 1" to 4" in length. While most of the handles were curved, a few consisted of straight lines with sharp angles.

A good sized fragment of a pot rim, with a handle attached horizontally—instead of vertically—and tilted slightly upward, came from a depth of 8". The upper edge of the handle was only  $\frac{1}{2}$ " below the rim. The handle was made after the fashion of handles or hand-grips on crockery churns and jars of pioneer day—except that instead of being attached to the vessel for the full length, this handle was fastened only at the ends and had a hole about  $\frac{1}{2}$ " in diameter between the center of the handle and the side of the vessel. The ends of the handle had been pressed into the side of the vessel and bradded, as in all other cases at this site. (Found by Goliad crew.)

From a depth of 54", near the center of the mound, came a rim sherd showing a round hole slightly less than  $\frac{1}{2}$ " in diameter. It seems to originally have contained a pot handle—that was not well “bradded”—and pulled out.

A pot knob, or leg, straight, 3" long and  $\frac{3}{4}$ " in diameter, with shell tempering, came from a depth of 8" in north edge of mound. It seems to have been attached to edge of rim and protruded upward rather than outward. (Goliad crew.)

One pot handle of clay was horizontal and tilted upward like copper handles found in the mound. It was not “bradded in” like other clay handles, but simply held by cohesion, being kneaded onto side of vessel just beneath rim. (Goliad crew.)

One handle was like others except for a groove on top and running length of handle.

One handle in horizontal position and tilted downward came from depth of 12".

Two small conical knobs, resembling legs on an iron kettle, found in mound. These suggest clay vessels on legs and raise a question as to whether the one described above may not also have been a clay pot leg.

Several Spanish pot or cup handles found are almost identical with those of Indian manufacture, and tend to show the origin of the Indian pot handles.

A total of 57 clay pot handles, 3 of copper and one of iron, was secured by U. of T. from this site [Figures A-32 and A-33].

On 11/5/33 several clay pot handles were found at San José Mission near San Antonio. They are identical in every respect to the ones found at Goliad [Figure A-34].

At a depth of 30", and 12 feet inward from the south edge of the mound, was part of the rim of a large copper vessel, with a heavy copper handle bradded to the rim and protruding upward 3". Handle is ½" in diameter.

Types of Vessel Rims: Four types of vessel rims have been noted among the potsherds. They are: (1) curved slightly inward, rounded and somewhat thinner than balance of vessel; (2) rim on same angle and same thickness as adjoining portion of vessel, some rounded, a few flat edge; (3) curved slightly outward, rim about same thickness, usually rounded but sometimes flat; (4) an unusual bevel-edge, ¼" to ½" slope, and flaring slightly outward with edge about one-half thickness of balance of vessel.

Did Indians Mend Vessels?: Several potsherds unearthed in the midden deposit seem to suggest efforts on the part of the Indians to mend broken vessels.

One such find was of a potsherd bearing seven small drilled holes near the edge. Presumably they were used to "sew" that fragment to another by means of small thongs.

The other suggestion of pot-mending was in the form of four potsherds bearing a thick coat of asphalt about ½" wide around the edges of the break on the inside. One of them also had asphalt on a part of the edge itself, as if it had been used as a cement.

Strengthening the impression made by these finds was still another, consisting of a sherd with a very thick application

of asphalt about ½" wide around both the inside and outside of the edge. No holes, however.

Ladle: A small earthenware ladle, from a depth of 14", was in perfect condition [Figure A-35]. Its total length is 2¾" which includes a pointed-end handle ¾" in length. Depth slightly less than 1". Yellow clay. Not polished but fairly well made. Real Indian work. Similar ladles come from Bussey Collection, Shelby Co., and from J. M. Riley Farm, Upshur Co., Texas.

Vessel Rest or Stand: What resembles a crude bird effigy came from a depth of 18". It shows to have been made of yellow clay, tempered with a small quantity of crushed shell and some coarse gravel. A crudely shaped "head" resting on a long, wide neck, at that time, seemed to label it as a bird effigy. Workmanship is very crude. At the base of the "neck" are two broken portions with an unbroken central part. Length of neck, 2½"; width at base, 1½"; at top of "head", ½". This object bears slight suggestion of a duck head. It is shaped about as shown in the following drawing and photo [photograph and artifact could not be located].



On November 5, 1933, while searching for Indian pottery at San José Mission near San Antonio, I met A. J. Madlem, who lives on the mission grounds. He is in charge of repairs and restoration to buildings and grounds, and has a collection gathered as a result of such work. Among other specimens was an earthenware object triangular in shape and with a slight knob at the ends of the three legs or projections. Its

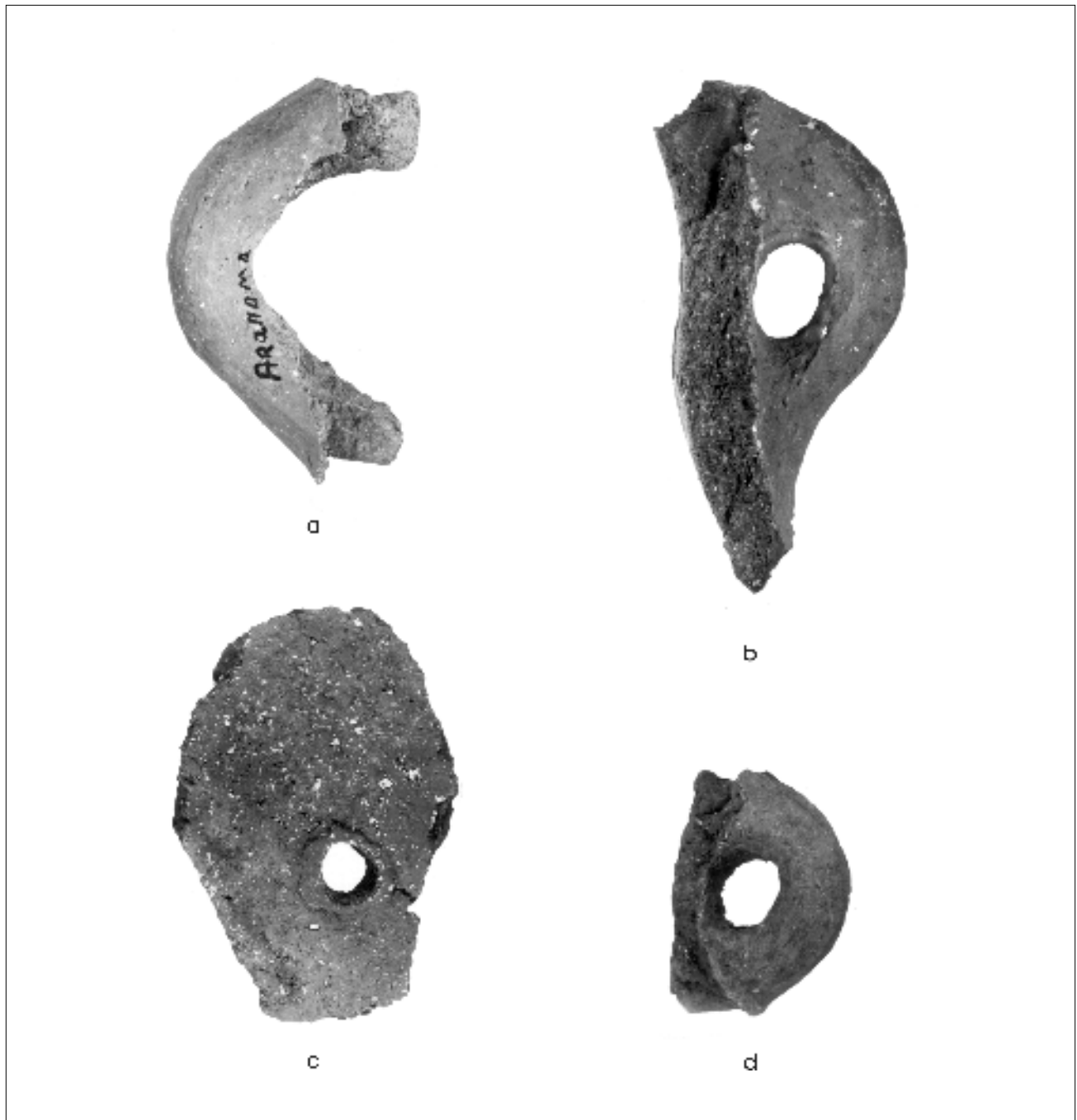


Figure A-32. Pot handles showing method of attachment to vessel. The ends of handle (a) were inserted in holes in the vessel (c) then flattened or “bradded” while plastic (d) and finally rubbed down and blended into complete handle (b). No scale. Courtesy TARL, UT-Austin, photo 41GD1-52.

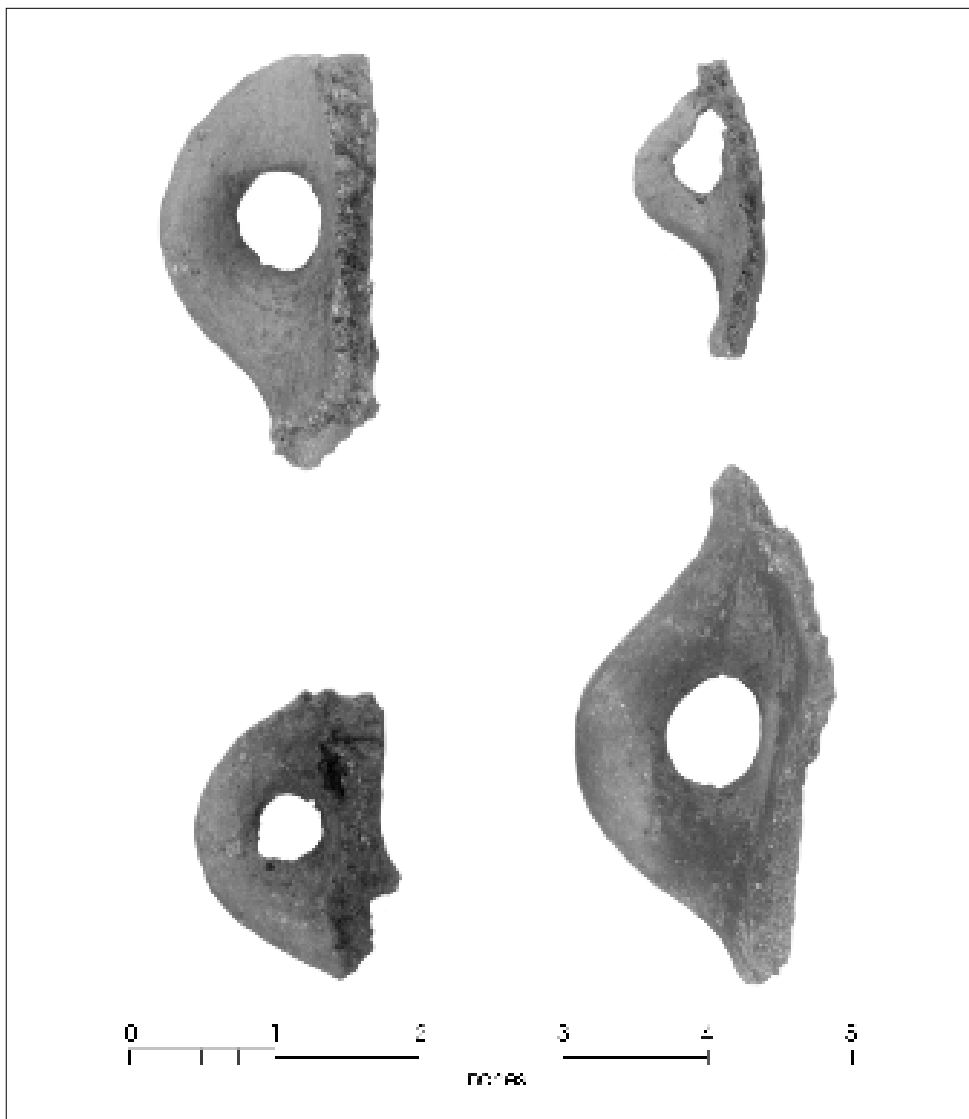
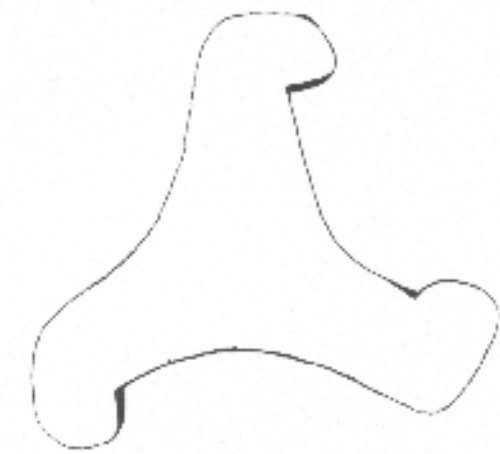


Figure A-33. This type of handle shows evidence of Spanish influence and is distinctly different from the handles of prehistoric pottery in East and Northeast Texas. Courtesy TARL, UT-Austin, photo 41GD1-48.



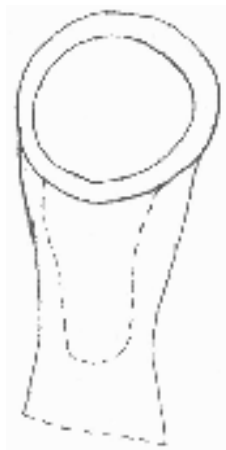
shape is as follows: length,  $2\frac{7}{8}$ "; thickness,  $\frac{5}{8}$ "; crudely made; bottom and top sides flat.



On seeing this object, it immediately became certain that the broken specimen excavated in midden mound at Aranama Mission at Goliad was the same type of article.

The top of each knob is slightly worn and two of them show evidence of a glaze, on the tip only. It was probably used as a rest or stand on which to place hot (?) vessels. It may have been made by Indians under Spanish influence.

Candle Holder (?): At a depth of 4", near center of the mound, was the bowl (?) of a clay pipe-like article of Indian manufacture. Crudely made of yellow clay end tempered with shell and gravel. The bowl, if such it be, is  $2\frac{1}{2}$ " tall,  $1\frac{1}{4}$ " outside diameter and  $\frac{3}{4}$ " inside diameter at top. It tapers gradually from top toward the bottom for 2", then begins to flare outward again. The hole is  $1\frac{1}{8}$ " deep and conical in shape. The inside is somewhat charred. The hole does not continue as in a pipe. This may have been an earthenware candle holder, with lower portion broken off.



Pottery and Stone Discs: No pottery disc with a hole in the center, such as frequently found in midden deposits in northeast Texas, was found in the Aranama mound.

But there was found one disc, some 2" in diameter and without a hole, ground down from a fragment of European glazed pottery. (Found by Goliad crew.)

A disc of unbaked clay  $1\frac{1}{4}$ " in diameter and  $\frac{1}{2}$ " thick, with no hole, from depth of 22".

Another disc, of Indian pottery, scarcely 1" in diameter, and without a hole; and a third, also of Indian pottery, about  $2\frac{1}{2}$ " in diameter, broken and without a drilled hole, were found in the north-central part of the mound. Both had edges worn smooth. (Found by Goliad crew.)

Three small discs not drilled. One copper disc 2" in diameter with  $\frac{1}{4}$ " hole in center. A stone disc  $1\frac{1}{4}$ " in diameter from depth of 12". Half of another stone disc, with drilled hole, came from 32".

A pottery disc 3" in diameter had no hole; depth 24".

Total of 19 pottery and 5 stone discs [Figures A-36 and A-37].

A few discs of stone and pottery identical with those at Goliad were found at San José Mission, San Antonio.

Game Pieces or "Marbles": Of interest as possibly having been used in games are two "marbles" (?), one of fired clay 1" in diameter; and the other of stone slightly larger and bearing a small smooth pit about  $\frac{1}{10}$ " deep [Figure A-38]. Depth 18".

## Arrowpoints and Spearheads

Projectile points of the following shapes and kinds were found [Figures A-39 and A-40].

## Evidence of Food

In the midden deposit were found hundreds of buffalo bones, some bones of ordinary cattle, a few of deer, rabbit and turkey. A very few oyster and clam shells were present; and freshwater mussel shells were likewise scarce, as compared to prehistoric sites in Central and East Texas. Snail shells in the midden were also very scarce. Few fish bones were found.



Figure A-34. Pot handles from San José Mission, Bexar County, Texas. These handles are pictured here to show that they are identical in technique to ones found at Aranama Mission, Goliad County. Courtesy TARL, UT-Austin, photo 41GD1-64.

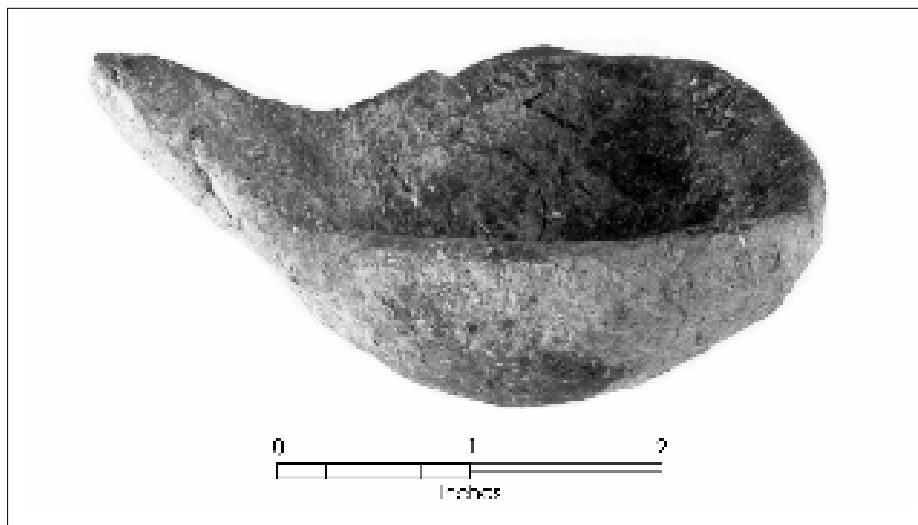


Figure A-35. Earthenware ladle. Courtesy TARL, UT-Austin, photo 41GD1-43.

These facts, no doubt, are largely explained by the statement of Solis that “at the mission their food consists of beef and cooked corn” (Solis Diary of 1767, page 14). With regard to corn and other crops, Solis further states: “It (Espíritu Santo Mission) has also large corn-fields. On these lands cotton, melons, potatoes, various kinds of peaches, figs, etc. are grown in large quantities” (Solis Diary of 1767, page 16) [Figure A-41].

“The mission has dwelling quarters for the religious, the soldiers and the Indians, and all these structures are respectable and sufficiently large” (Solis Diary of 1767, page 16).

If the Indians lived inside the mission yard part of the time, as we may infer from above, it accounts for the presence of a certain amount of midden material inside the walled yard. In digging a garbage pit inside the yard, at time of establishing our camp, we encountered camp refuse to a depth of 20”.

There is also much camp refuse, in the form of animal bones, broken pottery, flint chips and an occasional arrowpoint and flint scraper, just outside the stone yard fence. This, in a number of places, seems to have resulted from tossing rubbish over the fence in the process of cleaning the yard. This condition is especially pronounced along a portion of the north wall, which runs along the edge of the hill adjoining a ravine; and is least in evidence just outside the eastern or front side of the mission yard.

But every indication, particularly the midden mounds, seems to suggest that the Indians for long periods of time lived outside the yard to the west (near river) and to the south. The mound to the west of the fence is more than twice as large as that to the south, being a favored location, no doubt, on account of its proximity to the river.

At depths of 16” to 38” were found a few sheep and goat bones. This is not surprising, since Solis’ diary of 1767 states that this mission had 1,500 head of sheep and goats (Solis Diary of 1767, page 16).

Eleven gar scales, from a depth of 18”, suggests another item on the Indians’ menu.

The teeth of a gar were found on the same level as the heap of gar scales previously mentioned, but some 10 feet south. Sixty-three gar scales, some large (as much as 1 <sup>5</sup>/<sub>16</sub>” long) were in a heap at a depth of 12”. None showed evidence of work.

Also a few turkey bones and some large fish vertebrae tell of other meats that were eaten.

Anaque seeds were found in small deposits at several locations in the midden deposit. These berries, which taste somewhat like the hackberry, were doubtless eaten by the Indians. A row of these trees still grows at the “royal presidio” of La Bahia, ½ mile south of Aranama Mission

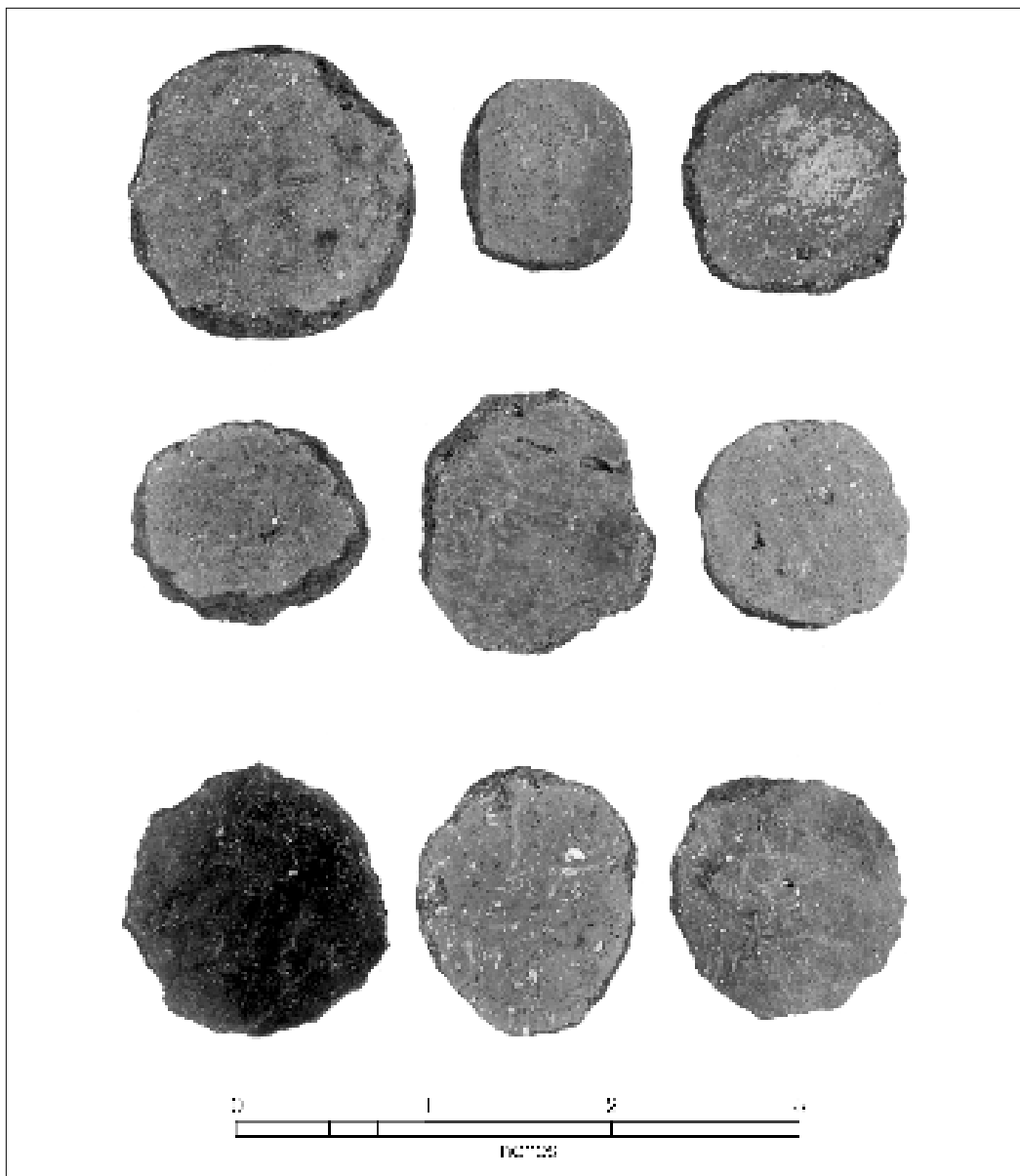


Figure A-36. Pottery discs recovered from midden deposit. Courtesy TARL, UT-Austin, photo 41GD1-49.

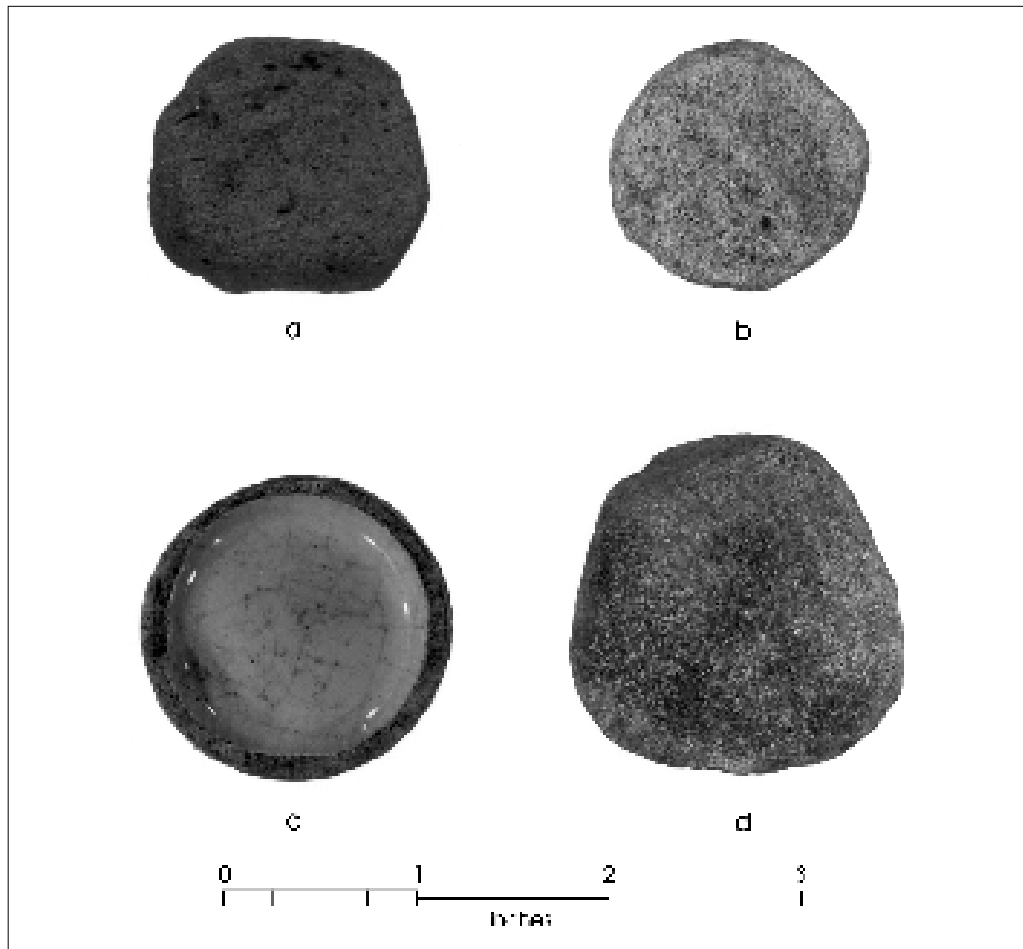


Figure A-37. Undrilled discs recovered from midden deposit. a) tempered, unfired clay; b) sandstone; c) European pottery; d) sandstone. Courtesy TARL, UT-Austin, photo 41GD1-47.

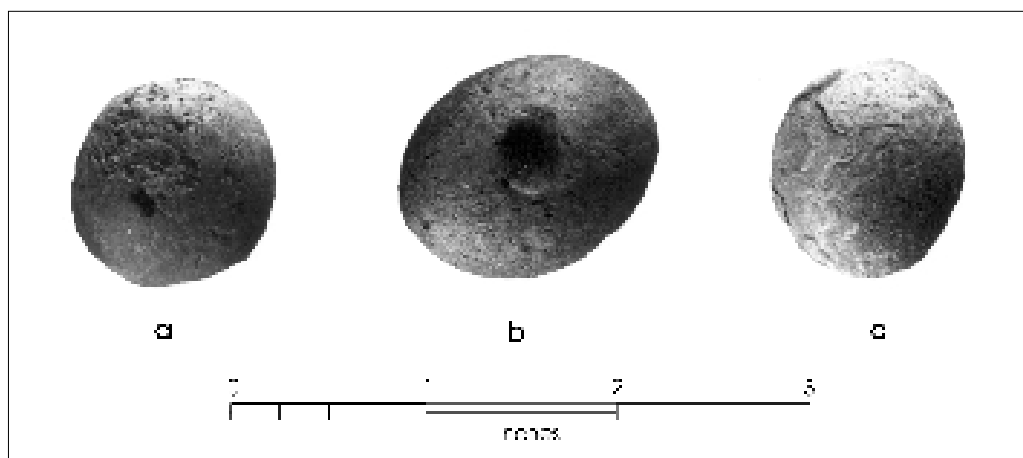


Figure A-38. Game pieces or “marbles”. a) clay; b-c) stone. Note pit in specimen b. Courtesy TARL, UT-Austin, photo 41GD1-57.



Figure A-39. Flint projectile points recovered from midden deposits. Courtesy TARL, UT-Austin, cat. numbers, left to right, (top) 1S-92-8, -31, -21B, -19E, (bottom) -7, -18B, -1B.



Figure A-40. Metal projectile points recovered from midden deposits. Courtesy TARL, UT-Austin, cat. numbers, left to right, 1S-92-94C, -95C, -95B.

[Figure A-42]; and 88 now grow around and within the yard of Aranama Mission. They are most plentiful along the west and south sides just outside the rock fence, or wall, adjacent to the dense midden deposits [Figures A-43, A-44, and A-45]. The largest and oldest of the anaque trees here is one growing 17 feet southeast of the southwest corner of the mission. Its trunk is 89 inches in circumference, or  $28\frac{1}{3}$  inches in diameter. The ones on top of the midden mound to the west of the fence range from 12 to 38 inches in circumference, or  $3\frac{4}{5}$  to 12 inches in diameter. The ones on the mound have, no doubt, attained their full growth since the abandonment of the mission.

A spot near the south edge of the mound contained a number of freshwater mussel shells, one of which was unusually large. There were a few snails on the surface, but no evidence of snail eating.

A few exceedingly small conch shells came from different depths in the midden.

Remains of a few mesquite beans were found in the midden deposit. There are many mesquite trees near. A number of black or Mexican persimmon trees grow on the mound.

A turkey leg bearing spur, from south edge of mound.

At 35" to 37", and 35 feet inward from N.W. edge of mound were found approximately 600 gar scales scattered over a space some 3 feet wide.

Deer bones seemed to be more numerous in the southern part of the mound. Also turkey bones.

At a depth of 40", and 41 feet inward from west center of mound, were found fragments of a corn cob. It was imbedded in a thin layer of charcoal, and in association with animal bones.

A few pecans of medium size were found in ash deposits at depths of 14" and 38". One squash seed was preserved in a deposit of ashes.

Animal bones were more numerous around edges than in central part of mound. This confirms the theory of the Indians having lived on the knoll. Bones naturally would be tossed to edge.

Inside and around the yard for some distance are plants of Mexican pepper, of small, round red type.

Bones present in the midden indicate the eating of the "soft-shell" turtle.



Figure A-41. Land formerly cultivated by Indians at Aranama Mission, Goliad County, Texas. Mission ruins in background. The growth seen here consists of mesquite trees. Courtesy TARL, UT-Austin, photo 41GD1-9.



Figure A-42. La Bahia, or Royal Presidio, as viewed from Aranama Mission about ½ mile to north, Goliad County. These missions, as may be here noted, were built on elevated sites that commanded a view of the surrounding country. Courtesy TARL, UT-Austin, photo 41GD1-10.



At a depth of 20" was a dog skull complete; but no other bones near. Dog may have been eaten.

The jaws of two dogs (possibly coyotes) may indicate another food.

Many of the animal bones were broken into splinters, no doubt incident to securing the marrow for food.

An alligator tooth pendant indicates alligator meat to eat.

Fragments of several deer skulls in the mound suggest the breaking into the skulls to obtain the brains.

Bones of rabbit and squirrel were not numerous.

At the southeast edge of the mound, very near the fence in the upper 3" to 5" of the deposit, were a number of cow bones with sawed ends. This sawing instead of breaking may indicate refuse from the mission at time occupied since the Civil War, and have no connection with the Indians.

Condition of Bones: It is interesting to note the condition of the bones from the bottom and top of the deep midden deposit. The bones from all depths were soft, brittle and somewhat decomposed at the ends; but there seemed to be little, if any, appreciable difference in the state of preservation of the oldest and the most recent ones. It is known that the mission activities were extended over a period of some 50 years. That was the period during which the midden mound was built up. These facts, then, would seem to indicate that 50 years makes no great difference in the state of preservation of midden bones.

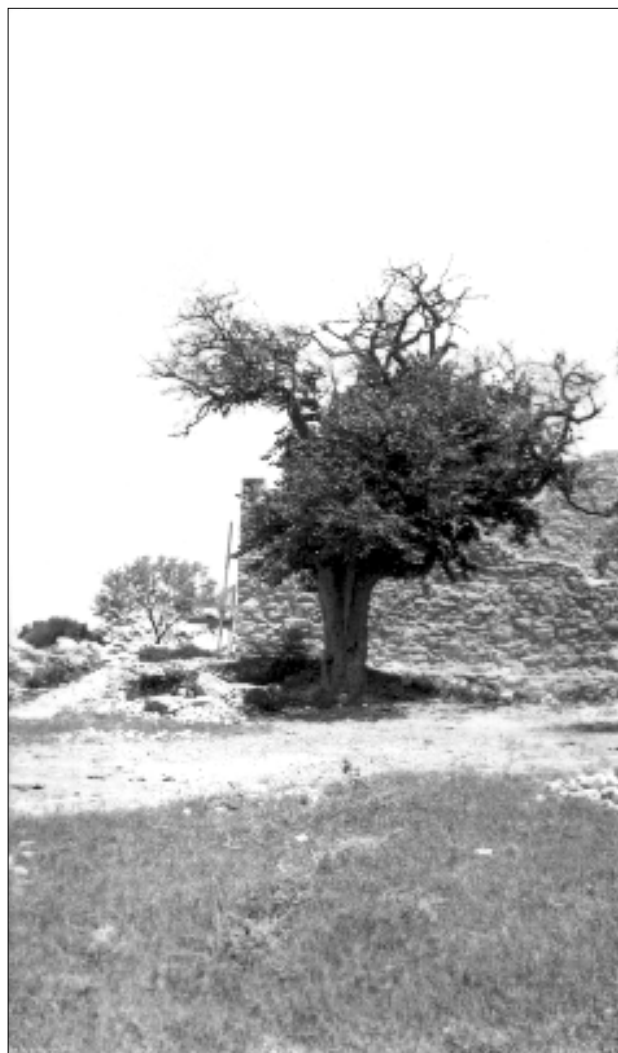


Figure A-43. Large anaque tree at corner of Aranama Mission, Goliad County. Courtesy TARL, UT-Austin, photo 41GD1-11.

### Depths of Mound Deposit

Figure A-46 shows excavation of the midden deposits.

The depths of the mound or midden deposit through the highest, or central, portion are as follows:

Western edge	5"
9 feet inward (to east)	27"
15 feet inward (to east)	52"
20 feet inward (to east)	53"
23½ feet inward (to east)	47"
30 feet inward (to east)	49"
32 feet inward (to east)	56"

39 feet inward (to east)	51"
42 feet inward (to east)	53"
48 feet inward (to east)	48"
54 feet inward (to east)	46"
56 feet inward (to east)	49"
62 feet inward (to east)	44"
66 feet inward (to east)	41"
68 feet inward (to east)	48"
73 feet inward (to east)	43"
76 feet inward (to east)	47"
80 feet inward (to east)	47"
85 feet inward (to east)	40"
87 feet inward (against wall)	40"

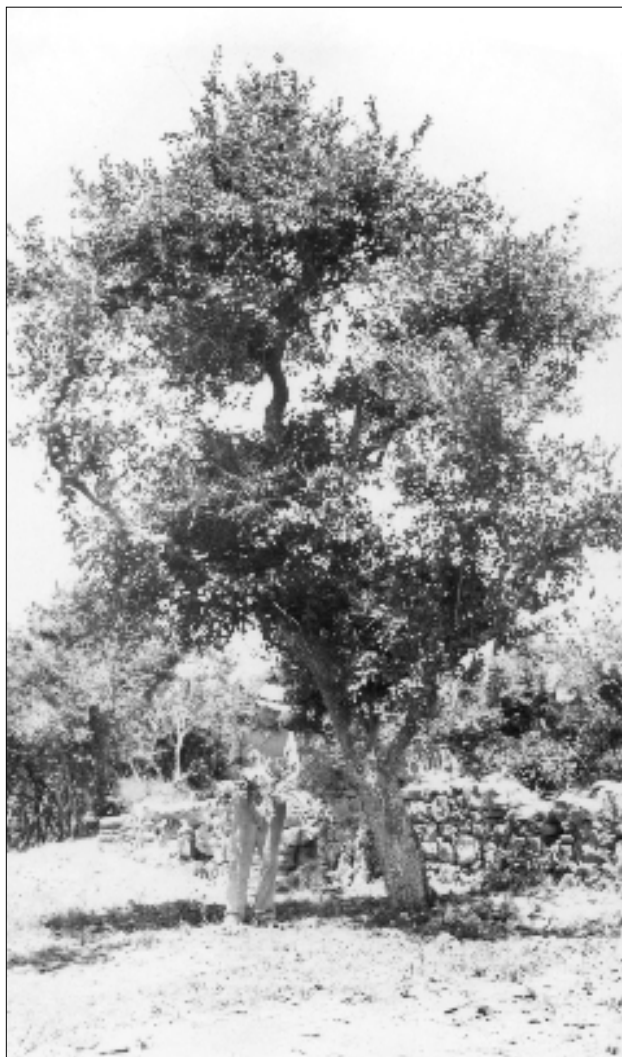


Figure A-44. *Anaque tree loaded with berries just outside stone fence that encloses mission.* Courtesy TARL, UT-Austin, photo 41GD1-12.



Figure A-45. *Anaque tree loaded with berries beside stone fence.* Courtesy TARL, UT-Austin, photo 41GD1-13.



Figure A-46. Excavating midden mound, Aranama Mission. Courtesy TARL, UT-Austin, photo 41GD1-14.

Against the wall or fence at the S.E. edge of the mound the deposit was 40" deep, with the wall extending above 46". The deposit, as well as the wall foundation, rested on bedrock. At this point the wall is 7'2" high [Figure A-47]. Apparently the wall was completed before the mound began to be built. Before the midden material accumulated, thus gradually lessening its height, the fence would have presented quite an obstacle to hostile Indians on the outside.

### Mission Quarters and Grounds

Solis states in his diary of 1767 that this mission had "dwelling-quarters for the religious, the soldiers and the Indians, and all of these structures are respectable and sufficiently large" (Solis Diary of 1767, page 16).

The only building with any part of walls now standing is the church building, or mission proper. It is located near the center of an enclosed yard that is approximately 300 square feet. The mission, of the usual thick-wall (33" to 42") stone structure, was partly demolished a number of years ago to secure stone for other building purposes in the town of Goliad [Figures A-48 through A-52].

Judge J. A. White, now County Judge of Goliad County, who has been untiring in his efforts to have the mission restored, tells me that the old building has had a varied and colorful history. After abandonment of mission activities, about 1790 to 1800 (?), the mission was secularized. It was the scene of a battle on March 18, 1836, the day before Fannin's retreat from La Bahia. Prior to the Civil War, Aranama College was located adjacent to the mission, and the latter occupied. All the students enlisted in the Confederate Army and the college was abandoned. For some years, around 1900, the mission was occupied as a residence. At that time it was converted into a two-story building. Later it was used as a storage place for hay. Then it was almost dismantled for its stones. In recent years local enterprise has resulted in securing the property by the town and county and having the site set aside as Goliad State Park. State of Texas has made small appropriations for clearing the undergrowth around the place. R.F.C. funds have been utilized to begin the restoration of the building. If and when completed, it is intended for the mission to house a small museum, including specimens gathered around the mission environs. Such is the reason for the Goliad crew working with U. of T. crew.



Figure A-47. Trench in midden deposit, showing stone fence 7'2" tall that enclosed Aranama Mission. The deposit at this point is 40 inches deep, with the fence extending 46 inches above. Courtesy TARL, UT-Austin, photo 41GD1-15.

From what now remains of the mission, it seems to have originally consisted of a small room, 16 x 10 feet inside, on the north; and a long room, 18 x 55½ feet inside, on the south. There is some evidence indicating that this long room was originally divided into three rooms.

While no other walls of buildings remain, there are heaps of ruins both to the northeast and southeast of the mission proper. These heaps may mark the sites of the original structures for the soldiers and Indians. One to N.E. probably



Figure A-48. Entrance to Aranama (Espíritu Santo) Mission. Courtesy TARL, UT-Austin, photo 41GD1-16.

for Indians. To the east of the mission is another heap of ruins. This may have been the “dwelling-quarters for the religious.” To the northwest of the mission was a dug well, which is now filled.

The grounds were enclosed by a thick stone wall or fence, with a gateway near the center of the eastern wall, leading to the entrance of the mission. The fence has fallen down in places, but is still in a fair state of preservation. It has a uniform thickness of 26" and in places is 6 to 7 feet high.

Connecting with the southeast corner of the yard is a low terrace of earth, of breast-work-like appearance, leading in an easterly direction toward the river half a mile away. (River meanders considerably.) The dirt for the “terrace” came from



Figure A-49. *Aranama Mission yard, showing part of the remains of the massive stone fence, or enclosing wall. Courtesy TARL, UT-Austin, photo 41GD1-17.*



Figure A-50. *Front view of the ruins of Aranama Mission. In process of restoration, July 1933. Courtesy TARL, UT-Austin, photo 41GD1-19.*

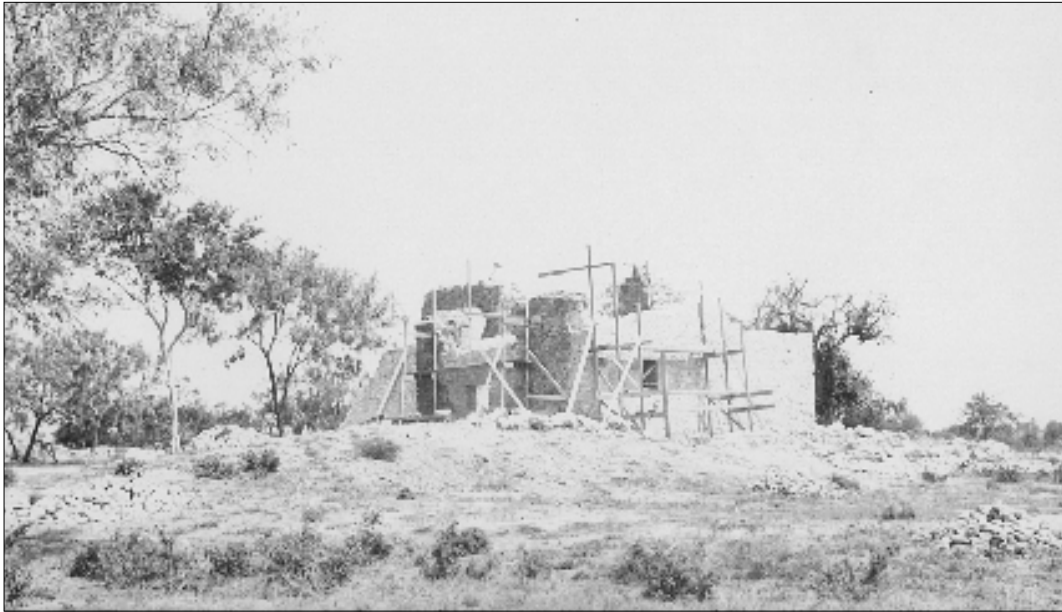


Figure A-51. Rear view of the ruins of Aranama Mission. In process of restoration, July 1933. Courtesy TARL, UT-Austin, photo 41GD1-20.

the north side. This could hardly have been an irrigation ditch, since it does not follow the contour of the land but runs in a direct line. Besides, Solis says no irrigation was practiced at this mission because the banks of the river were too steep (Solis Diary of 1767, page 16). Local tradition has it that this is an embankment or breastwork thrown up by Fannin's men. Some say it was once a brush fence. Along the embankment for some 100 yards from the mission yard are 28 anaque trees. In some spots the bank is almost leveled; for most of its length, however, it has a height of two to three feet, and is from six to nine feet wide at the base.

To the south of this ditch and the mission yard stretches a level, fertile strip of land nearly half a mile square. This presumably was the land cultivated by the Spaniards, with Indian labor. It extends from Aranama Mission to within 100 yards of the channel of San Antonio River.

(When speaking of the river being to the west and south of the mission, one must take into consideration the stream's meanderings.)

See rough sketch of mission and environs [Figure A-53].

Stones for erection of the building and fence are reported to have been secured from an outcrop of sandy limestone along

the bank of the river a few hundred yards N.W. of the mission. Several deep ravines at that place are said to have resulted from removing the soil and quarrying the underlying stone. One site shows evidence of such quarrying [Figures A-54 and A-55]. The mission Indians, of course, did the manual labor connected with such operations.

To the north of the yard, some 20 to 60 feet from the fence, is a depression several feet deep. Although this may be natural, there is at least a possibility that it was dug out either in quarrying stone for the building and fence, or to secure dirt for filling in low spots inside the yard.

### Cross Section of the Midden

The first 30 feet at the outer (western) edge of the mound was composed of the same general type of deposit—consisting of brown loam, a small quantity of ash, many animal bones, a few shells (mostly freshwater), some fish bones, fragments of pottery—both Indian and European—pieces of copper and iron of various sizes, square nails rusted into fragments, small pieces of glass, flint chips with a few flint artifacts, a few trade beads, buttons, metal knife and scissor blades, and various other small articles, all intermixed with the soil and a large number of unburnt small limestone rocks.

Beginning about 30 feet inward from the west edge and some 20 feet inward from the south edge, a cross section showed the following:

1" to 9" – Animal bones, few mussel shells, flint chips, pottery of Indian and European manufacture, a few fragments of copper, iron, and other refuse, intermixed with brown loam.

9" to 16" – Ash streak, intermixed with lime plaster in small lumps and a few small stones. No camp refuse or artifacts.

16" to 33" – Brown midden deposit very similar to that from 1" to 9". Chief difference between the two strata is that the one from 16" to 33" contains more fragments of metal.

33" to 45" – Stratum composed of chunks of wall plaster or lime ranging in size from 1" x 1" x 1" to 3" x 6" x 2", intermixed with a certain amount of ash. Like the stratum from 9" to 16", this one contains no camp refuse or artifacts.

45" to 53" – Black midden deposit very similar to stratum from 16" to 33". Glazed pottery, copper and iron found at bottom in association with Indian pottery and flint work. Many animal bones.

54" – Undisturbed earth with limestone just beneath.

At a distance of 32 feet inward from western edge and 30 feet from southern edge, a cross section showed the following:

1" to 8" – Brown stratum consisting of the usual midden material of bones, shell, etc., together with Indian and European pottery, flintwork and metal fragments.

8" to 30" – Sterile stratum of wall plaster, lime and a few small stones intermixed. No camp refuse or artifacts of any kind.

30" to 48" – Stratum similar to that from 8" to 30", except that the one from 30" to 48" also contains a considerable quantity of charcoal and fewer lumps of plaster or lime [lime?]. No camp refuse or artifacts.



Figure A-52. A view in one of the rooms in Aranama Mission. Courtesy TARL, UT-Austin, photo 41GD1-21.

48" to 56" – Layer of black midden deposit, containing animal bones, fragments of Indian pottery and a few flint chips and artifacts. No glazed pottery or metal found at this place. (But in other places European articles on bottom.)

57" – Undisturbed earth and limestone.

The finding of no European articles in the bottom layer as indicated above is not considered significant, and is thought to be a mere coincidence, since such articles were repeatedly



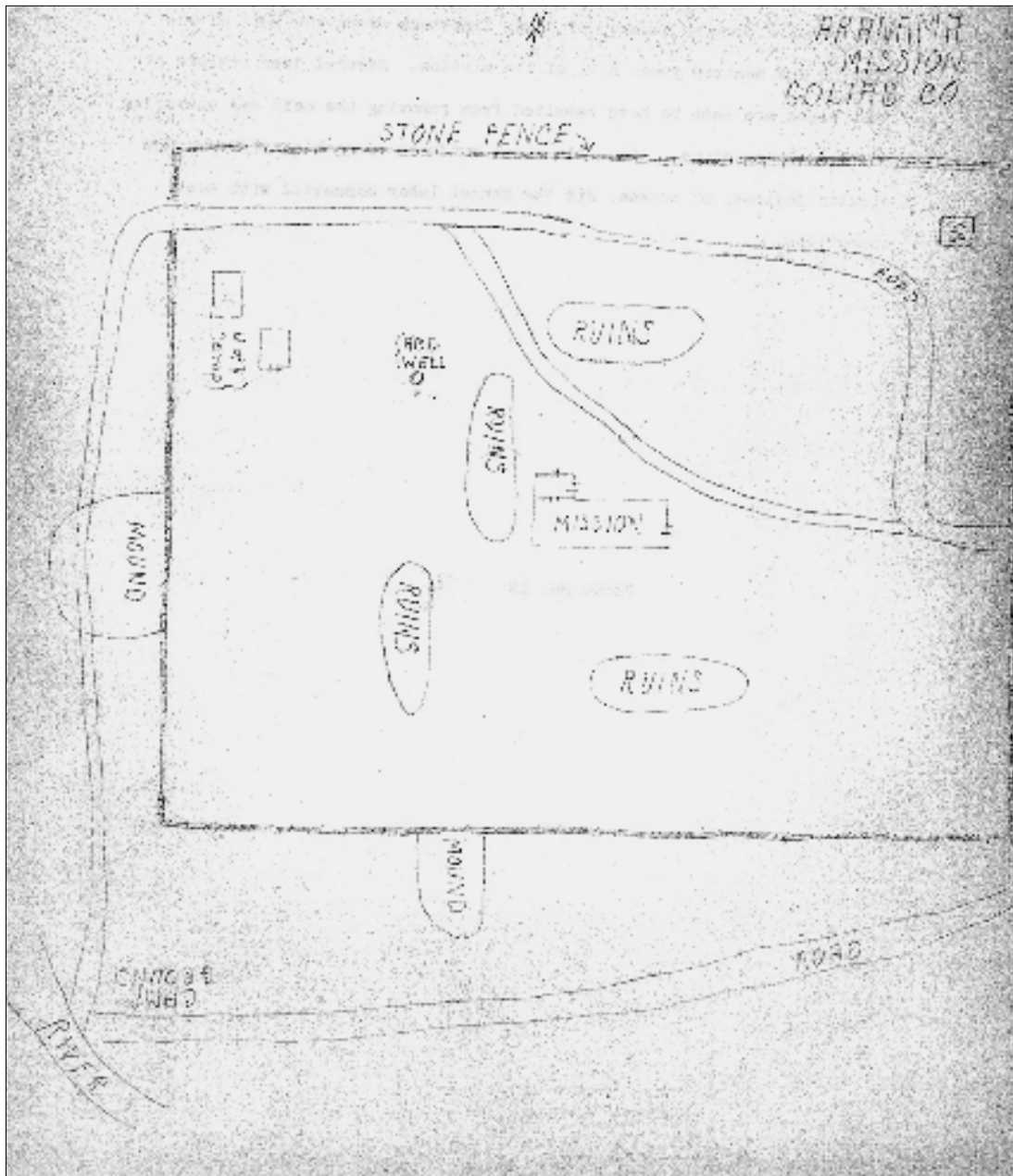


Figure A-53. Sketch of the mission and environs. Courtesy TARL, UT-Austin (from original 1933 manuscript).



found in the bottom level at all parts of the mound—even within six feet of the spot discussed above.

With this single exception, the cross section last given is typical of the central part of the midden mound.

Toward the outer edges of the mound there were more bones and discarded articles and less ashes than in the central part. This suggests that the fires were in the center and scraps were tossed toward the edges of the gradually growing heap.

The presence of distinct layers containing no Indian camp refuse, but with their midden material beneath and above in each case, would suggest periodic replastering of the mission building with consequent dumping of large quantities of old plaster and refuse on the Indian dump heap. Then the Indians resumed their occupation of the slightly higher mound.

### Continued Use of Bows and Arrows

The finding of projectile points at all depths in the midden deposit proves that their use was not entirely abandoned at any time in mission days [Figures A-56 and A-57].

In this connection in Solis' diary we read as follows: "The mission probably numbers some 300. Among these are about 65 warriors, 30 of whom are armed with guns and the other 35 with bows and arrows, spears and boomerangs" (Solis Diary of 1767, page 17).



Figure A-54. Stone quarry site, Aranama Mission. Courtesy TARL, UT-Austin, photo 41GD1-22.



Figure A-55. Location where stone was quarried for Aranama Mission. Courtesy TARL, UT-Austin, photo 41GD1-23.

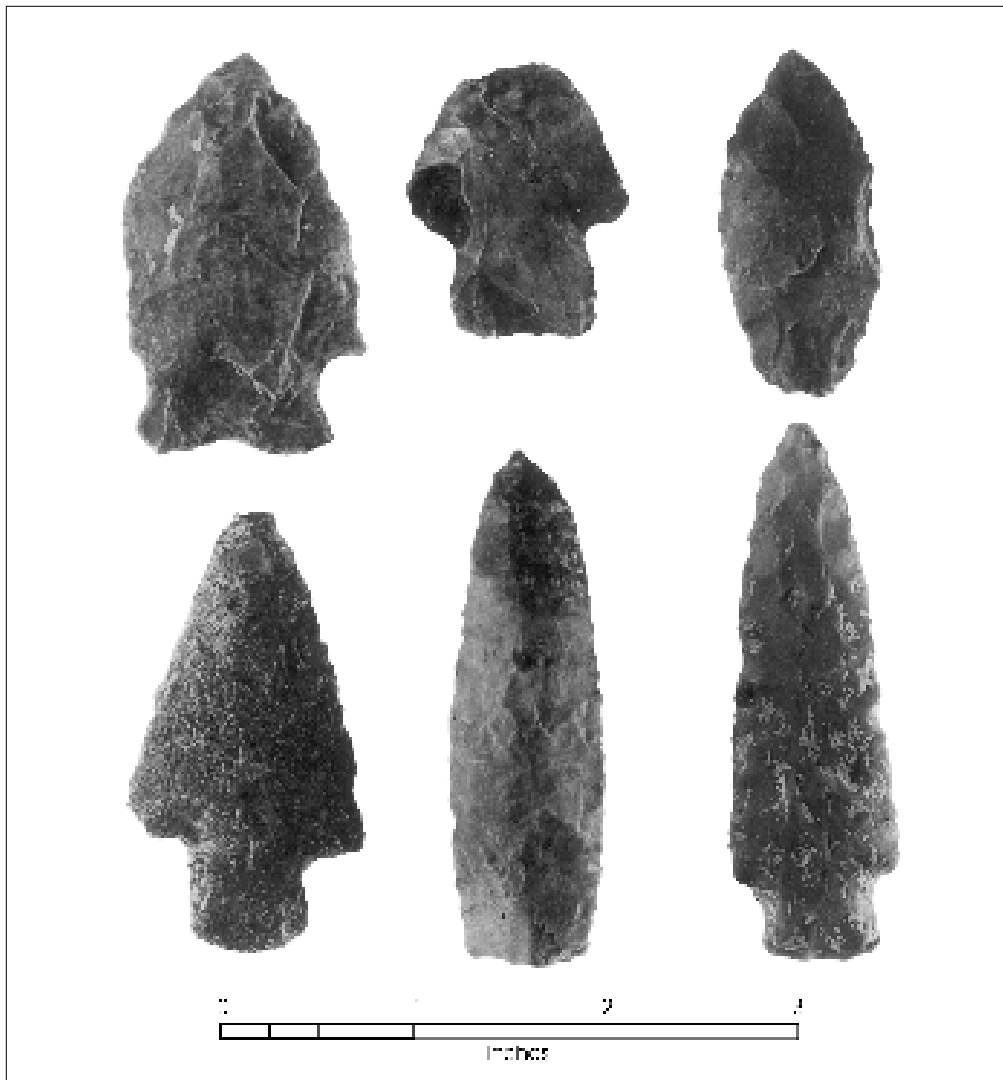


Figure A-56. Large, crudely made projectile points from various depths in the midden deposit. Courtesy TARL, UT-Austin, photo 41GD1-63.

### Abandonment of Work

It was my plan to completely excavate the large midden mound; and then do a considerable amount of work in several small midden deposits at various points around the enclosing wall or fence and dig in the cemetery at Aranama Mission. But several days before the large midden mound was complete I received orders from Prof. J. E. Pearce, Head of the Anthropology Dept. and Director of Research in Texas

Archeology at Austin, to abandon the work at Goliad and move the crew at once to Polk County, Texas, to test certain sites in the latter region. I worked the crew one day more at Aranama Mission, after receiving orders to move; then abandoned work at the site, in accordance with orders, on August 14, 1933.



Figure A-57. Small flint arrow points from various depths in the midden deposit. A few of these are slightly suggestive of the small arrow points found in burials in Northeast Texas. But the Goliad specimens are not so thin and well-worked. Courtesy TARL, UT-Austin, cat. numbers, left to right, (top) 1S-92-158(?), -13, -17, -16B, -15A, (bottom) -14A, -2, -15C, -12.

## Summary of Finds

Table A-1 presents a summary of the artifacts recovered from the midden deposit at Aranama Mission.

## Outstanding Features

Among the outstanding features at Aranama Mission are:

1. Evidence showing extent to which Indians abandoned use of certain aboriginal implements and weapons on securing better ones from Spaniards. There seems to be an open question as to whether
2. The midden deposit itself bespeaks a following of the old manner of living.
3. Evidence showing extent to which the Indians mastered certain European arts, such as an attempt at glazing pottery and adoption of European shape of handles.

the continued use of stone, bone and shell artifacts was due to more than an inadequate supply of European articles or to slowness on the part of the Indians to abandon their old way of doing things.

Table A-1. Summary of Finds

Earthenware Bowls			
	Restorable	1	
	Non-restorable	4	
	Total	5	
Earthenware Ladle		1	
Pipes			
	Clay (broken)	7	
	Stone	1	
	Total	8	
Trade Pipe Stems (fragments)		3	
Discs (not drilled)			
	Pottery	19	
	Stone	5	
	Total	24	
Pot Knob of Clay, plain		1	
Pottery Vessel Rest (part gone)		1	
Potsherds Patched with Asphalt		4	
Pot Handles			
	Clay	57	
	Copper	3	
	Iron	1	
	Total	61	
Pot Hooks, Copper		7	
"Marbles" or Game Pieces			
	Clay	1	
	Stone	2	
	Total	3	
Spearheads			
	Flint	5	
	Copper	1	
	Total	6	
Arrowpoints			
	Flint	28	
	Copper	5	
	Gar Scale	5	
	Iron or Steel	4	
	Glass	2	
	Total	44	
Knives			
	Flint	17	
	Flint Flake	8	
	Steel	9	
	Petrified Wood	1	
	Total	35	
Flint Scrapers			
	Side	152	
	End	104	
	Total	256	
Bone Crushers			
	Flint	26	
	Petrified Wood	1	
	Total	27	
Flint Spoke Shaves or "Drawing Knives"		5	
Flint War Club Spikes		7	
Axes			
	Flint Fist (coup de poing)	8	
	Flint (for hafting)	2	
	Steel, small	1	
	Copper(?), small	1	
	Total	12	
Gunflints		12	
Gouges			
	Flint	5	
	Copper	2	
	Petrified Wood	1	
	Iron	1	
	Total	9	
Awls			
	Bone	6	
	Steel or Iron	3	
	Square Nails (worked)	3	
	Copper	2	
	Flint	1	
	Total	15	
Flaking Tools			
	Deer Bone	9	
	Deer Antler	4	
	Total	13	
Abrading Stone, small		1	
Hammerstones		3	
Manos			
	Indian	14	
	Mexican	5	
	Total	19	
Metates			
	Indian	3	
	Mexican	1	
	Total	4	

Table A-1. continued...

Round Pebbles	6
Polished Pebbles (not round)	2
Ocher	
Red	15
Yellow	1
Total	16
Mussel Shell Implements	
Hoe (not pierced)	3
Spoon	1
Pierced Shell	1
Total	5
Metal Spoon	1
Large Square Nails	2
Scissors	
Complete	2
Fragmentary	7
Total	9
Brass Thimble	1
Metal Saw Fragment	1
Iron Staple, large	1
Iron Pins	3
Iron Band, hole at each end	1
Chain Fragments	2
Iron Hooks or Latches	3
Iron Bars with Hole at End	2
Brass Gun Decoration	1
Trigger Guard	1
Spurs	
Rowels	2
Fragmentary	1
Total	3
Brass Buckles	2
Iron Buckles	1
Iron Keys	3
Iron Lock	1
Watch Case (fragment)	1
Bottoms of Copper and Brass Vessels	2
Copper Container, tiny	1
Iron Pot Fragment	1
Brass Vessels, small	2
Brass Vessel Fragment	1
"Tear Cup" of Spanish Pottery	1
Sheet Copper	4
Copper Wire	1
Brass Celt or Gouge	1
Bottom of China Cup	1
Glass "Hat Pin" Knob	1
Brass Letter "H"	1
Jet Set	1
Brass Finger Rings	5
Brass Pendants and Breast Pins with Glass Sets	6
Glass Pendant	1
Crucifix	1
Brass Bugle Insignia	2
Metal Badge or Medal	1
Lead Medallion bearing coat of arms	1
Jew's Harp	1
Strips of Metal Cloth	4
Silver Coin	1
Leather Boot Heel	1
Beads	
Glass	387
Bone	9
Shell	8
Total	404
Buttons	
Brass	24
Gold Plated	3
Copper	2
Lead	2
Pearl	1
Porcelain	1
Total	33
Wall Plaster (fragments), painted red	40
Lumps of Gypsum	12
Fragments of Mica	2
Lump of Sulphur, small	1
Fragment of Slate	1
<b>Grand Total</b>	<b>1189</b>
<b>Recapitulation</b>	
European Articles	611
Articles of Indian Origin	578
Total	1189

4. Illustration of Indians' fondness for beads and cheap jewelry, as indicated by such European articles in midden.
5. Abandonment (by force perhaps) of old manner of burial in camp refuse.
6. Decadence of their native arts, even when they continued to practice them.
7. Evidence of work Indians were forced to do, quarrying stone, etc.

[Signed *A.T. Jackson* at bottom of page.]

## **Appendix B**

### **Native American Ceramic Analysis Attributes**

Table B-1. Native American Ceramic Analysis Attributes

FS#	Specimen	Cat #	Fca. #	AU	Ceramic Type	Sherd			Temper Type	Temper Density	Temper note	Firing Core	Firing Int	Firing Ext	Ex. Surface Finish	Interior Surface Finish	Decoration Int	Decoration Ext	Thickness (mm)	Orifice (cm)	Weight (g)	Comment
						Type	Rim Form	Lip Form														
117	1	2005-120-010	1	Goliad	body				Bone/Sand	Moderate	burned bone	Reduced	Oxidized	Reduced	smooth	smooth	none	none	5		1.06g	
117	1	2005-120-011	1	Goliad	rim	deep bowl	tapered	deep bowl	Bone/Sand	Moderate	burned bone	Reduced	Reduced	Reduced	smooth	smooth	none	none	6.5	16	3.83	
118	1	2005-121-004	1	Goliad	body			unknown	Bone/Sand	Abundant	burned bone	Reduced	Oxidized	Fire Clouded	flashed	none	none	6		1.87		
121	1	2005-124-6	1	Goliad	body				Bone/Sand	Sparse	burned bone	Reduced	Oxidized	Fire Clouded	flashed	smooth	none	9.5		7.25		
121	2	2005-124-6	1	Goliad	body				Bone/Sand	Sparse	feldspar fiber	Reduced	Oxidized	Oxidized	uneven	smooth	none	5.5		4.22	fiber (very fine) in void	
121	3	2005-124-6	1	Goliad	body				Bone/Sand	Sparse	sandstone, little bone	Oxidized	Oxidized	Oxidized	smooth	uneven	none	none	4		2.15	very sandy paste, little bone, buff color sherd
121	4	2005-124-6	1	Goliad	body				Bone	Abundant	burned bone	Reduced	Reduced	Reduced	uneven	uneven	none	none	7		5.93	
121	5	2005-124-6	1	Goliad	body				Bone/Sand	Moderate	feldspar burned bone	Reduced	Oxidized	Oxidized	rough	smooth	none	none	5		1.88	
121	1	2005-121-13	1	Goliad	rim	deep bowl	point	deep bowl	Bone/Sand	Abundant	feldspar burned bone	Reduced	Oxidized	Oxidized	rough	rough	none	none	5.5	22	6.78	
121	2	2005-121-13	1	Unknown Native	rim	straight	flatten	unknown	Bone/Sand	Moderate	burned sandstone	Oxidized	Oxidized	Oxidized	smooth	smooth	none	none	5	Unknown	3.06	Sandstone, chert and sand inclusions, very little bone present, platy breaks
123	1	2005-126-026	1	Goliad	rim	unknown	round	deep bowl	Bone	Abundant	burned bone	Reduced	Fire Cloud	Oxidized	flashed	flashed	none	none	6.5	Unknown	3.2	sand grains evident on exterior of sherd
123	2	2005-126-026	1	Goliad	rim	unknown	round	unknown	Bone/Sand	Abundant	feldspar	Reduced	Reduced	Reduced	flashed	flashed	none	none	6	Unknown	1.91	
123	1	2005-126-12	1	Goliad	body				Bone/Sand	Sparse	very little	Zoned	Oxidized	Oxidized	smooth	smooth	none	none	6		2.6	void present
123	2	2005-126-12	1	Goliad	body				Bone	Abundant	burned bone	Reduced	Reduced	Reduced	smooth	smooth	none	none	6		3.16	
123	3	2005-126-12	1	Goliad	body				Bone	Abundant	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	7		3.59	
123	4	2005-126-12	1	Goliad	body				Bone	Moderate	burned bone	Reduced	Fire Clouded	smooth	smooth	none	none	4		1.59	missing interior	
123	5	2005-126-12	1	Goliad	body				Bone	Abundant	burned bone	Reduced	Fire Cloud	Reduced	smooth	smooth	none	smudge	6.5		4.26	
123	6	2005-126-12	1	Goliad	body				Bone	Abundant	burned bone	Reduced	Oxidized	Fire Clouded	smooth	smooth	none	none	9.5		4.06	
123	7	2005-126-12	1	Goliad	body				Bone/Sand	Abundant	burned bone	Reduced	Oxidized	Fire Clouded	flashed	smooth	none	none	7.5		4.09	
123	8	2005-126-12	1	Goliad	body				Bone	Moderate	burned bone	Reduced	Oxidized	Oxidized	smooth	rough	none	none	6		4.11	
123	1	2005-126-	1	Rockport	rim	unknown	flatten	unknown	Bone/Sand	Sparse	burned bone	Reduced	Fire Cloud	Fire Clouded	smooth polish	smooth polish	none	none	3.5	Unknown	1.29	very sparse tempering, clay appears platy
119	1	2005-122-15	2	Goliad	body				Bone	Abundant	burned bone sandstone	Oxidized	Oxidized	smooth	smooth	none	none	6		2.28	paste appears reduced due to burned bone	
119	2	2005-122-15	2	Goliad	rim				Bone	Moderate	burned bone	Oxidized	Fire Cloud	Fire Clouded	smooth	smooth	none	none	6	Unknown	2.12	appears reduced due to burned bone
119	3	2005-122-15	2	Goliad	body				Bone/Sand	Abundant	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	6		2.98	
119	4	2005-122-15	2	Goliad	body				Bone/Sand	Moderate	burned bone	Reduced	Oxidized	Reduced	smooth	smooth	none	smudge	6		2.8	
119	5	2005-122-15	2	Goliad	body				Bone/Sand	Moderate	burned bone	Oxidized	Oxidized	Oxidized	smooth	smooth	none	asphaltum	7		5.17	
120	1	2005-123-8	2	Goliad	body				Bone/Sand	Moderate	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	6.5		1.89	
120	2	2005-123-8	2	Goliad	body				Bone/Sand	Moderate	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	7.5		2.8	
120	3	2005-123-8	2	Goliad	body				Bone	Sparse	burned bone	Reduced	Reduced	Oxidized	smooth	smooth	none	none	13		6.38	
120	4	2005-123-8	2	Goliad	body				Bone	Sparse	burned bone	Reduced	Oxidized	Reduced	brushed	smooth	none	smudge	6		2.3	
120	5	2005-123-8	2	Goliad	body				Bone/Sand	Sparse	burned bone	Reduced	Reduced	Oxidized	brushed	brushed	none	none	13		14.01	
124	1	2005-127-008	2	Goliad	rim	unknown	flatten	unknown	Bone	Abundant	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	5.5	Unknown	3.76	
124	2	2005-127-008	2	Goliad	rim	unknown	point	unknown	Bone	Moderate	burned bone	Reduced	Reduced	Reduced	smooth	smooth	none	none	6	10	1.63	
124	2	2005-127-8	2	Goliad	body				Bone	Moderate	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	8.5		5.26	
124	3	2005-127-8	2	Goliad	body				Bone	Sparse	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	7		4.5	
124	4	2005-127-8	2	Goliad	body				Bone	Sparse	burned bone	Reduced	Oxidized	Reduced	smooth	smooth	none	smudge	8		4.89	
124	6	2005-127-8	2	Goliad	body				Bone	Moderate	burned bone	Reduced	Reduced	Fire Clouded	smooth	smooth	none	none	5		5.22	
124	7	2005-127-8	2	Goliad	body				Bone/Sand	Moderate	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	7.5		2.07	
124	8	2005-127-8	2	Goliad	body				Bone	Moderate	burned bone	Reduced	Oxidized	Fire Clouded	smooth	smooth	none	smudge	9.5		5.14	
124	9	2005-127-8	2	Goliad	body				Bone/Sand	Moderate	burned bone	Reduced	Reduced	Fire Clouded	smooth	smooth	self slipped	none	6.5		4.69	
124	10	2005-127-8	2	Goliad	body				Bone/Sand	Abundant	burned bone	Oxidized	Fire Cloud	Fire Clouded	smooth polish	smooth	self slipped	self slipped	6.5		4.43	
124	11	2005-127-8	2	Goliad	body				Bone/Sand	Moderate	burned bone	Reduced	Oxidized	Fire Clouded	smooth	smooth	none	none	7		6.44	
124	12	2005-127-8	2	Goliad	body				Bone	Sparse	burned bone	Reduced	Oxidized	Reduced	smooth	smooth	none	none	7		5.82	
124	13	2005-127-8	2	Goliad	body				Bone	Abundant	burned bone	Reduced	Reduced	Oxidized	smooth	smooth	none	none	7.5		2.48	
124	14	2005-127-8	2	Goliad	body				Bone	Abundant	burned bone	Reduced	Reduced	Oxidized	smooth	smooth	none	none	6.5		3.41	
124	15	2005-127-8	2	Goliad	body				Bone	Sparse	burned bone	Reduced	Oxidized	Reduced	smooth	smooth	none	none	7		2.12	
124	16	2005-127-8	2	Goliad	body w/ handle frag				Bone	Moderate	burned bone	Reduced	Oxidized	Reduced	smooth	smooth	none	none	13		3.52	
124	17	2005-127-8	2	Goliad	body				Bone	Sparse	burned bone	Reduced	Oxidized	Reduced	smooth	smooth	none	smudge	7.5		3.44	
124	18	2005-127-8	2	Goliad	body				Bone	Sparse	burned bone	Reduced	Reduced	Reduced	smooth	smooth	none	smudge	6.5		2.18	
124	19	2005-127-8	2	Goliad	body				Bone/Sand	Moderate	burned bone	Reduced	Reduced	Reduced	smooth	smooth	none	none	9		1.74	
124	5	2005-127-8	2	Goliad	body				Bone	Abundant	burned bone	Reduced	oxidized	fire clouded	smooth polish	smooth	none	self slipped	7		5.09	
124	20	2005-127-8	2	Goliad	body				Bone	Abundant	burned bone	Reduced	reduced	oxidized	smooth	smooth	none	none	5.5		1.23	
124	21	2005-127-8	2	Goliad	body				Bone	Moderate	burned bone	Reduced	fire clouded	oxidized	smooth	smooth	none	none	6.5		2.12	
124	22	2005-127-8	2	Goliad	body				Bone/Sand	Moderate	burned bone	Reduced	Reduced	fire clouded	smooth	smooth	none	none	5.5		1.39	
124	23	2005-127-8	2	Goliad	body				Bone/Sand	Moderate	burned bone	Reduced	Reduced	oxidized	smooth	smooth	none	none	5		1.8	
124	24	2005-127-8	2	Goliad	body				Bone	Abundant	burned bone	Reduced	Reduced	oxidized	smooth	smooth	none	none	6		1.23	
124	25	2005-127-8	2	Goliad	body				Bone	Moderate	burned bone	Reduced	Reduced	reduced	smooth	smooth	none	none	6		1.17	
124	26	2005-127-8	2	Goliad	body				Bone	Abundant	burned bone	Reduced	Reduced	oxidized	smooth	smooth	none	none	6.5		1.15	
124	27	2005-127-8	2	Goliad	body				Bone/Sand	Moderate	burned bone	Reduced	oxidized	reduced	smooth	smooth	none	none	8.5		1.57	
124	28	2005-127-8	2	Goliad	body				Bone/Sand	Moderate	burned bone	Oxidized	oxidized	oxidized	smooth	smooth	none	none	6.5		1.28	
124	29	2005-127-8	2	Goliad	body				Bone	Abundant	burned bone	Reduced	oxidized	oxidized	smooth	smooth	none	none	7.5		1.35	
124	30	2005-127-8	2	Goliad	body				Bone	Abundant	burned bone	Reduced	oxidized	oxidized	smooth	smooth	none	none	7.5		2.21	
124	31	2005-127-8	2	Goliad	body				Bone	Moderate	burned bone	Reduced	oxidized	oxidized	smooth	smooth	none	none	7.5		2.28	
124	32	2005-127-8	2	Goliad	body				Bone/Sand	Moderate	burned bone	Reduced	Reduced	reduced	smooth	smooth	none	none	5.5		2.23	
124	33	2005-127-8	2	Goliad	body				Bone	Sparse	burned bone	Reduced	Reduced	oxidized	smooth	smooth	none	none	6.5		1.08	
124	34	2005-127-8	2	Goliad	body				Bone	Abundant	burned bone	Reduced	Reduced	reduced	smooth	smooth	none	none	7		1.67	
124	35	2005-127-8	2	Goliad	body				Bone/Sand	Abundant	burned bone	Reduced	Reduced	oxidized	smooth	smooth	none	none	7.5		2.59	
124	36	2005-127-8	2	Goliad	body				Bone/Sand	Sparse	burned bone	Reduced	Reduced	oxidized	smooth	smooth	none	none	5.5		1.42	
124	37	2005-127-8	2	Goliad	body				Bone/Sand	Abundant	burned bone	Reduced	Reduced	oxidized	smooth	smooth	none	none	5		0.61	
124	38	2005-127-8	2	Goliad	body				Bone/Sand	Moderate	burned bone	Reduced	Reduced	reduced	smooth	smooth	none	none	5		1.35	
124	39	2005-127-8	2	Goliad	body				Bone/Sand	Sparse	burned bone	Reduced	Reduced	reduced	smooth	smooth	none	asphaltum	5.5		1.97	
124	40	2005-127-8	2	Goliad	body				Bone	Moderate	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	6.5		1.48	
124	41	2005-127-8	2	Goliad	body				Bone	Moderate	burned bone	Reduced	Oxidized	Reduced	smooth	smooth	none	smudge	6		1.13	
124	42	2005-127-8	2	Goliad	body				Bone	Abundant	burned bone	Oxidized	Oxidized	Oxidized	smooth	smooth	none	none	7		1.31	
124	43	2005-127-8	2	Goliad	body				Bone	Abundant	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	7		1.76	
124	44	2005-127-8	2	Goliad	body																	



Table B-1. continued...

FS#	Specimen	Cat #	Fca. #	AU	Ceramic Type	Sherd				Temper Type	Temper Density	Temper note	Firing Core	Firing Int	Firing Ext	Ex. Surface Finish	Interior Surface Finish	Decoration Int	Decoration Ext	Thickness (mm)	Orifice (cm)	Weight (g)	Comment
						Rim Form	Lip Form	Vessel Form	Type														
124	45 2005-127-8		2	Goliad	body	Bone	Moderate	burned bone	Reduced	Reduced	Reduced	smooth	smooth	smudge	smudge	6	1.53						
124	47 2005-127-8		2	Goliad	body	Bone/Sand	Abundant		Reduced	Reduced	Reduced	smooth	smooth	smudge	smudge	5.5	1.69						
124	49 2005-127-8		2	Goliad	body	Bone	Abundant		Reduced	Reduced	Fire Clouded	smooth	smooth	none	smudge	5.5	1.19						
126	1 2005-129-007		2	Goliad	body	Bone/Sand	Sparse		Reduced	Fire Cloud	Reduced	brushed	smooth	none	none	9	12.88						
126	2 2005-129-007		2	Goliad	body	Bone	Moderate	burned bone	Reduced	Oxidized	Fire Clouded	smooth	smooth	none	none	8.5	16.69						
122	1 2005-125-007	1	3	Goliad	body	Bone	Sparse		Reduced	Oxidized	Oxidized	smooth	smooth	smudge	none	7	6.31						
122	2 2005-125-007	1	3	Goliad	body	Bone	Moderate	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	6	1.8						
122	3 2005-125-007	1	3	Goliad	body	Bone/Sand	Moderate	burned bone	Reduced	Oxidized	Fire Clouded	smooth	smooth	none	none	7	3.01						
122	4 2005-125-007	1	3	Goliad	body	Bone	Sparse		Reduced	Reduced	Oxidized	smooth	smooth	none	none	6	1.16						
122	5 2005-125-007	1	3	Goliad	body	Bone/Sand	Moderate	sandstone burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	6	1.54						
125	1 2005-128-009	1	3	Goliad	body	Bone/Sand	Moderate		Reduced	Oxidized	Oxidized	rough	smooth	none	none	6.5	1.47						
128	1 2005-132-003	1	3	Goliad	body	Bone	Sparse		Reduced	Fire Cloud	Fire Clouded	smooth	smooth	asphaltum	asphaltum	6	23.04						
129	1 2005-133-003	1	3	Goliad	body	Bone	Abundant	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	6	1.73						
130	1 2005-134-008	1	3	Goliad	rim	Bone	Moderate		Reduced	Reduced	Fire Clouded	smooth	smooth	none	none	6	Unknown						
130	12 2005-134-008	1	3	Goliad	handlle	Bone	Moderate		Reduced	Reduced	Reduced	polished	smooth	polish	none	15	6.89						
130	1 2005-134-008	1	3	Goliad	body	Bone	Moderate		Reduced	Reduced	Reduced	smooth	smooth	none	none	5.5	5.4						
130	3 2005-134-008	1	3	Goliad	body	Bone	Moderate		Reduced	Oxidized	Oxidized	rough	rough	asphaltum	none	7	3.24						
130	2005-134-008	1	3	Goliad	body	Bone/Sand	Moderate	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	6.5	2.94						
130	5 2005-134-008	1	3	Goliad	body	Bone	Abundant		Reduced	Oxidized	Oxidized	smooth	smooth	none	none	6.5	2.35						
130	6 2005-134-008	1	3	Goliad	body	Bone/Sand	Moderate		Reduced	Fire Cloud	Oxidized	smooth	smooth	none	none	6	1.22						
130	7 2005-134-008	1	3	Goliad	body	Bone/Sand	Sparse	burned bone	Reduced	Oxidized	Reduced	smooth	polish	smooth	none	9	1.93						
130	8 2005-134-008	1	3	Goliad	body	Bone/Sand	Moderate		Reduced	Fire Cloud	Oxidized	smooth	smooth	none	none	6	2.11						
130	9 2005-134-008	1	3	Goliad	body	Bone/Sand	Moderate	burned bone	Reduced	Reduced	Oxidized	rough	smooth	none	none	6	2.53						
131	1 2005-135-007	1	3	Goliad	body	Bone	Moderate	bone	Reduced	Oxidized	Oxidized	rough	rough	none	none	7	6.53						
131	2 2005-135-007	1	3	Goliad	body	Bone/Sand	Sparse	burned bone	Reduced	Oxidized	Fire Clouded	smooth	smooth	none	none	6	2.1g						
131	1 2005-135-007	1	3	Goliad	rim	Bone	Abundant		Oxidized	Oxidized	Oxidized	smooth	smooth	none	none	5.5	Unknown						
133	1 2005-139-005	1	3	Goliad	rim	Bone/Sand	Abundant	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	6	Unknown						
133	2 2005-139-005	1	3	Goliad	rim	Bone	Abundant	burned bone	Reduced	Oxidized	Fire Clouded	smooth	smooth	none	none	6.5	Unknown						
133	3 2005-139-005	1	3	Goliad	body	Bone	Abundant		Reduced	Reduced	smooth	smooth	none	none	6.5	1.18							
133	4 2005-139-005	1	3	Goliad	body	Bone	Moderate		Reduced	Reduced	Reduced	smooth	smooth	none	none	7	1.99						
133	5 2005-139-005	1	3	Goliad	body	Bone	Moderate	burned bone	Reduced	Reduced	Oxidized	smooth	smooth	none	none	6	2.02						
133	6 2005-139-005	1	3	Goliad	body	Bone/Sand	Abundant	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	6	3.95						
133	7 2005-139-005	1	3	Goliad	body	Bone	Moderate	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	7	1.43						
133	8 2005-139-005	1	3	Goliad	body	Bone	Abundant		Reduced	Reduced	Reduced	smooth	smooth	none	none	7	3.11						
133	9 2005-139-005	1	3	Goliad	body	Bone/Sand	Abundant	burned bone	Reduced	Reduced	Fire Clouded	smooth	smooth	smudge	none	8	12.91						
127	1 2005-130-013	2	4	Goliad	body	Bone	Sparse		Reduced	Oxidized	Reduced	smooth	smooth	none	none	6.5	2.69						
127	2 2005-130-013	2	4	Goliad	body	Bone	Moderate	burned bone	Reduced	Reduced	Reduced	smooth	smooth	none	none	8	3.61						
127	3 2005-130-013	2	4	Goliad	body	Bone	Abundant	burned bone	Reduced	Reduced	Reduced	smooth	polish	smooth	none	smudge	7	2.79					
127	4 2005-130-013	2	4	Goliad	body	Bone/Sand	Moderate		Reduced	Reduced	Reduced	smooth	polish	smooth	none	smudge	7	6.94					
127	5 2005-130-013	2	4	Goliad	body	Bone	Sparse	burned bone	Reduced	Reduced	zoned	smooth	smooth	none	smudge	7	10.17						
127	6 2005-130-013	2	4	Goliad	body	Bone	Moderate	sandstone	Reduced	Reduced	zoned	smooth	smooth	none	smudge	8	13.19						
127	7 2005-130-013	2	4	Goliad	body	Bone	Sparse		Reduced	Fire Cloud	Fire Clouded	smooth	polish	smooth	none	none	8.5	17.35					
127	8 2005-130-013	2	4	Goliad	body	Bone	Sparse	burned bone	Reduced	Reduced	Reduced	smooth	smooth	none	none	6	5.15						
127	9 2005-130-013	2	4	Goliad	body	Bone/Sand	Abundant	sandstone	Oxidized	Oxidized	Oxidized	smooth	polish	smooth	none	none	8	5.15					
127	10 2005-130-013	2	4	Goliad	body	Bone/Sand	Abundant	burned bone	Reduced	Reduced	Reduced	smooth	smooth	none	none	9.9	7.27						
127	11 2005-130-013	2	4	Goliad	body	Bone/Sand	Sparse	burned bone	Reduced	Reduced	Reduced	smooth	smooth	none	none	10	7.63						
127	12 2005-130-013	2	4	Goliad	body	Bone	Moderate	burned bone	Reduced	Reduced	Reduced	smooth	smooth	none	none	7	1.69						
127	13 2005-130-013	2	4	Goliad	body	Bone	Moderate		Reduced	Oxidized	Oxidized	smooth	smooth	none	none	6	1.14						
127	14 2005-130-013	2	4	Goliad	body	Bone/Sand	Moderate	burned bone	Reduced	Reduced	Oxidized	smooth	smooth	none	smudge	6	1.2						
127	1 2005-130-012	2	4	Goliad	rim	Bone/Sand	Moderate	grog	Reduced	Reduced	Reduced	smooth	smooth	polish	none	none	8	20					
127	2 2005-130-012	2	4	Goliad	rim	Bone/Sand	Sparse		Reduced	Reduced	Reduced	smooth	smooth	none	none	7	Unknown						
135	1 2005-143-005	2	4	Goliad	body	Bone/Sand	Abundant	burned bone	Reduced	Fire Cloud	Reduced	smooth	smooth	none	none	8	12.64						
135	3 2005-143-005	2	4	Goliad	body	Bone	Moderate	burned bone	Reduced	Reduced	Reduced	smooth	smooth	none	none	6	2.4						
135	4 2005-143-005	2	4	Goliad	body	Bone/Sand	Sparse	burned bone	Reduced	Oxidized	Reduced	smooth	smooth	none	none	5	2.72						
135	6 2005-143-005	2	4	Goliad	body	Bone/Sand	Abundant	Feldspar	Reduced	Reduced	Reduced	smooth	smooth	none	smudge	11.5	4.24						
135	7 2005-143-005	2	4	Goliad	body	Bone/Sand	Moderate	burned bone	Reduced	Reduced	Fire Clouded	smooth	smooth	none	smudge	6	2.33						
135	10 2005-143-005	2	4	Goliad	body	Bone/Sand	Abundant	burned bone	Reduced	Reduced	Reduced	smooth	smooth	none	none	6	1.23						
135	12 2005-143-005	2	4	Goliad	body	Bone	Abundant	burned bone	Reduced	Oxidized	Oxidized	smooth	rough	none	none	9	5.74						
135	13 2005-143-005	2	4	Goliad	body	Bone	Moderate		Reduced	Reduced	Fire Clouded	smooth	smooth	none	none	5.5	0.78						
135	15 2005-143-005	2	4	Goliad	body	Bone	Sparse	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	7	3.52						
135	16 2005-143-005	2	4	Goliad	body	Bone	Abundant	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	7	3.28						
135	17 2005-143-005	2	4	Goliad	body	Bone	Abundant	burned bone	Reduced	Reduced	Oxidized	smooth	smooth	none	none	7	3.51						
135	18 2005-143-005	2	4	Goliad	body	Bone	Moderate	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	7.5	1.56						
135	19 2005-143-005	2	4	Goliad	body	Bone	Abundant	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	8	3						
135	20 2005-143-005	2	4	Goliad	body	Bone/Sand	Moderate	burned bone	Reduced	Oxidized	Reduced	smooth	smooth	none	none	7.5	1.14						
135	4 2005-143-005	2	4	Goliad	body	Bone/Sand	Abundant	burned bone	Reduced	Reduced	Reduced	smooth	smooth	none	none	7	5.39						
135	5 2005-143-005	2	4	Goliad	body	Bone	Sparse	burned bone	Zoned	Reduced	Reduced	smooth	smooth	none	none	6	1.64					core has very red paste but appears reduced due to burned temper	
135	8 2005-143-005	2	4	Goliad	body	Bone	Moderate	plant fiber burned bone	Reduced	Fire Cloud	Fire Clouded	smooth	smooth	none	none	8.5	2.83						
135	9 2005-143-005	2	4	Goliad	body	Bone/Sand	Sparse	burned bone	Reduced	Reduced	Reduced	smooth	smooth	none	none	8	1.84						
135	14 2005-143-005	2	4	Goliad	body	Bone	Sparse	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	6	3.73						
135	20 2005-143-05	2	4	Goliad	rim	Bone/Sand	Moderate	burned bone	Reduced	Fire Cloud	Fire Clouded	smooth	smooth	none	none	8	26						
135	21 2005-143-05	2	4	Goliad	rim	Bone/Sand	Abundant		Reduced	Oxidized	Oxidized	smooth	smooth	none	none	6.5	Unknown						
135	22 2005-143-05	2	4	Goliad	rim	Bone/Sand	Moderate		Reduced	Reduced	Reduced	smooth	smooth	none	none	6.5	19						
135	23 2005-143-5	2	4	Goliad	rim	Bone	Moderate		Reduced	Fire Cloud	Reduced	smooth	smooth	asphaltum	none	6	Unknown						
135	24 2005-143-5	2	4	Goliad	rim	Bone/Sand	Moderate	burned bone	Reduced	Reduced	Fire Clouded	smooth	smooth	none	none	7	28						
137	8 2005-146-006	2	4	Goliad	body	Bone	Moderate		Reduced	Reduced	Reduced	smooth	smooth	none	none	5.5	2.04						
137	1 2005-146-006	2	4	Goliad	body	Bone/Sand	Abundant		Reduced	Reduced	Reduced	smooth	smooth	none	none								

Table B-1. continued...

FS#	Specimen	Cat #	Fea. #	AU	Ceramic Type	Sherd Type	Rim Form	Lip Form	Vessel Form	Temper Type	Temper Density	Temper note	Firing Core	Firing Int	Firing Ext	Ex. Surface Finish	Interior Surface Finish	Decoration Int	Decoration Ext	Thickness (mm)	Orifice (cm)	Weight (g)	Comment
137	2 2005-146-006	2	4	Goliad	body					Bone/Sand	Sparse		Reduced	Reduced	Reduced	smooth	smooth	none	none	9		1.4	
137	3 2005-146-006	2	4	Goliad	body					Bone/Sand	Sparse	burned bone	Reduced	Reduced	Reduced	smooth	smooth	none	none	5		1.45	
137	4 2005-146-006	2	4	Goliad	body					Bone/Sand	Sparse	burned sandstone	Reduced	Reduced	Reduced	smooth	smooth	none	none	8		2.17	
137	23 2005-146-006	2	4	Goliad	body					Bone	Moderate		Reduced	Oxidized	Oxidized	smooth	smooth	none	none	6		3.15	
137	21 2005-146-006	2	4	Goliad	body					Bone/Sand	Abundant	burned bone	Reduced	Reduced	Oxidized	smooth	smooth	none	none	7		4.97	
137	22 2005-146-006	2	4	Goliad	body					Bone	Moderate	burned bone	Reduced	Reduced	Reduced	smooth	smooth	none	smudge	8.5		9.85	
137	20 2005-146-006	2	4	Goliad	body					Bone/Sand	Abundant	burned bone	Oxidized	Oxidized	Reduced	smooth	floatated	none	none	6		3.58	
137	15 2005-146-006	2	4	Goliad	body					Bone	Abundant	burned bone	Reduced	Reduced	Oxidized	smooth	smooth	none	none	8		13.27	possibly rim
137	16 2005-146-006	2	4	Goliad	body					Bone	Sparse		Reduced	Oxidized	Reduced	smooth	smooth	none	smudge	8.5		8.73	
137	18 2005-146-006	2	4	Goliad	body					Bone	Moderate		Reduced	Reduced	Reduced	smooth	smooth	none	smudge	7		3.16	
137	6 2005-146-006	2	4	Goliad	body					Bone	Abundant	burned bone	Reduced	Oxidized	Oxidized	smooth	smooth	none	none	6		1.89	
137	19 2005-146-006	2	4	Goliad	body					Bone/Sand	Sparse	burned bone	Reduced	Oxidized	Reduced	smooth	smooth	none	asphaltum lin	8.5		7.61	
137	9 2005-146-006	2	4	Goliad	body					Bone/Sand	Abundant	burned bone	Reduced	Reduced	Reduced	smooth	smooth	none	none	8		5.49	
137	13 2005-146-006	2	4	Goliad	body					Bone/Sand	Moderate	burned bone	Reduced	Reduced	Reduced	smooth	smooth	none	none	9		16.64	
137	12 2005-146-006	2	4	Goliad	body					Bone	Abundant		Reduced	Reduced	Reduced	smooth	smooth	none	none	7		4.16	
137	5 2005-146-006	2	4	Goliad	body					Bone/Sand	Abundant	burned bone	Reduced	Reduced	Oxidized	smooth	smooth	none	none	8		1.97	
137	11 2005-146-006	2	4	Goliad	body					Bone	Abundant		Reduced	Reduced	Reduced	smooth	smooth	none	none	7		4.48	
137	7 2005-146-006	2	4	Goliad	body					Bone	Moderate		Reduced	Reduced	Reduced	smooth	smooth	none	smudge	9		6.18	
137	14 2005-146-006	2	4	Goliad	body					Bone	Sparse		Reduced	Oxidized	Oxidized	smooth	smooth	none	none	6		1.02	
137	17 2005-146-006	2	4	Goliad	body					Bone/Sand	Moderate		Reduced	Reduced	Reduced	smooth	smooth	none	none	8		1.57	
137	10 2005-146-006	2	4	Goliad	body					Bone/Sand	Moderate		Reduced	Reduced	Reduced	smooth	smooth	none	none	6		1.78	
141	1 2005-150-011	2	4	Goliad	base					Bone/Sand	Sparse		zoned	Oxidized	Fire Clouded	smooth	smooth	none	none	7.5		4.49	
141	2 2005-150-011	2	4	Goliad	base					Bone/Sand	Moderate		Reduced	Reduced	Oxidized	smooth	smooth	none	none	10.5		30.6	refit to Specimen 2 and 3
141	3 2005-150-011	2	4	Goliad	base					Bone	Moderate		Reduced	Reduced	Oxidized	smooth	smooth	none	none	10		25.64	refit to Specimen 1 and 3
141	4 2005-150-011	2	4	Goliad	base					Bone	Moderate		Fire Clouded	Reduced	Fire Clouded	smooth	smooth	none	none	12		134.55	refit to Specimen 1 and 2
141	5 2005-150-011	2	4	Goliad	base					Bone	Moderate		Reduced	Reduced	Reduced	smooth	smooth	none	none	9		16.15	
142	1 2005-15-10	2	4	Goliad	body					Bone	Moderate	burned bone	Reduced	Reduced	Oxidized	smooth	smooth	none	none	6		3.01	
142	2 2005-15-10	2	4	Goliad	body					Bone/Sand	Abundant	burned bone	Zoned	Oxidized	Oxidized	smooth	smooth	none	none	7.5		3.54	
142	3 2005-15-10	2	4	Goliad	body					Bone	Sparse	feldspar	Reduced	Reduced	Reduced	smooth	smooth	none	none	6		3.47	
139	1 2005-142-007	5	Goliad	rim	deep bowl	flatten	deep bowl			Bone	Moderate		Reduced	Oxidized	Oxidized	smooth	smooth	asphaltum	none	6 Unknown		3.33	has sandy conglomeration on surface of sherd

**Appendix C**  
**Description of Human Remains Recovered at**  
**Mission Espíritu Santo (41GD1)**

## Appendix C: Description of Human Remains Recovered at Mission Espiritu Santo (41GD1)

Cynthia M. Muñoz

In November 2004, human skeletal remains were exposed during archeological testing of Mission Nuestra Señora del Espiritu Santo de Zuñiga (41GD1). The remains were located in Level 6 of Shovel Test 1 and in Levels 3 and 6 of Test Unit 2 (Table C-1).

The remains were encountered in highly disturbed soils. Due to the disturbed context of the soil, the remains cannot be assigned to a single individual, but must be considered isolated human bones. Specifically, the elements present consist of one thoracic vertebra, one mandibular incisor, and one phalanx. The incisor is heavily worn and contains a moderate amount of calculus. No pathologies were evident on the remains. The remains were affected by natural, post-depositional factors. Chemical weathering has affected the cortical surfaces of the vertebra and the phalanx. The vertebra from Shovel Test 1 was located in an area near the midden deposits excavated by Ricklis (2000) and may be the result of material washed downslope. The occurrence of the vertebra is not due to an intact burial, though an explanation to its presence is not known. Test Unit 2, which

exhibits evidence of the CCC builder's trench throughout many of its levels, produced a human tooth from Level 3. Other artifacts recovered from this level include a mixture of Native American ceramics, metal, chipped stone, flat glass, building material, and animal bone. Modern material (post-1920s) was also recovered from this level. Test Unit 2 also produced a human phalanx from Level 6. This level continued to exhibit disturbance due to the builder's trench. Other artifacts recovered from Level 6 include native ceramics, metal, glass fragments, building material, and chipped stone. Both areas that produced human remains are believed to have been disturbed either by previous construction activity (such as the CCC stabilization of the mission walls), previous excavations, or the natural movement of soils.

Upon completion of these investigations, the incisor and the phalanx were transferred to the Texas Parks and Wildlife Department. At the time of this report, the vertebra could not be located. It will be transferred to the Texas Parks and Wildlife Department as soon as it is relocated.

Table C-1. Human Remains Recovered at Mission Espiritu Santo

Unit	Level	Element	Context	Taphonomy	Disposition
Shovel Test 1	6	1 thoracic vertebra	Disturbed	Natural post-depositional chemical weathering	Missing
Test Unit 2	3	1 mandibular incisor	Disturbed	Natural post-depositional chemical weathering	Transferred to TPWD
Test Unit 2	6	1 phalanx	Disturbed	Natural post-depositional chemical weathering	Transferred to TPWD

## References Cited

Ricklis, R. A.

- 2000 *Archaeological Investigations at the Spanish Colonial Missions of Espíritu Santo (41GD1) and Nuestra Señora del Rosario (41GD2), Goliad County, Texas*. Coastal Archaeological Studies, Inc. Corpus Christi, Texas.

