# Archaeological Investigations Associated with Mission San Juan (41BX5) Church Underpinning, San Antonio, Bexar County, Texas

*by*
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and Raymond P. Mauldin

Principal Investigator
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Former Principal Investigator
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Volume I

Texas Antiquities Permit No. 6040

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Archaeological Report, No. 429

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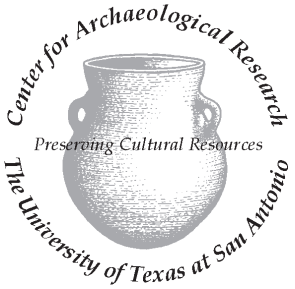


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# Abstract:

The Center for Archaeological Research (CAR) was contracted by Pugh Constructors, Inc. of San Antonio, Texas, to conduct archaeological investigations in association with the underpinning of the current church walls at Mission San Juan de Capistrano (41BX5) located in Bexar County, Texas. The archaeological work, conducted under the requirements of the Texas Antiquities Code, was performed under Texas Antiquities Permit No. 6040. Dr. Steve Tomka served as Principal Investigator for much of the project. He, along with Project Archaeologist Kristi Miller Nichols, designed and executed the fieldwork, as well as the initial laboratory processing and analysis. The field portion of the project was conducted in four phases.

Phase 1 consisted of the excavation of 14 1-x-1 m test units arranged in six blocks around the perimeter of the church. The goal of this portion of the project was to determine the extent of cultural deposits around the church, the terminal depth of the church foundation, and to document features. Test unit excavations removed 16.3 $m^3$ of sediment resulting in 179 artifacts/$m^3$ and 387 gm of faunal material/$m^3$ of screened soil. The excavations revealed that the majority of the sediments along the east and north walls of the church have been previously disturbed from utility installations, previously dug trenches, and human interments. The vertical distribution of cultural material recovered in units along the south wall of the church suggests that the upper 50 cm of sediment may contain a "midden deposit" including both Colonial and Post-Colonial artifacts. Initially, CAR personnel also thought that the testing identified an upper and a lower strata at various locations, with the lower strata potentially reflecting Colonial material, and the upper strata being mixed. Testing documented a previously identified Colonial wall along the southeast corner of the church, and a shelf-like stone protrusion was uncovered in two test units on the west wall of the church. The base of the church foundation, uncovered in five test units, ranged from 1.4 m below the surface (mbs) along the northeast wall to 1.7-1.9 mbs along the northwest wall to 1.8 mbs on the south wall to 2.0 mbs on the north wall.

Phase 2 involved the excavation of four backhoe trenches to obtain additional data on the terminal depth of the church's foundation and further explore the Colonial wall exposed in Phase 1. The base of the foundation was uncovered at 1.55 mbs on the southwest side of the church and at 1.60 mbs on the southeast side.

CAR archaeologists monitored the mechanical removal of and partially screened the matrix from around the perimeter of the church during Phase 3. This removal and screening was conducted in sections and screened by the upper and lower strata distinction. A high concentration of artifacts and faunal material recovered from the south wall of the church supports the Phase 1 findings that the area likely contains a midden. Large amounts of faunal material suggest a second midden deposit along the southwest wall of the church. Buried walls and foundations from earlier structures were exposed on the northwest corner of the church. However, the distinctions between upper and lower strata, with the lower strata reflecting Colonial material, proved to be spurious.

Phase 4 consisted of the hand-excavation of human remains that were exposed along the northeast side of the church wall between Buttresses 1 and 5 during the Phase 2 and 3 excavations. Seventeen articulated burials and disassociated human bone representing a minimum of 12 additional individuals were removed. All of the human remains and their associated grave items were stored and analyzed at the Tufa House located on the grounds of Mission San Juan. Upon the completion of the project, custody of the human remains and associated grave goods was transferred to the Tap Pilam, a local Native American group associated with the Coahuiltecans. The burials were reinterred at the close of the project on the San Juan property. A reburial ceremony arranged by the Archdiocese, the National Park Service (NPS), and the Tap Pilam was held on February 23, 2013.

In the spring of 2014, both Dr. Tomka and Kristi Nichols left CAR. Dr. Raymond Mauldin assumed Permit responsibilities for the project. At that time, a preliminary draft of a report was present. Cynthia Munoz, assisted by Dr. Mauldin, completed an extensively revised draft over the summer of 2014. That draft was submitted for review to the Texas Historical Commission (THC) and the NPS. We have incorporated all review comments into this final document. Note that all archaeological samples, artifacts, documents, notes, and photographs were prepared for curation according to NPS and THC guidelines. These materials are permanently curated at the Center for Archaeological Research at the University of Texas at San Antonio.

## Volume I



## Volume II

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The authors would like to thank many people for the successful completion of the project. In particular, the CAR would like to thank William and Micha Pugh of Pugh Constructors, Inc. for their help in coordinating the project. Special thanks also go to Susan Snow and the National Park Service (NPS) for their effort in communicating the needs of NPS as well as helping the CAR to coordinate with the Archdiocese. NPS allowed us the use of their mechanical screen for Phase 3 of the project. The CAR would like to thank Ford, Powell and Carson, especially Carolyn Peterson and Rachel L.H. Wright, for their input on the engineering needs and for working with the archaeologists to develop new approaches when features and problems were encountered. The CAR would like to thank Patrick Sparks, P.E., of Sparks Engineering, Inc. for developing the designs for the stabilization of the church. Thanks also go to Mark Denton and Pat Mercado-Allinger from the Texas Historical Commission for their participation in the project and guidance. Thanks also to Kim Barker of the Architecture Division of the Texas Historical Commission.

The field crews consisted of Preston Beecher, Justin Blomquist, Tyrone Tatum, Lynn Wack, Lindy Martinez, Antonia Figueroa, Sarah Wigley, Kelly Denham, Cathy Stacy, Cyndi Dickey, and Taylor Freeman. In addition, the exhumation of the burials was conducted under the lead of Cynthia Moore Munoz by Lynn Wack, Cyndi Dickey, Lindy Martinez, Alex McBride, Nate DiVito, Alex Wadley, and Kristi Miller Nichols. The human remains analysis was conducted by Cynthia Moore Munoz and Kirsten Verostick. Grave item analysis was conducted by Cynthia Moore Munoz and Cyndi Dickey. The crew would also like to thank those at the job site who showed us kindness and helped us throughout the project. These people include Fillipe, the site manager for Pugh Constructors, Inc., and Bacilio Pizarra, Guillermo Pizarra, and Juan C. Pizarra of Curtis Hunt Restoration.

Thanks go to Marybeth Tomka and Melissa Eiring for overseeing the processing of the artifacts and final curation of the project generated material. Melissa deserves a special note of thanks for her efforts to solve numerous provenience and identification issues. Thanks to Rick Young and Kelly Harris for producing the figures for the final report. Kelly Harris edited the final manuscript. The authors would like to thank Steve Tomka, former Director of the CAR, and Raymond P. Mauldin, acting Director of the CAR, for guidance on various aspects of the project.

# Chapter 1: Introduction

*Kristi Miller Nichols, Cynthia M. Munoz, and Raymond P. Mauldin*

This report discusses archaeological investigations at 41BX5. The fieldwork occurred from September 2011 through June 2012. Pugh Constructors, Inc. contracted with the Center for Archaeological Research at the University of Texas at San Antonio (CAR-UTSA) to conduct archaeological testing excavations and monitoring around the current church (Room 17) at Mission San Juan de Capistrano in San Antonio, Bexar County, Texas (Figure 1-1). These archaeological investigations were proposed ahead of the stabilization of the Works Progress Administration (WPA) era reconstructed church. San Juan is one of four Spanish Colonial missions within the San Antonio Missions National Historic Park. The San Antonio Archdiocese and federal agencies share control of the property. The Archdioceses controls all alterations to the physical plant, while the National Parks Service (NPS) controls alterations to the ground. As this structure is a State Antiquities Landmark (SAL) and is listed on the National Register of Historic Places (NRHP), the stabilization of the structure is critical to its preservation. However, preserving this architectural landmark through underpinning will involve significant impacts, potentially disturbing intact archaeological deposits and human interments. Therefore, archaeological testing is required prior to any stabilization efforts to determine the depth of intact archaeological deposits. The archaeological investigations were performed under Texas Antiquities Permit No. 6040, with Dr. Steve Tomka, former CAR Director, serving as Principal Investigator and Kristi Miller Nichols serving as Project Archaeologist. Dr. Raymond Mauldin assumed the Principal Investigator role in the spring of 2014.

Figure 1-1. *The Church at Mission San Juan prior to the initiation of the underpinning.*

The church (Room 17) has exhibited movement in the walls over the years, leaving the building with the potential for structural failure. Stabilization of the building involved the placement of piers along the foundation and rebar "stitching" through the walls for added support. The stitching process consisted of drilling holes through the walls for the insertion of rebar. Voids created between the holes and rebar were filled with mortar. Stitching was completed in columns above and below the current ground surface. Both the stitching and the pier installation impacted the subsurface around the footprint of the church. The sediments around the perimeter of Room 17 were removed from the church foundation outward approximately 1.8 m. The subsurface work removed a minimum depth of 1.5 m of soil with a much deeper interval drilling for the installation of piers.

The archaeological fieldwork was completed in four phases spanning nine months (Figure 1-2). The first phase consisted of the hand-excavation of seven 1-x-2 m units. Each unit was placed adjacent to the church walls to reveal the condition of the foundation and to determine if the deposits were disturbed. Phase 2 involved the excavation of four mechanically excavated backhoe trenches perpendicular to the church wall to expose the base of the church foundation. The third phase entailed archaeological monitoring of the mechanical removal of the sediments surrounding the church foundations and mechanical screening of approximately 50 percent of the excavated soil. Human remains encountered in Phases 2 and 3 were removed and analyzed during Phase 4. Project Archeologist Cynthia Munoz oversaw the removal of the human remains, as well as their analysis.

This report summarizes the findings of each phase and discusses the analyses of recovered artifacts, faunal bone, and human remains. The document is organized into thirteen chapters and eight appendices in two volumes. Chapter 2 discusses the environment of the project area and provides a brief overview of the historical background of Mission San Juan de Capistrano. Chapter 3 reviews previous archaeological investigations conducted at the mission. Field methodology is presented in Chapter 4. The results of the first three phases are presented in detail in Chapter 5. Chapter 6 presents descriptions of recovered artifacts, and Chapters 7 through 10 discuss the results of their analyses. Chapters 11 and 12 cover the removal and analysis of human remains from the excavations. Chapter 13 summarizes the four phases of archaeological work. The second volume presents supporting data for the first volume. There are eight appendices in that volume, including information on radiocarbon dates, artifact inventories, foundation photos, ceramic type descriptions, petrographic data, faunal data, stable isotopic information on fauna, and human remains.


Figure 1-2. *Map of archaeological investigations conducted at Mission San Juan.*

# Chapter 2: Project Overview

*Cynthia M. Munoz, Raymond P. Mauldin, and Kristi Miller Nichols*

This chapter contains a description of the environmental setting of the project area, including climate, vegetation, flora, and fauna. A discussion of the historic background of Mission San Juan de Capistrano is included.

## Environmental Setting

The project area is located in southern Bexar County on the Southton 7.5-minute USGS quadrangle map (Figure 2-1). The mission is bordered by the San Antonio River to the west, East Ashley Road to the north, Villamain Road to the east, and rural farms to the south. The Area of Potential Effect (APE), Room 17, is located along the southwest edge of the mission property, adjacent to an original meander of the currently channelized San Antonio River. Elevations at the mission range from 162-165 m amsl. The APE consists of the perimeter of an approximately 10-x-30 m structure.

### Flora and Fauna

The site lies in the westernmost portion of the West Coast Coastal Plain of North America's Atlantic Plain physiographic region with the Edwards Plateau and the Balcones Escarpment division of the Great Plains province to the northwest (Fenneman 1938; USGS 2014). The San Antonio River, emerging from a group of Edwards Aquifer springs in central Bexar County, flows to the southeast for 290 km through Wilson, Karnes, and Goliad Counties. The river forms the county line between Victoria and Refugio Counties. Eight kilometers from the Gulf of Mexico, it empties into the Guadalupe River in Calhoun County. The river crosses flat to gently rolling terrain and supports diverse ecosystems across south Texas (Donecker 2014; Eckhardt 2014; TPWD 2010).

Mission San Juan is located near the northernmost limits of the Tamaulipan Biotic Province (Blair 1950). The Tamaulipan Province, ranging from the east-west portion of the Balcones Escarpment in southern Texas to the east of the eastern Sierra Madre in northeastern Mexico, is made up of a mix of plants and animals typical of neotropical Mexico, the semiarid southern Plains, and the humid southeastern United States. Presently this subhumid to semi-arid land is dominated by thorny brush. The province has a semiarid, megathermal climate that allows year-round plant growth and supports a wide range of vertebrate species (Blair 1950:103). Sixty-one species of mammals, 57 species of reptiles, and 21 species of amphibians have been documented on the Tamaulipan Province (Blair 1950).

The project area is located on the Blackland Prairie region of Texas, a biotic zone running west to east across most of central Bexar County. The Blackland Prairie is characterized by low, rolling hills with gentle slopes (TPWD 2014a). Flora representative of this region includes a variety of oaks (*Quercus* sp.), pecan (*Carya illinoinensis*), cedar elm

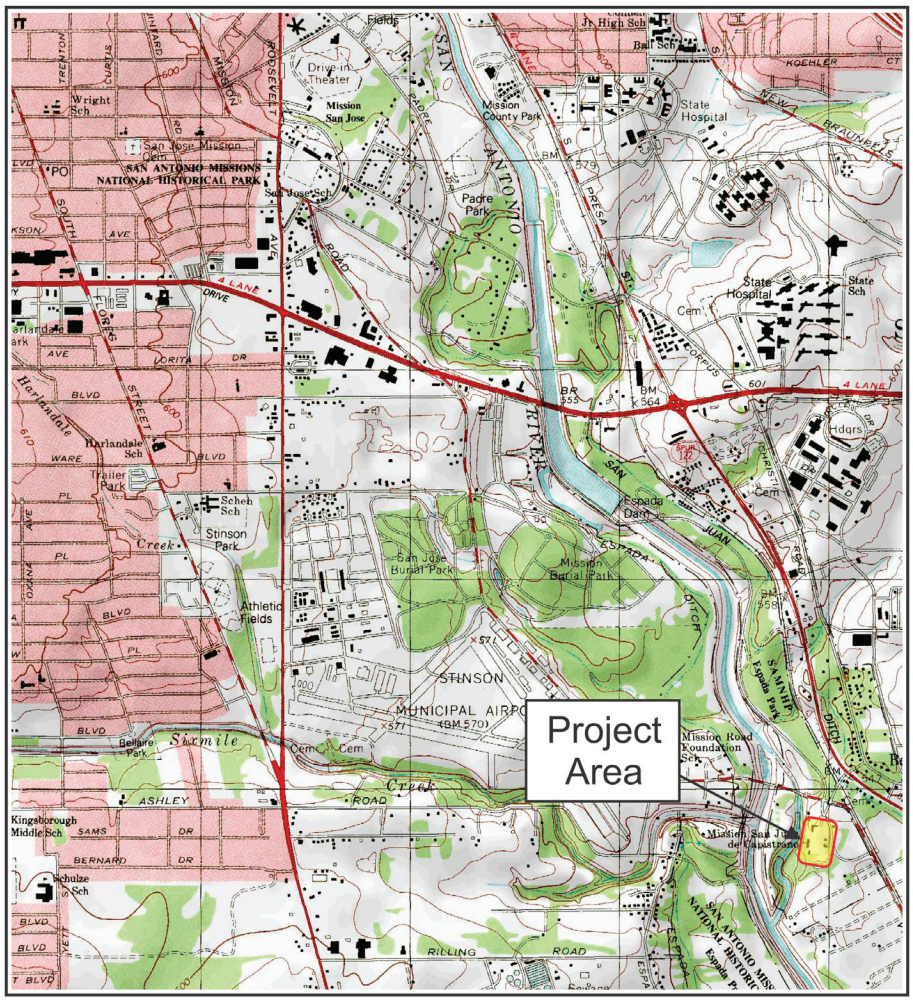


Figure 2-1. *The project area on the Southton 7.5-minute USGS quadrangle map.*

(*Ulmus crassifolia*), mesquite (*Prosopis* sp.), buffalo grass (*Buchloë dactyloides*), Texas grama (*Bouteloua rigidiseta*), big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), sideoats grama (*Bouteloua curtipendula*), hairy grama (*Bouteloua hirsuta*), tall dropseed (*Sporobolus asper*), and Texas wintergrass (*Stipa leucotricha*; TPWD 2014b).

The project area is located in an urban area (TPWD 1984). It is likely that in the mid-1800s, prior to European settlement of the region, grassland was more common, and the juniper, mesquite, woody brush and shrubs that dominate the region today had a more restricted distribution. Currently, Live Oak-Ashe Juniper Woods, distributed chiefly on shallow limestone soils on the hills and escarpment of the Edwards Plateau, and Live Oak-Mesquite-Ashe Juniper Parks and Live Oak-Ashe Juniper Parks, found on level to gently rolling uplands and ridge tops of the Edwards Plateau, dominate the landscape to the north of San Antonio. Cropland with pockets of Mesquite-Live Oak-Bluewood Parks, primarily located in Uvalde, Medina, and Bee Counties on the South Texas Plains, and Post Oak Woods/Forest and Post Oak Woods Forest with Grassland Mosaic, distributed mostly on the sandy soils of the Post Oak Savannah, covers most of the areas to the south, east, and west (TPWD 2014b).

Present day fauna occupying the area include bobcat (*Lynx rufus*), coyote (*Canis latrans*), eastern cottontail rabbit (*Sylvilagus floridanus*), fox squirrel (*Sciurus niger)*, gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), turkey (*Meleagris gallopavo*), and white-tailed deer (*Odocoileus virginianus*), in addition to other mammals, snakes, and reptiles (Blair 1950). Prehistorically, important economic species in the area included bison (*Bison bison*), black bear (*Ursus americanus*), and pronghorn antelope (*Antilocapra americana*; Gerstle et al. 1978).

## Climate

Climate in Bexar County is classified as humid subtropical with hot, humid summers and mild, dry winters. The length of the growing season in the area is approximately 265 days per year (Long 2014). Figure 2-2 presents the average minimum and maximum monthly temperatures in San Antonio, Texas, between 1971 and 2000 (NOAA 2004). Throughout these three decades the coolest months occurred in December and January and the warmest in July and August. Between 1971 and 2000, the average annual precipitation in San Antonio was 835.7 mm. Rainfall peaks in May and June with a smaller peak in October, indicating a bimodal pattern (Figure 2-3). The driest periods fall in the winter to early spring with December, January, February, and March having an average of 46.1 mm of rain each (NOAA 2004).

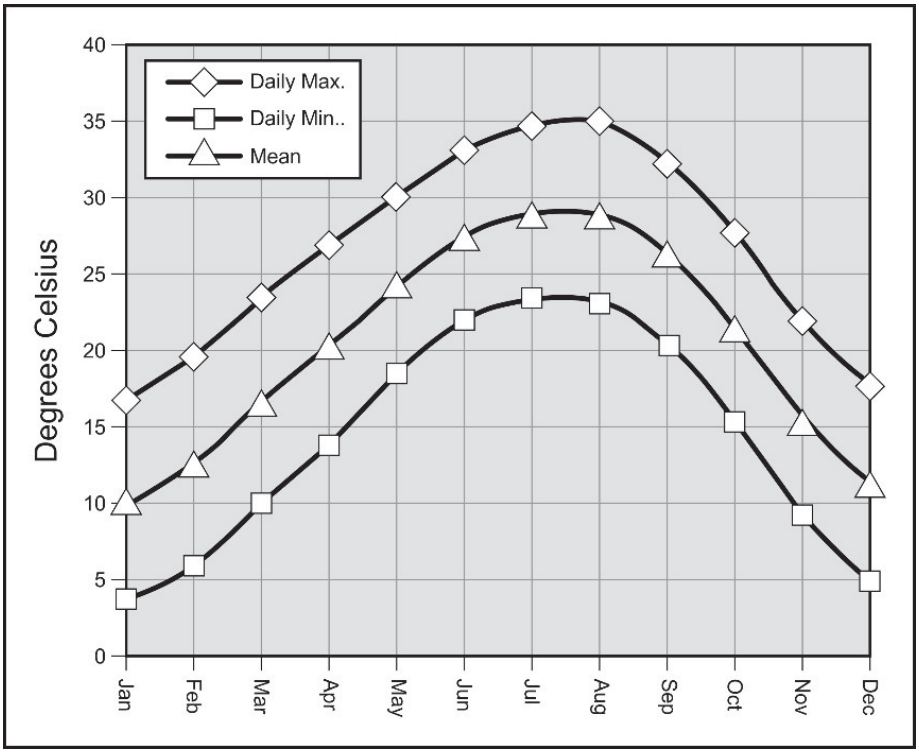


Figure 2-2. *Average maximum, minimum, and mean temperatures for San Antonio, Texas (1971-2000).*

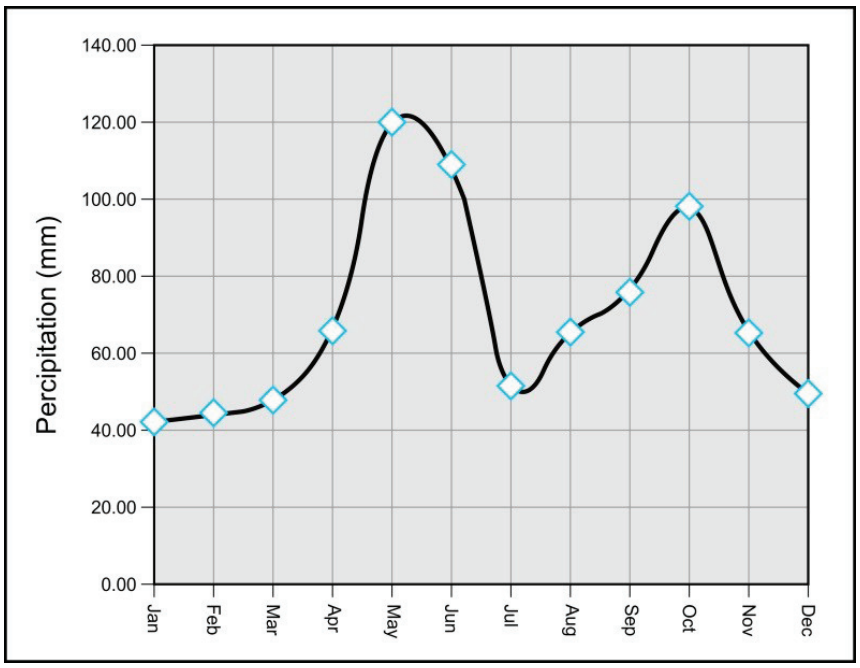


Figure 2-3. *Average precipitation for San Antonio, Texas (1971-2000).*

To construct an overall summary of climate variability in the historic period, we turn to the Palmer Drought Severity Index (PDSI). The PDSI relies on tree-ring based measures of moisture availability. Developed in the early 1960s, the PDSI is a relative measure of soil moisture calculated from rainfall, temperature, transpiration, potential evaporation, soil type, and runoff values (Alley 1984; Karl 1986). The index usually ranges from a value of four (severe wet spell) to negative four (severe drought), though more extreme values are possible. A value of zero indicates a normal period. The PDSI values used here were developed using summer rainfall estimates and a point-by-point regression method with 835 tree-ring chronologies spread across North America (Cook and Krusic 2004). Cook and Krusic (2004) established a grid, 2.5 degrees latitude by 2.5 degrees longitude, consisting of 286 locations in the United States, Mexico, and Canada. Mission San Juan is located within four of these grid points: point 166 (100 degrees west/ 30 degrees north), point 167 (100 degrees west/27.5 degrees north), point 181 (97.5 degrees west/30 degrees north), and point 182 (97.5 degrees west/267.5 degrees north; Cook and Krusic 2004). Because the project area is located within the four points and a comparison of the data from the four grid points indicates minimal variation, an average value from the four points was calculated for each year.

Figure 2-4 presents the average values of the four data stations from AD 1730-1830. This date range reflects the years from Mission San Juan's establishment on the San Antonio River in 1731 to its secularization in 1823. Using the value of -1.0 as an indicator of drought, the figure suggests that during this 100-year period, 32 years (32 percent) can be classified as drought years. Looking at peaks, 19 different droughts are indicated. The average drought during the mission years was 1.7 years with two prolonged droughts, one lasting from 1750-1752 and one lasting from 1775-1778. Based on a reconstruction of the PDSI for South Central Texas, the Upper Coast, the Trans Pecos, and Edwards Plateau, Cleaveland et al. (2011; see also Mauldin 2003) concluded that droughts lasting a decade or more were randomly distributed and occurred frequently in the region between AD 1500 and 2008.

Forty wet years, values greater than 1.0, are indicated from the four data points, with peaks suggesting 18 wet periods (see Figure 2-4). These mesic peaks averaged 2.2 years with four extended wet periods, from 1758-1762, 1782-1784, 1792-1797, and 1814-1818. The overall range of values for this 100-year period was from -4.45 to 5.15. The average PDSI value was a slightly positive 0.23.

## Historic Background

The work described in this report is associated with repair and stabilization of Mission San Juan de Capistrano, one of five missions located in San Antonio, Texas. As discussed below, the mission was constructed at its current location in 1731, and while the nature and intensity of use has fluctuated over the last three centuries, Mission San Juan still serves a variety of

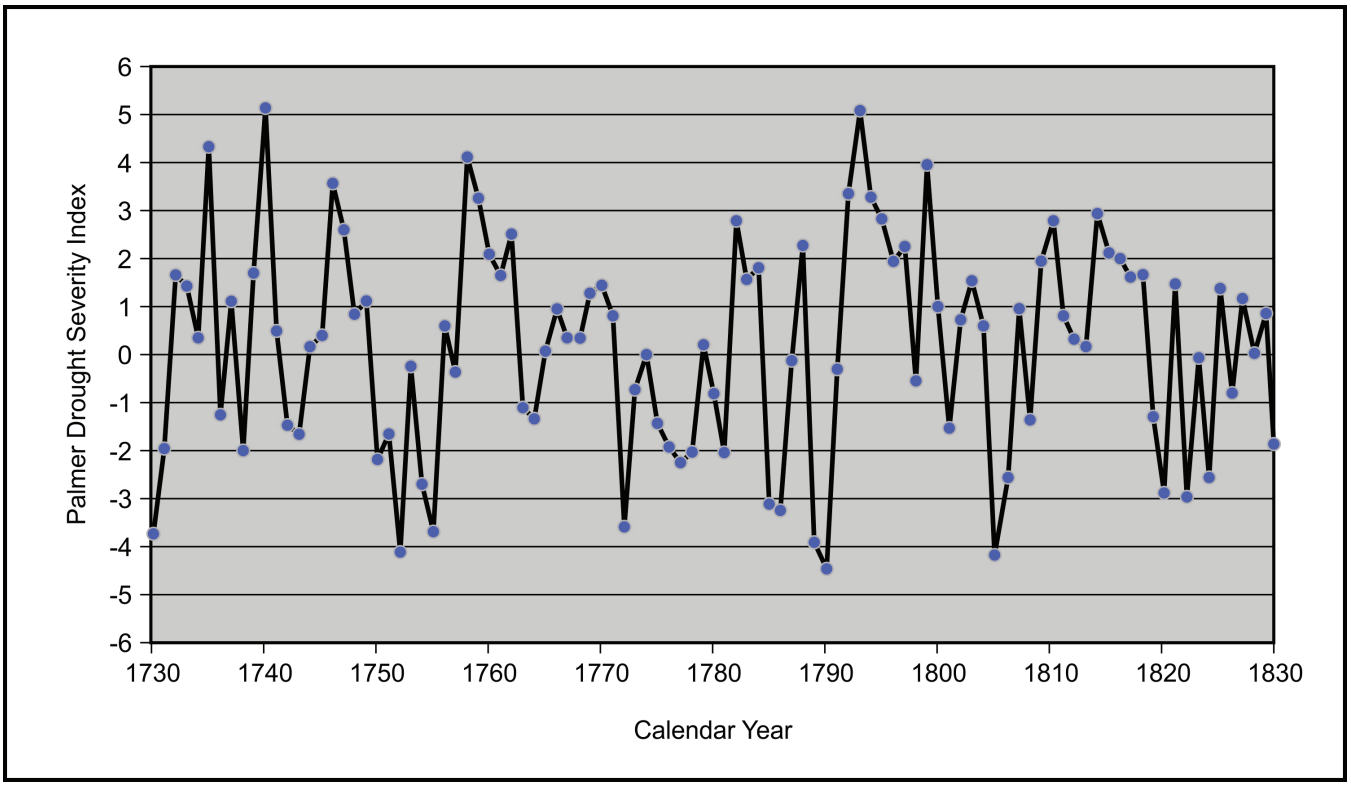


Figure 2-4. *PDSI values from AD 1730-1830 based on an average of PDSI grid points 166, 167, 181, and 182.*

roles in the San Antonio community. Our work at this mission produced significant quantities of material, including a variety of ceramic and lithic artifacts, faunal remains, architectural details, and human interments. Artifacts recovered from our excavations, archival documents, and radiocarbon dates demonstrate that while much of what we have recovered likely is related to activities conducted in the 1800s and into the early 1900s, the material spans roughly four and a half centuries (ca. AD 1500-1950). Therefore, to place the results of that work into a historic context, this portion of the chapter reviews aspects of several broad periods that span the time from the close of the Late Prehistoric through AD 1900. These short reviews include the Protohistoric period (1528-1700), Colonial/Mission period (1700-1821), the Mexican period (1821-1836), the Republic of Texas (1836-1845), and the Early State of Texas (1845-1900). Information on the post AD 1900 period in Texas can be found in Fehrenbach (2010), Ramsdell (1959), and Campbell (2003).

## Protohistoric (ca. 1528-1700)

Although their presence in Texas begins with the shipwreck of the Narvaez expedition along the Gulf Coast in 1528 (Favata and Fernandez 1993; Krieger 2002), Europeans forays into South and Central Texas were infrequent until the late 1600s (see Wade 2003). This period between AD 1528 and roughly 1700, referred to as the Protohistoric, overlaps with the Terminal Late Prehistoric (AD 1250–1600) and encompasses the transition from the Late Prehistoric to the establishment of permanent, sustained settlements by the Spanish in the region after AD 1700 (Taylor 1996).

From AD 1528 to the late 1600s, there were sporadic interactions between Europeans and Native Americans in South and Central Texas (Foster 1995; Wade 2003). These interactions included those described by Cabeza de Vaca between 1528 and 1536 (Krieger 2002) and several subsequent, primarily Spanish, forays into the area (see Wade 2003). René Robert Cavelier, Sieur de La Salle, made one of the earliest attempts to establish a more permanent presence in the region. In 1685, he established a French settlement, Fort St. Louis, along Matagorda Bay on the Gulf Coast. Hunger, disease, and escalating hostilities between the French and Native Americans subsequently resulted in the destruction of the colony in 1689 (Foster 1998).

The Mendoza-Lopez expedition from El Paso into west-central Texas occurred between 1683 and 1684 (Wade 2003). The Spanish followed this with increasingly frequent expedition that ventured farther into Central and South Texas (Kenmotsu and Arnn 2012). In 1689, Spain sent General Alfonso de Leon into the region, and in AD 1691, Domingo Teran de los Rios and Father Damian Massanet visited what

was to become San Antonio (Cox 2005a). The first permanent European settlements in the region dated to the early 1700s (Taylor 1996).

### The Colonial and Mission Period (1700-1821)

The AD 1700 start date for this period is tied to the founding of Mission San Juan Bautista near present day Eagle Pass/ Piedras Negras along the Rio Grande (Weddle 1968). While there had been earlier attempts to establish missions, such as Mission San Francisco de los Tejas near Nacogdoches and Santismo Nombre de Maria on the Neches River, neither had been successful (Fox and Cox 2000). San Juan Bautista represented the first major Spanish settlement in the region (Weddle 1968). However, the founding of this mission as well as others in Texas was simply a late addition in a long-standing pattern of confrontation between the Spanish, the French, and the British. In the New World, Spanish interests were concentrated in what would become Mexico, the Pueblo Region of the southwest, and in California, Florida, and the Gulf Coast (see Jones 1979; Moorehead 1991; Weber 1992).

In many of these areas, as in Texas, the Spanish established missions, presidios, and supporting infrastructure to assimilate and Christianize the indigenous populations, as well as establish claims to territory. Some of the earliest missions within what is now Texas were established in the west near El Paso and farther south along the Rio Grande near the modern town of Presidio. This initial wave of missions was a response, in part, to the retreat of the Spanish from the Pueblo regions following the Pueblo Revolt in 1680 (Weber 1992).

The Spanish established a second wave of missions in east Texas in the early 1700s (see Chipman 1992). The primary threats to Spanish interests in this part of the Texas region were from the French. While the early settlement near Matagorda Bay had failed, France had maintained a presence in the region, including settlement to the east in what is now Louisiana. As noted above, to counteract the French threat, Spain had attempted to established missions in east Texas as early as 1690 without success. Between 1716 and 1731, the French threat to Spanish interests intensified as France formed an alliance with the other major New World power, Great Britain (Black 1985). In east Texas, likely in response to France's expansion concerns, Spain established several additional missions and a presidio between 1716 and 1717. Mission San Juan de Capistrano was one such mission, originally established in 1716 in east Texas near present day Nacogdoches as San José de los Nazonis (Schuetz 1980a).

In early 1718, France and Britain declared war on Spain, and while the War of the Quadrangle Alliance was short and primarily fought in Europe (Simner 2013), several major battles occurred in the New World. In East Texas in 1719, French forces attacked Mission San Miguel de los Adaes, and the Spanish retreated from the region to San Antonio. The Villa de Bexar had been established the previous year, in 1718, near San Pedro Springs (Cox 1997, 2005a, 2005b). Several new missions were soon established in 1719, including Mission Purisma Concepción de Acuna and San Francisco de Espada (Carlson 1994; Habig 1968). Spain was essentially defeated by 1720, and in 1721, Spain signed the Treaty of Madrid with France in which the two parties mutually guaranteed the extant distribution of holdings (Smith 1965).

The Spanish reoccupied portions of east Texas in 1722 (Gilmore 1980). However, in response to the reduced French threat, as well as native unrest and increased costs associated with supplying the isolated missions, several were soon abandoned, including Mission San José de los Nazonis. In 1731, this mission was reestablished in San Antonio. Franciscans from the Colegio de la Santa Cruz de Querétaro renamed the mission San Juan de Capistrano (Schuetz 1968). That same year saw the establishment of the Villa de San Fernando, a settlement that was home to families brought into San Antonio from the Canary Islands (Cox 1997).

The next major series of events that influenced the Colonial/ Mission period in the region were associated with the Seven Years War (1754-1763). It pitted Great Britain and its allies against France, Spain, and their allies (Baugh 2011). While there were extensive battles in eastern North America, there appears to have been little fighting in Spanish dominated areas of Texas. The British, however, replaced the French as the major external threat to Spanish dominance in the region. As a result, Spain shifted emphasis, resulting in further deterioration of missions in the region (Carlson 1994).

By the close of the 1700s, missions in San Antonio, as well as elsewhere in the region, were on the decline. Falling population totals and several small pox epidemics in the region hastened this decline. In 1794, a decree was issued that called for the secularization of San Antonio missions, and several missions, including San Antonio de Valero, were essentially abandoned (Cox 1997, 2005b). Missions in the area were secularized by 1824 (Carlson 1994; Cox 1997).

At roughly the same time, Colonial rule ended. Tensions at the close of the eighteenth century between Spain and its colonies in Texas and Mexico increased, and in 1810, several groups rebelled against Spanish control. The rebels were eventually successful, and in 1821, Mexico became independent, essentially ending Colonial rule (Henderson 2009).

## The Mexican Period (1821-1835)

The successful ouster of Spain in 1821 was followed by a new constitution in 1824. The 1824 Constitution merged Texas with the State of Coahuila and moved the state capital from San Antonio to Saltillo. The Constitution also enacted a series of laws that enabled heads of households to claim land in Mexico. This resulted in an influx of settlers from the United States into Texas, with many concentrating on east Texas farmlands (Cox 1997). These laws were subsequently changed. By 1830 immigration from the United States into Texas was prohibited, a prohibition that was enforced by the establishment of several presidios, associated troops, and increasingly centralized control by Mexico City (Cox 1997; Fehrenbach 1983; see also Barker 1928; Campbell 2003; Weber 1982).

Increasing demands for greater autonomy and tighter control from Mexico City resulted in the Battle of Fort Velasco. Rebel forces captured the fort at the mouth of the Brazos River in 1832 and called for a return to the freedoms proposed in the 1824 Constitution. A peaceful solution was negotiated, though tensions continued to rise (Cox 1997).

Santa Anna took control of the government in 1834. He dispatched forces under the command of General Cos to deal with unrest in Coahuila and Texas, and he officially revoked the Constitution of 1824. General Cos arrived in San Antonio, and in October of 1835, a rebel army under the command of Stephen F. Austin moved to displace the Mexican forces. In December, Cos surrendered and withdrew his forces. In February of 1836, Santa Anna and a Mexican army arrived on the outskirts of San Antonio to retake the city. Rebel forces retreated to what remained of Mission San Antonio de Valero. After a short siege, the Alamo fell in early March. The following April, Santa Anna's forces were defeated at the Battle of San Jacinto. Santa Anna was captured, and Mexican forces withdrew (Cox 1997).

## The Republic of Texas (1836-1845)

The Republic of Texas was established in March of 1836 with Sam Houston as the first president. Mexico did not recognize the Republic as an independent entity, and there were continuing disputes. Many of these involved the establishment of the southern boundary of the Republic (Fehrenbach 1983). A state of war continued between the two entities, though no formal hostilities occurred until 1842. In March of that year, a Mexican force of 700 soldiers briefly occupied San Antonio, as the Texas forces offered no resistance. In September, forces loyal to Mexico captured the city and withdrew. An armistice was reached in June of 1843 between Mexico and Texas that reduced tensions (Cox 1997).

Texans were ill prepared for independence in 1836. While recognition by the United States of the Republic of Texas was relatively quick, annexation to the United States, which shared close ties to many influential Texans, took more time to achieve. Significant foreign debt and support of slavery within the Republic in the context of increasing disagreement on slavery within the United States delayed annexation. Nevertheless, late in 1845, the United States Congress and the Texas Republic agreed to annexation terms. Texas was admitted to the as the 28th state on December 29, 1845 (TSLAC 2014).

## The Early Texas State (1845-1900)

Mexico broke diplomatic relations with the United States on learning that the United States had sent an invitation to the Republic of Texas to become a state. In 1846, disputes on the location of the southern border that had initially been between Texas and Mexico were now between Mexico and the United States. Various skirmishes occurred between Mexican and United States troops, and on May 13, 1846, the United States issued a declaration of war. The war was primarily fought on Mexican soil, and in 1847, General Winfield Scott landed an army at Veracruz and soon occupied Mexico City, ending the conflict. The Treaty of Guadalupe-Hidalgo formally ended the war in February of 1848. The treaty established the southern boundary between the United States and Mexico as the Rio Grande. In addition, Mexico ceded all territorial claims to what is now most of Arizona, California, New Mexico, Nevada, Colorado, Utah, and Texas to the United States in exchange for $15 million (Campbell 2003; Wallace 1965).

Following the war with Mexico, Texas experienced rapid population growth. The majority of immigrants came from the southern United States or from Europe, with the later dominated by Germans and Czechs. Texas population increased from roughly 142,000 in 1847 to just over 600,000 by 1860 (Campbell 2003). One reason for this significant growth was the availability of farmland. Cotton, often supported by slave labor, was dominant in east Texas. In 1846, more than 30,000 black slaves were present in the state (Campbell 1989; Cox 1997), a number that increased to over 180,000 by 1860 (Campbell 2003; 1989). Not surprisingly, with the outbreak of the Civil War, Texas sided with the Confederacy. Texas seceded from the United States in February of 1861, and joined the Confederate States of America in March. There were few major battles within Texas, though Texas fought on both sides of the conflict (Campbell 2003).

Following the defeat of the Confederacy, Texas was readmitted to the United States in 1870. Population growth continued, and major industries initially developed around farming and cattle ranching (Campbell 2003; Sonnichsen 1950). Railroads expanded into the state (Reed 1941), arriving in San Antonio in February of 1877 (Cox 1997). Civic improvements, including efforts at flood control and sanitation (Cox 1997, 2005a), set the stage for increasing commercial developments throughout the remainder of the nineteenth century. For detailed information on this most recent period in Texas and San Antonio, see Cox (1997, 2005a), Fehrenbach (2010), Campbell (2003), and Ramsdell (1959).

## History of Mission San Juan de Capistrano

Mission San Juan was originally founded in east Texas as Mission San José de los Nazonis in 1716. It was abandoned in 1729, then, in 1731, reestablished in the San Antonio area as Mission San Juan de Capistrano (Bannon 1974; Schuetz 1968, 1969; Scurlock 1976). Mission San Juan persisted at its location on the San Antonio River through the remainder of the eighteenth century (Córdova et al. 2005).

Construction of the mission compound likely began immediately after its foundation, though the first recorded history is not available until 1745 (Schuetz 1968). Major renovations took place across the compound in 1772 though smaller scale building renovations occurred throughout the history of the mission. The earliest mention of structures dates to 1745. However, construction of a temporary church likely began immediately after the foundation of the mission was founded. Similarly, the construction of the irrigation ditch that would have brought water to the mission and allowed agriculture to flourish would have begun early on in the history of the mission. The 1745 visit makes it clear that a number of buildings had already been erected within the compound. A group of *jacals* providing shelter for the natives, a stone building for the missionaries' quarters, a storeroom, granary, and *jacal* church stood at the mission. These made up a row of buildings across the west side of the compound. The storeroom eventually became the church used today. Two rooms of the friary built south of the storeroom function as the gift shop and museum today. The first church at the mission was a *jacal*, not a permanent structure, and reportedly sat on the east end of southern wall. These rooms represent the first structures on the mission compound built prior to 1745. The *jacal* church was replaced with a stone church by 1756. This church saw a number of renovations including the construction of an entirely new sacristy. The *convento* compound, which is at the southwest corner of the main compound, contained cells for the missionaries, and a weaving workshop added between 1756 and 1759. The *convento* also underwent many renovations that included additional cells, covered walkways and entrances, patios, and Roman arches (Schuetz 1968).

By 1756, the core of the building complex along the south wall, which included an office, refectory, and kitchen, overlapped with rooms from the *convento*, specifically the weaving workshop. By 1772, this complex grew to include a gateway, additional storerooms, infirmary, guest room, offices, and a chicken house. These additions were built over older foundations making the building sequence and footprint difficult to discern on this part of the grounds. The east row of buildings included a church and sacristy (Schuetz 1968).

In 1765, 34 years after the founding of the mission, construction of pueblos began to replace the *jacals* that previously housed the native residents of the mission. Historic journals described 15 new stone houses sheltering 60 families. The remaining families still inhabited the *jacals*. Both the old and new housing was enclosed by a stone wall within the mission compound (Schuetz 1968).

Secularization of the mission began in 1794, although it was not fully secularized until 1823. The resident padre of Mission San Francisco de la Espada attended to the needs of the native families of San Juan during this period. In 1824, the remaining properties of Mission San Juan, along with all the furnishings, were handed over to San Fernando. A few years later, all the properties, except the church, were sold at public auction (Schuetz 1968).

During the remainder of the nineteenth century, San Juan fell into disrepair. The roof of the church was torn off during the hurricane of 1886. The church was not repaired until 1907. In 1915, diocesan clergy began to care for the church, while additional renovations were being conducted. Shortly after, the Archdiocese of San Antonio began to buy back the individually owned parcels of land within the mission compound. By 1933, the Archdiocese had successfully regained ownership of the entire compound (Schuetz 1968). During the 1930s, the WPA conducted extensive excavations to expose the mission's foundations. This led to reconstruction efforts in the 1950s and 1960s.

### History of the Current Church (Room 17)

In 1756, 25 years after the mission was established, accounts indicate that a stone church had been constructed and was

located north of the *convento* (Ortiz 1756; Schuetz 1968, 1969). This could refer to either Room 17 (the current church) or Room 29. The construction of Room 17 and its use as the mission church was not adequately established at the time of Schuetz's excavations. The current church is longer than the one described by Ortiz (1756). This discrepancy may be because the southern portion of the church is not original or that Room 17 is not the church referred to in the 1756 account. Several architectural features suggest that the southern portion of the church was a later addition. Room 29 was located at an angle off the northern portion of Room 17. Room 29's construction predates that of Room 17, and its dimensions appear to fit Ortiz's description (Ortiz 1756).

A 1762 account given in the Dolores Chronicle, describing the dimensions of a room that was serving as the church, appear to match those of Room 17 (Dolores 1762). The account includes a discussion of the construction of a new church (Room 26). Schuetz (1968) concludes that Room 17 was probably the temporary church, in use while Room 26 was under construction, and argues that Room 17 was built sometime between 1756 and 1762. No historic documents indicate whether Room 26 was ever completed. Mission records from 1827 mentions "the church" (Room 26) as the south boundary of a house belonging to Jose Maria Dias (BCAMR 27; Fox 1993; Santos 1968). A painting by Theodore Gentilz depicts a wedding scene in front of Room 17 suggesting its use as a church in the mid-1800s (Gentilz [1850s?]).

Restoration of the church (Room 17) occurred in 1907 under the guidance of the Missionary Sons of the Immaculate Heart of Mary (Thurber et al. 1993). During that time, a corrugated metal roof, a concrete walkway set into the wooden floor, an altar, a choir loft, benches, doors, and windows were installed. The church has been an active parish since its restoration.

## Native Groups

The friars of Mission San Juan attempted to evangelize the local population occupying present-day San Antonio and its vicinity. During the early sixteenth century, native groups that occupied the upper reaches of the San Antonio River and the San Pedro Springs area likely included primarily Coahuiltecan-speaking peoples. Specifically these were the Borrado, Camasuqua, Chayopine, Guanbraunta-Aiaguia, Malaquita, Orejone, Pacao, Pajalat, Pamoque, Pana, Pasnacan, Peana, Peguique, Pitalac, Sarapjon, Tacame, Taguaguan, Tilijae, Tinapihuaya, Venado, and Viayan (Campbell 1988:90; Carlson 1994:77; Mitchell 1980; Schuetz 1968, 1976, 1980b). Members of the individual tribes resided at the mission periodically during the mission's history. They were not all consistently present or present in large numbers. They brought with them knowledge and skills of ceramic and lithic technologies as exhibited in their material cultures that today provides a rich archaeological record of the brief coexistence of Native Americans and Spanish Colonists.

## Population Trends

A number of factors influenced the size, origin, and ethnic makeup of the resident population at the mission. Foremost, during the early years, desertion was prompted by cultural differences, disease, lack of supplies, and raids from neighboring Apache groups from the Edwards Plateau. Understandably, mission life was difficult to adjust to and many people left to return to their native traditions. Sometimes desertion was only temporary. Natives left seasonally to harvest traditional foods, like prickly pear, during the long process of assimilation. Some reports indicate the natives moved from one mission to the next trying each out before choosing a place to settle (Schuetz 1968).

The population fluctuated throughout the mission's history. Records show a peak of 265 residents in 1756 with a gradual decline through periods of social unrest and epidemics until secularization in 1794 (Schuetz 1980a). Population numbers are problematic especially after 1790 when the census rules changed to include only those individuals residing within the compound walls. Because the number of converts in part gauged the mission's success, bias in the historical population records should be considered. After secularization, twelve Native American heads of households received land. The properties changed ownership repeatedly until the Archdiocese began purchasing rooms and property to begin the restoration of the mission.

# Chapter 3: Previous Archaeology

*Kristi Miller Nichols*

Numerous archaeological investigations have been conducted at Mission San Juan de Capistrano since the WPA first reconstructed portions of the compound. This chapter describes the excavations related to Room 17. A thorough description of the mission excavations can be found in Thompson (2006). Figure 3-1 shows the location of the previous archaeological excavations described below.

## WPA Excavations

Harvey P. Smith, Jack Berreta, and Ernst F. Schuchard, architects for the Texas Civil Works Administration and the Texas Relief Commission, conducted the first excavations at San Juan in 1934 with financing from the WPA and the Archdiocese of San Antonio. The focus of the project was to define the layout of the mission complex. Although no report on the excavations was produced, maps were created and used as references for subsequent archaeological investigations (Schuetz 1968, 1969). Smith et al. found walls of the living quarters, the unfinished church on the east side of the compound, and other buildings inside the quadrangle (Scurlock et al. 1976). Later in 1934, the WPA commenced restoration of the mission walls and structures (Scurlock et al. 1976:63).

## Mardith Schuetz Excavations

The most extensive work inside the mission compound was conducted in the late 1960s and early 1970s by Mardith Schuetz of the Witte Museum. Extensive excavations started in January of 1967 prior to the start of restoration of the 1930s WPA construction. Schuetz returned in 1968, 1969, and 1971 with particular interest in determining a building sequence and retrieving artifacts of the indigenous people who resided there (Schuetz 1968, 1969). The multi-year project resulted in the complete excavation of the interior of Rooms 4-13 and 19-22. The project also included portions of the main plaza, a midden, and Rooms 1, 2, 17-18, 23, 27, 29, and 31-34 (Schuetz 1968, 1969, 1980a). Schuetz noted that every room at the mission had been disturbed at some point by treasure hunters and that burrowing animals, looting, and root activity have displaced mission artifacts (Schuetz 1968:71).

### 1967

In 1967, Schuetz excavated six test trenches around the exterior of the present church (Room 17) and its sacristy (see Figure 3-1; Schuetz 1968). Trench 1, between the sacristy door and the buried foundation, measured 1.9-x-0.6 m. The bottom of the wall was discovered 1.2 meters below the surface (mbs). The foundation was recorded as being 0.8-m wide. The foundation was sitting on top of sterile brown clay. The wall was reinforced with 0.1 m of stone footing. The footing was recorded from 0.3-0.9 mbs. In addition to the church wall foundation, Schuetz recorded other buried foundations that appear to be the depicted on the maps created in the 1930s (Schuetz 1968).

Schuetz placed Trench 2 next to a buttress on the north side of the northern chapel door (see Figure 3-1). The trench measured 1.6-x-0.7 m. The bottom of the wall was recorded 0.9 mbs. No support footer was recorded. The base of the buttress was 1.1 mbs and was noted to be 0.2 m wider than the buttress. Trench 3, 2.1-x-0.6 m, was excavated outside the northeast corner of the Room 17. The church foundation terminated at 1.1 mbs without a footer (Schuetz 1968). An additional foundation lying perpendicular to the church wall was uncovered during the excavation of this Trench 3. Its top was uncovered at a depth of 0.6 mbs. It is likely part of Room 16's foundation. The foundation of a second wall, uncovered approximately 0.9 mbs, appears to be related to Room 29.

Trench 4, 2.0-x-1.7 m, was excavated at the interior southwest corner of Room 29 (the northwest exterior of Room 17). It exposed the stone footing supporting the corner of the church (see Figure 3-1). The footing measured 0.6-m wide and consisted of three courses of stone. Sterile brown clay was noted 0.5 mbs (Schuetz 1968). Trench 5, 2-x-0.8 m, was placed 4.8 m south of the large west wall window. The wall foundation was exposed at 1.3 mbs and was sitting on top of sterile brown clay. The wall appeared to have been built using various methods and materials. Its base consisted of two layers of footing, each approximately 0.3-m thick. The base was covered with a layer of mortar poured into a trench, approximately 0.5 m wider than the wall. The top of the foundation consisted of slabs of sandstone similar to the west wall of the church (Schuetz 1968). Trench 6 exposed the base of the church wall 0.9 mbs. The foundation was sitting on sterile brown clay. The trench was located in the southwest corner outside the sacristy and measured 1.7-x-0.5 m.

An examination of old drawings and photographs of the church led Schuetz (1968) to conclude that the door in the

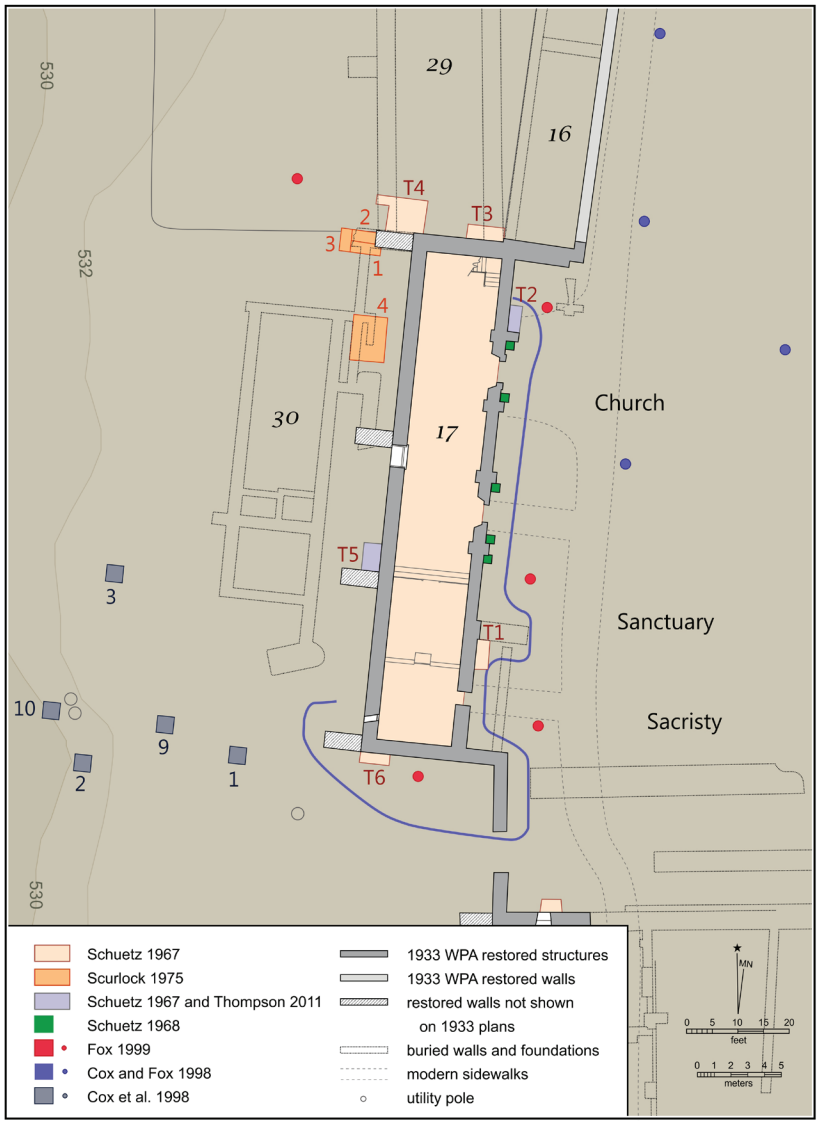


Figure 3-1. *Composite map of previous archaeological excavations around Room 17 at Mission San Juan Capistrano.*

middle of the east wall of the church had been bricked up prior to 1886. It appears to have been restored during repairs to the structure in 1907. A large window on the west wall was also created at this time. The window was approximately 0.6 m above ground level within the church but at ground level outside of the church. An additional possible doorway or window was evident from a bricked up archway. The dates of its construction and closure are unknown. Schuetz (1968) determined that the arches on the east side of the church are "non-structural" and appear to have been added to formalize the church building.

## 1968

In 1968, Schuetz returned to San Juan to determine if Room 17 functioned as anything other than a church during the early mission period. The excavations were conducted to facilitate the restoration of the southwest corner of the *convento* and the present church. To address this question as well as determine the quality of the WPA-era restoration, five test units were excavated on the west side of the church before each pilaster of the chapel façade to obtain foundation data (Schuetz 1969, 1980a:13-17). Test Unit 1 lay just north of the northernmost door, and Test Unit 2 was just south of the northernmost door (see Figure 3-1). The pilaster footings were found at 0.9 mbs and 0.5 mbs, respectively. Sterile soil commenced at 0.5 mbs. Test Unit 3 was located just north of the middle door. The pilaster was on top of a footing 0.6 mbs. Test Unit 4 was placed immediately south of the middle door. The bottom of the footing was 1.2 mbs. Test Unit 5, placed at the south end of the nave, uncovered the bottom of the pilaster at 1.4 mbs (Schuetz 1969, 1980a).

### 1969

In 1969, Schuetz (1974) excavated inside Room 17. Results of the excavations suggested that Room 17 was initially used as a granary and then converted to a church sometime after 1780 (Schuetz 1974:49). The excavations identified six floor surfaces and two building phases. The artifact assemblage consisted of Colonial and Post-Colonial components. Ninety-two individuals were represented in skeletal remains removed from Room 17. All skeletal remains, with the exception of Burial 16, appear to have been interred in wooden coffins held together with cut nails. The nails were not hand-wrought but were types consistent with nineteenth century burials (Schuetz 1974:32). Analysis of the remains indicated that there were 51 adults and 41 children buried within the area. Of the 92 individuals, 16 crania were intact enough to determine cultural affiliation. Cranial analysis indicated that 10 to 15 individuals were Native Americans, and one was Caucasoid (Schuetz 1974).

The 1969 excavations produced a high density of ceramic artifacts. Ceramic sherds accounted for 241 of the 304 artifacts (79 percent) relating to the Colonial period (ca. 1718 to 1835). Only a few fragments of ceramics were recovered from the Post-Colonial period (ca. 1836 to present). The remaining artifacts were burial associated or related to the fill created by the WPA-era restoration activities (Schuetz 1974). The presence of Colonial artifacts between Floors 3 and 5 led Schuetz to conclude that the construction of the church occurred during the Colonial period. Post-Colonial artifacts were found above Floor 3, indicating that the structures above this floor were constructed during a later phase (Schuetz 1974).

Evidence collected during the 1969 investigations supports the idea that Room 17 functioned as a granary, or other food storage facility, before it was converted to a church. The structure's conversion to a church appeared to have occurred at the time of the completion of Floor 3 in the Late-Colonial or early Post-Colonial periods (Schuetz 1974).

## Scurlock and Celorio Investigations

In 1975, Scurlock, representing the Office of the State Archeologist, conducted excavations around Room 17, and Miguel Celorio, a University of Texas Architecture professor, examined its architectural form. The goals of this project were in part to determine whether the structure was originally constructed as an "open chapel" form. They suggested this architectural form might have been more conducive to American Indian attendance of church services than a "closed form" (Scurlock 1976). To determine the temporal relationship between the subsurface walls shown on Smith's 1934 plan of the mission and the "open chapel" form, Scurlock excavated test units around the church (see Figure 3-1). To expose construction techniques used and the type of fill, cement plaster was removed during the excavations. Four test units were excavated on the west side of the church. Of the four, three were located adjacent to a buttress at the northwest corner of the church, and the fourth was located 4.2 m south of this buttress and 1 m west of the wall of the church. The units exposed walls constructed of sandstone and limestone cemented with lime mortar and recovered Spanish Colonial, nineteenth-century, Anglo, and twentieth-century artifacts mixed in mottled soil. Scurlock believed that the highly disturbed matrix was related to backfilling from WPA-era restoration activities. Because the matrix was disturbed and the deposits were not intact, Scurlock was unable to report the temporal relationship between the open chapel form and the construction of walls. Despite their findings, Scurlock and Celorio confirmed that Room 17 was constructed as an "open chapel" form (Scurlock 1976). The hypothesized open chapel model is not supported by current knowledge of the foundation.

## CAR Investigations

Multiple investigations were conducted by CAR archaeologists around Room 17 over the last 16 years (Cox et al. 2001; Fox 1999; Fox and Cox 2000; Thompson 2011).

### 1998

In October of 1998, CAR began investigations at Mission San Juan for City Public Service. The investigation was part of monitoring for the Mission Trails Underground Conversion Project, which upgraded and relocated electrical and utility connections at each of the four missions (Cox et al. 2001). The purpose of the archaeological investigations was to test for intact, buried cultural features. Excavation units uncovered evidence of buildings, wall foundations, and Colonial period floors. The data collected during this project concerning areas west of the known structures shed new light on the cultural history of the mission in areas that had not been previously documented (Cox et al. 2001:54).

Ten 1-x-1 m units and twelve shovel tests were opened along the outside of the western wall of the mission compound. Five units were located west of Room 17, showing evidence of previously existing structures (see Figure 3-1). One of the units indicated a series of Colonial period flooring phases, revealing that the area had been continuously used. Phytolith analysis on specimens recovered from this unit suggests that the area was used for food storage (Cox et al. 2001).

Also in 1998, the NPS hired the CAR to monitor installation of buried electrical lines along the south side and front of the present church (Fox and Cox 2000). The utility trench was mechanically excavated with a small hand-held trenching machine. The trench was 0.2-m wide and 0.5-m deep (see Figure 3-1). No artifacts were observed during monitoring.

**1999**

In 1999, the CAR excavated a test unit at the northwest corner of Room 4. Room 4 lies at the northeast corner of the compound, approximately 75 m north of Room 17 (Fox 1999). Seven test holes were also excavated during this project. Bore holes (BH) 6 and 7 were placed to the north of Room 17. The remaining five were placed in close proximity to Room 17. BH 1 was south of the northeast corner of the structure. BH 2 was southeast of the middle door on the church's east side. BH 3 was outside the sacristy door. BH 4 was south of the sacristy, and BH 5 was west of the north end of the church (see Figure 3-1).

**2011**

In 2011, the CAR returned to San Juan to reexamine excavations conducted by Schuetz in 1967 (Schuetz 1968). Schuetz's Trench 2 and 5 were reopened to expose the church foundation in advance of the building stabilization work (Thompson 2011). Trench 2 was terminated at 1.4 mbs. Approximately 30 cm of topsoil covered the plaster on the wall. Below this level, foundation stones were not plastered (see Figure 3-1). This appears to be the depth where Schuetz's excavations started. The bottom of the east church wall was found 1.3 mbs in the west wall of the trench, coinciding with the bottom of Schuetz's excavations. The foundation exposed in Trench 2 was a continuation of the wall. There were no supporting stones stacked out from the wall as noted below in Trench 5. The foundation of the stone and mortar buttress was located 1.3 mbs, but the concrete buttress support extended to 1.4 mbs.

Thompson's (2011) re-excavation of Schuetz's Trench 5 revealed a stone foundation built out from the west wall at 0.45-0.55 mbs down to approximately 0.7 mbs (see Figure 3-1). These stones were left in situ while the western portion of the unit was excavated to the bottom of the trench. The profile revealed poured concrete below the stone at 0.9-1.3 mbs, as described by Schuetz (1968:145), which was present to the base of the excavation at approximately 1.3 mbs. An electrical cable disturbed the trench. Because of a drainage feature built at its southern end, the CAR was only able to reopen a 1.3-x-0.8 m section of Schuetz's trench.

# Chapter 4: Field and Laboratory Methodology

*Kristi Miller Nichols*

The proposed stabilization of Room 17 will impact the ground around the perimeter of the church to a minimum depth of 2.3 mbs. Previous investigations in the vicinity of the church indicate that the perimeter may contain intact deposits of Colonial and Post-Colonial cultural materials, and human interments. Because the process of preserving this architectural landmark will involve significant ground disturbance, the CAR was contracted to carry out archaeological testing before the start of construction, followed by archaeological monitoring of construction activities.

## Field Methodology

The archaeological investigations occurred as a result of the underpinning of the Mission San Juan Church progressed in four phases. Phase 1 of the investigations consisted of the hand-excavation of seven 1-x-2 m units. The second phase of the project entailed the monitoring of four mechanically excavated trenches placed at points around the church to determine the depth of the foundation. Phase 3 involved archaeological monitoring of the mechanical-removal of the matrix surrounding the perimeter of the church and the screening of approximately 50 percent of the excavated soil for any unique artifacts and small, disarticulated human bone fragments. The decision by all parties, i.e. the THC, CAR, Pugh Constructors, NPS, and the Archdiocese, to mechanically remove the sediments around the exterior foundation of the chapel was based on the disturbed nature of most of those deposits, the critical need for stabilization of the foundation of the chapel, and the redundant nature of most of the artifacts that were being recovered. Any features encountered during Phase 3 were hand excavated. The last phase, consisting of the removal of human remains encountered during the second and third phases, is discussed in Chapter 11.

### Phase 1: Test Units

Seven 1-x-2 m test units were placed adjacent to Room 17 at Mission San Juan (Figure 4-1). Test units were placed outside of areas known to have been previously excavated or disturbed. Each 1-x-2 m unit was excavated in arbitrary 10-cm increments. Excavations were terminated either at the bottom of the church foundation or at a maximum depth of 1.5 mbs. The matrix removed from each level was screened through ¼-inch hardware cloth. A test unit level form was completed for each 10-cm level. All recovered artifacts were bagged and referenced to the appropriate provenience. Any encountered features, such as the builder's trench, were documented using standard archaeological procedures, including the completion of feature and level forms, measured drawings, photographs, and soil samples when appropriate. Any major structural features, such as foundations or wall structures, were preserved and documented. All material collected was returned to the CAR laboratory for processing and detailed analysis.

### Phase 2: Backhoe Trenches

Phase 2 consisted of the mechanical-excavation of four trenches adjacent to the church wall (see Figure 4-1). Each trench was aligned perpendicular to the foundation and excavated to depths that revealed the base of the foundation. To comply with the Minimum Survey Standards as defined by the THC, the backhoe trenches were approximately 1-m wide, 3 to 5-m long, and 1.5-m deep. After the excavation of each backhoe trench, an archaeologist entered the trench to examine the stratigraphy and artifact density associated with the trench walls. Any discrete, potentially intact historic features or deposits detected in the backhoe trenches were recorded (i.e., profiled, photographed, scaled drawing). The backhoe trenches were excavated in full compliance with Occupational Safety and Health Administration (OSHA) standards for protection of employees in excavations (29 CFR 1926.652). No matrix removed via mechanical means was screened. No artifacts were collected during the trenching.

### Phase 3: Monitoring

After the completion of the test unit and trench excavations, the construction company began the subsurface underpinning process. Soil was mechanically removed from the church perimeter to allow masons and engineers to stabilize the structure. Based on initial impressions from test unit and trench deposits, the matrix was removed in two layers reflecting two soil strata. The upper stratum was believed to be fill, and the lower intact soil was believed to contain Colonial deposits. Material was removed and, in some cases, screened following that upper and lower distinction. However, upon completion of fieldwork, a detailed analysis of the test unit material, including radiocarbon dating of faunal samples (see Chapter 5 and Appendix A1) demonstrated that both strata were jumbled together. For analysis purposes, the strata are treated as one analytical unit with no vertical distinctions.

The matrix was removed in sections around the building using a backhoe (see Figure 4-1). The CAR was initially informed

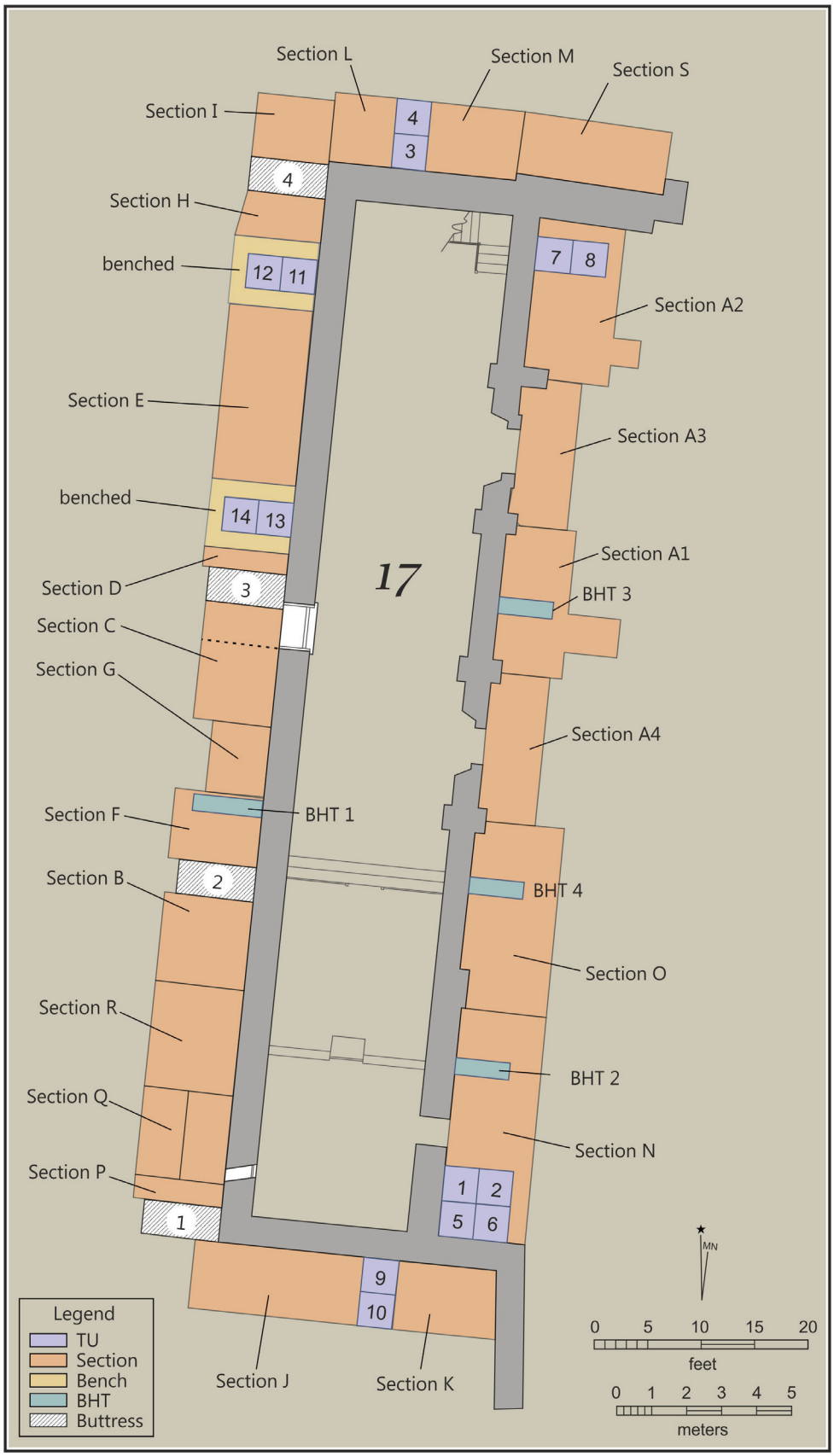


Figure 4-1. *Locations of Phase 1-3 excavations at Room 17.*

that the matrix would be removed in 1.2-x-1.2 m sections. The actual amounts of soil removed from each section greatly varied. Approximately 50 percent of the sediments were manually or mechanically screened through ¼-inch hardware cloth (Table 4-1). All artifacts encountered were collected and placed in brown paper bags marked with the appropriate provenience information. Artifacts were returned to the CAR laboratory for processing.

### Phase 4: Human Remains Removal

The potential for discovering human remains was considered to be high prior to the excavations. Human remains have been discovered in both disturbed and undisturbed contexts at Mission San Juan and within Room 17. Human remains were encountered in Phase 2 and 3. The excavation methodology and analysis results are presented in Chapters 11 and 12.

## Artifact Curation

Cultural materials recovered from the testing procedures outlined above were inventoried and processed at the CAR laboratory at the UTSA. All artifacts recovered were identified and analyzed. Proveniences for the materials were double checked through the use of a field sack number that was recorded on a field log form. Field sack numbers were assigned to all artifact bags in the field. At the CAR, all artifacts and samples were separated by type and recovery context to facilitate analysis. Processing of recovered artifacts began with washing and sorting into appropriate categories (e.g., glass, ceramics, and debitage). Individual categories were then analyzed by specific attributes designed for each group. All data was entered into Excel® spreadsheets.

Cultural materials and records obtained and/or generated during the project were prepared in accordance with 36 CFR part 79 and THC requirements for State Held-in-Trust collections. Artifacts processed in the CAR laboratory were washed, air-dried, and stored in archival-quality bags. Acid-free labels were placed in all artifact bags with a provenience and corresponding lot number. Prehistoric tools and diagnostic historic materials were labeled with permanent ink and covered by a clear coat of acrylic. In addition, samples of unmodified debitage and nondiagnostic historic artifacts from each lot were labeled with the appropriate provenience data. Other artifacts were separated by class and stored in acid-free boxes.

Digital photographs were printed on acid-free paper and labeled with archivally appropriate materials and placed in archival-quality sleeves. All field forms were completed with pencil. Field notes, forms, photographs, and drawings were printed on acid-free paper and placed in archival folders. All archival folders were stored in acid-free boxes. A copy of this survey report and all computer media pertaining to the investigation were stored in an archival box and curated with the field notes and documents.

Following laboratory processing and analysis, and in consultation with both the NPS and the THC, artifacts possessing little scientific value were discarded pursuant to Chapter 26.27(g)(2) of the Antiquities Code of Texas. Artifact classes to be discarded specific to this project may have included, but were not limited to, burned rock, snail shell, unidentifiable metal, soil samples, and recent (post-1950) materials. In all instances, discarded materials were documented and their counts included in the final report and curation documentation. This discard was in conformance with THC guidelines. Upon completion of the project, all remaining materials and records will be permanently curated at the CAR facility.

Table 4-1. Sediments Screened by Sections during Phase 3

| Section | Monitored | Strata Screened |
|---|---|---|
| A1 | yes | burial fill |
| A2 | yes | burial fill |
| A3 | yes | burial fill |
| A4 | yes | burial fill |
| B | yes | 1 |
| C | yes | 1 and 2 |
| D | yes | 1 and 2 |
| E | yes | 1 and 2 |
| F | yes | 1 |
| G | yes | 1 and 2 |
| H | yes | 1 and 2 |
| I | yes | 1 and 2 |
| J | yes | 1 and 2 |
| K | yes | 1 |
| L | yes | none |
| M | yes | none |
| N | yes | none |
| O | no | n/a |
| P | no | n/a |
| Q | no | n/a |
| R | no | n/a |
| S | yes | none |

# Chapter 5: Results of Phases 1, 2, and 3

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The first three phases of archaeological work at Mission San Juan occurred from September 2011 through May 2012. Fourteen test units (TU) were excavated, two each on the north and south walls of the church, four on the west wall, and six on the east wall. This was followed by the mechanical-excavation of four trenches, one perpendicular to the west wall and three to the east wall, to determine the depth of the church foundation and by the monitoring of mechanical-excavations of sections of Room 17's perimeter sediments (n=17). This chapter discusses the results of the archaeological investigations.

## Phase 1: Test Units

The test units were arranged into six blocks consisting of five 1-x-2 m units and one 2-x-2 m unit (Figure 5-1). Locations were chosen to sample areas outside of the church walls that had either not been previously investigated or had the least amount of disturbance (Fox 1999; Fox and Cox 2000; Schuetz 1968, 1980a; Scurlock 1976; Thompson 2011).

Recovered artifacts consist of 2,920 historic and prehistoric artifacts, 6,231 gm of faunal bone, and 73 gm of mussel

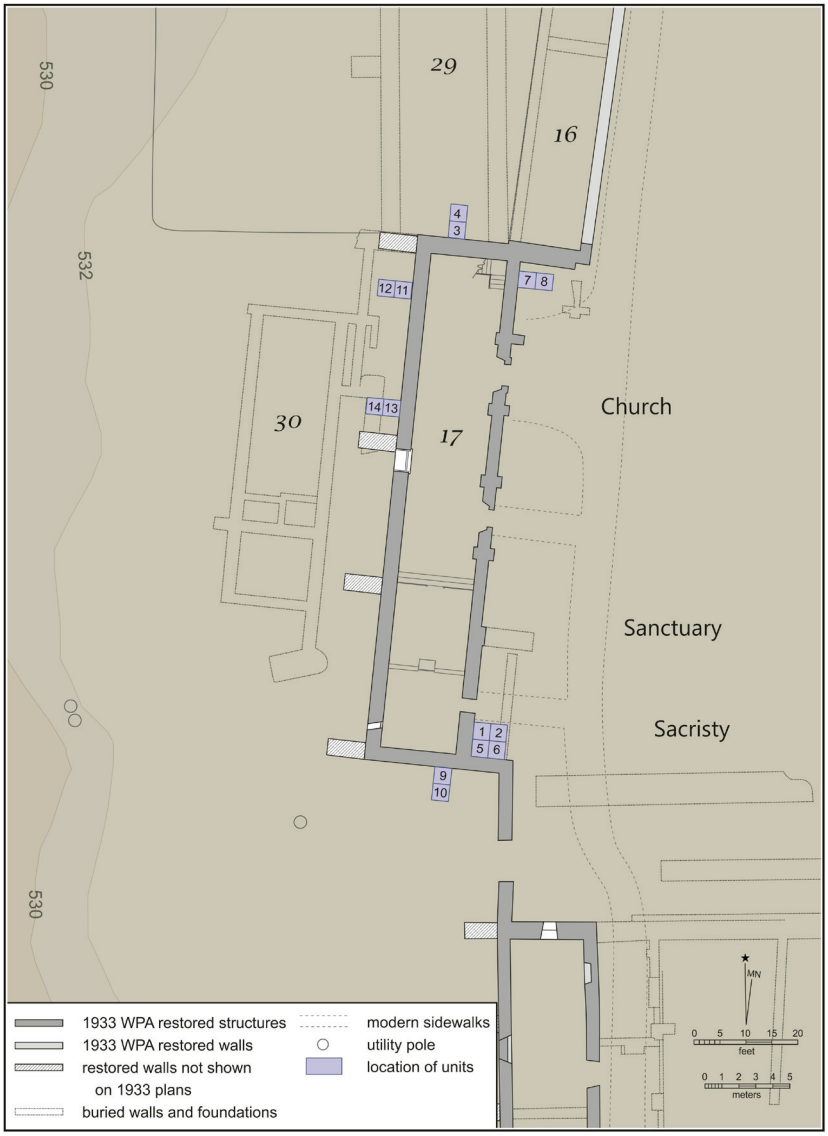


Figure 5-1. *Location of the test units excavated during Phase 1 at Mission San Juan.*

shell or marine shell. Modern materials (n=141), including flowerpot fragments (n=12), holiday light bulb fragments (n=61), glass disks (n=2), and modern trash (n=66), were also recovered (Table 5-1). Although most of the modern material (95 percent) was uncovered in the upper 40 cm of excavated sediment, a modern screw, a Christmas light bulb fragment, and plastic line from a weed eater were excavated from TU 8 (128-138 cm below the surface [cmbs]), TU 9 (112-122 cmbs), and TU 12 (114-124 cmbs), respectively (Table 5-2). The excavation of TU 6 resulted in the most artifacts (596/$m^3$), followed by TU 1 (525/$m^3$), TU 4 (505/$m^3$), and TU 10 (373/$m^3$). The largest concentrations of faunal material were found in TU 10 (937 gm/$m^3$), followed by TU 9 (670 gm/$m^3$), and TU 3 (480 gm/$m^3$). In total, 16.3 $m^3$ of sediment were excavated during Phase 1 of the project resulting in 179 artifacts per cubic meter and 387 gm of faunal material per cubic meter of screened sediment.

### Test Units 1, 2, 5, and 6

A 2-x-2 m block of four units (TUs 1, 2, 5, and 6) was located against the eastern wall of the church, near the entrance to the sacristy (see Figure 5-1). Initially TUs 1 and 2 were placed in this location to expose the church foundation and to investigate a wall foundation shown on early maps of the mission compound (designated on Figure 5-1 by dashed polygon). Because a drain feature that potentially contained asbestos was uncovered in TU 1, two additional units (TUs 5 and 6) were added to the block.

Test Unit 1 was terminated at 50 cmbs and TU 2 at 89 cmbs. The upper layer of soil consisted of loose, silty, clay loam. The matrix became more compact in Level 2 (10-20 cmbs), then it returned to loose, silty clay to termination. An electrical pipe, related to lighting fixtures at the base of the church wall, was uncovered 20 cmbs. At approximately 40 cmbs, the top of a lid for a drainage cover was exposed (Figure 5-2). Further excavations revealed that a portion of the church foundation had been cut to allow a pipe to enter the structure. Small-size gravel had been used to fill the hole. Excavations were terminated in TU 1 when it was determined that the lid and drain were made of asbestos. A portion of a Colonial wall, disturbed by an electrical line, was uncovered 19 cmbs in TU 2 (see Figure 5-2). The base of the wall extended to approximately 69 cmbs. It appears that the wall is sitting on top of a layer of packed caliche. Because large stones were present on the east side of the wall, it was not possible to determine whether the caliche layer extended to the east. The sediment below the caliche layer was a dark, silty clay.

Table 5-1. Artifacts Recovered from Test Units

| TU | Historic Ceramics | Native American Ceramics | Glass | Metal | Personal Items | Building Material | Gunflints | Debitage | Lithic Tools | Total Count | Modern Material | Faunal Bone (gm) | Mussel and Marine Shell (gm) | Total Weight (gm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 89 | 125 | 1 | 13 | | 2 | | 232 | 25 | 13.3 | | 13.3 |
| 2 | 3 | | 20 | 10 | 1 | 22 | | 5 | | 61 | 11 | 200.3 | | 200.3 |
| 3 | 10 | 2 | 59 | 12 | | 19 | | 1 | | 103 | 1 | 864.3 | | 864.3 |
| 4 | 18 | 13 | 495 | 42 | | 21 | 1 | 6 | | 596 | | 533.1 | 2.2 | 535.3 |
| 5 | 2 | | 12 | 2 | | 1 | | | | 17 | 8 | 5.9 | 2.6 | 8.5 |
| 6 | 1 | | 68 | 2 | | 8 | | | | 79 | 12 | 51.1 | | 51.1 |
| 7 | 6 | 1 | 25 | 168 | | 16 | | 4 | | 220 | 10 | 282.3 | 5.3 | 287.6 |
| 8 | 9 | 2 | 56 | 86 | 1 | 18 | 1 | 5 | 3 | 181 | 33 | 249.3 | | 249.3 |
| 9 | 106 | 39 | 88 | 21 | 4 | 21 | | 7 | | 286 | 6 | 1207.1 | 12.2 | 1219.3 |
| 10 | 186 | 97 | 166 | 54 | 4 | 22 | 2 | 20 | 1 | 552 | 13 | 1339.3 | 48.1 | 1387.4 |
| 11 | 7 | 10 | 85 | 24 | | 30 | | 6 | 1 | 163 | 1 | 359.8 | | 359.8 |
| 12 | 7 | 6 | 37 | 11 | 1 | 29 | | 7 | | 98 | 5 | 233.9 | | 233.9 |
| 13 | 10 | 11 | 32 | 22 | | 32 | | 4 | | 111 | 11 | 496.2 | | 496.2 |
| 14 | 11 | 11 | 132 | 21 | 1 | 41 | 1 | 3 | | 221 | 5 | 394.8 | 2.3 | 397.1 |
| **Total** | **377** | **193** | **1364** | **600** | **13** | **293** | **5** | **70** | **5** | **2920** | **141** | **6230.8** | **72.7** | **6303.4** |

Table 5-2. Depth of Modern Trash in Test Units

| CMBS | Test Unit | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 0-10 | x | x | x | | x | x | x | x | x | x | x | x | x | x |
| 10-20 | x | x | | | x | | x | x | | x | | x | x | x |
| 20-30 | x | | x | | | x | x | x | x | | | | x | |
| 30-40 | x | | | | | | | x | | | | | x | |
| 40-50 | x | | | | | | | | | x | | | | |
| 50-60 | | | | | | | | | x | | | | x | |
| 60-70 | | | | | | | | | | | | | | |
| 70-80 | | | | | | | | | | x | | | | |
| 80-90 | | | | | | | | | | | | | | |
| 90-100 | | | | | | | | | | | | | | |
| 100-110 | | | | | | | | | | | | | | |
| 110-120 | | | | | | | | | x | | | x | | |
| 120-130 | | | | | | | | x | | | | | | |
| 130-140 | | | | | | | | | | | | | | |
| 140-150 | | | | | | | | | | | | | | |
| 150-160 | | | | | | | | | | | | | | |
| 160-170 | | | | | | | | | | | | | | |
| 170-180 | | | | | | | | | | | | | | |
| 180-190 | | | | | | | | | | | | | | |
| 190-200 | | | | | | | | | | | | | | |

= not excavated

Test Units 5 and 6 were positioned adjacent to TUs 1 and 2 (Figure 5-3) to investigate the Colonial wall and determine how far the caliche layer extended. Test Unit 5, excavated against the wall of the sacristy (see Figure 5-1), was also disturbed by the electrical line uncovered in TU 1. The unit was terminated at 21 cmbs because of potential asbestos contaminated soils. A modern walkway, set on top of the Colonial wall, was uncovered 8 cmbs in TU 6 (see Figure 5-3). The walkway was composed of limestone fragments and Portland cement. A small column of soil (65-x-30 cm) was excavated to 68 cmbs in the northwestern corner of TU 6.

Cultural materials retrieved from the 2-x-2 m block include historic ceramics (n=7), one sherd of Native ceramic, glass (n=189), metal (n=139), personal items (n=2), building material (n=44), lithic debitage (n=7), and faunal material (273 gm). Modern trash (n=56) was recovered from the surface to 50 cmbs (see Appendix 2, Table A2-1). One sherd of Goliad (10-20 cmbs) and four pieces of Spanish Colonial ceramics (0-39 cmbs) were excavated from the test block. The ceramics will be discussed in more detail in Chapters 6-8.

## Test Units 3 and 4

Test Units 3 and 4 were located along the north wall of the church (see Figure 5-1). Gray paving bricks from a walkway to the entrance of the church were removed prior to the excavation of the units. The bricks were set into a layer of orange construction sand. Asphalt formed the western boundary of the units. Test Units 3 and 4 were terminated at 200 cmbs and 118 cmbs, respectively. Test Unit 3 was placed against the wall of the church to locate the base of the wall foundation and expose the details of its construction (Figure 5-4). Because the base of the foundation was not uncovered at 150 cmbs in the excavation, the south half of the unit was excavated to 200 cmbs.

The upper layers of soil in the 1-x-2 m block consisted of a loose, sandy, silty fill from beneath the construction sand to approximately 40 cmbs in TU 3 and 80 cmbs in TU 4. The sediments below the fill were compact. A layer of caliche was encountered between 86-106 cmbs in TU 3 (Figure 5-5). Few artifacts were uncovered below the caliche layer. The wall


Figure 5-2. *Test Units 1 and 2. Test Unit 1 contains the asbestos drain. Test Unit 2 has a portion of a Colonial wall foundation.*


Figure 5-3. *Modern walkway uncovered in Test Unit 6.*

profile of the test units indicates disturbance, possibly from a trench, in TU 4. The base of the church foundation was located at approximately 195-200 cmbs.

Six hundred and ninety-nine artifacts, consisting of historic ceramics (n=28), Native ceramics (n=15), glass (n=554), metal (n=54), one gunflint, building materials (n=40), lithic debitage (n=7), and faunal material (1,251 gm), were recovered from TUs 3 and 4 (see Appendix 2, Table A2-2). One piece of modern trash was retrieved from Level 4 (17-25 cmbs) of TU 3. Two specimens of Goliad ceramics were recovered from TU 3 (36-46 cmbs) and thirteen from TU 4 (6-118 cmbs). Seven pieces of Spanish Colonial ceramics were excavated from TU 4 (26-97 cmbs).


Figure 5-4. *Church wall foundation in Test Unit 3.*


Figure 5-5. *Profile of the west wall of Test Unit 3. Note the layer of caliche.*

### Test Units 7 and 8

Test Units 7 and 8 were located near the northeast corner of the church (see Figure 5-1). Test Unit 7 was placed against the wall of the church to expose the church foundation. Levels 1 through 3 (0-23 cmbs) consisted of modern trash and construction fill. Sediments from 23-103 cmbs contained fill with fragments of plaster and mortar. The base of the foundation was uncovered at 143 cmbs (Figure 5-6). The upper levels (0-38 cmbs) of TU 8 contained gravel and a limestone alignment from the remnants of a light fixture. The unit showed evidence of disturbance to its termination (148 cmbs).

Two distinct trench outlines were noted in the profile of TUs 7 and 8 (Figure 5-7). At the time of unit excavation, information about the trenches was unknown. Phase 4 excavations (see Chapters 11 and 12) revealed that the trenches were the results of human burials. A compact caliche layer, similar to caliche in the other excavated units, is evident in the profile.

Cultural materials retrieved from TUs 7 and 8 include historic ceramics (n=15), Native ceramics (n=3), glass (n=81), metal (n=254), one personal item, one gunflint, building material (n=34), lithic debitage (n=9), lithic tools (n=3), and faunal material (537 gm). Forty-two pieces of modern trash were excavated from Levels 1-4 (0-38 cmbs) of TUs 7 and 8 and one from Level 14 (128-138 cmbs) of TU 8 (see Appendix 2, Table A2-3). Colonial period artifacts include seven fragments of Spanish Colonial ceramics (13-154 cmbs). Three specimens of Goliad ceramics (33-78 cmbs) were also recovered.

### Test Units 9 and 10

Test Units 9 and 10 were placed near the southeast corner of the church to examine the construction of the foundation (Figure 5-8; see also Figure 5-1). There was no evidence of disturbance in this area prior to excavation. The units were excavated to a terminal depth of 182 cmbs and 148 cmbs, respectively. The matrix consisted of 20 cm of silty clay with


Figure 5-6. *Base of the wall foundation in Test Unit 7.*

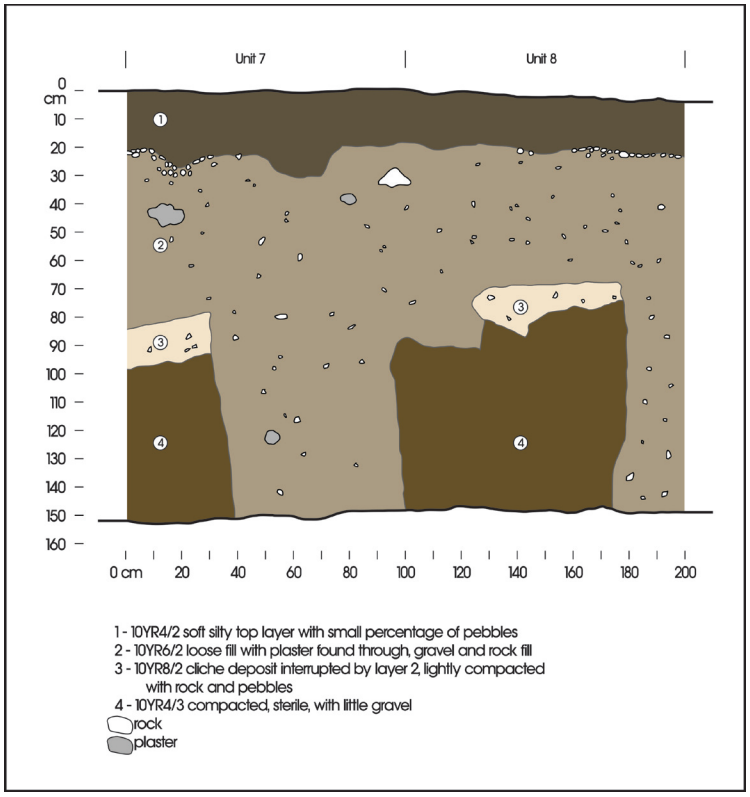


Figure 5-7. *Profile of the north wall of Test Units 7 and 8.*


Figure 5-8. *Foundation of the church revealed in Test Unit 9.*

approximately 15 percent pea-size gravels over 10 cm of fine silty clay with flecks of charcoal. From 32-112 cmbs, sediments were made up of loose, fine silt with carbonate nodules and gravel. Extremely compact, silty sand was uncovered from 112 cmbs to unit termination.

Historic ceramics (n=292), Native ceramics (n=136), glass (n=254), metal (n=75), personal items (n=8), gunflints (n=2), lithic debitage (n=27), one lithic tool, and faunal material (n=2,607 gm) were recovered from TUs 9 and 10 (see Appendix 2, Table A2-4). Nineteen pieces of modern trash were found from 2-122 cmbs. The vertical distribution of artifacts indicates that most of the cultural material (93 percent) was recovered from the upper 50 cm of sediment suggesting the possibility of a midden deposit. Both Colonial and Post-Colonial diagnostics were in these deposits. Of interest, the sediments below 50 cm contain no European ceramics but do contain Spanish Colonial and Goliad ceramics suggesting the lower sediments may represent a Colonial component. However, the sediments below 50 cm also include one wire nail, five pieces of cement, and three pieces of modern trash. Faunal material was distributed throughout the excavated sediments with 41 percent falling in the upper 50 cm.

Radiocarbon dates were obtained from bone collagen samples from six faunal elements (one white-tailed deer, two goat/sheep, one cow, and two bison) recovered from both the upper and lower levels (Levels 3, 4, 7, 9, and 12) of TUs 9 and 10 (see Appendix 1). The radiocarbon results confirm that there is a significant mixing of the deposits. The bone sample from Level 9 produced a modern age. Four of the remaining five samples likely date between about AD 1800 and the 1930s, and there is no patterning between the date ranges and levels. The remaining sample (bison) dates to the Terminal Late Prehistoric (Toyah) period with a date range of between AD 1453 and 1633 (95.4 percent probability). The dated faunal material suggests that there is a low probability that any of the samples represent an early Colonial period occupation.

### Test Units 11 and 12

Test Units 11 and 12 were located along the western wall of the church, just south of the northern buttress (see Figure 5-1). The 1-x-2 m block was placed in an area believed to be near another wall foundation. Sediments in TUs 11 and 12 consisted of variations of loose, silty sands with carbonate nodules. The soil located adjacent to the wall of the church was highly compacted.

Excavations of TU 11 revealed the base of the church foundation at 170 cmbs. A shelf, built with flat stones placed perpendicular to the foundation on top of supporting stones, was noted approximately 58 cmbs along the foundation (Figure 5-9). This feature was not noted on the north, east, or south wall foundations. A concentration of mortar and plaster was noted in the southern portion of TU 12 at approximately 94 cmbs. Below this (94-124 cmbs) much of the unit contained limestone and sandstone that was too large to remove. Although previous maps of the mission indicate that a wall foundation was in the vicinity of the units, no definite wall was uncovered. The large rocks in TU 12 suggest wall fall.

Two hundred and sixty-one artifacts consisting of historic ceramics (n=14), Native ceramics (n=16), glass (n=122), metal (n=35), one personal item, building material (n=59), lithic debitage (n=13), one lithic tool, and faunal bone (594 gm) were recovered from the 1-x-2 m block (see Appendix 2, Table A2-5). Modern trash (n=6) was retrieved from Levels 1-3 (0-24 cmbs). Colonial period artifacts include 11 specimens of Spanish Colonial ceramics (34-128 cmbs), 16 fragments of Goliad ceramics (8-128 cmbs), and one Guerrero arrow point (38-48 cmbs).

### Test Units 13 and 14

Test Units 13 and 14 were located 7 m south of TUs 11 and 12 (see Figure 5-1). They were excavated to terminal depths of 191 cmbs and 148 cmbs, respectively. Test Unit 13 was placed against the wall of the church. The shelf with supporting stones discussed above was also present, 76 cmbs, in TU 13. At this point on the foundation, the shelf is constructed from one large limestone rock (Figure 5-10). It is unknown what the function of this rock shelf was. One interpretation is that the church is sitting slightly off the foundation of an older structure.

The sediments in TUs 13 and 14 consisted of approximately 25 cm of silty sand with small pebbles, mortar fragments, and pieces of sandstone overlying 10 cm of caliche. Below the caliche, loose silty sand containing angular rock continued for 75 cm to the start of a compact layer of silty sediment. Differences profiles of the units' north and south walls suggest disturbance and soil movement.

Cultural materials retrieved from TUs 13 and 14 include historic ceramics (n=21), Native ceramics (n=22), glass (n=164), metal (n=43), one personal item, one gunflint, building material (n=73), lithic debitage (n=7), and faunal material (893 gm). Sixteen pieces of modern trash were excavated from 0-61 cmbs (see Appendix 2, Table A2-6). Colonial period artifacts include 14 pieces of Spanish Colonial ceramics (0-98 cmbs). Twenty-two specimens of Goliad ceramics (0-131 cmbs) were also recovered (see Appendix 2, Table A2-6).


Figure 5-9. *Stone shelf on the foundation of the church in Test Unit 11.*


Figure 5-10. *Foundation of the church in Test Unit 13.*

## Phase 2: Backhoe Trenches

Four backhoe trenches (BHTs) were excavated after the completion of the unit excavations (Figure 5-11) to locate the base of the foundation in areas not explored by test units. One trench was placed on the west side of the church, and three were placed on the east side.

### Backhoe Trench 1

Backhoe Trench 1 was located against the western wall, south of the large window (see Figure 5-11). The trench was excavated to a depth of approximately 155 cmbs (Figure 5-12). Stratum 1 of the trench was approximately 60 to 70-cm thick and exhibited sandy silt with sandstone fragments and carbonate nodules that may be related to the plastering of the church walls. Artifacts noted in this level include ceramic fragments and animal bone fragments. The upper layer was disturbed by construction debris.

The second stratum, approximately 45 to 50-cm thick, consisted of sandy silt. The density of the carbonate nodules and sandstone fragments decreased in comparison to the upper stratum. Fragments of animal bone and Goliad ceramic sherds were noted, but in decreasing numbers compared to Stratum 1. The third stratum was made up of a thin layer (10-20 cm) of fine, sandy silt with marble-size gravel. The artifact density was low in comparison to the previous levels. A few small fragments of bone and ceramics were noted. The trench was terminated at Stratum 4, which consisted of white, sterile caliche with a high density of gravel. The base of the church foundation was uncovered at 1.55 mbs.

### Backhoe Trench 2

Backhoe Trench 2 was located against the east wall of the church, between the door to the sacristy and the buttress. It was placed near the 1-x-2 m block (TUs 1, 2, 5, and 6) to explore the wall uncovered in TUs 2 and 6 (see Figures

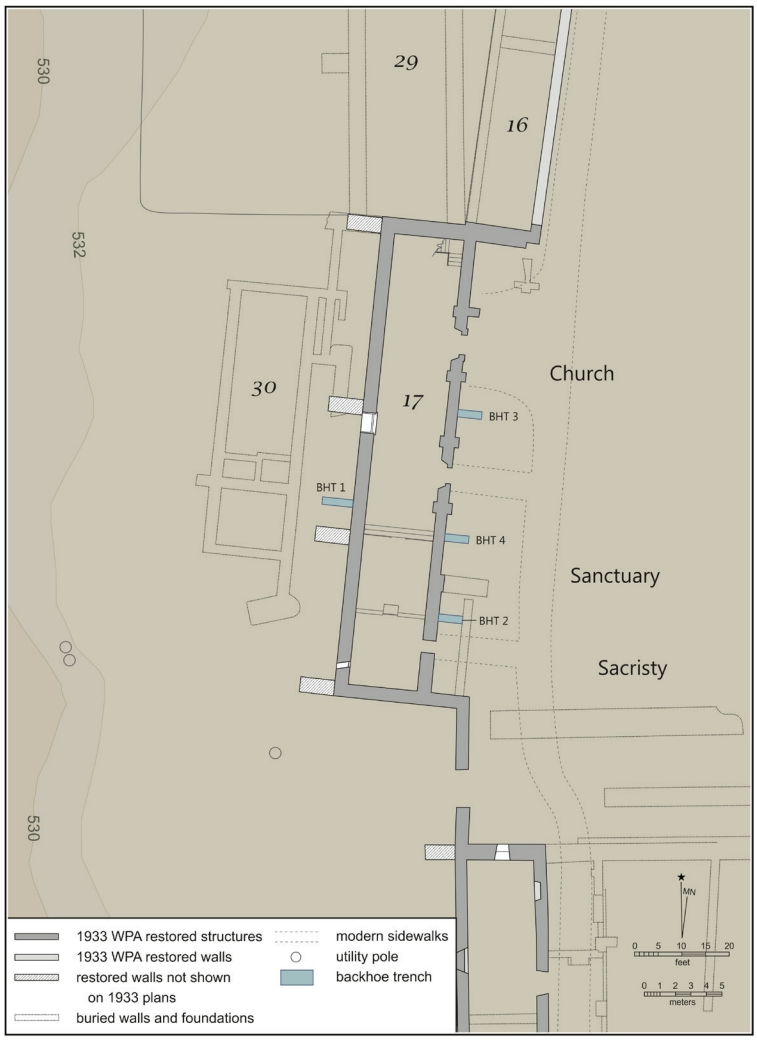


Figure 5-11. *Location of backhoe trenches excavated during Phase 2.*

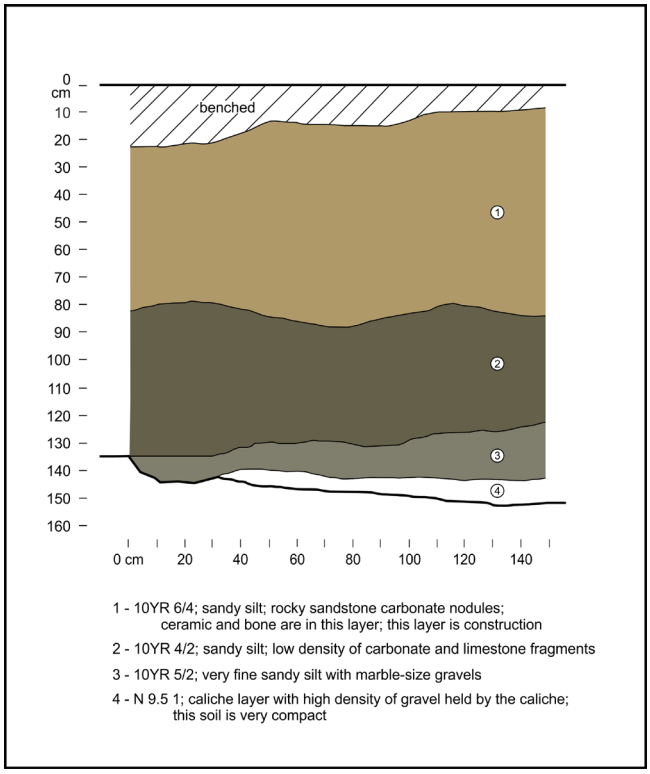


Figure 5-12. *Profile of Backhoe Trench 1.*

5-2, 5-3, and 5-11). The wall, topped by a walkway, was encountered approximately 15-20 cmbs (Figure 5-13). The wall crossed the trench approximately 100 cm from the east church wall. One of the upper stones of the wall was missing suggesting an earlier removal. Because the backhoe could not maneuver between the wall and the church foundation, the remaining matrix was hand-excavated. The base of the church foundation was not located. The strata of the trench consisted of a dark brown, clay loam with grass roots over silty sand. Glass, metal, and modern materials were noted in the profile.

## Backhoe Trench 3

Backhoe Trench 3 was placed against the east wall of the church approximately 3.5 m south of the north door between two buttresses (see Figure 5-11). The upper strata consisted of silty, clay loam with grass roots (Figure 5-14). Artifacts noted in the backdirt included glass, metal (scrap, wire nails, and wick holders), and plastic. Stratum 2 contained sandy silt with gravels, sandstone, and carbonates. At approximately 25 cmbs, a layer of concrete was uncovered protruding from the church wall. Stratum 3 consisted of compacted, sandy silt with gravel. Small fragments of faunal bone, glass, metal, and Goliad Ware were noted. A small pocket of loose, sandy silt with moderate gravel (Stratum 5) was recorded in the third stratum. No artifacts were noted in this layer. Stratum 4 was a loose, sandy silt with gravel and faunal fragments. Stratum 6, consisting of blocky, sandy silt with gravel, appears to be a trench cut into the profile. Two parallel alignments of wood fragments uncovered approximately 125 cmbs suggested the possibility of a human interment. Hand-excavation of sediments between the wood revealed human bone (Figure 5-15). Excavation of BHT 3 ceased at this point, and the burial was covered with plastic and plywood to protect it from further disturbance. The appropriate parties were notified. The base of the church foundation was not located.

## Backhoe Trench 4

Backhoe Trench 4 was placed on the east wall of the church between BHT 2 and the south church door to document the terminal depth of the wall foundation (see Figure 5-11). The upper stratum consisted of clay loam with grass roots, small carbonate flakes, and modern trash (Figure 5-16). The carbonates may be plaster from the church wall. Stratum 2 (5-15 cm) contained sandy silt with small-size gravel. Below this level, the sandy silt included charcoal flecks, marble-size gravel, limestone fragments, and carbonates. A few large faunal bones were noted in the trench wall.

The next 20-25 cm consists of five jumbled strata (see Figure 5-16). Stratum 4 consisted of silt with approximately 75 percent gravel. Stratum 5 contained sandy silt with pea-size

Figure 5-13. *Wall uncovered in Backhoe Trench 2.*

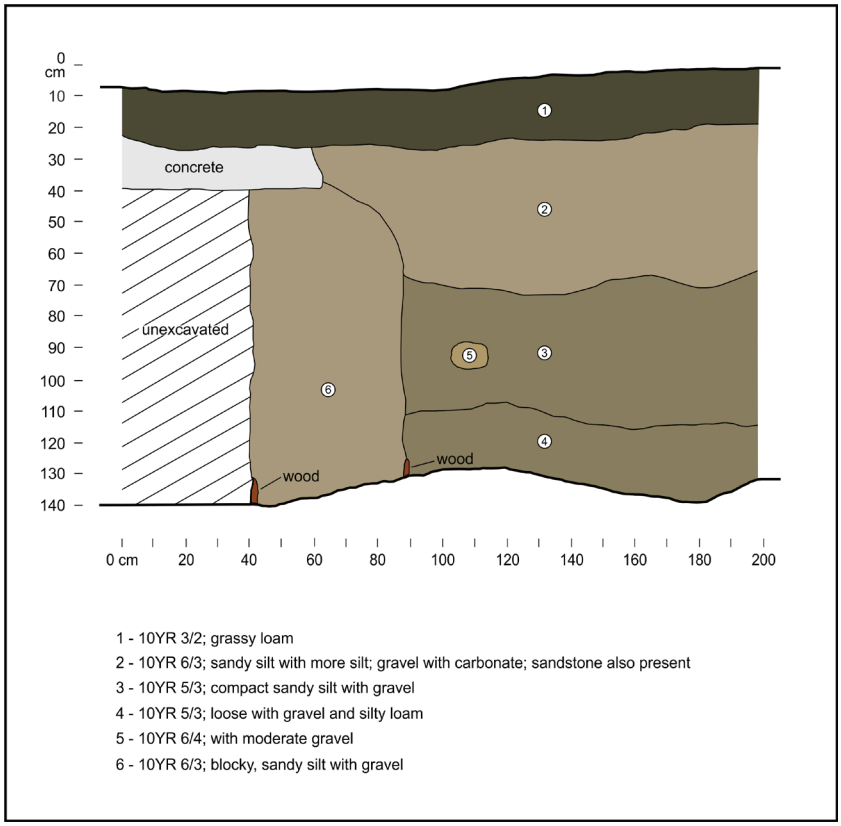


Figure 5-14. *Profile of Backhoe Trench 3.*

Figure 5-15. *Wood and bagged bone fragments uncovered at the base of Backhoe Trench 3.*

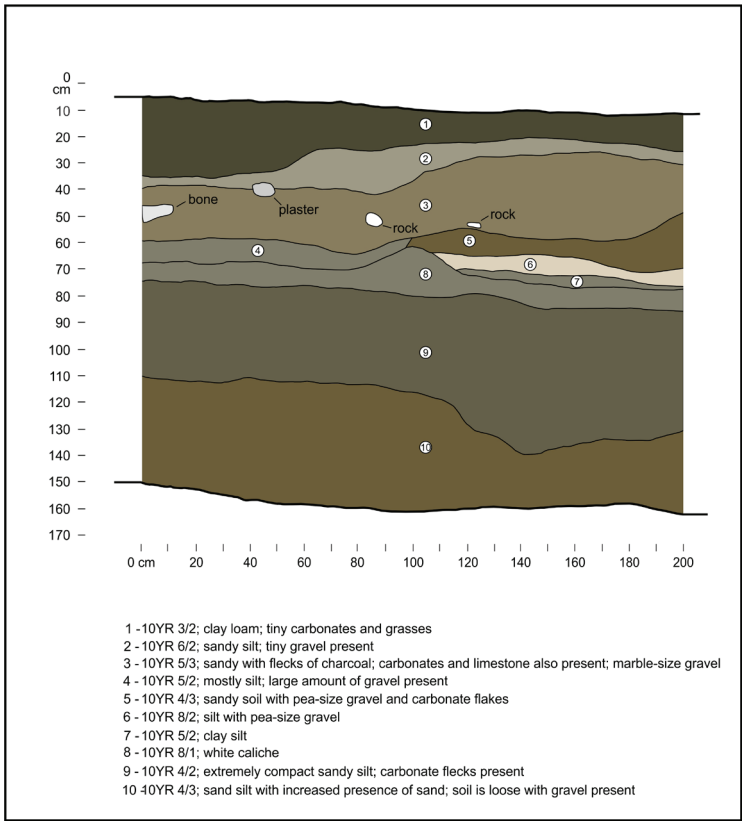


Figure 5-16. *Profile of Backhoe Trench 4.*

gravel and carbonate flecks. Carbonates decreased below Stratum 5. Stratum 6 consisted of silt mixed with pea-size gravel, and Stratum 7 contained silty clay without pea-size gravel. Stratum 8 was a 5 to 15-cm layer of sterile, white caliche running the entire length of the trench (Figure 5-17).

Two compact strata were uncovered below the caliche layer and the trench termination. Stratum 9 consisted of sandy silt with carbonate flecks, Native, Colonial, and European ceramics, bone, glass, and metal objects. Stratum 10 contained silty sand with gravel. Artifacts noted included lithic flakes as well as Native and Colonial ceramics. The base of the foundation was uncovered approximately 160 cmbs.

## Phase 3: Monitoring

After the completion of the archaeological excavations, the entire foundation of the church was mechanically exposed as part of the underpinning process. Excavation methodology evolved during the process as obstacles were encountered. Frequent consultations with NPS, THC, and Pugh Constructors were held to decide on the best methods of sediment removal, recording, and screening. Matrix was to be removed in a trench, 1.22-m wide, around the church perimeter to the bottom of the foundation that ranged from 1.22-2.0 mbs. To avoid undermining the integrity of the church foundation and to contend with buttresses, Pugh Constructors planned to remove the matrix in 1.22-m sections. The excavations of the sections would alternate to leave supporting sections of matrix against the wall while alternating sections were stitched together. As the project progressed the length and the width of the sections varied. As previously discussed in Chapter 4, based on initial impressions from test unit and trench deposits, the perimeter matrix was removed in two layers thought to reflect an upper fill deposit and a lower Colonial component. Subsequent artifact analysis and radiocarbon assays revealed that the deposits were mixed.

Twenty-two sections (A1-A4 and B-S) were mechanically excavated during Phase 3 (Figure 5-18). The upper sediments of Sections A1 and A2 were mechanically excavated, but the lower deposits were hand-excavated after the exposure of human remains (see Chapters 11 and 12). Of the 22 sections, 18 were monitored, and 14 were screened to some degree. The CAR was not notified when the excavations of Sections O-R occurred.

Figure 5-17. *South wall of Backhoe Trench 4. Note layer of white caliche.*


Figure 5-18. *Location of the sections mechanically excavated during Phase 3.*

Recovered artifacts consist of 8,569 historic and prehistoric artifacts, 45,290 gm of faunal bone, and 285 gm of mussel shell or marine shell (Table 5-3). Artifacts from Section A are not included but are described in Chapter 12. The largest concentration of artifacts (n=4,158) was recovered from Section J. The largest amounts of faunal material were found in Section J (16,144 gm) and Section B (12,087 gm). Because not all the sediments were screened, e.g., only the upper strata were screened from Section B, artifact densities could not be calculated. The concentration of cultural material suggests a possible midden in Section J.

### Section A (A1-A4)

Section A1 was located on the east wall of the church approximately 1.5 m south of the north door between two buttresses (see Figure 5-18). Backhoe Trench 3 was placed in this section (see Phase 2). No further mechanical-excavations were conducted in Section A1 after the discovery of human remains. Section A2 was located on the east wall of the church, at the northeast corner under the bell tower. Initial excavations began at the base of the buttress to determine how far the buttress extended. At approximately

Table 5-3. Artifacts Recovered from Section Excavations

| Section | Historic Ceramics | Native American Ceramics | Glass | Metal | Personal Items | Gunflints | Building Material | Debitage | Lithic Tools | Total Count | Modern Material | Faunal Bone (gm) | Mussel and Marine Shell (gm) | Total Weight (gm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B | 90 | 140 | 157 | 76 | 2 | 2 | 38 | 25 | 1 | 531 | 23 | 12039.0 | 47.6 | 12086.6 |
| C | 47 | 79 | 110 | 51 | | 1 | 27 | 9 | 1 | 325 | 6 | 6878.4 | 38.4 | 6916.7 |
| D | 11 | 18 | 12 | 11 | | | 7 | 1 | | 60 | 1 | 955.2 | 43.2 | 998.4 |
| E | 32 | 28 | 20 | 13 | | | 105 | 8 | 1 | 207 | 3 | 937.5 | 5.1 | 942.6 |
| F | 69 | 18 | 26 | 121 | 2 | | 614 | 13 | 2 | 865 | 24 | 6407.6 | 23.9 | 6431.5 |
| G | 12 | 14 | 9 | 9 | | | 28 | 4 | | 76 | 3 | 1211.8 | 4.7 | 1216.5 |
| H | 15 | 27 | 44 | 160 | 2 | 1 | 1191 | 4 | 1 | 1445 | 1 | 753.2 | | 753.2 |
| I | 9 | 3 | 46 | 29 | | | 37 | | | 124 | 2 | 80.9 | 0.6 | 81.5 |
| J | 627 | 331 | 1004 | 243 | 8 | 7 | 1935 | | 3 | 4158 | 29 | 16026.0 | 117.6 | 16143.5 |
| K | 38 | 11 | 335 | 49 | 2 | | 343 | | | 778 | 2 | | 3.7 | 3.7 |
| **Total** | **950** | **669** | **1763** | **762** | **16** | **11** | **4325** | **64** | **9** | **8569** | **94** | **45289.6** | **284.7** | **45574.3** |

25 cmbs, the buttress footer was uncovered. Human bone was exposed at approximately 1.5 mbs. Excavations in the area were halted, and all pertinent parties were notified. A mini-excavator was used to remove the upper layer of soil from Section A2 to just above 1.5 mbs. During this removal, a slab of concrete was dislodged. The project archaeologist halted the excavations. Chapters 11 and 12 discuss the excavation of the human remains. Sections A3 and A4 were both mechanically excavated to approximately 1.35 mbs. Auger bores were then drilled into the southeast corner of the Section A3 against the footer and into the northeast corner of the Section A4. Human remains were revealed in both auger bores (see Chapters 11 and 12). No matrix was screened from the mechanical excavations of Section A.

## Section B

Section B, against the south side of Buttress 2 on the west wall of the church, was approximately 2.4-x-3.0 m. The matrix in the section was similar to that noted in BHT 1. The upper layers contained mortar, plaster, loose sandstone, and animal bone. Artifact density increased beneath the upper 20 cm. The upper and lower strata were distinguished by a shift in the density of carbonates, and the change from a lighter, sandy silt to a compact, browner, silty soil. Along the entire west side of the church, the shift from the upper to the lower strata occurred between 80 and 100 cmbs.

The base of the church foundation was uncovered approximately 1.5 mbs. A small limestone and sandstone footer was present under the concrete and rebar base of Buttress 2 suggesting that an earlier, smaller buttress was originally in this location. No major architectural features were encountered in Section B.

## Section C

Section C, 2.4-x-2.7 m, was placed just south of the large window on the western side of the church, between Sections D and G. The upper stratum contained modern construction material and trash over Post-Colonial and Colonial artifacts. The lower stratum consisted of a modern trash and a low density of Colonial (n=2) and Native American (n=3) ceramics. An increase in gravel was also noted in the lower

levels. The transition between strata was determined by carbonate density and by the presence of a thin caliche level. Two bone collagen samples (one white-tailed deer and one cow) recovered from the lower stratum of Section C were sampled for radiocarbon dating (see Appendix 1). The results confirm that the deposits are jumbled. The highest probability date range for both samples is between about AD 1800 and the 1930s.

No significant architectural features were encountered during the excavation of Section C. The base of the church foundation was uncovered at approximately 1.6 mbs.

### Section D

Section D, on the west side of the church, was located north of Section C against Buttress 3. The upper sediments contained a layer of construction debris over sediments with Post-Colonial and Colonial ceramics, glass, metal, and bone. The density of cultural material (modern trash, building material, cut nail, and bone) dropped dramatically in Stratum 2 (80 cmbs).

The base of the church foundation was uncovered at approximately 1.5 mbs. After the removal of Buttress 3, it was evident that sandstones were used to tie the buttress into the church wall. A small limestone and sandstone footer below the concrete base of the buttress appeared to be part of an earlier structure.

### Section E

Section E, 6.0-x-2.5 m, was located on the west side of the church, north of TUs 13 and 14 and south of TUs 11 and 12. Previous maps of the mission indicated that there were buried walls from structures that predated Room 17 in this section. Although several large stones were encountered, the excavation of Section E did not produce evidence of intact walls. Of the two strata, the lower produced the greatest amount of cultural material, including European and Colonial ceramics, glass fragments, lithic material, and faunal remains. No significant architectural features were revealed. The base of the church foundation was located 1.56 mbs.

### Section F

Section F was located north of Buttress 2 and Section B, and incorporated BHT 1 (see Phase 2). The section, 2.5-x-2.5 m, contained a high density of artifacts in its upper stratum. The lower stratum had very few artifacts. The base of the church foundation was uncovered at approximately 1.6 mbs. No significant architectural features were encountered. One radiocarbon date, obtained from the bone collagen of a bison bone recovered from the upper sediments, suggests that the highest probability date range for the sample is between about AD 1800 and the 1930s (see Appendix 1).

### Section G

Section G was located between Sections C and F along the west wall of the church. The upper layers contained the higher density of cultural material. Modern trash and construction material was noted in the upper 10-20 cmbs overlying European and Colonial ceramics, glass fragments, nails, metal objects, and faunal material. Artifact density dropped significantly in the lower stratum. No significant architectural features were encountered.

### Section H

Section H was placed between Buttress 4 and TUs 11 and 12. The soil from under the buttress was included in this section. The upper soils were silty with various amounts of carbonates or plaster and sandstone fragments. They contained modern trash and construction material over a high density of nineteenth- to early twentieth-century cultural material. The artifact density dramatically decreased in the compact soil excavated from Stratum 2.

An architectural feature, constructed from limestone and sandstone, was uncovered under the buttress footing. Previous maps (Ivey 1982) indicate an earlier wall in this location (see Figure 5-18). It appears that a portion of the wall was used as a footer for Buttress 4. Although a few large stones were out of place, the wall appeared to be relatively intact.

### Section I

Section I was against Buttress 4 on the north wall of the church. The sediments in the upper stratum were disturbed with a high density of construction material. A layer of caliche divided the upper and lower strata. The section profile revealed that the caliche did not extend throughout the entire section but was disturbed from previous construction. Cultural material recovered from Stratum 2 contained modern materials and one piece of Spanish Colonial ceramic.

The remains of a previous mission wall built of limestone and sandstone were uncovered 60 cmbs in the west half of Section I (see Figure 5-18). The wall was lying on a north-south axis with a slight angle to the west. Because only a portion of the wall was uncovered, its width could not be determined. The

church foundation and the wall terminated at approximately 1.6 mbs. To stop further construction impact on the wall, the NPS, THC, and Pugh Constructors changed the underpinning design for this section of the church foundation.

### Section J

Section J was located along the south wall of the church to the west of TUs 9 and 10. A drain line, lying parallel to the church wall, disturbed parts of the upper sediments. The upper stratum contained loose, silty soil with construction material and a high density of glass, metal, faunal bone, and mid to late nineteenth- and early twentieth-century ceramics. Stratum 2 started at 70-80 cmbs. Sediments changed to compact, sandy, silty clay with fewer carbonates. Both Colonial and Post-Colonial artifacts were present. One bone collagen sample (white-tailed deer) recovered from the lower stratum of Section J was sampled for radiocarbon dating (see Appendix 1). The date range with the highest probability is between about AD 1800 and the 1930s.

No significant architectural features were recorded. The base of the foundation was uncovered 1.8 mbs. The lower 80 cm of the foundation contained looser mortar and fewer larger stones than the upper portion.

### Section K

Section K was located east of TUs 9 and 10 against the south wall of the church. The upper sediments consisted of loose, sandy silt with a high frequency of carbonate material and a mixture of nineteenth- and twentieth-century artifacts. Strata 2 commenced with more compact soils at 80 cmbs.

The base of the foundation was uncovered 1.8 mbs. A wall, added to the southeast corner of the structure after the church was constructed, terminated at approximately 1.3 mbs (see Figure 5-18). No significant architectural features were recorded in Section K.

### Section L

Section L was located on the north wall of the church, between Section I and TUs 3 and 4. Because the sediments in this section were disturbed, no matrix was screened. Several large stones were removed that appear to be wall fall from Room 29 (see Figure 5-18). The base of the church foundation was located at approximately 1.56 mbs.

### Section M

Section M was placed on the north wall of the church to the east of TUs 3 and 4. Because the CAR had completed screening the percentage of soils agreed upon by the THC and the NPS, no matrix was screened from Section M. The church foundation was uncovered at approximately 1.6 mbs. Several large stones that appeared to line up with the east wall of Room 29 (see Figure 5-18) were revealed against the church foundation in the west side of the section. The stones were disturbed approximately 1.5 m out from the church foundation.

### Section N

Section N was a large area located along the east wall of the church between its southeast corner and the buttress north of the sacristy door. A portion of a wall from an earlier structure was uncovered in the section during Phases 1 and 2. The wall is parallel to the church (see Figure 5-18). The sediments from Section N were mechanically removed to the depth of the top of the wall. The remaining sediments were excavated by hand.

The wall is approximately 0.3-m wide, 6.5-m long, and 0.5 to 0.7-m high. To preserve the wall, piers for the church stabilization were moved from their planned positions to between the wall and the church. The matrix from Section N was not screened.

### Section S

Section S was excavated along the east side of the north wall of the church. A portion of the wall from an earlier structure (Room 16) was revealed 0.6 mbs in the west half of the section (see Figure 5-18). The wall is perpendicular to the north wall of the church and is 0.6 to 1.3-m wide. The portion exposed in the section was 1.7-m long. The wall was left in place. Sediments from Section S were not screened.

## Documentation of the Church Foundation

After the perimeter matrix was removed the foundation of the church was photo-documented. Because, the foundation was exposed in alternating sections, the documentation was accomplished in stages. The digital images were then stitched together. The completed images of each wall are presented in Appendix 3. Shoring, consisting of panels and horizontal wood posts from the walls of the trench to the church wall, obscured parts of the foundation in the photos.

# Chapter 6: Artifact Descriptions

*Kristi Miller Nichols and Cynthia M. Munoz*

This chapter presents descriptive data for the cultural material recovered during Phase 1 testing and Phase 3 monitoring of Mission San Juan. Artifacts discussed include glass, Spanish Colonial and European ceramics, personal items, and construction materials. Analyses of the Native American ceramics are presented in Chapters 7 and 8. Lithic material and faunal bone are discussed in Chapters 9 and 10, respectively.

## Glass

Excavations during Phases 1 and 3 recovered 3,126 fragments of glass. Sixty-six additional fragments of glass were categorized as modern trash (e.g., Christmas light bulbs). The glass consisted of fragments of vessels, windows, lamp chimneys, and ornaments. A review of test unit data indicates that 45 percent of the glass was recovered from the upper two levels of sediments (0-24 cmbs; Figure 6-1). All 14 test units had glass present in Levels 1 and 2 (Table 6-1).

Glass color is often diagnostic of a specific time period. Glass is produced from sand, soda from wood ash, and lime. Unpure sand contains traces of minerals that result in various glass colors. Due to the difficulty in procuring pure sand, most early glass companies manufactured colored vessels. Prior to industrialization, the production of clear glass was expensive. The Venetians discovered that quartz would result in colorless vessels. Around 1673, the English copied this technique but used ground flint in the place of quartz. Another English method added red lead during manufacture to produce brilliantly clear glass. Because of the expense to produce clear glass, most early glass ranges from shades of aqua to light green (Kendrick 1966). Iron oxide, a natural occurring mineral in sand, results in brown, amber, olive, and aqua colors.

Prior to the 1860s, iron slag was commonly used to produce glass. The iron and carbon mixture of the slag resulted in an olive green to amber green tint. In some cases, the tint would

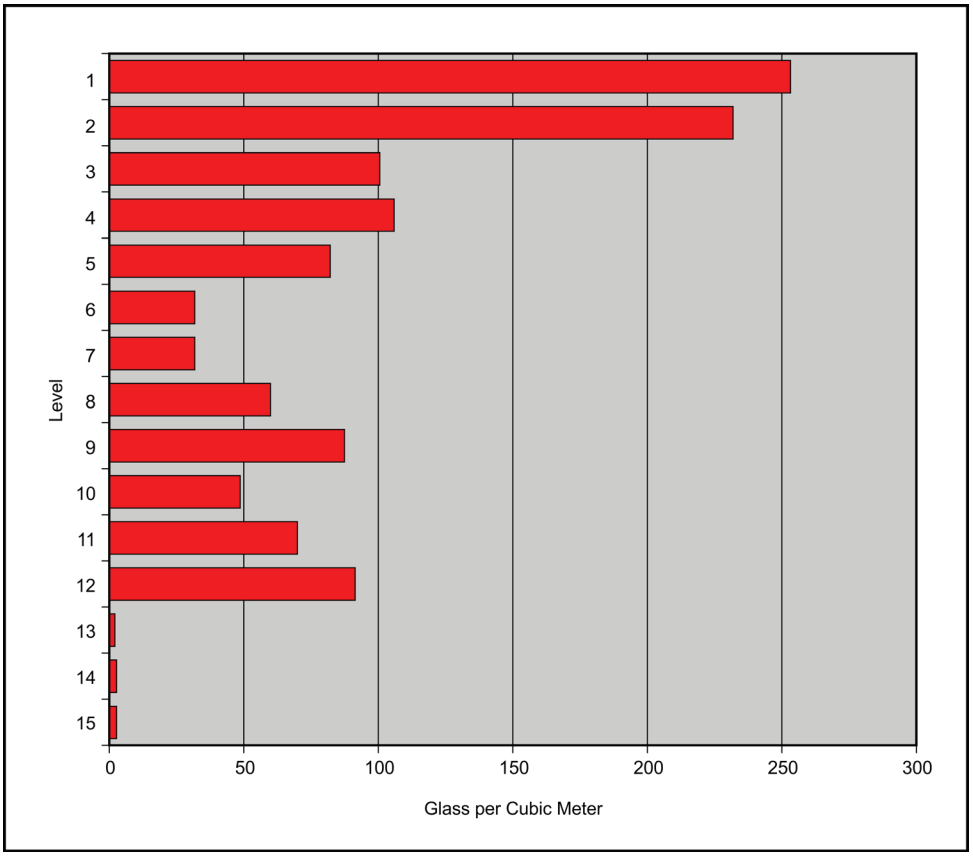


Figure 6-1. *Counts of glass per cubic meter recovered by level from Test Units 1-14.*

Table 6-1. Glass Recovered from Phases 1 and 3

| Location | Clear | Aqua | Brown | Olive | | | Purpled | Milk | | Blue | Amber | Green | | | | Orange | Red | Teal | Yellow | Yellow-green | Ornament | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Olive | Dark | Amber | | White | Purpled | | | 7-Up | Coke | Dr. Pepper | Green | | | | | | | |
| TU 1 | 15 | 44 | 8 | | | | | | | | | | 1 | 21 | | | | | | | | **89** |
| TU 2 | 13 | | 3 | | 2 | | | | | | | | | | | | 2 | | | | | **20** |
| TU 3 | 50 | | 1 | 5 | 1 | | 1 | | | | | | | | | | | | 1 | | | **59** |
| TU 4 | 459 | 24 | 6 | 5 | | | | | | | | | | | 1 | | | | | | | **495** |
| TU 5 | 5 | | 2 | | | | | | | 1 | | 1 | 3 | | | | | | | | | **12** |
| TU 6 | 65 | 1 | | | | | | | | | | | | | | | 2 | | | | | **68** |
| TU 7 | 11 | 3 | 5 | | 4 | | | | | | | | 1 | | 1 | | | | | | | **25** |
| TU 8 | 5 | 12 | 16 | 6 | | | | | | | 11 | 2 | 1 | | 1 | | | | | 2 | | **56** |
| TU 9 | 55 | 6 | 4 | 11 | 6 | | | | 2 | 3 | | | | | | | | 1 | | | | **88** |
| TU 10 | 110 | 3 | 13 | 15 | 1 | | | 1 | | 2 | | 10 | | | | | 11 | | | | | **166** |
| TU 11 | 37 | 22 | 22 | 2 | | | | | | | | | | | 2 | | | | | | | **85** |
| TU 12 | 28 | 4 | 3 | 1 | | | | | | | 1 | | | | | | | | | | | **37** |
| TU 13 | 27 | | 3 | 2 | | | | | | | | | | | | | | | | | | **32** |
| TU 14 | 36 | 82 | 9 | 2 | | | 1 | | | | | | | | | | | | 2 | | | **132** |
| Section B | 127 | 7 | 11 | 4 | | | | | | 2 | | 2 | 4 | | | | | | | | | **157** |
| Section C | 91 | 2 | 12 | 1 | | | | | | 3 | | | 1 | | | | | | | | | **110** |
| Section D | 3 | | 1 | 5 | | | | 1 | | | | | | | | 2 | | | | | | **12** |
| Section E | 9 | 1 | 1 | 1 | 4 | | 1 | 2 | | | | | | | | | | | 1 | | | **20** |
| Section F | 4 | 1 | 13 | 6 | | | | 1 | | | | 1 | | | | | | | | | | **26** |
| Section G | 3 | 1 | 4 | | | | | | | | 1 | | | | | | | | | | | **9** |
| Section H | 15 | 8 | 7 | 3 | 1 | 1 | 6 | 1 | | | | | | | 1 | 1 | | | | | | **44** |
| Section I | 37 | 2 | | 2 | | | | 1 | | 2 | 2 | | | | | | | | | | | **46** |
| Section J | 533 | 30 | 249 | 45 | 80 | 1 | | 3 | 4 | 29 | | 15 | | | | 7 | 5 | | | | 2 | **1003** |
| Section K | 251 | 4 | 21 | 9 | | | | | | 10 | 4 | 16 | 9 | | | | 7 | | | | 4 | **335** |
| **Total** | **1989** | **257** | **414** | **125** | **99** | **2** | **9** | **10** | **6** | **52** | **19** | **47** | **20** | **21** | **6** | **10** | **27** | **1** | **4** | **2** | **6** | **3126** |

be so dark that the glass would be referred to as "black," and darker glass was valued as protection for the contents of containers (Kendrick 1966). In the 1880s, the demand for clear glass bottles increased in the food-preservation and packing industries. Glass manufacturers began adding manganese and selenium to bleach the green tints from glass. Although manganese and selenium produced clear glass initially, a chemical reaction caused by exposure to sunlight would change the glass hue over time. Both of these additives were discontinued after 1930. Glass produced after the 1930s remains clear. Other minerals or metallic oxides result in bright colors such as cobalt blue, milk (white), yellow, and green. Because these colors were expensive to produce, they are not commonly found in the archaeological record.

Glass fragments recovered from the mission were categorized into 20 color groupings (see Table 6-1). Colors diagnostic of specific periods of time, such as clear, aqua, amber, black, purple, and milk, were found throughout test unit levels suggesting that the sediments around the church are jumbled.

## Clear

Clear glass, also referred to as "colorless," comprised the largest category of glass fragments recovered from the unit excavations and the foundation matrix. The fragments (n=1,989) were cataloged, and they represent many vessel forms including soda bottles, condiment bottles, canning

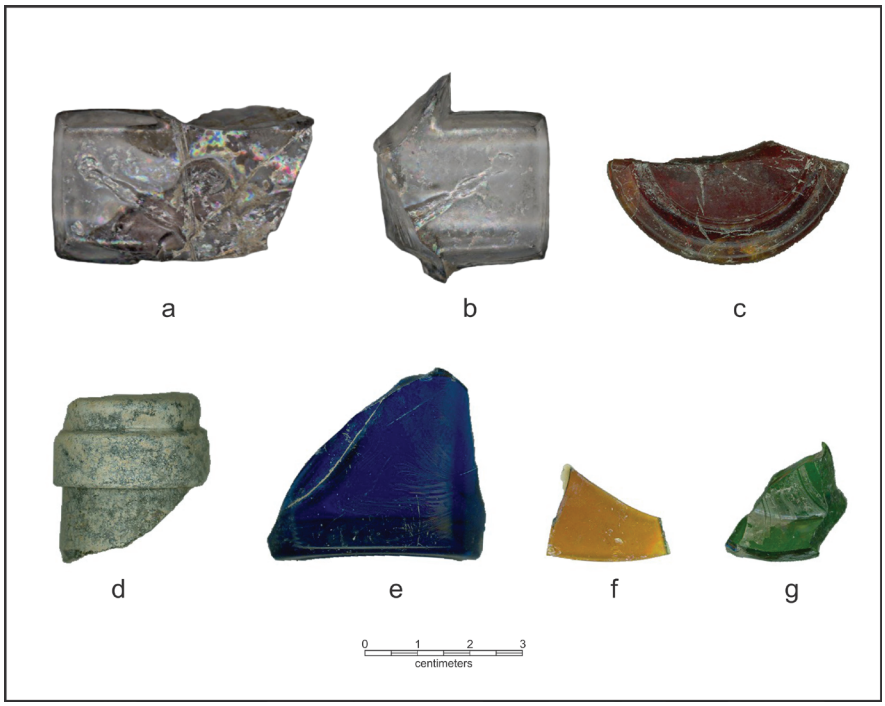


Figure 6-2. *Glass fragments recovered from the site. Several colors were encountered including: a and b) clear; c) brown; d) olive; e) blue; f) amber; g) green.*

jars, vases, and glass serving ware (see Table 6-1; Figure 6-2a, b). No tinge of green, aqua, purple, or amber was noted in the clear category suggesting that the fragments were manufactured after the 1930s.

In the test units, the majority of clear glass fragments (94 percent) were recovered from the upper four levels (0-43 cmbs; Figure 6-3). The deep recovery of clear glass (n=1) in Level 9 (74-86 cmbs) suggests that the sediments are disturbed. Section J contained 50 percent of the clear glass recovered from Phase 3.

## Aqua

Aqua glass fragments (n=257) were recovered from the Phase 1 and 3 excavations (see Table 6-1). Although aqua glass is found from the Late Colonial period to modern times, it appears to have decreased after the 1880s. Aqua glass vessels include soda and water bottles, canning jars, and medicine bottles. With the exception of canning jars and soda bottles, machine-made aqua bottle glass typically pre-dates the 1920s (BLM 2013). Coca-Cola and Dr. Pepper bottles were made of aqua glass well into the late twentieth century. Aqua colored canning jars (Ball) were manufactured between 1885 and 1937 (Vincent 2014). Although aqua glass was manufactured between 1975 and 1977 for the bicentennial, it is generally suggestive of manufacture prior to the 1930s (BLM 2013).

The majority of the aqua glass fragments from Phase 1 were recovered from the upper five levels in the test units (79 percent; 0-50 cmbs,) and from Section J (54 percent) in Phase 3. Aqua glass recovery terminated in Level 15 (n=1; 138-148 cmbs; see Figure 6-3).

## Brown

Brown glass, considered a "natural" glass color, was commonly used to contain alcohol and medicine. The brown color acted as a filter to prevent light from spoiling the bottle's contents. Beer and alcohol bottles are often brown. Brown is a common modern color as well. Brown is often categorized in an "amber" group. Because brown glass often dates later than amber and true amber colors are rare at many of the historic sites in Central Texas, the colors were separated for this analysis.

During this project, 414 brown glass fragments were recovered from the site (see Table 6-1 and Figure 6-2c). Of the 414, 95 were recovered from the test unit excavations (see Figure 6-3). Although most of the fragments (77 percent) were recovered from the upper three levels of excavation (0-33 cmbs), four fragments were removed from Levels 12-14 (107-138 cmbs). Brown glass was recovered from all but one of the screened sections of Phase 3 (Section I) with the majority recorded in Section J (78 percent).

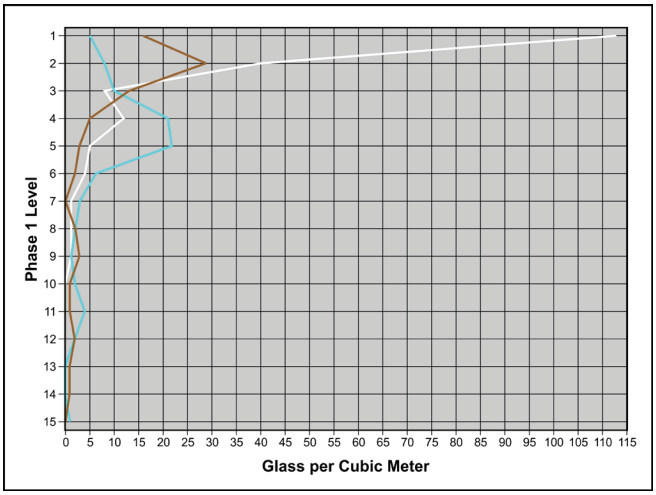


Figure 6-3. *Counts of clear (white), aqua (blue), and brown (brown) glass per cubic meter recovered by level from Test Units 1-14.*

## Amber

Amber glass is also referred to as "Straw Glass" due to its honey-tinged yellow hue (see Figure 6-2f). Historically, manganese from Germany was used to produce clear glass. The advent of World War I virtually cut off the supply of the mineral to the United States (Kendrick 1966). Glass makers replaced manganese with selenium. This process produced a clear, colorless glass that turned amber when exposed to UV rays. Nineteen fragments of amber glass were recovered during the course of the project (see Table 6-1). The highest density was recovered in Test Unit 8, between 28 and 48 cmbs.

## Olive

Olive glass is commonly recovered at Spanish Mission sites in Texas. Various shades of olive green are a result of iron oxide levels present in the sand used during manufacture (BLM 2013). The typical vessel type encountered at the missions is the wine bottle (see Figure 6-2d). During the Colonial period, wine was stored in olive colored hand-blown bottles. Uneven walls and bases with pontil marks can be used to identify these bottles. No bases with pontil marks were recovered during the excavations, but many of the fragments were patinated, suggesting that some sherds likely predated the twentieth century. Olive green glass was commonly used in water and soda bottles until 1870 and for other vessel types before the 1860s. Wine and champagne bottles are currently manufactured with olive glass, but the color is often of a brighter hue (BLM 2013).

A variation of olive glass typed as "amber olive" was also recovered from the site. With the exception of champagne and wine bottles, this color indicates glass produced before 1900. Dark olive glass, also termed "black glass," is believed to be one of the earliest glass types found at North American sites. The use of black glass has roots to seventeenth-century Europe (BLM 2013). Black glass was a common color produced for alcohol, wine, and mineral water bottles before 1880 in America and before 1890 in Europe.

In total, 226 fragments of olive glass were recovered from the project including 99 pieces of dark olive and 2 pieces of amber olive (see Table 6-1). The amber olive fragments were removed from the Phase 3 excavations. Of the 226 olive fragments, 63 were found during Phase 1. Of the 63, 13 were dark olive. These fragments were recovered from Levels 2-5, 9, 10, and 14 with the highest density (69 percent) in the upper levels (6-48 cmbs).

## Milk Glass

Milk glass is produced with tin oxide, zinc oxide, fluorides, and phosphates additives. The glass is typically used for cosmetic and toiletry jars, ointment jars, candy dishes, and figurines (BLM 2013). The manufacture of milk glass predominately dates from 1870 to 1920 (BLM 2013). Purple milk glass, dating to the first two decades of the twentieth century (BLM 2013), is produced from the reaction of added manganese oxide and UV light. Of 16 recovered fragments, 3 were recovered from the upper levels (0-12 cmbs) of TUs 9 and 10, and 13 were excavated from Phase 3 (see Table 6-1).

## Purple

Glass treated with manganese oxide turns a purple hue when exposed to UV light. The additive was commonly used from the 1880s to the start of World War I to produce clear glass (Kendrick 1966). Some manufacturers continued to add manganese until the 1930s, but its use dramatically dropped after 1914. Nine fragments of purple glass were recovered, seven from Phase 3 and two from Level 2 (6-18 cmbs) of the Phase 1 test units (see Table 6-1).

## Blue

Blue glass (see Figure 6-2e) tends to be uncommon at historic sites. Blue glass was used in a variety of different bottle types and spans too large of a time period to be a useful diagnostic. Fifty-two blue glass fragments were recovered during the course of the project, six from the test units and 46 from the section excavations (see Table 6-1). The fragments recovered from the test units were from the upper three levels (0-32 cmbs).

## Green

Four shades were grouped into the green category, including 7-Up, Coke, and Dr. Pepper greens, and a green that was

neither olive nor another definitive variety (see Figure 6-2g). The first three are most definitely a twentieth-century phenomenon, while the last offers little diagnostic utility. There may be a few late nineteenth-century vessels of the bright 7-Up color, but it is more commonly associated with soda bottles (BLM 2013). Ninety-four green glass fragments were recovered during the project, 45 from Phase 1 and 49 from Phase 3 (see Table 6-1). Most of the test unit green glass (93 percent) was recovered from the upper five levels (0-50 cmbs). Three fragments were uncovered 88-107 cmbs.

### Other Colors

Other colors of glass fragments recovered during Phase 1 and 3 (n=44), including orange, red, teal, and yellow, are not commonly used as temporal diagnostic. Twenty-one of these fragments were recovered from Levels 1-5 (0-48 cmbs), 7 (58-68 cmbs), and 12 (108-118 cmbs) of the test units, and 23 were uncovered during Phase 3 (see Table 6-1). Typically, vibrant colors were produced in the late twentieth century. It is possible that yellow is a variation of amber. Versions of amber glass that are characterized as "yellow" have been attributed to the 1880s (BLM 2013). Variations of red glass have been noted in bottles produced from the 1840s to the 1890s (BLM 2013). A "ruby red" variety is linked to Schlitz beer bottles that were manufactured from the 1940s to the 1960s (BLM 2013).

### Soda Bottles

Twenty-four fragments were definitively identified as soda bottles from coloring and markings on the glass. Of the 24, 21 were identified as Dr. Pepper bottles. Two fragments were light green, and 19 were clear. Three fragments of clear glass were from Pepsi bottles. Glass bottles with silk screen labels were commonly used until the 1980s. By the 1990s, there was a shift from glass bottles to plastic. The soda bottle fragments likely date between 1960 and 1980. The Dr. Pepper fragments were recovered from Levels 3-5 (20-50 cmbs) of TU 1. The Pepsi glass was removed during Phase 3.

## Ceramics

Test unit and section excavations recovered 2,206 ceramic sherds, including Spanish Colonial (n=854), European (n=462), Native American (n=862), kiln (n=11), and modern fragments (n=17; Table 6-2). An analysis of artifacts recovered from the Phase 1 test units indicates that 86% of the ceramics were recovered from the upper five levels (0-52 cmbs). Spanish Colonial, European, and Native ceramics were present throughout the test unit levels (Figure 6-4). Native American ceramics, i.e., Goliad, are discussed in detail in Chapters 7 and 8.

### Colonial Ceramics

Three varieties of Colonial ceramics, unglazed, lead glazed, and tin glazed wares, were collected during the first and third phases of the project. Unglazed wares are wheel-thrown or handmade utilitarian wares that were most likely manufactured in Mexico and imported to the missions. Decoration methods included painting, slipping, and burnishing. Three types, consisting of Valero, Tonalá Burnished, and Red Burnished, were recovered during the excavations (Figure 6-5). Appendix 4 presents type descriptions. Undecorated Valero fragments (n=182) were recovered from Phase 1 and 3 excavations, 73 from test units and 109 from section matrix removal. Most of the fragments removed from the test units (95 percent) were recovered in the top five layers (0-48 cmbs; Table 6-3). Valero wares terminated at 108-118 cmbs (n=1). In the section excavations, the highest counts of the ware were removed from Section J (n=65, Table 6-4). Twenty pieces of Tonalá Burnished Ware, seven from Phase 1 and thirteen from Phase 3, were recovered during the project. The fragments were distributed throughout the test unit levels from 9-154 cmbs. One fragment of Red Burnished was recovered from Level 4 (28-38 cmbs) of Phase 1, and eight were excavated from Phase 3.

Lead glazed ceramics are common at Spanish Colonial sites throughout Texas. The wheel-thrown vessels are grouped into two categories: sandy-pasted and fine-pasted. Ten varieties, including yellow and green glazed, green glazed, black luster, olive jar, brown on yellow, dark brown, Galera, red brown, smooth brown, and Tonalá glazed wares, were recorded during the excavations (Figure 6-6; see Appendix 4). The specimens of lead glazed ceramics (n=444) were removed during test unit and section excavations. Of the 444, 126 were recovered from Phase 1 test units (see Table 6-3). The majority of the test unit fragments (87 percent) were found in the upper five layers (0-52 cmbs). The deepest sherds, one fragment of Red Brown Ware and one undecorated fragment, were recovered from Level 13 (118-132 cmbs). Section J had the highest recovery of lead glazed fragments from Phase 3 excavations (n=244), indicating the possible presence of a midden along the south wall of the church (see Table 6-4).

Tin glazed earthenwares, i.e., majolicas, are present at all Spanish Colonial sites within the United States. Chronologically, Texas majolicas appear to fit into the middle of the overall type sequence. All of the varieties recovered from Phase 1 and 3 excavations were wheel-thrown wares made in Mexico. A version of the tin glazed earthenware from France is referred to as Faience (Fox and Ulrich 2008). Tin glaze is produced by adding tin to lead glaze. Vessels were fired, decorated, and fired again to set the design. Sixteen varieties of tin glaze, including Puebla Polychrome, Puebla Plain, San Augustín, Puebla Blue on White, Huejotzingo, Molded Blue

Table 6-2. Ceramics Recovered from Phases 1 and 3

| Location | Spanish Colonial | | | Native American | European | | | | Other | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Unglazed | Lead Glazed | Tin Glazed | | White Earthenware | Porcelain | Stoneware | Copper Luster | Modern | Kiln Furniture | |
| TU 1 | | | | 1 | 1 | | | | 1 | | **3** |
| TU 2 | 1 | 1 | | | 1 | | | | | | **3** |
| TU 3 | | | | 2 | 10 | | | | | | **12** |
| TU 4 | | 4 | 3 | 13 | 10 | 1 | | | | | **31** |
| TU 5 | 2 | | | | | | | | | | **2** |
| TU 6 | | | | | 1 | | | | | | **1** |
| TU 7 | 4 | 1 | | 1 | 1 | | | | | | **7** |
| TU 8 | 1 | | 1 | 2 | 5 | 1 | 1 | | 10 | | **21** |
| TU 9 | 18 | 36 | 5 | 39 | 47 | | | | | | **145** |
| TU 10 | 49 | 73 | 15 | 97 | 45 | | 4 | | | | **283** |
| TU 11 | 2 | 2 | 2 | 10 | 1 | | | | | | **17** |
| TU 12 | | 1 | 4 | 6 | 2 | | | | | | **13** |
| TU 13 | 2 | 4 | | 11 | 3 | 1 | | | 1 | | **22** |
| TU 14 | 2 | 4 | 2 | 11 | 3 | | | | 1 | | **23** |
| Section B | 24 | 22 | 32 | 140 | 9 | | | | | 3 | **230** |
| Section C | 6 | 10 | 21 | 79 | 6 | | | | | 4 | **126** |
| Section D | 3 | 2 | 5 | 18 | 1 | | | | | | **29** |
| Section E | 9 | 15 | 1 | 28 | 6 | | | | | 1 | **60** |
| Section F | 7 | 17 | 25 | 18 | 18 | | | | 1 | 2 | **88** |
| Section G | 3 | 2 | 3 | 14 | 4 | | | | | | **26** |
| Section H | 3 | 4 | 2 | 27 | 5 | | 1 | | | | **42** |
| Section I | | | 1 | 3 | 8 | | | | 1 | | **13** |
| Section J | 70 | 244 | 70 | 331 | 237 | 3 | 1 | 1 | 2 | 1 | **960** |
| Section K | 6 | 2 | 6 | 11 | 22 | | 1 | 1 | | | **49** |
| **Total** | **212** | **444** | **198** | **862** | **446** | **6** | **8** | **2** | **17** | **11** | **2206** |

on White, Aranama Polychrome, San Diego Polychrome, Monterey Polychrome, La Bahia Polychrome, Orange Banded Polychrome, San Elizario Polychrome, Puebla Blue on White II, Puebla Blue on Blue, Guanajuato Polychrome, and Sgraffito, were recovered during the excavations (Figure 6-7; see Appendix 4). Of 198 tin glazed fragments uncovered during Phases 1 and 3, 32 were from test units and 166 were from sections (see Table 6-3). Although 75 percent of the tin glazed fragments were recovered from the top 6 layers of excavation (0-58 cmbs), two pieces of Monterey Polychrome, one San Elizario Polychrome, and one Puebla Blue on White were found in the deeper sediments (128-142 cmbs). The highest counts of tin glazed ceramics from Phase 3 were recovered from Section J (n=70; see Table 6-4).

## European Ceramics

Four varieties of European ceramics, White Earthenwares, Porcelains, Stonewares, and Copper Luster, were collected during Phase 1 and 3 of the project. For this report, the term European ceramics refers to all ceramics not produced in Mexico.

White Earthenwares are characterized by refined, hard pastes resulting from high firing in controlled kilns. The variety's cream, white, and, bluish paste colors are diagnostic of the time period in which they were manufactured. White Earthenwares exhibit a vitreous glaze and various decoration styles. Although White Earthenwares are recorded in San

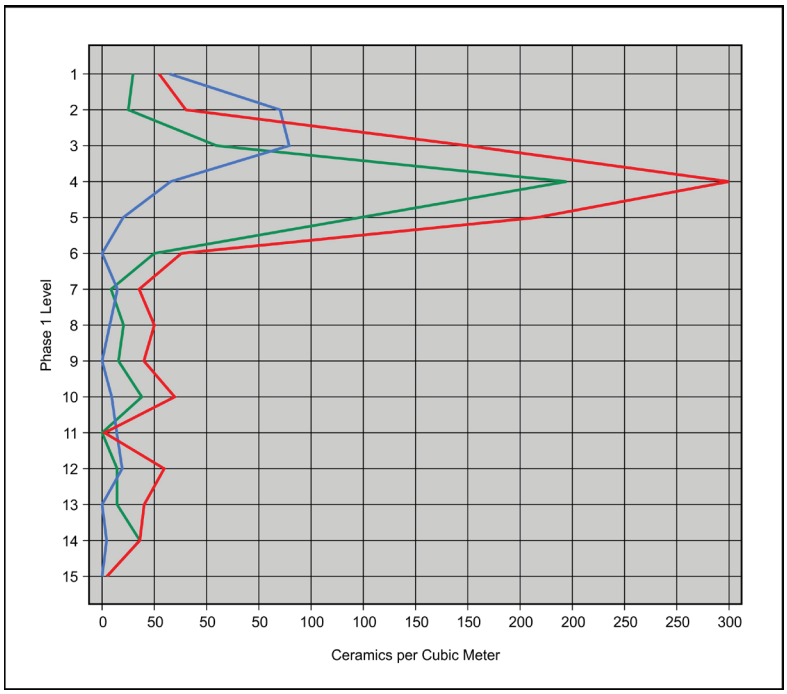


Figure 6-4. *Counts of Spanish Colonial (green), Native (red), and European (blue) ceramics per cubic meter recovered by level from Test Units 1-14.*

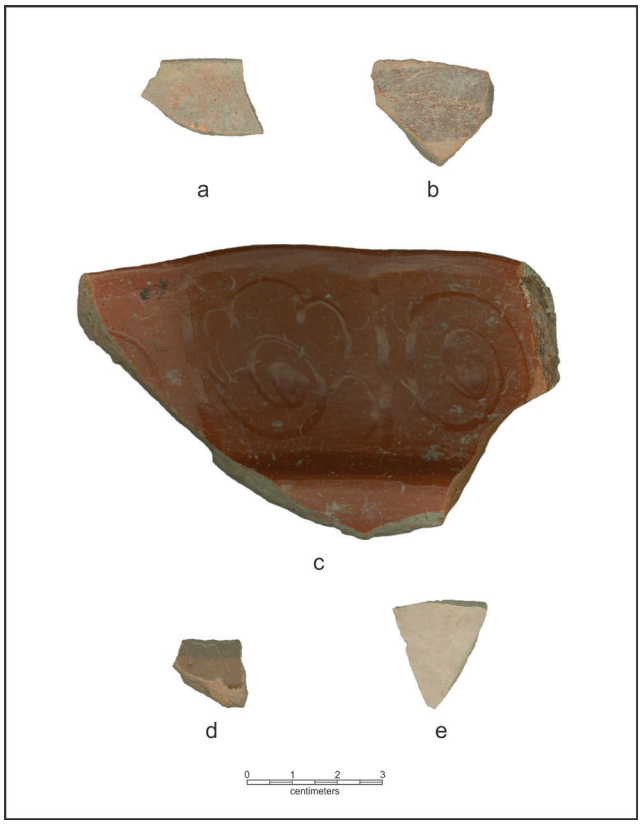


Figure 6-5. *Colonial unglazed earthenwares recovered from the site: a and b) Valero; c) Red Burnished; d and e) Tonalá Burnished.*

Table 6-3. Colonial Earthenwares Recovered from TUs 1-14

| Level | Unglazed | | | Lead Glazed | | | | | | | | Tin Glaze | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Valero | Tonala Burnished | Red Burnished | Dark Brown | Galera | Olive Jar | Red Brown | Smooth Brown | Tonala Glazed | Yellow & Green Glaze | Undecorated | Aranama | Guanajuato Polychrome | Huejotzingo | Monterey Polychrome | Puebla Blue on White | Puebla Blue on White II | San Diego Polylchrome | San Elizario | Sgraffito | Undecorated | Unknown | |
| 1 | 4 | | | | | | | | | | 1 | | | 1 | | | | 1 | | | 1 | | **8** |
| 2 | 1 | 1 | | | | | 1 | | 1 | | 1 | | 1 | 1 | | | | | | | | | **7** |
| 3 | 10 | | | | | | | 1 | | 10 | 3 | 1 | 1 | | | | | | | | | | **26** |
| 4 | 47 | 2 | 1 | | 3 | | 1 | | | 37 | 5 | | | | | 3 | 1 | | 2 | | 1 | 2 | **105** |
| 5 | 7 | | | | | 1 | 1 | 2 | | 29 | 13 | | | | | | | | 1 | 1 | 2 | | **57** |
| 6 | 1 | | | | | 1 | | 1 | | | 3 | | | | | 1 | | | 3 | | | | **10** |
| 7 | 1 | | | | | | | | | | | | | | | | | 1 | | | | | **2** |
| 8 | | | | | | | 2 | | | 1 | | | | | | | | 1 | | | | | **4** |
| 9 | | 1 | | | | | | | | | 1 | | | | | | | | 1 | | | | **3** |
| 10 | 1 | 1 | | | | | | 1 | | | 2 | | | | | | | | 1 | | | | **6** |
| 11 | | | | | | | | | | | | | | | | | | | | | | | **0** |
| 12 | 1 | | | 1 | | | 1 | | | | | | | | | | | | | | | | **3** |
| 13 | | | | | | | 1 | | | | 1 | | | | | | | | | | | | **2** |
| 14 | | 1 | | | | | | | | | | | | | 2 | 1 | | | 1 | | | | **5** |
| 15 | | 1 | | | | | | | | | | | | | | | | | | | | | **1** |
| **Total** | **73** | **7** | **1** | **1** | **3** | **2** | **7** | **5** | **1** | **77** | **30** | **1** | **2** | **2** | **2** | **5** | **1** | **3** | **9** | **1** | **4** | **2** | **239** |

Table 6-4. Colonial Earthenwares Recovered from Phase 3 Section Excavations

| Section | Unglazed | | | | Lead Glazed | | | | | | | | | | | | Tin Glaze | | | | | | | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Valero | Tonala Burnished | Red Burnished | Colonoware | Dark Brown | Galera | Olive Jar | Red Brown | Smooth Brown | Tonala Glazed | Yellow & Green Glaze | Black Luster | Brown on Yellow | Green Glaze | Undecorated | Unknown | Aranama | Guanajuato Polychrome | Huejotzingo | Monterey Polychrome | Puebla Blue on White | Puebla Blue on White II | San Diego Polylchrome | San Elizario | Puebla Blue on Blue | La Bahia | Molded Blue on White | Orange Band Polychrome | Puebla Plain | Puebla Polychrome | San Agustin | Undecorated | Unknown | |
| B | 23 | | 1 | | 2 | 2 | | 1 | | 2 | 13 | | | | 2 | | | | 1 | | 7 | | 3 | 5 | 8 | | | 1 | 1 | | 2 | 5 | | **79** |
| C | 1 | 4 | 1 | | | | | | | | | | | | 10 | | | | | | 4 | 8 | 1 | 3 | | | | | | | 1 | 4 | | **37** |
| D | 2 | | 1 | | | | | | | 1 | | | | | 1 | | | | | | | 1 | | 2 | | | | | | | | 2 | | **10** |
| E | 8 | 1 | | | | | | | | | 15 | | | | | | | | | | | | | 1 | | | | | | | | | | **25** |
| F | 3 | 1 | 3 | | | | | | | 1 | | 1 | | 11 | 3 | 1 | 2 | | | | | 10 | | 3 | | | | 2 | | 2 | | 6 | | **49** |
| G | 1 | 2 | | | | | | | | | | | | 2 | | | | | | | | | 2 | 1 | | | | | | | | | | **8** |
| H | | 2 | 1 | | | | | | | | | | | | 4 | | | | | | 1 | | | 1 | | | | | | | | | | **9** |
| I | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | **1** |
| J | 65 | 3 | 1 | 1 | | 6 | 1 | | 3 | 3 | 221 | 2 | 1 | | 7 | | 1 | 7 | 7 | 1 | 7 | | 4 | 9 | 1 | 2 | 5 | | 6 | | 3 | 16 | | **383** |
| K | 6 | | | | | | | 1 | | | | | | 1 | | | | | | | | 2 | | 1 | | | | | 1 | | | 1 | 1 | **14** |
| **Total** | **109** | **13** | **8** | **1** | **2** | **8** | **1** | **2** | **3** | **7** | **249** | **3** | **1** | **14** | **27** | **1** | **3** | **7** | **8** | **1** | **20** | **21** | **10** | **26** | **9** | **2** | **5** | **3** | **8** | **2** | **6** | **34** | **1** | **615** |

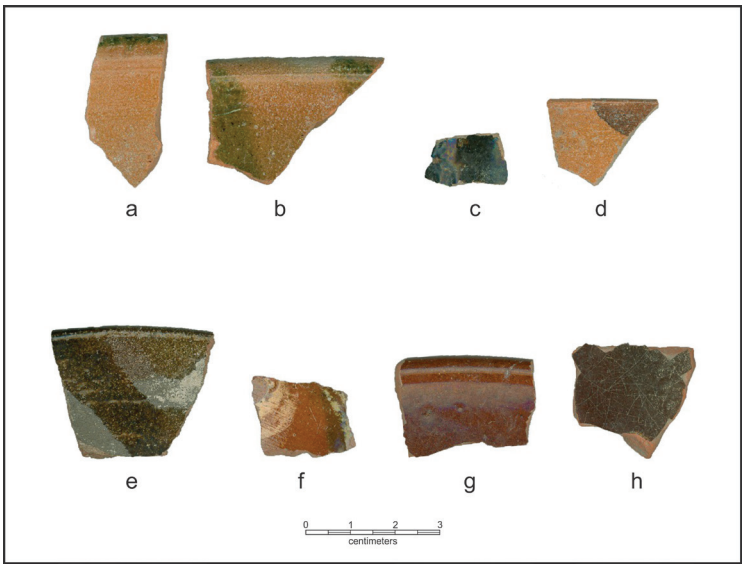


Figure 6-6. *Colonial lead glazed earthenwares recovered from the site. Various types were encountered including: a and b) Yellow and Green Glaze; c) Black Luster; d) Brown on Yellow; e) Dark Brown; f) Galera; g) Red Brown Ware; h) Smooth Brownware.*

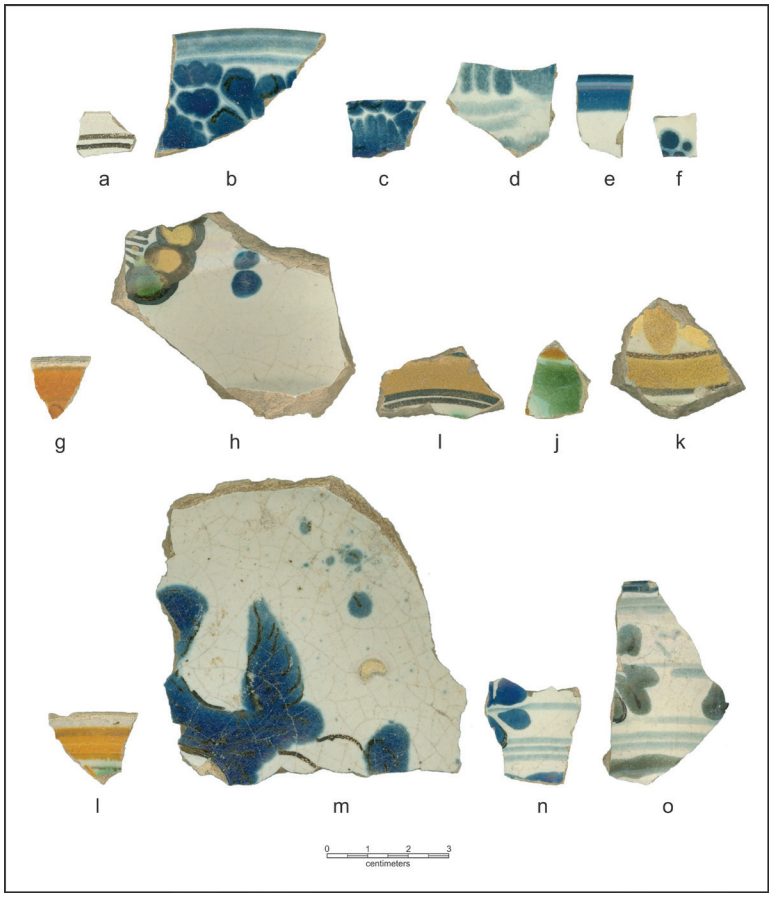


Figure 6-7. *Tin glazed ceramics recovered from the site included fragments of the following: a) Puebla Polychrome; b and c) San Agustín; d) Puebla Blue on White; e) Huejotzingo; f) Molded Blue on White; g) Aranama; h) San Diego; i and j) Monterey; k) La Bahia; l) Orange Band; m) San Elizario; n and o) Puebla Blue on White II.*

Antonio in the mid-eighteenth century, they did not become widespread until the nineteenth century. Ten types of White Earthenwares, including Annular wares, Creamware, Edgeware, Flow Blue, Handpainted, Reinforced and Textured, Rim Banded, Sponge/Spatterware, Transferware, and Clobber Transferware, were recorded during the excavations (Figures 6-8 through 6-12). Appendix 4 presents type descriptions.

Of 446 White Earthenware fragments recovered during excavations, 130 were from test units, and 316 were from Phase 3. Ninety-one percent of the fragments from Phase 1 were excavated from the upper five levels of sediment (0-52 cmbs; Table 6-5). Two Annular fragments, one Sponge/Splatterware, one Transferware, and one undecorated piece were recovered in the deepest levels (107-138 cmbs). Section J produced 75 percent of the White Earthenware from Phase 3 (n=237; Table 6-6).

Porcelain is produced by firing very fine-grained clay mixed with Kaolin at extremely high temperatures. The firing temperature vitrifies the clay mixture, producing a nearly translucent ware. Six fragments of porcelain, consisting of one Lusterware, one decorated, and four undecorated fragments, were recovered from the site (see Tables 6-5 and 6-6). Lusterware, European porcelain with an iridescent sheen, became popular in the mid-nineteenth century. The decorated fragment, identified by its slightly blue-gray tint, is a type of Chinese porcelain. Produced by the Ching Dynasty (1644-1912), the type was imported to Texas from 1680-1820 (Fox and Ulrich 2008). The undecorated fragments were identified as Semi-Porcelain. This is a less vitreous type of porcelain that is fired at a lower temperature.

Eight fragments of stoneware were recovered from the excavations. Stonewares are made of natural clays fired at high heats to produce vitrified, non-permeable vessels. Commonly used as utilitarian vessels and found in most households, the ware was produced locally in the late 1800s.

Two pieces of Copper Luster were recovered from Phase 3 excavations (see Table 6-6). Copper Luster was made of terra cotta to red paste covered by a thick copper glaze. The type was manufactured in England between 1820 and 1860 and in the United States by 1850. Reproductions of Copper Luster were created in the 1890s through the early part of the twentieth century.

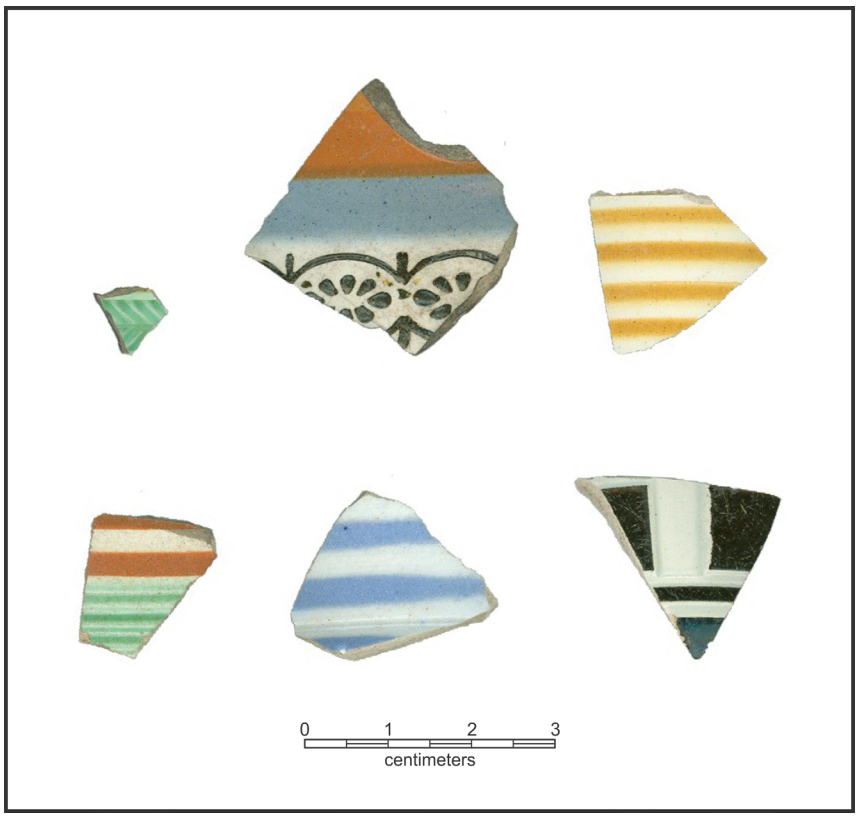


Figure 6-8. *Annular wares recovered from Phase 1 and 3 excavations.*

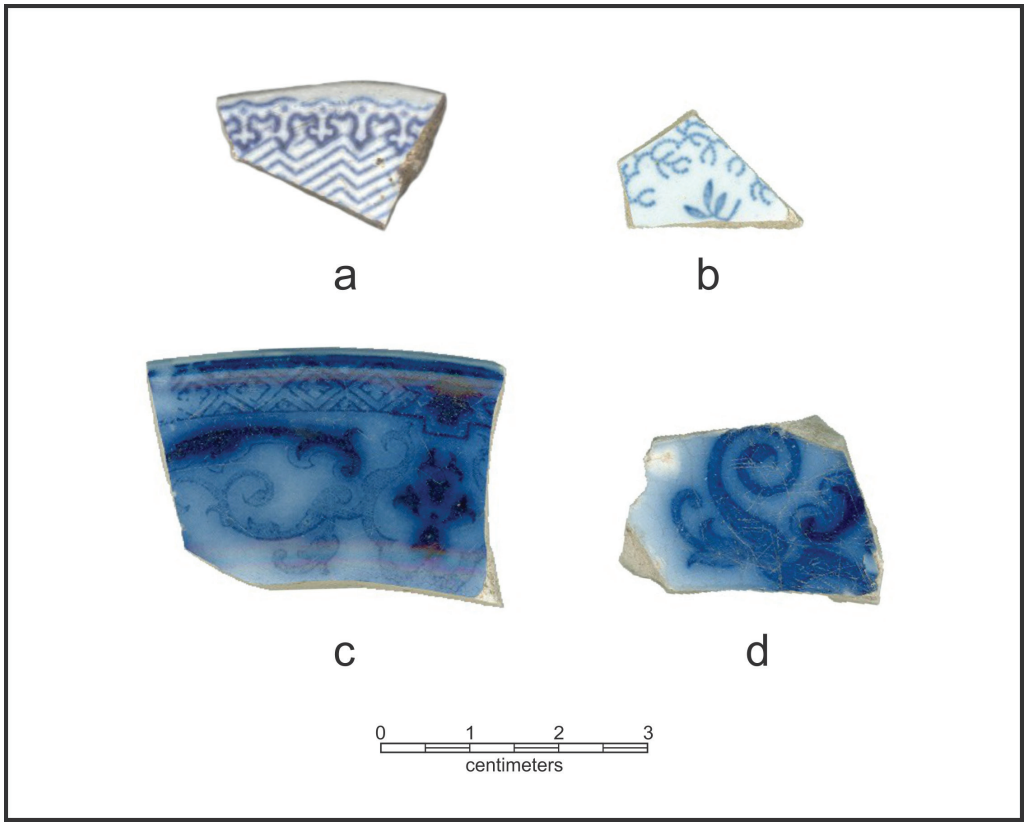


Figure 6-9. *Transferware (a and b) and Flow Blue (c and d) recovered from Phase 1 and 3 excavations.*

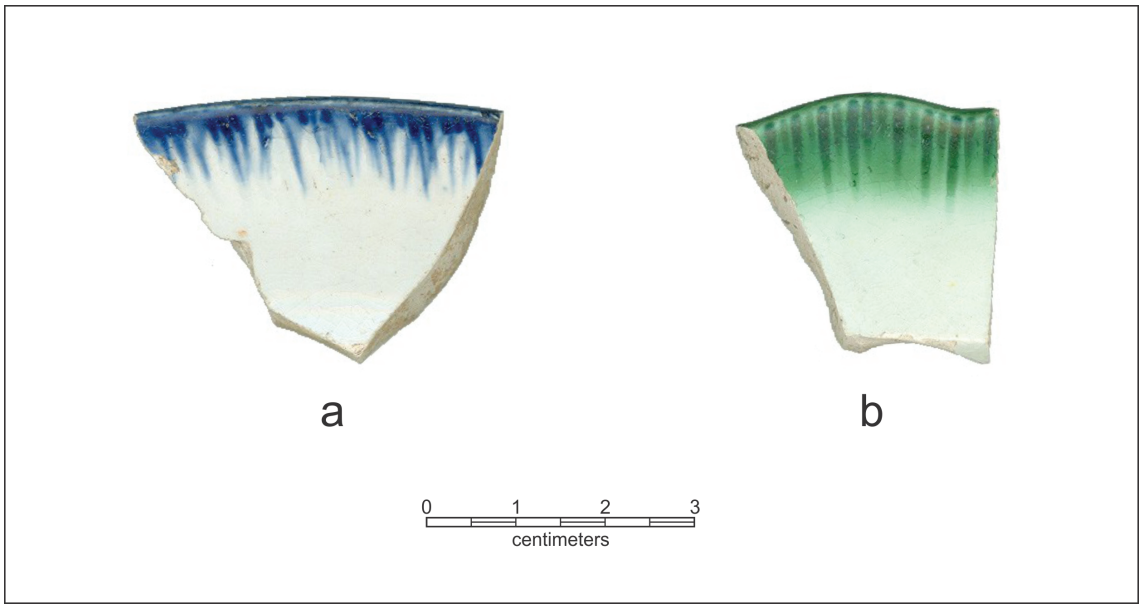


*Figure 6-10. Edgewares recovered from the excavations: a) Blue Featheredge; b) Green Edgeware.*

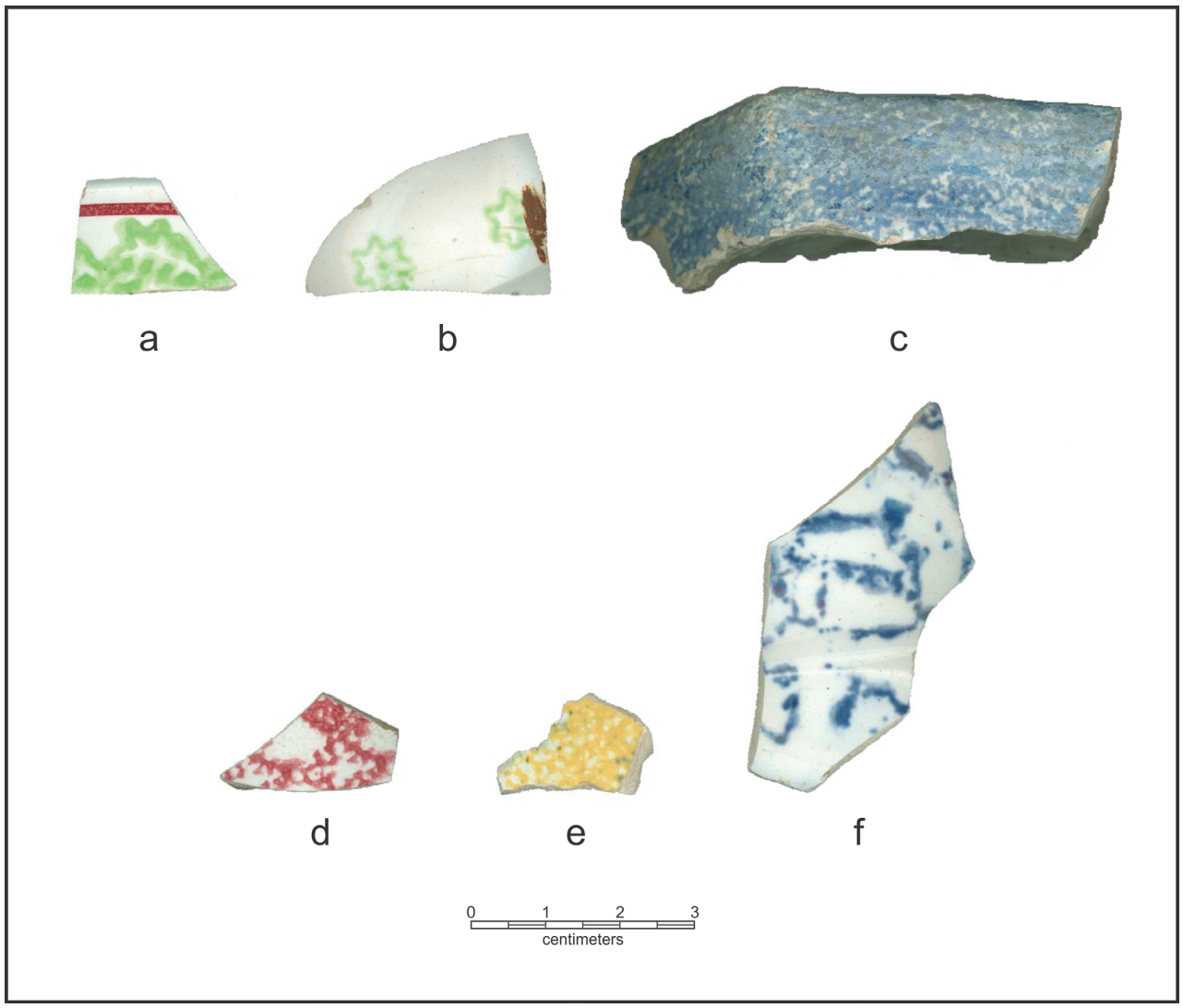


Figure 6-11. *Sponge/Spatterware varieties recovered from the excavations: a and b) Cut Sponge; c) Spatterware; d-f) Sponge/Spatterware.*

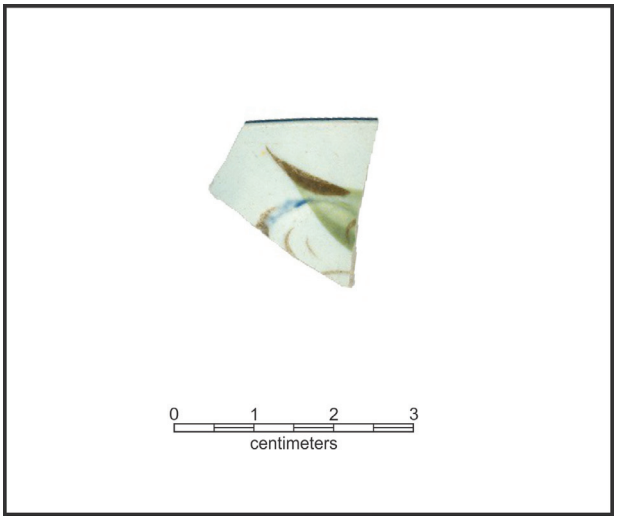


Figure 6-12. *Example of Handpainted White Earthenware recovered from the excavations.*

Table 6-5. English Ceramics Recovered from TUs 1-14

| Level | White Earthenware | | | | | | | | | | Porcelain | | | Stoneware | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Annular | Creamware | Edgeware | Flow Blue | Handpainted | Reinforced and Textured | Rim Banded | Sponge/Spatter | Transferware | Undecorated | Lusterware | Undecorated | Decorated | | |
| 1 | 1 | | | | 1 | | | | 1 | 10 | | | | 4 | **17** |
| 2 | 7 | | 1 | | 6 | 8 | | 3 | 1 | 17 | | 1 | | | **44** |
| 3 | 15 | 1 | | | 2 | | 2 | 5 | 3 | 14 | | | | | **42** |
| 4 | 1 | | | | 5 | | | 2 | 1 | 6 | | | | | **15** |
| 5 | | | 1 | | 1 | | | | | 3 | | | | | **5** |
| 6 | | | | | | | | | | | | | | | **0** |
| 7 | | | | | | | | | 2 | | | | | 1 | **3** |
| 8 | | | | | | | | | 1 | | 1 | | | | **2** |
| 9 | | | | | | | | | | | | | | | **0** |
| 10 | | | 1 | | | | | | | 1 | | | | | **2** |
| 11 | | | | 1 | | | | | | 1 | | | 1 | | **3** |
| 12 | 2 | | | | | | | 1 | 1 | | | | | | **4** |
| 13 | | | | | | | | | | | | | | | **0** |
| 14 | | | | | | | | | | 1 | | | | | **1** |
| **Total** | **26** | **1** | **3** | **1** | **15** | **8** | **2** | **11** | **10** | **53** | **1** | **1** | **1** | **5** | **138** |

Table 6-6. English Ceramics Recovered from Phase 3 Section Excavations

| Section | White Earthenware | | | | | | | | | | | Copper Luster | Undecorated Porcelain | Stoneware | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Annular | Creamware | Edgeware | Flow Blue | Handpainted | Rim Banded | Sponge/Spatter | Transferware | Clobber Transferware | Undecorated | Unidentified | | | | |
| B | 2 | | | | 3 | | | | | 4 | | | | | **9** |
| C | 1 | | | | 1 | | | | | 3 | | | | | **5** |
| D | | | | | | | 1 | | | 1 | | | | | **2** |
| E | 1 | | | | 1 | | 1 | | | 3 | | | | | **6** |
| F | 2 | | 1 | | 2 | | 2 | 3 | | 5 | 3 | | | | **18** |
| G | 2 | | | | | | | | | 2 | | | | | **4** |
| H | 2 | | | | | 1 | 1 | | | 1 | | | | 1 | **6** |
| I | 2 | | 1 | | 1 | | 2 | 1 | | 1 | | | | | **8** |
| J | 27 | 12 | 10 | 4 | 29 | | 44 | 25 | 1 | 85 | | 1 | 3 | 1 | **242** |
| K | 3 | | 3 | 1 | 6 | | 2 | 1 | | 6 | | 1 | | 1 | **24** |
| **Total** | **42** | **12** | **15** | **5** | **43** | **1** | **53** | **30** | **1** | **111** | **3** | **2** | **3** | **3** | **324** |

## Personal Artifacts

Personal artifacts recovered from the Phase 1 and 3 excavations include fasteners, jewelry, toys, one syringe, and one coin (Table 6-7). Loop-shank and holed buttons comprise the largest part of the assemblage (n=11). Buttons recovered during Phase 4 are discussed in Chapter 12. Loop-shank buttons are composed of ferrous, cuprous, and unidentified metal materials. One of the cuprous loop-shank buttons was identified as a ca.1902-present U.S. Army General Service Button (Figure 6-13a). The two- and four-holed buttons were made of rubber, porcelain, and tin. The tin button was from either the Napoleonic or Civil War Era.

Recovered jewelry includes a pair of earrings, a medallion, a bird-bone bead, and a glass bead (see Figure 6-13b and c). The gold earrings were removed from different locations within Section J. It is uncommon to find intact jewelry. The discovery of a pair of earrings may suggest a burial in proximity to Section J. One adult premolar was also recovered from the sediments (see Chapter 12). One corroded medallion was found 32-42 cmbs in Test Unit 9; however, the item was too corroded to identify its type.

Six small gaming discs, five made from sandstone and one from white earthenware, were recovered from the site during the Phase 1 and 3 excavations (Figure 6-14; see Table 6-7). Gaming pieces manufactured out of various materials have been recorded at Spanish Colonial sites and at historic sites with strong Hispanic roots. A 1938 Jefferson Head nickel was recovered from Section H, and 1938 was the initial year the coins were minted (Yeoman 1991).

## Construction Materials

Various types of construction materials were recovered during the course of the project including brick, mortar, plaster, nails, and modern items (e.g., asphalt, concrete, tar, etc.). Sandstone and mortar (37,876 gm) make up the bulk of recovered construction materials.

### Brick

Modern (nineteenth and twentieth century) and Colonial brick fragments were recovered during Phase 1 and 3 excavations (Table 6-8). Ninety-four percent of the recovered fragments were modern (2,280 gm). These bricks are red and more vitrified than the orange hued Colonial specimens. Colonial brick (143 gm) was recorded in TUs 8 and 11 from 98-108 cmbs. Modern brick fragments were found from the surface to 148 cmbs.

Table 6-7. Personal Items Recovered from Phase 1 and 3 Excavations

| Location | | Jewelry | Hair Pin | Safety Pin | Button | Stud | Syringe | Gaming Disk | Coin | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| Phase 1 Level | 1 | | | | 1 | | | | | **1** |
| | 2 | | | | 1 | | | 1 | | **2** |
| | 3 | | | 1 | 1 | | | | | **2** |
| | 4 | 1 | | | 1 | | | | | **2** |
| | 5 | 1 | | | 1 | 1 | | | | **3** |
| | 6 | | | | 1 | | | | | **1** |
| | 7 | | | | | | | | | **0** |
| | 8 | | 1 | | | | | | | **1** |
| | 9 | | | | | | | 1 | | **1** |
| Phase 3 Section | B | | | | 1 | | | | | **1** |
| | F | | | | | | | 2 | | **2** |
| | H | 1 | | | | | | | 1 | **2** |
| | J | 2 | | | 3 | | 1 | 2 | | **8** |
| | K | | | | 1 | | | | | **1** |
| **Total** | | **5** | **1** | **1** | **11** | **1** | **1** | **6** | **1** | **27** |

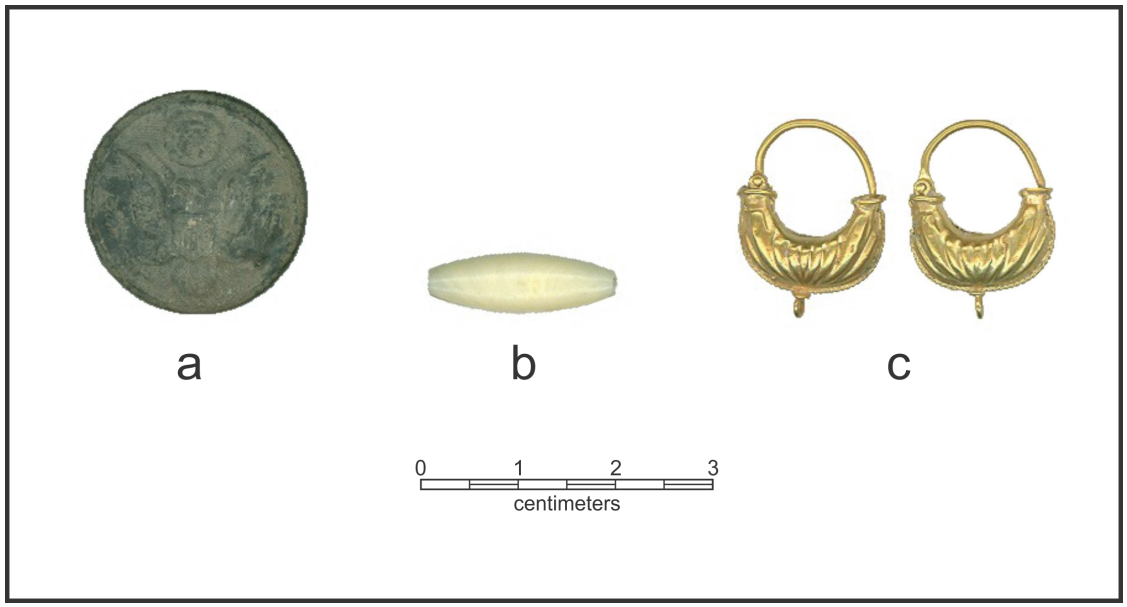


Figure 6-13. *Personal items recovered from the site: a) U.S. Army General Service Button; b) bead; c) gold hoop earrings.*

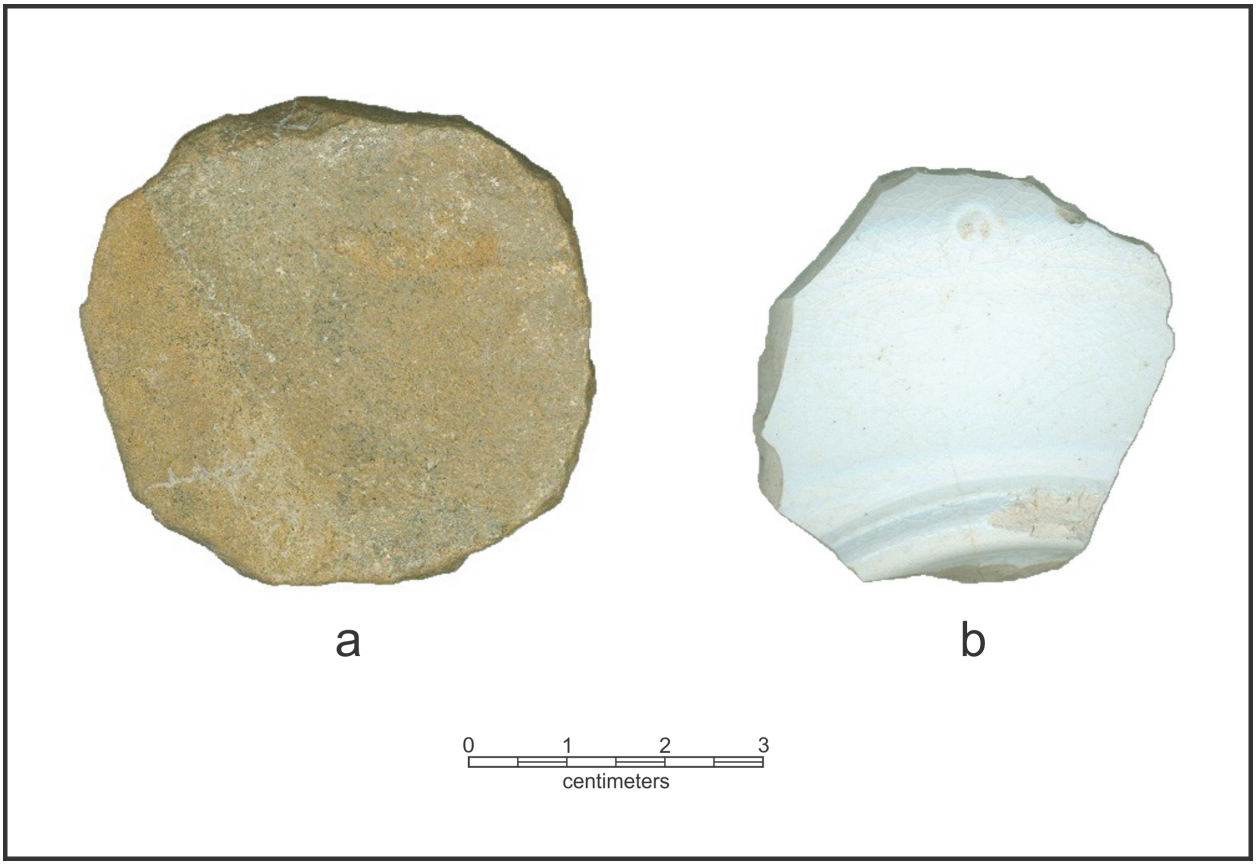


Figure 6-14. *Gaming pieces recovered at the site: a) sandstone gaming piece; b) white gaming piece.*

Table 6-8. Construction Material Recovered from Phase 1 and 3 Excavations

| Location | | Brick (gm) | | Mortar (gm) | Plaster (gm) | Sandstone (gm) | Modern (gm) | Total (gm) | Nails (n) | | Total nails (n) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Modern | Colonial | | | | | | Cut | Wire | |
| Phase 1 Level | 1 | 81 | | 282 | 26 | | 358 | **747** | 10 | 21 | **31** |
| | 2 | | | 163 | 35 | | 249 | **447** | 19 | 8 | **27** |
| | 3 | 43 | | 162 | | | 128 | **334** | 31 | 2 | **33** |
| | 4 | 3 | | 5367 | 52 | | 585 | **6006** | 22 | 4 | **26** |
| | 5 | 2 | | 559 | 56 | | 463 | **1080** | 15 | 4 | **19** |
| | 6 | 3 | | 328 | 3 | | 96 | **429** | 9 | 3 | **12** |
| | 7 | | | 181 | | | 195 | **376** | 10 | 5 | **15** |
| | 8 | | | 98 | 1 | | 274 | **373** | 11 | | **11** |
| | 9 | 26 | | 123 | 24 | | 248 | **421** | 13 | 2 | **15** |
| | 10 | 19 | | 59 | 22 | 9 | 407 | **516** | 9 | | **9** |
| | 11 | | 143 | 100 | | | 7 | **249** | 9 | 1 | **10** |
| | 12 | | | 270 | 3 | | 1139 | **1411** | 6 | 1 | **7** |
| | 13 | 4 | | 34 | 27 | | 8 | **73** | 3 | | **3** |
| | 14 | | | 79 | 23 | | 7 | **109** | | | **0** |
| | 15 | 63 | | 7 | 2 | | 13 | **85** | 17 | | **17** |
| | 16 | | | | 4 | | | **4** | | | **0** |
| | 17 | | | | 5 | | | **5** | | | **0** |
| Phase 3 Section | B | 272 | | 834 | | 260 | 149 | **1516** | | 2 | **2** |
| | C | | | | | 468 | 995 | **1463** | 22 | 14 | **36** |
| | D | 68 | | 80 | 0 | 1041 | | **1189** | 4 | 1 | **5** |
| | E | 12 | | 321 | 13 | 571 | | **917** | 7 | 2 | **9** |
| | F | 213 | | 668 | 272 | 3118 | 198 | **4469** | 41 | 49 | **90** |
| | G | 13 | | 65 | 26 | 1423 | 6 | **1533** | 4 | 2 | **6** |
| | H | 193 | | 696 | 14 | 7567 | 246 | **8717** | 50 | 29 | **79** |
| | I | 684 | | 50 | | 452 | 1071 | **2258** | 8 | 6 | **14** |
| | J | 573 | | 858 | 8 | 8903 | 1215 | **11557** | 133 | 63 | **196** |
| | K | 8 | | 90 | | 2590 | | **2688** | 19 | 12 | **31** |
| **Total** | | **2280** | **143** | **11475** | **618** | **26401** | **8056** | **48973** | **472** | **231** | **703** |

## Nails

Both cut (n=472) and wire (n=231) nails were recovered from the test unit and section excavations. Cut nails were produced before 1880 (Gross and Meissner 1997). The square-shaped nails were cut out of metal sheets. They were recovered from the surface to 154 cmbs (see Table 6-8). Test Units 7 and 8 produced 45 percent of the cut nails from Phase 1 with an artifact peak from 28-43 cmbs (n=14) and from 138-154 cmbs (n=17). During Phase 4, human burials were recorded immediately below the termination level of TUs 7 and 8, suggesting that the nails are coffin hardware (see Chapters 11 and 12). Wire nails were commonly produced after 1880 and replaced cut nails by the turn of the century. Because they were usually made of galvanized metal, they are less corroded than cut nails. Wire nails were present from the surface to 122 cmbs in the test units indicating sediment disturbance. During Phase 3, 42 percent of cut and wire nails (n=196) were recovered from Section J.

# Chapter 7: Macroscopic Analysis of Goliad Ware

*Kristi Miller Nichols and Cynthia M. Munoz*

A macroscopic analysis of the Native American ceramics collected during the course of the project was conducted to gain additional information on Goliad Ware. The unglazed ware was produced at missions and presidios throughout Texas using prehistoric technology. Not much information about ceramic manufacture and acquisition is available in the Colonial period's archival records. The geographic locations of each production site and the ethnically distinct groups that occupied the missions should have resulted in variation within the ceramic assemblage. An analysis of visible signs of variation related to form and function and clay sources may produce patterns leading to identification of production locale. Ethnohistoric records indicate that the Aranama at Mission Espiritu Santo were manufacturing wares and may have furnished other missions, such as Rosario and Refugio, with ceramic vessels (Cardenas 1783; Perttula 2002; Ricklis 1999; Ricklis et al. 2000). It should be possible to identify sherds of Goliad Ware made at Espiritu Santo by characteristic identifiers.

## Macroscopic Analysis Methods

A sample of 441 sherds from the assemblage of 862 Goliad ceramic sherds recovered during the course of the project was examined for this analysis. The sample consisted of rim, neck, and body sherds exceeding 2 cm in diameter. Each sherd was measured and weighed, and a series of physical attributes (formal, technological, and stylistic) were recorded. The information was entered into an Excel® database.

### Formal Attributes

Formal attributes included surface treatments, and size and thickness of all sherds. Rim sherds were examined for orientation, shape, orifice diameter, and vessel form. Rim form was recorded as everted, inverted, straight, or undetermined. Typically, vessel forms can be inferred from the rim form and degree of curvature. Everted rims are characteristic of ollas and jars. Inverted rims usually indicate neckless jars and certain bowls. Straight rims are often from deep bowls and bottles. Shallow and deep bowls can be differentiated by the degree of curvature the rim sherds exhibit when placed on a flat plane (Ricklis et al. 2000). Due to the small quantity of rim sherds, shallow and deep bowl forms were not determined. Lip form categories included flat, rounded, pointed, and flared. Lip form may indicate the style of an individual potter or of a cultural group. The orifice diameter was determined by placing the rim sherd rim down with the lip resting on a flat surface on a concentric circle template consisting of graduated 1-cm rings. The closest diameter was recorded.

The average thickness (mm) from three locations was recorded for each sherd with digital calipers. Because thicker vessel walls are assumed to increase impact resistance (Braun 1983; Rice 1987; Skibo 1992), they were advantageous for vessels moved over long distances and may indicate high levels of mobility. Thinner walls are believed to increase thermal shock resistance. This characteristic would be beneficial for frequently used cooking vessels (Rice 1987; Ulrich 2004).

### Technological Attributes

Technological attributes are characteristics associated with clay preparation and vessel firing. Recorded data included the type, size, and density of aplastic inclusions, firing atmosphere, and paste texture.

Aplastic inclusions, particles included in a vessel's clay matrix, consisted of crushed bone, sand, grog (previously fired vessel fragments), and burned sandstone. While it is assumed that crushed bone is a deliberate addition to the clay matrix, it is difficult to determine if sand and sandstone were purposefully added as a tempering agent or are a natural occurrence. Because the density of sand within sherd pastes varied, a determination could not be made.

As part of the analysis each sherd was broken to allow a clean view of the sherd interior. Paste was examined with a 10x magnification hand lens to determine the type and density of inclusions. For comparison to previous Goliad Ware (Fox and Tomka 2006; Ricklis et al. 2000), Toyah (Black 1986), and Rockport (Ricklis 1995, 1996) analyses, inclusions were recorded as sparse when less than percent, moderate when between 5 and 25 percent, and heavy when greater than 25 percent of the paste.

In addition, the color of both sides of each sherd and its paste were examined to determine the firing atmosphere of the vessel. Shades of buff to red-orange were recorded as oxidized, and gray to black were recorded as non-oxidized (reduced). Fire clouding, which can result from uneven firing, vessels touching during the firing process, or organic materials in contact with the vessel, was recorded as zoned.

### Stylistic Attributes

Stylistic attributes included surface finish and treatment. Categories included smooth, rough, and brushed treatments and finishes from applications of organic coating or from smudging. Stylistic attributes were recorded for each of the vessel surfaces.

## Discussion of Results

The analyzed assemblage consisted of rim (n=112), body (n=328), and neck (n=1) sherds (Table 7-1) pulled from Phase 3 Sections B-D and F-K, and Phase 1 Test Units 1, 4, and 7-14.

### Vessel Forms

Each rim sherd was examined in an attempt to determine the original form of the vessel. Of the 112 rim sherds, 67 were identified as bowls, 18 as jar remnants, eight as bottles, and 19 were unclassifiable. Because body sherd characteristics do not suggest vessel form, they were all classified as unknown. Bowls appear to be the dominant vessel form suggesting that serving vessels were more common than storage vessels (jars and bottles). This also suggests that the mission may not have had large stores of food at the household level. Food was probably consumed shortly after being prepared. Assemblages containing large percentages of serving vessels are common at Spanish Colonial sites, specifically mission and presidio sites (Cordova et al. 2005; Fox and Tomka 2006; Ricklis et al. 2000).

Table 7-1. Analyzed Goliad Ware by Phase 1 Level and Phase 3 Section

| Location | | Body | Neck | Rim | Total |
|---|---|---|---|---|---|
| Phase 1 Level | 1 | 2 | | | 2 |
| | 2 | 6 | | 4 | 10 |
| | 3 | 2 | | 9 | 11 |
| | 4 | 1 | | 2 | 3 |
| | 5 | | | 3 | 3 |
| | 6 | 3 | | | 3 |
| | 7 | 2 | | | 2 |
| | 8 | | | 1 | 1 |
| | 9 | 1 | | | 1 |
| | 10 | 2 | | 1 | 3 |
| | 11 | | | | 0 |
| | 12 | 1 | | 1 | 2 |
| | 13 | 1 | | 1 | 2 |
| Phase 3 Section | B | 85 | | 9 | 94 |
| | C | 36 | 1 | 8 | 45 |
| | D | 7 | | 3 | 10 |
| | F | 37 | | 7 | 44 |
| | G | 4 | | 1 | 5 |
| | H | 6 | | 7 | 13 |
| | I | 2 | | 1 | 3 |
| | J | 126 | | 52 | 178 |
| | K | 4 | | 2 | 6 |
| **Total** | | **328** | **1** | **112** | **441** |

### Thickness

The average thickness of the analyzed Goliad sherds (n=441) was 6.56 mm. The average thickness of the rim sherds was 5.63 mm with a range of 3.72-8.89 mm and a standard deviation of 1.37 mm. Body sherds averaged 6.89 mm with a range of 4.03-13.70 mm and a standard deviation of 1.41 mm (Figure 7-1). The rim sherds that were collected during this project are slightly thinner than the sherds collected during the excavations conducted at Mission San Juan in 1968 by Schuetz (Ulrich 2004, mean = 6.14 mm), but they are consistent with the assemblage from a later project (Cordova et al. 2005, mean=5.58 mm). The rims were also thinner than collections analyzed from Mission Espiritu Santo (Ricklis et al. 2000, mean = 5.99 mm; Ulrich et al. 2005, mean = 7.00 mm) and thicker than an assemblage analyzed from Mission Rosario (Ricklis et al. 2000; mean = 5.47 mm).

Though there is some variation, the mean thicknesses of the sherds at these locations are similar enough to suggest that they follow the same pattern. Structural limitations of ceramic manufacture may play a role, but it is also possible that the pattern is due to a limited manufacturing circle. In addition, the thickness similarities may be directly related to the technological attributes of the limited vessel types that are found at presidio and mission sites in Texas. The lack of variation in thickness also suggests low mobility. Previous analyses comparing Goliad Wares to Leon Plain wares concluded that Goliad Wares tended to be the thinner of the two. Leon Plain wares exhibited characteristics important for impact-shock resistance, whereas Goliad Wares were better for thermal-shock resistance. Leon Plain wares were manufactured by and for highly mobile groups. Thinner wares may be related to increased sedentism related to the occupation of the missions and presidios in Texas (Fox and Tomka 2006).

### Aplastic Inclusions

The temper on all 441 sherds was examined under 10x magnification to determine aplastic inclusions. Ninety-eight

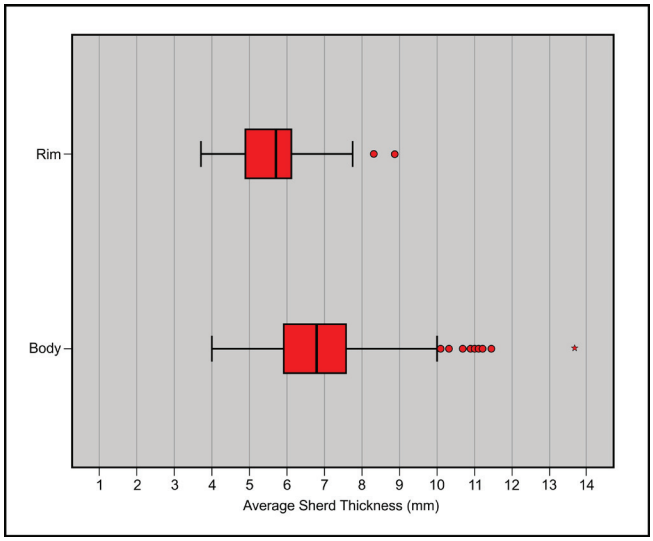


Figure 7-1. *Boxplot of the average sherd thickness for analyzed rim and body sherds.*

percent of the sherds contained calcined bone tempering (n=432; Table 7-2). Although the majority of these contained bone only (n=351), combinations of bone, sand, grog (ground up previously fired ceramics), sandstone, calcium carbonate, and mica were also present. See Chapter 8 for a finer scale temper analysis.

## Bone-tempered Ceramics

Of the 351 Goliad sherds with only bone as a tempering agent, 81 fragments (23 percent) contained a high level of crushed, calcined bone, 187 (53 percent) had a moderate level, 73 (21 percent) contained a sparse level, and 10 fragments (3 percent) contained a very sparse level of bone tempering. Thirty-six sherds were made with both bone and grog tempering agents. In comparison to calcined bone, the grog density was relatively low. Of the 36, six sherds (17 percent) had a high density of temper, 17 (47 percent) had moderate levels, 12 (33 percent) had a sparse level, and one (3 percent) contained very sparse levels. One sherd analyzed during the project contained bone, grog, and sandstone. Sandstone, which turns a bright red after heating, may be a natural component of the clay. Seven sherds contained bone and sandstone. Three of these sherds (43 percent) contained a moderate level of tempering agents, and four (57 percent) had sparse levels. One sherd was recorded as having a sparse level of bone and mica within the paste.

## Bone-tempered Sandy Paste wares

Thirty-five sherds (8 percent) contained paste made from both bone and sand. Without knowing the clay source, it is impossible to determine if the sand inclusions are intentional. The presence of sand increases a vessel's thermal shock resistance (Rice 1987). Of the 35 sherds, 28 (80 percent) contained only bone and sand. The remaining seven (20 percent) contained sand, bone, and grog. Five (18 percent) of the sherds that contained bone and sand contained high levels of tempering agents. Three (11 percent) had high levels of bone but sparse level of sand, and eight (29 percent) contained moderate levels of sand and bone. Eleven (39 percent) had a sparse amount of tempering, and one (3 percent) sherd had a very sparse amount of sand and bone. Of the seven sandy-pasted samples with bone and grog, two (29 percent) contained high levels of tempering agents with a high level of sand and bone with a sparse amount of grog in one and a high concentration of bone, but sparse levels of sand and grog, in the other. Four of the seven (57 percent) had moderate levels of inclusions, and one (14 percent) sherd contained a sparse level.

## Sandy-pasted wares

Eight (2 percent) of the analyzed sherds were made from paste containing only sand. Of the eight, one (13 percent) contained a high amount of sand granules, and one (13 percent) had a moderate amount of sand. Five (61 percent) contained a sparse amount of sand, and one (13 percent) had a very sparse amount of sand within the matrix.

Table 7-2. Temper Type by Vessel Form

| Form | Temper Type | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bone | Bone/ Calcium Carbonate | Bone/ Grog | Bone/ Grog/ Sand | Bone/ Grog/ Sandstone | Bone/ Mica | Bone/ Sand | Bone/ Sandstone | Grog | Sand | |
| **Bottle** | 7 | | | | | | 1 | | | | **8** |
| **Bowl** | 44 | 1 | 7 | 1 | 1 | 1 | 3 | 4 | 1 | 4 | **67** |
| **Jar** | 12 | | 1 | | | | 2 | 3 | | | **18** |
| **Unknown** | 288 | | 28 | 6 | | | 22 | | | 4 | **348** |
| **Total** | **351** | **1** | **36** | **7** | **1** | **1** | **28** | **7** | **1** | **8** | **441** |

Table 7-3. Average Thickness of Rim Sherds by Temper Type and Vessel Form

| Form | Temper Type | | | | | | | | | | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bone | Bone/ Calcium Carbonate | Bone/ Grog | Bone/ Grog/ Sand | Bone/ Grog/ Sandstone | Bone/ Mica | Bone/ Sand | Bone/ Sandstone | Grog | Sand | |
| **Bottle** | 5.83 | | | | | | 5.34 | | | | **5.77** |
| **Bowl** | 5.47 | 5.80 | 5.85 | 7.41 | 4.47 | 3.80 | 5.51 | 6.39 | 6.04 | 5.18 | **5.55** |
| **Jar** | 5.73 | | 5.62 | | | | 7.02 | 4.90 | | | **5.73** |
| **Unknown** | 5.68 | | 6.16 | 6.15 | | | | | | 5.88 | **5.77** |
| **Average** | **5.58** | **5.80** | **5.86** | **6.57** | **4.47** | **3.80** | **5.99** | **5.75** | **6.04** | **5.32** | **5.63** |

## Thickness and Temper Type

A comparison of aplastic inclusions to rim sherd thickness suggests that sand-tempered clay vessels are slightly thinner on average compared to those that contain bone in the matrix (Table 7-3). Bottles and jars, which are typically not subjected to repeated heating, appear to exhibit thicker walls than bowls. Because bowls were used for cooking and serving, thinner walls would have withstood the stress caused by repeated reheating. The identifiable sherds that contained a sand paste were all classified as bowl rims (n=4). The low percentage of sand-tempered sherds (two percent) in the analyzed sample is similar to the percentage of sand temper recorded at Presidio La Bahia (41VT8). An analysis of 190 Goliad Ware rim sherds (Fox and Tomka 2006) categorized three percent as sand tempered. Higher counts of bone/sand tempered sherds were recorded at the Presidio (18 percent) than at Mission San Juan (six percent). The low percentage of sand paste at San Juan may be related to limited sources of sandy clays in the area.

## Firing Atmospheres

Firing atmospheres are classified as non-oxidized (reduced), oxidized, or zoned, i.e. the firing temperature was uneven adjacent to the vessel resulting in signs of both non-oxidized and oxidized atmospheres. Analysis results indicate that 65 percent (n=289) of the analyzed sample was oxidized, 33 percent (n=144) was non-oxidized, and 2 percent (n=8) was zoned (Table 7-4). The results suggest that the majority of the sherds were heated at high temperatures for long periods to reach the oxidized state. In contrast, assemblages from Mission Espiritu Santo (41GD1) and Presidio La Bahia (41VT8) show evidence of low firing temperatures and short firing periods causing a higher density (91 percent and 43 percent, respectively) of non-oxidized sherds (Ulrich et al 2005; Fox and Tomka 2006). Non-oxidized (reduced) firing atmospheres are common when vessels are fired in open pits rather than closed kilns. Because organic material catching fire too quickly can cause flare-ups and some fuel may not burn at all, it is difficult to regulate temperature in an open pit. Ventilation problems can create pockets of high and low heat. In some cases, uneven heating results in vessels with signs of both oxidized and reduced (zoned) paste. The percentage of sherds from San Juan with evidence of a zoned atmosphere (2 percent) is similar to the collection from Mission Espiritu Santo (3 percent) and lower than the collection from Presidio La Bahia (24 percent; Fox and Tomka 2006; Ulrich et al. 2005). It appears that the Goliad ceramics recovered from Mission San Juan were fired in a controlled atmosphere.

Table 7-4. Firing Atmosphere of Sherds by Vessel Type

| Form | Non-oxidized | Oxidized | Zoned | Total |
|---|---|---|---|---|
| **Bottle** | 1 | 7 | | **8** |
| **Bowl** | 11 | 54 | 2 | **67** |
| **Jar** | 3 | 14 | 1 | **18** |
| **Unknown** | 129 | 214 | 5 | **348** |
| **Total** | **144** | **289** | **8** | **441** |

## Surface Finish and Decoration

The interior and exterior of the sherds were examined for surface treatment and decoration. Surface treatment was recorded as polished, smooth, rough, or no treatment (Table 7-5). Polished and smoothed surfaces were the most common treatments noted within this assemblage. Smoothed surfaces have a uniform texture with few irregularities. Polished surfaces exhibit a sheen. Of the 441 analyzed sherds, 64 percent of the interior surfaces and 56 percent of the exterior surfaces were smoothed, and 34 percent of the interior surfaces and 43 percent of the exterior surfaces were polished. One sherd did not appear to have a surface treatment, but the surface was degraded. A few specimens, six interiors and three exteriors, had rough surfaces. The roughness may be due to erosion rather than an intentional finishing technique.

Table 7-5. Interior and Exterior Surface Treatments

| Surface | Form | Polished | Smoothed | Rough | None | Total |
|---|---|---|---|---|---|---|
| Interior | Bottle | 3 | 5 | | | **8** |
| | Bowl | 26 | 40 | 1 | | **67** |
| | Jar | 9 | 9 | | | **18** |
| | Unknown | 112 | 230 | 5 | 1 | **348** |
| | Total | 150 | 284 | 6 | 1 | **441** |
| Exterior | Bottle | 5 | 3 | | | **8** |
| | Bowl | 28 | 37 | 2 | | **67** |
| | Jar | 11 | 7 | | | **18** |
| | Unknown | 145 | 201 | 1 | 1 | **348** |
| | **Total** | **189** | **248** | **3** | **1** | **441** |

Table 7-6. Interior and Exterior Decorative Treatments

| Surface | Form | Asphaltum | Brushed | Burnished | Floated | Slipped | Fireclouding | Smudged | None | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| Interior | Bottle | | | | 1 | | | | 7 | **8** |
| | Bowl | | 2 | | 14 | 2 | 1 | | 48 | **67** |
| | Jar | | | | 7 | | 1 | | 10 | **18** |
| | Unknown | 4 | | 2 | 94 | 1 | 3 | 1 | 243 | **348** |
| | Total | 4 | 2 | 2 | 116 | 3 | 5 | 1 | 308 | **441** |
| Exterior | Bottle | | | | 1 | | | | 7 | **8** |
| | Bowl | | 1 | | 16 | 2 | | | 48 | **67** |
| | Jar | | | 1 | 9 | | 1 | 1 | 6 | **18** |
| | Unknown | 1 | 1 | 4 | 114 | | 2 | 1 | 225 | **348** |
| | **Total** | **1** | **2** | **5** | **140** | **2** | **3** | **2** | **286** | **441** |

There is little evidence in archaeological and ethnohistoric records of intentional decoration of Goliad Wares. It is likely that recorded decorative attributes are a result of production techniques. Brushing, however, does appear intentional. Brushed surfaces on vessel exteriors may have helped to prevent slippage during transport. Brush marks are likely a result of the potter wiping the leather-hard vessel with straw or grasses prior to the final firing. Two interior and two exterior sherd surfaces were brushed (Table 7-6).

Asphaltum, a natural tar-like substance from coastal Texas, was noted on the interior of four sherds and the exterior of one (see Table 7-6). When heated to a molten state, asphaltum can be applied to vessels like paint. This decoration technique is common on Rockport wares recovered from coastal archaeological sites, including Mission Rosario and Mission Espiritu Santo (41GD1; Ulrich et al. 2005). It is not common on Goliad Wares recovered from San Antonio Missions.

The most common decorative treatment in the assemblage was floating (see Table 7-6). Floating entails rubbing the surface of a vessel to bring clay particles to the surface. When fired, the clay particles appear to separate from the body of the vessel. This is a different process than slip application, which is accomplished by painting a slurry of clay onto a leather hard vessel before firing. Floated surfaces are often bright brick-red. The interior of 116 sherds (26 percent) and the exterior of 140 sherds (32 percent) exhibited floating. Half of the identified jars were floated on at least one surface, and less than a quarter of the bowls (22 percent) were floated.

The interior of two sherds and the exterior of five were burnished. Burnishing involves polishing the surface of a leather hard vessel with a stone or other smooth object. After firing, the surface becomes extremely shiny.

Fireclouding is a result of uneven firing. Five interior surfaces and three exterior surfaces had evidence of fireclouding.

Smudging results when a vessel is placed in sooty smoke during the firing process or during heating. Oily soot blackens the vessel and causes a film on its surface. Smudging tends to occur on the exterior of vessels. The majority of the sherd surfaces, 70 percent of sherd interiors and 65 percent of sherd exteriors, had no evidence of decorative treatments. This is consistent with analyses on assemblages from other missions and presidios (Fox and Tomka 2006; Ulrich et al. 2005).

## Summary

Ethnographic records indicate that the Aranama groups that inhabited Mission Espiritu Santo were producing Goliad Wares and distributing them to the other missions and presidios in the area (Cardenas 1783). A comparison of the analyzed Goliad sherds from Mission San Juan to collections from Mission Espiritu Santo (41GD1) and Presidio La Bahia (41VT8) suggests that the San Juan assemblage did not originate from Espiritu Santo. The assemblages from the coastal mission and presidio have a higher density of sandy-pasted, bone-tempered wares. At Mission San Juan calcined bone is the predominant tempering agent within the ceramic sample. Sandy-pasted/bone-tempered sherds made up 10 percent of the analyzed sample. At 41GD1, 55 percent of the Goliad sherds are bone-tempered, and 44 percent are bone and sand tempered sherds (Ulrich et al. 2005). Analyzed sherds from 41VT8 consist of 79 percent bone temper and 21 percent bone and sand temper (Fox and Tomka 2006). Although all three assemblages had a moderate to high density of crushed calcined bone within the clay paste, the low numbers of sandy-paste sherds in the San Juan sample suggests a different manufacturing location.

In addition, the ceramic assemblages from Mission Espiritu Santo and Presidio La Bahia contain a higher density of non-oxidized sherds (91 and 43 percent, respectively) than the San Juan sample. Sixty-five percent of the San Juan assemblage exhibited evidence of an oxidized firing atmosphere. Mission Espiritu Santo, in contrast, had approximately seven percent oxidized sherds (Ulrich et al. 2005), and Presidio La Bahia had 33 percent (Fox and Tomka 2006). The higher frequency of oxidized sherds suggests that the San Juan ceramics were manufactured in a controlled setting.

# Chapter 8: Petrographic Analysis of Goliad Ware

*Lori Barkwill Love*

A total of 53 thin sections were analyzed, 48 thin sections from Mission San Juan (Table 8-1) and 5 clay samples from the San Antonio area (Table 8-2).

## Methods

The sherds were sent to National Petrographic Services in Houston, Texas, for the creation of thin sections. The thin sections were created following industry standard procedures. A small piece of the sample was removed and placed in blue-dyed epoxy and vacuum impregnated. A blue-dyed epoxy was chosen over clear epoxy to allow for easier identification of voids and bone. In most cases, the initial cut was transverse to the plane of the sherd so that a slip could be identified, if present. A slice of the cured specimen was then removed and mounted on a 2.5-x-5 cm microscope slide and ground down to 0.03 mm in thickness. A permanent cover slip was used on half of the samples submitted. Samples 26 through 50 had a permanent cover slip; however, samples 1 through 25 did not.

The thin sections were examined with a Leica Petrographic microscope with a mechanical stage attached. A two-step process was used to examine the thin sections. A drop of

Table 8-1. Ceramic Thin-sections by Paste Group and Provenience

| Paste Group | SAAN | Provenience |
|---|---|---|
| Sandy Paste-Light Bone | 32585 | Section I |
| Unsandy Paste-Heavy Bone | 32572 | Section B |
| | 32592 | Section B |
| | 32594-26 | Section B |
| | 32595-27 | Section B |
| | 32597-29 | Section B |
| | 32599-31 | Section B |
| | 32577 | Section C |
| | 32591 | Section C |
| | 32608-40 | Section C |
| | 32587 | Section F |
| | 32588 | Section F |
| | 32589 | Section F |
| | 32611-43 | Section F |
| | 32612-44 | Section F |
| | 32613-45 | Section F |
| | 32573 | Section H |
| | 32603-35 | Section H |
| | 32616-48 | Section J |
| | 32580 | TU 4 6-15 cmbs |
| | 32609-41 | TU 10 48-58 cmbs |
| | 32610-42 | TU 10 48-58 cmbs |
| | 32583 | TU 14 58-68 cmbs |
| Unsandy Paste-Light Bone | 32570 | Section B |
| | 32601-33 | Section J |
| | 32602-34 | Section J |
| | 32618-50 | Section J |
| Unsandy Paste-Moderate Bone | 32568 | Section B |
| | 32571 | Section B |
| | 32593 | Section B |
| | 32596-28 | Section B |
| | 32578 | Section C |
| | 32607-39 | Section C |
| | 32579 | Section F |
| | 32574 | Section J |
| | 32575 | Section J |
| | 32584 | Section J |
| | 32615-47 | Section J |
| | 32576 | TU 4 15-26 cmbs |
| | 32582 | TU 4 107-118 cmbs |
| | 32604-36 | TU 10 8-18 cmbs |
| | 32606-38 | TU 14 58-68 cmbs |
| | 32581 | TU 14 108-118 cmbs |
| Very Sandy Paste-Light Bone | 32586 | Section J |
| Very Sandy Paste-Moderate Bone | 32590 | Section C |
| Very Sandy Paste-Sand Tempered | 32614-46 | Section F |
| | 32617-49 | Section J |
| | 32605-37 | TU 10 38-48 cmbs |

Table 8-2. Provenience for Modern Comparitive Clay Samples

| Paste Group | SAAN | Provenience |
|---|---|---|
| Unsandy (< 10% sand) | Thelka-dg-51 | Dark gray clay from the San Antonio River at Thelka Avenue |
| | Thelka-lg-52 | Light gray clay from the San Antonio River at Thelka Avenue |
| | Lackafb-54 | West bank of Salado Creek within Lackland AFB |
| Sandy (10.01% - 19.99% sand) | Concprk-53 | Concepcion Park at Realigned Theo Avenue |
| Very Sandy (20% or more sand) | Buzz-55 | Buzzard Creel at cross of IH-10 |

distilled water and a temporary glass cover slip were placed on the thin sections without a permanent cover slip to aid in viewing. The first step involved recording the general characteristics and taking photomicrographs of the thin sections. The general characteristics (described below) recorded included paste matrix description, paste color, b-fabric (Stoops 2003:95), and description of edges. For the photomicrographs, at least one set (plane light and cross-polar light) were taken of each thin section at 4x magnification. Digital images were captured using a Leica DFC 295 Digital Camera attached to a Dell computer. All digital images are stored on the computer's hard drive and backed-up daily on the UTSA Server. All images are added to the CAR's image library of petrographic thin sections. All petrographic thin sections are stored at the CAR with the appropriate artifact collections.

The second step involved point counting using the Glagolev-Chayes method. The Glagolev-Chayes method involves using the mechanical stage, which allows one to move the thin section at a given interval beneath the crosshairs in the ocular, and identify and record each point encountered in the crosshairs (Galehouse 1971:389-390). For each point count sampling, the microscope was set at 10x magnification, and the stage was set so that the vertical and horizontal increments were both 0.4 mm. Each point encountered was identified as paste matrix, void, or nonplastic inclusion. Paste matrix was recorded by tally; however, for all voids and nonplastic inclusions, estimated size (based on the ocular scale) and shape were recorded. Nonplastic inclusions and voids were only counted once even if they were encountered more than once in the crosshairs. The maximum size recorded for nonplastic inclusions was 1.2 mm given that is the maximum size that could be recorded with the ocular scale. The thin sections were point counted until 100-paste points were reached. The minimum number of points recorded was 116, and the maximum number of points recorded was 202. The counts, measurements and paste, voids, and nonplastic inclusion type recorded during point counting for each thin section were input into a JMP Pro 10 data table. In addition to the point counting, nonplastic inclusions present but not encountered in the crosshairs were recorded.

## General Characteristics Recorded in Petrographic Analysis

Characteristics recorded include paste matrix, paste color, b-fabric, general categories, paste type, bone type, and paste group categories.

### Paste Matrix (PPL)

Paste matrix was recorded as continuous, mottled, zoned, core, or half and half. This attribute describes the general appearance of the paste matrix in plane light (Figure 8-1).

### Paste Color (PPL)

This attribute is a description of paste color in plane light. Munsell Soil Color Charts (2000) were used to record both the color code and description.

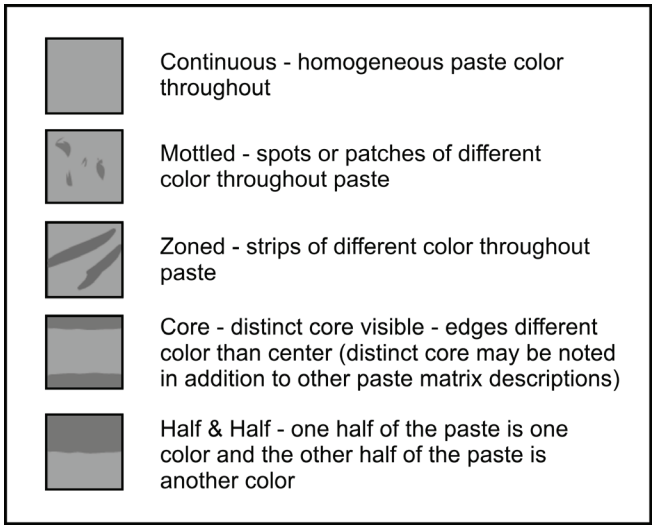


Figure 8-1. *Categories of paste matrix employed in the analysis.*

## B-fabric

B-fabric (Stoops 2003:95) describes the distribution of interference colors in the clay micromass in cross-polar light. The distribution was recorded as 1) undifferentiated – no interference colors in the fine mass, 2) speckled – randomly arranged birefringent particles, 3) striated – streaks of birefringent particles, or 4) zoned – alternating or zones of nonbirefringent and birefringent micromass. For categories other than undifferentiated, the birefringent activity was described as 1) active – when the stage is rotated the majority of the birefringent particles go extinct, or 2) slightly active – when the stage is rotated only some of the birefringent particles go extinct.

## General Category Assignments

For this analysis 26 unique paste/inclusions were combined into nine general categories (Table 8-3).

Table 8-3. General Paste/Inclusion Categories Used for Goliad Ware Petrographic Analysis

| General Category | Paste/Inclusions Recorded in Point Counting |
|---|---|
| Paste | Paste |
| Bone | Bone |
| Sand | Quartz |
| | Alkali feldspar |
| | Chert |
| | Rock |
| | Polycrystalline quartz |
| | Plagioclase feldspar |
| | Microcline feldspar |
| | Chalcedony |
| | Perthite |
| | Schist |
| Voids | Voids |
| n/a | Voids (space around inclusions) |
| | Secondary calcite |
| Carbonates | Calcite |
| | Calcium Carbonate |
| | Fossil |
| Other | Clay pellet |
| | Opaque |
| | Amphibole |
| | Sherd |
| | Augite |
| Mica | Muscovite |
| | Biotite |
| Shell | Shell |

## Paste Type

Paste type was defined based on the percentage of sand. Three paste types were defined for the petrographic analysis: unsandy (less than 10 percent sand), sandy (10.01 to 19.99 percent sand), and very sandy (20 percent or more sand). The majority (87.50 percent) of the sherds from Mission San Juan had a unsandy paste type (Figure 8-2).

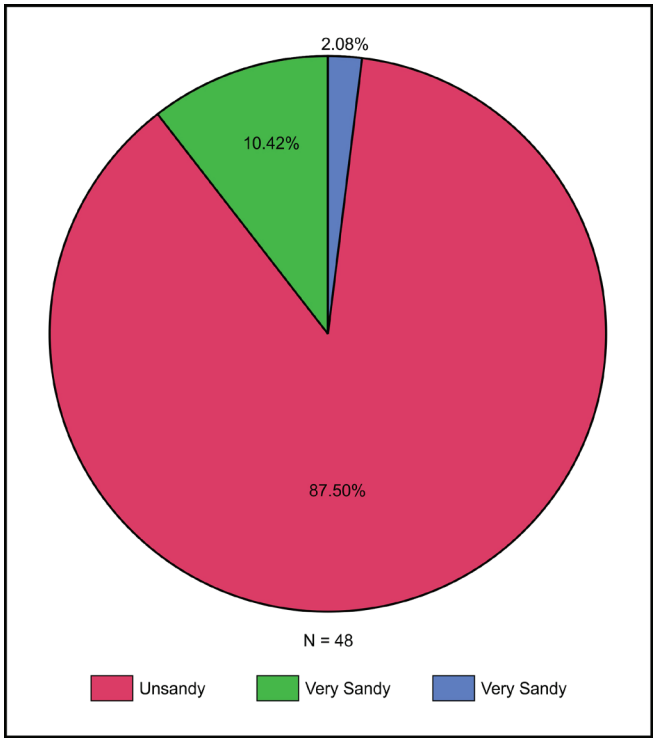


Figure 8-2. *Paste type breakdowns within the San Juan Underpinning Goliad sherd collection.*

## Bone Type

Bone type was defined based on the percentage of bone present (Figure 8-3). Four bone types were defined for the analysis: none (no bone), light (less than 10 percent bone), moderate (10.01 to 19.99 percent bone), and heavy (20 percent or more bone).

## Paste Group Categories

A frequency distribution was created for each sherd based on the revised paste/inclusion categories (Figure 8-4). Voids and n/a were excluded from the distribution. Seven paste groups were determined based on the percentage of sand and bone. The groups consist of 1) unsandy paste-light bone – less than 10 percent sand and less than 10 percent bone; 2) unsandy paste-moderate bone – less than 10 percent sand and 10.01 to 19.99 percent bone; 3) unsandy paste-heavy bone – less than 10 percent sand and 20 percent or more bone; 4) sandy paste-light

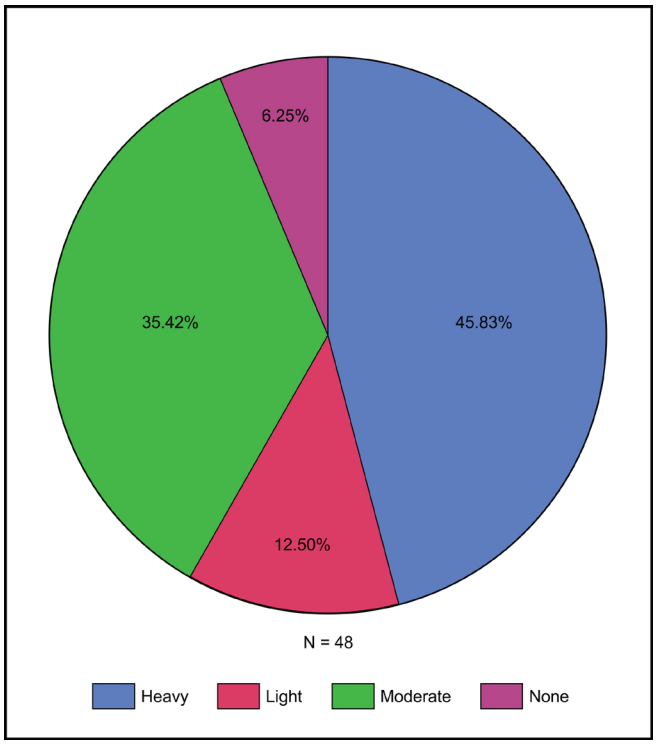


Figure 8-3. *Breakdowns by bone temper quantity.*

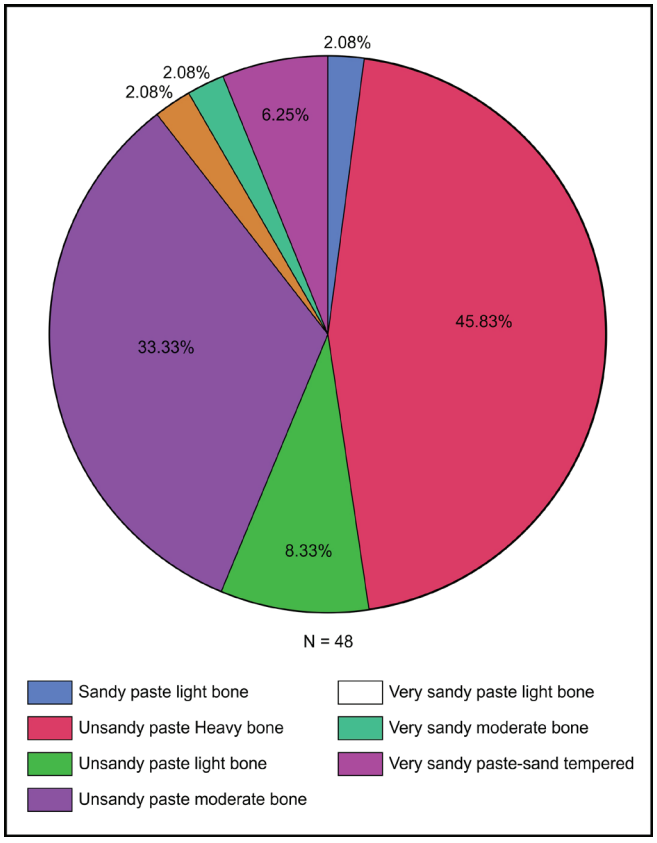


Figure 8-4. *Breakdown of sherds by the percentage of sand and bone in the paste.*

bone – 10.01 to 19.99 percent sand and less than 10 percent bone; 5) very sandy paste-light bone – 20 percent or more sand and less than 10 percent bone; 6) very sandy paste-moderate bone – 20 percent or more sand and 10.01 to 19.99 percent bone; and 7) very sand paste-sand temper – 20 percent or more sand and no bone. The other revised inclusion categories were not used in paste type determination given that none of the categories exceeded five percent for any thin section.

## Detailed Paste Group Summary

The percentage of bone and sand represents the revised inclusion categories (voids were not included in this percentage). The percentage of voids is from the total inclusions with spaces around inclusions and secondary calcite excluded. Tables of all inclusions and photographs at 4x magnification in plane and cross-polar light are included for each sample in Appendix 5.

### Sandy Paste – Light Bone (n = 1)

This sample had 18.46 percent sand and 4.62 percent bone (Figure 8-5; Table 8-4). Alkali feldspar, calcium carbonate, clay pellets, chert, muscovite, opaques, polycrystalline quartz, plagioclase, and fossils were the other inclusions found in this section. The paste matrix was continuous with a lighter core. The b-fabric was speckled and active. Secondary calcite was moderately present.

### Unsandy Paste – Heavy Bone (n = 22)

This paste group accounted for the majority of the sherds in the Mission San Juan sample. The percentage of sand ranged from zero percent (quartz was not encountered during point counting but was present) to 9.68 percent and the percentage of bone ranged from 22.58 to 41.94 percent (Figure 8-6; see Table 8-4). Calcium carbonate was present in all the samples. Muscovite was present in all but two samples. Other commonly found inclusions included calcite, alkali feldspar, opaques, and polycrystalline quartz. The most common paste matrix was continuous at 72.73 percent. A darker core was found on 27.27 percent of the thin sections. The most common b-fabric was speckled (77.27 percent) and active (72.73 percent). Secondary calcite was moderate on 63.64 percent of the thin sections.

### Unsandy Paste – Light Bone (n = 4)

The percentage of sand ranged from 2.73 to 8.80 percent and bone from 3.45 to 8.80 percent (Figure 8-7; see Table 8-4). Other inclusions found in all samples included calcium carbonate, muscovite, and opaques. Calcite, alkali

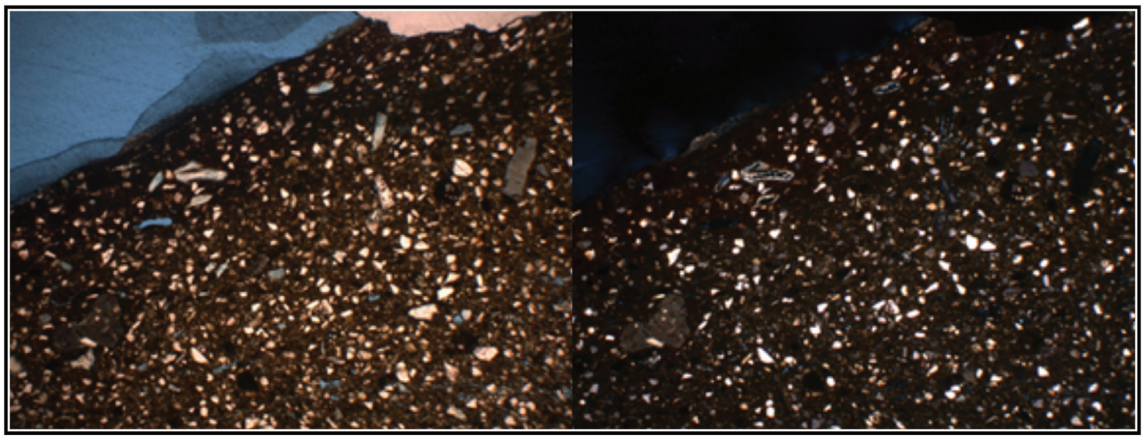

Figure 8-5. *Sandy paste-light bone paste group (SAAN-32585) at 4x magnification in plane light (left) and cross-polar light (right).*

Table 8-4. Summary Statistics for Paste Groups

| Paste Group | SAAN | Bone % | Sand % | Voids % |
|---|---|---|---|---|
| Sandy Paste-Light Bone | 32585 | 4.62 | 18.46 | 3.70 |
| Unsandy Paste-Heavy Bone | 32572 | 30.67 | 2.67 | 3.85 |
| | 32573 | 31.08 | 1.35 | 6.33 |
| | 32577 | 30.07 | 0.00 | 3.38 |
| | 32580 | 30.00 | 1.33 | 4.46 |
| | 32583 | 26.17 | 4.70 | 4.49 |
| | 32587 | 23.88 | 0.75 | 2.19 |
| | 32588 | 23.68 | 5.26 | 2.56 |
| | 32589 | 29.93 | 0.68 | 2.65 |
| | 32591 | 29.80 | 1.33 | 0.66 |
| | 32592 | 28.77 | 1.37 | 2.67 |
| | 32594-26 | 31.45 | 3.77 | 9.66 |
| | 32595-27 | 24.11 | 4.26 | 4.73 |
| | 32597-29 | 23.74 | 1.44 | 4.14 |
| | 32599-31 | 22.96 | 2.22 | 2.88 |
| | 32603-35 | 41.94 | 3.76 | 5.10 |
| | 32608-40 | 35.15 | 3.03 | 6.25 |
| | 32609-41 | 33.33 | 2.52 | 2.45 |
| | 32610-42 | 28.29 | 4.61 | 0.65 |
| | 32611-43 | 23.78 | 4.20 | 7.14 |
| | 32612-44 | 27.97 | 0.70 | 2.72 |
| | 32613-45 | 30.46 | 1.33 | 3.82 |
| | 32616-48 | 22.58 | 9.68 | 0.64 |
| Unsandy Paste-Light Bone | 32570 | 6.90 | 5.17 | 0.85 |
| | 32601-33 | 5.46 | 2.73 | 5.17 |
| | 32602-34 | 8.80 | 8.80 | 1.57 |
| | 32618-50 | 3.45 | 7.76 | 0.85 |
| Unsandy Paste-Moderate Bone | 32568 | 14.40 | 4.00 | 4.45 |
| | 32571 | 15.00 | 0.83 | 4.76 |
| | 32574 | 15.45 | 2.44 | 1.60 |
| | 32575 | 13.82 | 3.25 | 3.15 |
| | 32576 | 19.26 | 5.19 | 5.59 |
| | 32578 | 11.97 | 0.86 | 3.31 |
| | 32579 | 15.32 | 1.61 | 4.62 |
| | 32581 | 13.39 | 6.30 | 1.55 |
| | 32582 | 13.82 | 2.44 | 1.60 |
| | 32584 | 19.85 | 2.29 | 2.24 |
| | 32593 | 18.18 | 4.55 | 1.49 |
| | 32596-28 | 10.17 | 3.39 | 3.28 |
| | 32604-36 | 11.40 | 0.88 | 0.87 |
| | 32606-38 | 17.97 | 3.13 | 0.78 |
| | 32607-39 | 12.71 | 1.70 | 2.48 |
| | 32615-47 | 13.85 | 4.62 | 0.76 |
| Very Sandy Paste-Light Bone | 32586 | 4.05 | 25.68 | 6.33 |
| Very Sandy Paste-Moderate Bone | 32590 | 18.86 | 21.14 | 2.78 |
| Very Sandy Paste-Sand Tempered | 32605-37 | 0.00 | 40.48 | 5.62 |
| | 32614-46 | 0.00 | 33.12 | 1.26 |
| | 32617-49 | 0.00 | 32.69 | 11.86 |

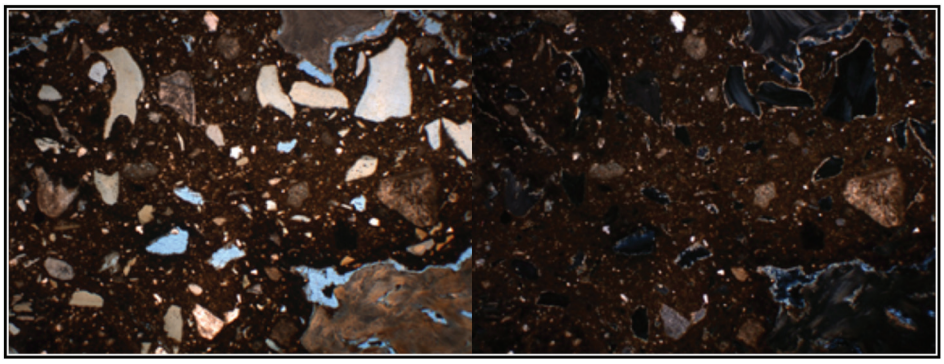

Figure 8-6. *Sample of unsandy paste-heavy bone (SAAN-32588) at 4x magnification in plane light (left) and cross-polar light (right).*

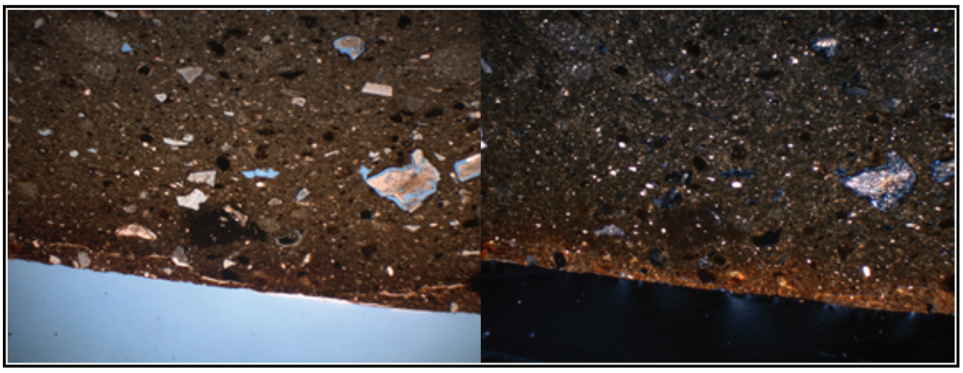

Figure 8-7. *Sample of unsandy paste-light bone (SAAN-32601-33) at 4x magnification in plane light (left) and cross-polar light (right).*

feldspar, and polycrystalline quartz were found in at least 50 percent of the samples. The paste matrix was evenly split between mottled and continuous. A lighter core was found in sample (SAAN-32618-50). All of the samples had a speckled b-fabric with the majority (75 percent) being slightly active. Secondary calcite was moderate on 76 percent of the thin sections.

### Unsandy Paste – Moderate Bone (n = 16)

The percentage of sand ranged from 0.83 to 6.30 percent, and bone ranged from 10.17 to 19.85 percent (Figure 8-8; see Table 8-4). Muscovite was present in all the samples. Other common inclusions were calcite, calcium carbonate, alkali feldspar, and polycrystalline quartz. The most common paste matrix was mottled (62.50 percent). Three thin sections had a lighter core, and three thin sections had a dark core. The most common b-fabric was speckled (87.50 percent) and slightly active (75 percent). Secondary calcite was moderate on 43.75 percent of the thin sections.

### Very Sandy Paste – Light Bone (n = 1)

This sample had 25.68 percent sand and 4.05 percent bone (Figure 8-9; see Table 8-4). Other inclusions present in the thin section included alkali feldspar, calcium carbonate, chert, muscovite, opaques, polycrystalline quartz, biotite, and perthite. The paste matrix was mottled. The b-fabric was undifferentiated. Sparse secondary calcite was found on the bone.

### Very Sandy Paste – Moderate Bone (n = 1)

This sample had 21.14 percent sand and 18.86 percent bone (Figure 8-10; see Table 8-4). Other inclusions found in the thin section included calcite, alkali feldspar, calcium carbonate, muscovite, opaques, polycrystalline quartz, and plagioclase. The paste matrix was continuous. The b-fabric was undifferentiated. Sparse secondary calcite was found on the bone.

### Very Sandy Paste – Sand Tempered (n = 3)

The percentage of sand ranged from 32.69 to 40.48 percent (Figure 8-11; see Table 8-4). No bone was found in the thin section. Other inclusions found in all of the thin sections included alkali feldspar, chert, muscovite, rock conglomerates, polycrystalline quartz, plagioclase, microcline, biotite, and augite. Only sample SAAN-31614-46 had calcium carbonate present. The paste matrix in all the thin sections was continuous. The b-fabric was speckled in all thin sections and mostly (66.67 percent) slightly active.

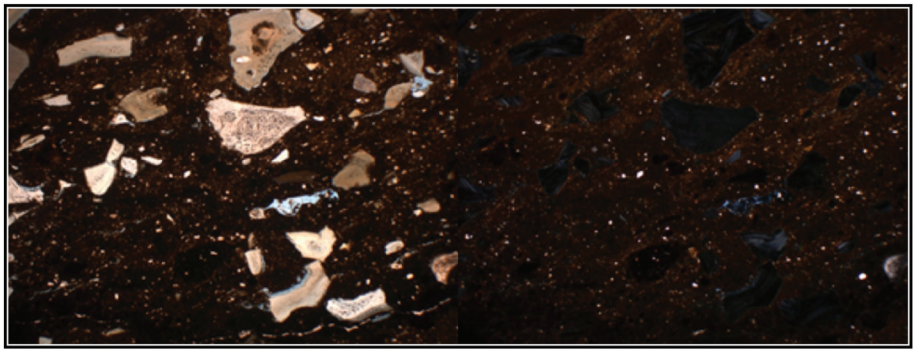

Figure 8-8. *Sample of unsandy paste-moderate bone (SAAN-32574) at 4x magnification in plane light (left) and cross-polar light (right).*

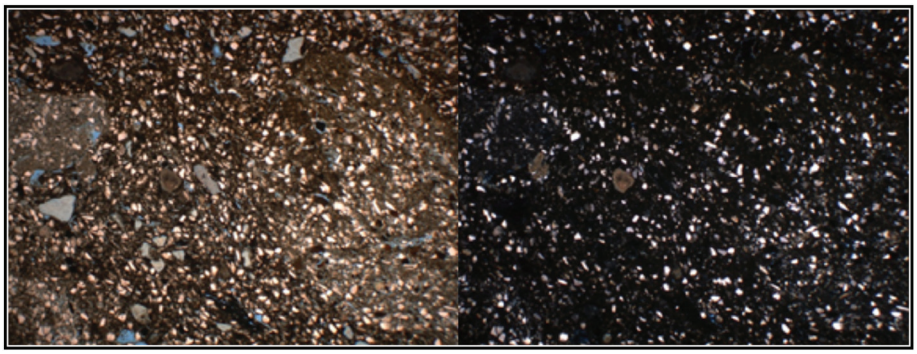

Figure 8-9. *Very sandy paste-light bone sample (SAAN-32586) at 4x magnification in plane light (left) and cross-polar light (right).*

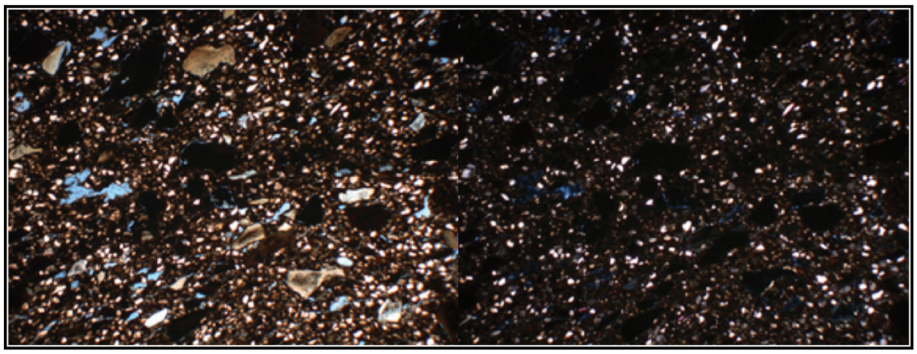

Figure 8-10. *Very sandy paste-moderate bone (SAAN-32590) at 4x magnification in plane light (left) and cross-polar light (right).*

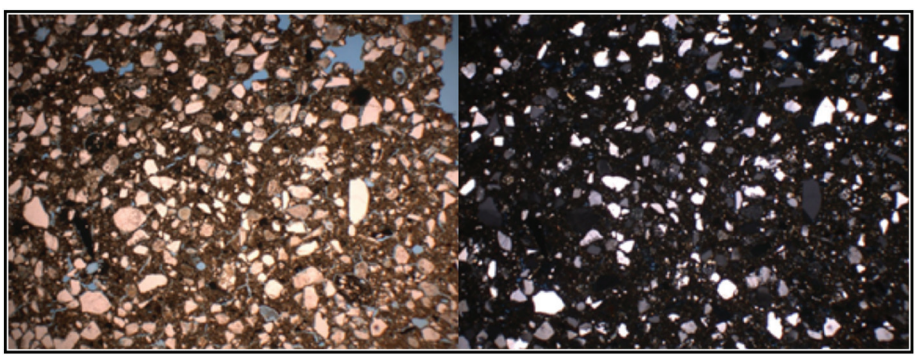

Figure 8-11. *Very sandy-sand tempered sample (SAAN-32605-37) at 4x magnification in plane light (left) and cross-polar light (right).*

## Bone Size

Bone size was examined by paste type and bone temper amount to determine if different processing techniques were used. The student's t test was used to compare bone size between paste types. For this purpose, paste type was consolidated to sandy (10 percent or more sand) and unsandy (less than 10 percent sand). The 0.0002 mm difference in the mean bone size between sandy and unsandy paste was not significant ($t = 0.004$, $p = 0.498$). Therefore, it appears that type of clay does not make a difference in terms of bone temper processing.

Bone size was compared by bone amount (Table 8-5). The difference observed in the mean bone size between light, moderate, and heavy bone temper amounts was significant ($F = 3.307$, $p = 0.0369$). However, when bone size was compared between moderate and heavy bone temper amounts, there was not a significant difference ($t = 0.982$, $p = 0.837$). The use of only a small amount of bone temper reflects a difference in processing techniques not just in terms of bone amount but also in processing of the bone temper.

Table 8-5. Summary of Bone Size (mm) by Bone Temper Amount

| Bone Temper | Count | Mean (mm) | Standard Deviation (mm) |
|---|---|---|---|
| Heavy | 953 | 0.41 | 0.29 |
| Moderate | 329 | 0.43 | 0.29 |
| Light | 41 | 0.31 | 0.23 |

## Clay Sample Descriptions

In addition to the sherds from Mission San Juan, five clay samples from the San Antonio area were submitted for petrographic analysis (see Table 8-2). Clay tiles were prepared from each of the five samples. The tiles were fired at 450 °C. Thin sections for the clay tiles were prepared following the same methods listed above for the San Juan sherds. The petrographic analysis methods used for the San Juan samples were followed, but voids were not recorded when encountered during point counting. For the clay samples, the minimum number of points counted was 104, and the maximum number of points counted was 142.

### Clay Paste Type

The clays were assigned to a paste type based on the percentage of sand, the same criteria that were used for the sherds. It should be noted that sand was found in all of the clay samples; however, following the procedures applied for the archaeological sherds, the comparative clay samples were assigned to three paste types. Thelka-dg-51, Thelka-lg-52, and Lackafb-54 were categorized as unsandy paste (less than 10 percent sand), Concprk-53 as sandy paste (10.01 to 19.99 percent sand), and Buzz-55 as very sandy paste (20 percent or more sand).

### Detailed Clay Descriptions

#### Thelka-dg-51

This dark gray clay from the San Antonio River at Thelka Avenue contained mottled paste matrix (PPL), 2.5Y 8/6 (yellow) with spots of 2.5Y 5/4 (light olive brown) paste color (PPL), and speckled-active b-fabric (XPL). Biotite, calcite, fossils, polycrystalline quartz, muscovite, amphibole, and clay pellets were present but were not encountered in the point count (Figure 8-12; Table 8-6). The average sand size of this unsandy paste type (2.88 percent sand) is categorized as silt on the Wentworth Scale.

#### Thelka-lg-52

This sample, a light gray clay from the San Antonio River at Thelka Avenue, was made up of mottled paste matrix (PPL), 10YR 7/6 (yellow) with spots of 5YR 5/8 (yellowish red) and 2.5Y 8/6 (yellow) paste color (PPL), and speckled-active b-fabric (XPL). The clay contained large amounts of hematite (Figure 8-13; see Table 8-6). Inclusions not encountered but present include biotite, muscovite, chert, clay pellets, and fossils. The sample is considered an unsandy paste type (1.92 percent sand) and has an average sand size of silt on the Wentworth Scale.

#### Concprk-53

This sample from Concepción Park at Theo Avenue contained continuous paste matrix (PPL), 10YR 5/6 (yellowish brown) paste color (PPL), and speckled-slightly active b-fabric (XPL). Some spots of hematite were present. Muscovite, calcium carbonate, clay pellets, and plagioclase feldspar were present but were not encountered in the point count (Figure 8-14; Table 8-6). This sandy paste type (15.45 percent sand) is categorized as very fine sand on the Wentworth average sand size scale.

#### Lackafb-54

This clay sample from Salado Creek at Lackland AFB included continuous paste matrix (PPL), 10YR 5/6 (yellowish brown) paste color (PPL), and speckled-slightly active b-fabric (XPL). There are lots of tiny specks of calcite throughout the paste. The paste has a very high birefringence (Figure 8-15; see Table 8-6). Opaques, muscovite, plagioclase feldspar, alkali feldspar, shell, and calcium carbonate were present but not encountered in the point count. The sample is an unsandy paste type (7.96 percent sand) with an average sand size of silt on the Wentworth scale.

## Buzz-55

This sample of Houston Black clay from Buzzard Creek at IH-10 contained continuous paste matrix (PPL), 10YR 5/4 (yellowish brown) paste color (PPL), and speckled-slightly active b-fabric (XPL). Some spots of hematite were present. Augite, polycrystalline quartz, chert, plagioclase, and perthite were present but were not encountered in the point count (Figure 8-16; Table 8-6). The paste type is very sandy (28.17 percent sand) with an average sand size of very fine sand on the Wentworth scale.

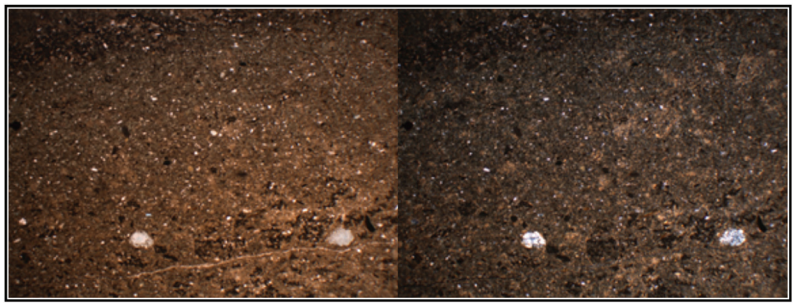

Figure 8-12. *Thelka-dg-51 at 4x magnification in plane light (left) and cross-polar light (right).*

Table 8-6. Point Counts for Clay Samples

| Sample | General Category | Paste/ Inclusion | Count | Frequency (%) |
|---|---|---|---|---|
| Thelka-dg-51 | Paste | Paste | 100 | 96.15 |
| | Sand | Quartz | 3 | 2.88 |
| | Other | Opaque | 1 | 0.96 |
| **Total** | | | **104** | **100.00** |
| Thelka-lg-52 | Paste | Paste | 100 | 96.15 |
| | Sand | Quartz | 2 | 1.93 |
| | Other | Opaque | 2 | 1.92 |
| **Total** | | | **104** | **100.00** |
| Concprk-53 | Paste | Paste | 100 | 81.30 |
| | Sand | Quartz | 14 | 11.38 |
| | | Alkali feldspar | 1 | 0.81 |
| | | Chert | 2 | 1.63 |
| | | Polycrystalline quartz | 2 | 1.63 |
| | Carbonates | Calcite | 1 | 0.81 |
| | | Fossils | 2 | 1.63 |
| | Other | Opaque | 1 | 0.81 |
| **Total** | | | **123** | **100.00** |
| Lackafb-54 | Paste | Paste | 100 | 88.50 |
| | Sand | Quartz | 8 | 7.08 |
| | | Polycrystalline quartz | 1 | 0.88 |
| | Carbonates | Calcite | 4 | 3.54 |
| **Total** | | | **113** | **100.00** |
| Buzz-55 | Paste | Paste | 100 | 70.42 |
| | Sand | Quartz | 35 | 24.65 |
| | | Alkali feldspar | 5 | 3.52 |
| | Carbonates | Calcium carbonate | 1 | 0.70 |
| | Other | Opaque | 1 | 0.70 |
| **Total** | | | **142** | **100.00** |

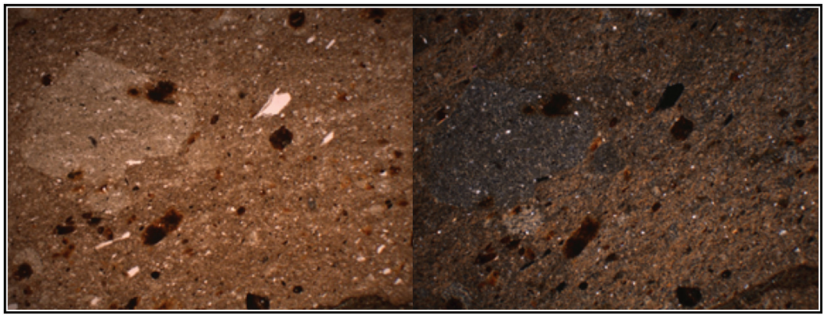

Figure 8-13. *Thelka-lg-52 at 4x magnification in plane light (left) and cross-polar light (right).*

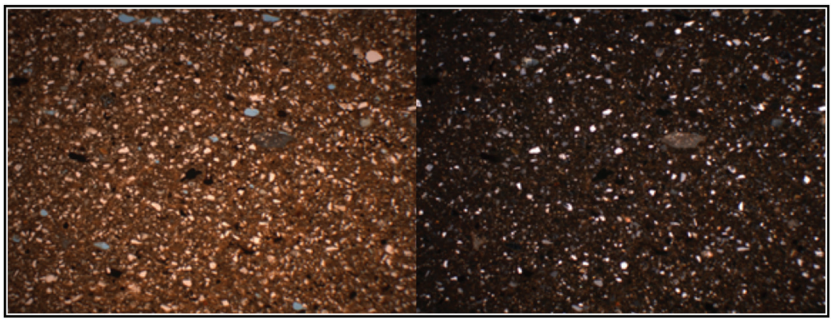

Figure 8-14. *Concprk-53 at 4x magnification in plane light (left) and cross-polar light (right).*

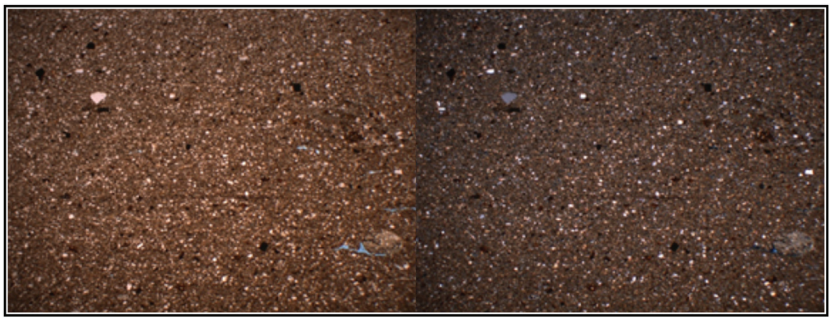

Figure 8-15. *Lackafb-54 at 4x magnification in plane light (left) and cross-polar light (right).*

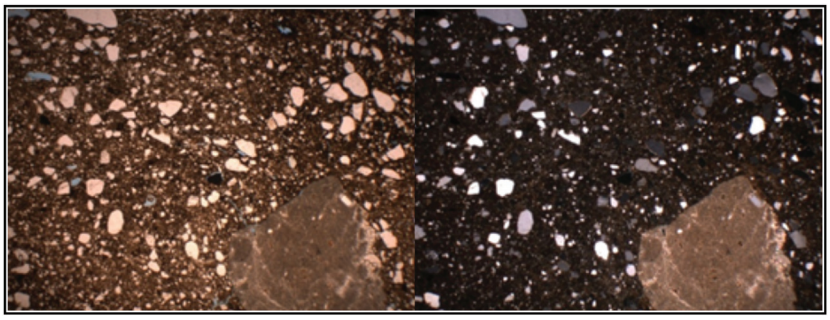

Figure 8-16. *Buzz-55 at 4x magnification in plane light (left) and cross-polar light (right).*

## Summary

There appears to be no clear-cut association between the clay samples and the sherds from Mission San Juan. The light and dark gray clay from the San Antonio River (Theeka-dg-51 and Theeka-lg-52) appear to be likely candidates from unsandy paste sherds with less than five percent sand; however, the lack of carbonates, especially calcium carbonate, is at odds with most of the sherds samples in which calcium carbonate is commonly present. The clay sample from Lackland AFB is a likely candidate for unsandy paste sherds with slightly higher sand percentages (between 5 and 9.99 percent). The clay sample from Concepción Park (Concprk-53) is a likely candidate for sandy to very sandy paste sherds with bone temper. However, this clay is unlikely to have been used for the very sandy paste-sand tempered sherds given the common occurrence of carbonates in the paste, which are generally not found in the sand tempered sherds. The common occurrence of carbonates and the lack of micas in the Buzzard Creek clay (Buzz-55) make it unlikely that it was used for the sand-tempered sherds. However, it does illustrate that the high percentage of sand could be a natural component of the clay.

One of the things that stood out in the clay samples was the presence of clay pellets or what appeared to be a mix of clays, such as can be seen in the clay sample Thelka-lg-52 (Figure 8-17). Clay pellets are an argillaceous inclusion, which according to Whitbread (1986:83) may "have been formed within a depositional environment of the clay." However, in hand-formed ceramics, clay pellets may also be formed by dry clay bits being incorporated into the paste during the manufacturing process (Reedy 2008:175). Often in the sherd samples from Mission San Juan there appeared to be different clays (clay pellets) mixed into the paste, such as can be seen in the sample SAAN-32616-48 (Figure 8-18). Therefore, what may appear to be a mixing of different clays could be natural inclusions.

Both the macroscopic and the petrographic analyses suggest that bone temper was the predominate paste type used in Goliad Ware at Mission San Juan. Sandy-pasted wares without bone inclusions were recovered in lower numbers. Sand may be a natural occurrence in the clay rather than an intentional additive.

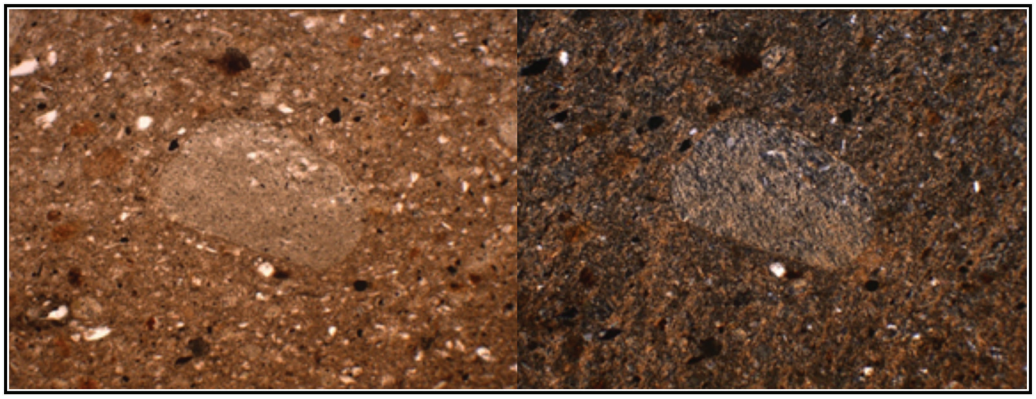

Figure 8-17. *Clay pellet/mix of clay in clay sample Theeka-lg-52 at 10x magnification in plane light (left) and cross-polar light (right).*

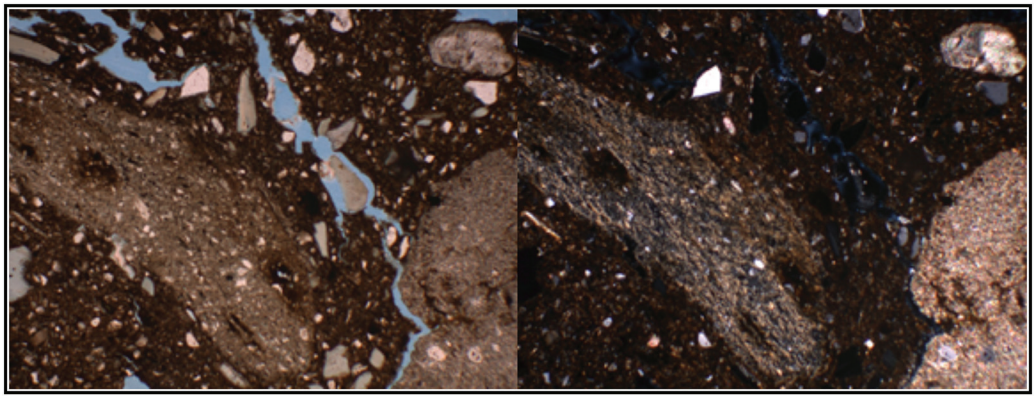

Figure 8-18. *Clay pellet/mix of clay in sherd sample SAAN-32616-48 at 10x magnification in plane light (left) and cross-polar light (right).*

# Chapter 9: Lithic Technology at San Juan Capistrano

*Mark P. Luzmoor, Steve A. Tomka, Cynthia M. Munoz, and Raymond P. Mauldin*

Excavations during Phases 1 and 3 recovered 164 pieces of chipped stone, including 134 specimens of debitage, 14 lithic tools, 15 gunflints, and 1 strike-a-lite. These counts are based on the CAR's current database for the project artifacts. The database reflects the inventoried project collection. The lithic analyst examined 188 specimens of debitage for various attributes. The discrepancy of 54 flakes cannot presently be accounted for.

## Unmodified Lithic Debitage

One hundred and eighty-eight pieces of debitage were examined for cortex coverage, completeness, platform faceting, and platform grinding. Maximum dimensions were recorded for 179 specimens, and flake type was determined for 136 pieces. Per the current CAR database, 70 flakes were recovered from the systematic excavation of 1-x-2 m test units during Phase 1, and 64 flakes were recovered from the mechanically excavated sections of Phase 3. The analyst recorded flake type for the 70 Phase 1 flakes currently accounted for and for 66 Phase 3 flakes (2 presently unaccounted for), maximum dimensions for 73 Phase 1 flakes (3 unaccounted for), and 106 from Phase 3 (42 presently not accounted for), and cortex coverage, completeness, platform faceting, and platform grinding for 75 Phase 1 flakes (5 unaccounted for) and 113 from Phase 3 (49 not accounted for on the current CAR database). Because the discrepancies in counts are lower in Phase 1 and in the Phase 3 sample analyzed for flake type, this chapter reviews the 136 flakes making up these groupings.

Table 9-1 presents the proveniences for the 70 Phase 1 flakes included in the CAR database. The largest numbers of debitage recovered from the test units came from TU 10,

Table 9-1. Count (Black), Density per 10 cm Level (Red), and Density per Cubic Meter (Blue) for Lithic Debitage by Test Unit and Level

| Level | Test Unit | | | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | |
| 1 | | 1 (1) | | 1 (2) | | | | | | | | | | | **2 (2)** |
| 2 | 1 (1) | | 1 (1) | 1 (1) | | | | | | 1 (1) | 2 (2) | 3 (3) | 1 (1) | | **10 (8)** |
| 3 | | 3 (4) | | | | | 1 (1) | 3 (3) | | | | 1 (1) | | | **8 (7)** |
| 4 | 1 (1) | | | | | | 2 (2) | | | 2 (2) | | | | | **5 (4)** |
| 5 | | | | | | | 1 (1) | | 2 (2) | 5 (5) | | 1 (1) | | | **9 (8)** |
| 6 | | | | 1 (1) | | | | | 1 (1) | | | 1 (1) | 1 (1) | 1 (1) | **5 (5)** |
| 7 | | | | | | | | | | | | | | | **0** |
| 8 | | 1 (5) | | 1 (1) | | | | | | | | | | | **2 (2)** |
| 9 | | | | 2 (2) | | | | 1 (1) | | 1 (1) | | | | | **4 (4)** |
| 10 | | | | | | | | | | | 1 (2) | | | | **1 (1)** |
| 11 | | | | | | | | | | | 1 (2) | 1 (2) | | | **2 (2)** |
| 12 | | | | | | | | | 2 (2) | 3 (3) | | | | | **5 (5)** |
| 13 | | | | | | | | | 1 (1) | 4 (4) | 1 (1) | | | | **6 (8)** |
| 14 | | | | | | | | | 1 (1) | 4 (4) | | | 1 (1) | 1 (1) | **7 (9)** |
| 15 | | | | | | | | 1 (1) | | | | | | 1 (1) | **2 (3)** |
| 16 | | | | | | | | | | | 1 (2) | | 1 (1) | | **2 (6)** |
| 17 | | | | | | | | | | | | | | | **0** |
| 18 | | | | | | | | | | | | | | | **0** |
| 19 | | | | | | | | | | | | | | | **0** |
| 20 | | | | | | | | | | | | | | | **0** |
| 21 | | | | | | | | | | | | | | | **0** |
| **Total** | **2 (5)** | **5 (10)** | **1 (1)** | **6 (5)** | **0** | **0** | **4 (3)** | **5 (3)** | **7 (4)** | **20 (16)** | **6 (4)** | **7 (6)** | **4 (2)** | **3 (2)** | **70 (4)** |

= not excavated

followed by smaller quantities in TUs 12, 9, 4, and 11. The units with the largest volume of flakes were TU 10 (16/$m^3$), TU 2 (10/$m^3$), and TU 12 (6/$m^3$). The vertical distribution of debitage indicates a peak in materials in Levels 2 (8/$m^3$) and 3 (7/$m^3$), a second peak in Level 5 (8/$m^3$), and a third peak in Levels 13 (8/$m^3$) and 14 (9/$m^3$). The majority of the flakes in the lower two peaks come from TU 10. Overall, the test unit excavations produced a very low density of debitage (4/$m^3$).

Six attributes were recorded as part of the analysis of the unmodified lithic debitage. The attributes consisted of platform faceting, platform grinding, maximum dimension, flake type, cortex category, and debitage completeness. Platform faceting (single or multiple) and platform grinding (present or absent) relate to a knapper's platform preparation techniques during tool manufacture and to the specific reduction strategy employed. Typically, core reduction for the production of flake blanks used as expedient tools requires no platform preparation, and most flakes produced are single faceted and have unground platforms. In contrast, the manufacture of bifacial tools results in a significant degree of platform preparation related to platform angle construction (i.e., platform faceting) and strengthening through grinding (Andrefsky 1998; Whittaker 1994). Cortex category (primary [100 percent corticated], secondary [1-99 percent corticated], and tertiary [zero cortex]) reflects, in a broad manner, the stage of reduction during bifacial tool manufacture and, to a lesser degree, core reduction. Early reduction debitage will tend to retain cortex while flakes removed later in the reduction are typically cortex free (Andrefsky 1998; Magne 1985; Magne and Pokotylo 1981). During core reduction, the emphasis tends to be on flake production rather than on specific steps to decortify the core as the reduction proceeds; therefore, even exhausted cores, will often retain cortex on their surfaces. Debitage completeness (complete, proximal [platform but no distal termination], medial [no platform, no distal termination], distal [no platform but has distal termination]) simply identifies whether the flake is complete or incomplete. Completeness appears to have a relationship to reduction strategy in that more complete flakes are generated by core reduction compared to bifacial tool manufacture (Sullivan and Rozen 1985). Maximum dimension tracks the size range of the debitage represented in the collection.

Of the 136 specimens of Phase 1 and 3 debitage analyzed for flake type, 39 percent are complete, 20 percent are proximal, and three percent are longitudinal, i.e., 62 percent of the flakes retain a platform. The analysis of the platform preparation attributes from Phase 1 debitage indicates that of the 70 pieces of debitage, 44 (63 percent) retain platform attributes. Of these specimens, the large majority (n=38; 86 percent) are single faceted. In addition, 33 (87 percent) of the single faceted specimens were not ground. These figures suggest that most of the lithic debitage recovered during this project is the product of core reduction rather than the manufacture of bifacial tools. Only six pieces of debitage have multi-faceted striking platforms, and of these, only three are ground and represent the classic debitage produced during biface manufacture. A review of the 66 specimens from Phase 3 analyzed for flake types reveals that 40 (61 percent) have platforms and that 38 of the 40 (95 percent) are single faceted. All but one is not ground.

Flake types, defined on the basis of broad morphological categories, support the interpretations based on platform attributes (Tables 9-2 and 9-3). Biface reduction and debitage derived from platform preparation of bifacial cores represents 20 percent (n=14) of the Phase 1 specimens and 29 percent (n=19) from Phase 3. In contrast, debitage derived from core reduction, which is the production of flake and blade blanks for expedient tools, constitutes 60 percent (n=42) of the Phase 1 and 47 percent (n=31) of Phase 3. Two uniface manufacture flakes were recovered. Of the two, one exhibits the classic morphological characteristics of uniface manufacture. These characteristics include a single faceted platform, a trapezoidal morphology, cortex near the distal end of the dorsal face, and a longitudinal curvature that is evident near the termination of the flake. Of the 136 Phase 1 and 3 flakes analyzed for flake type, one percent (n=2) were 100 percent corticated, 38 percent (n=51) were partially corticated (1-99 percent), and 61 percent had no remaining cortex.

In summary, the small collection of unmodified lithic debitage recovered from the site is characteristic primarily of core reduction for the purposes of flake blank production. Bifacial reduction is less commonly represented in the debitage. Interestingly, bifacial tools are commonly represented, but no cores were recovered.

Table 9-2. Phase 1 Flake Type by Cortex Category

| **Flake Type** | **Cortex** | | **Total** |
|---|---|---|---|
| | **Secondary** | **Tertiary** | |
| Biface reduction | 0 | 10 | **10** |
| Biface platform prep | 1 | 3 | **4** |
| Blade | 1 | 2 | **3** |
| Blade-like flake | 4 | 2 | **6** |
| Core prep/ reduction | 16 | 16 | **32** |
| Core tablet | 0 | 1 | **1** |
| Tool resharpening flake | 0 | 2 | **2** |
| Indeterminate | 1 | 9 | **10** |
| Angular debris | 1 | 1 | **2** |
| **Total** | **24** | **46** | **70** |
| **Percent** | **34%** | **66%** | **100%** |

Table 9-3. Phase 3 Flake Type by Cortex Category

| Flake Type | Cortex | | | Total |
|---|---|---|---|---|
| | Primary | Secondary | Tertiary | |
| Biface reduction | 0 | 0 | 9 | **9** |
| Biface platform prep | 1 | 2 | 7 | **10** |
| Blade | 0 | 0 | 1 | **1** |
| Blade-like flake | 0 | 7 | 2 | **9** |
| Core prep/ reduction | 0 | 9 | 12 | **21** |
| Uniface manufacture flake | 0 | 2 | 0 | **2** |
| Errailure flake | 0 | 0 | 1 | **1** |
| Indeterminate | 1 | 7 | 4 | **12** |
| Angular debris | 0 | 0 | 1 | **1** |
| **Total** | **2** | **27** | **37** | **66** |
| **Percent** | **3%** | **41%** | **56%** | **100%** |

## Lithic Tools

Thirty tools have been identified among the lithic artifacts recovered from Mission San Juan (Table 9-4). Gunflints constitute the largest category (n=15), followed by expedient tools (n=5), miscellaneous bifaces (n=3), and Guerrero arrow points (n=3). Other artifacts include the distal end of a bifacial adze, a flake with extreme edge crushing similar to wear derived from use as a strike-a-lite, a planer, and a graver.

### Gunflints

Of the fifteen gunflints from the project, two are rectangular and bifacial. Three were produced from tertiary flakes, are rectangular to square, and are unifacial. Three were made from secondary flakes, are rounded to rectangular, and are minimally retouched. The remaining seven were from tertiary (n=6) or secondary (n=1) flakes, are irregular, and exhibit localized crushing and step-fractured flake scars (Figure 9-1). The gunflints retain polished flake ridges and surfaces from contact with the wise jaw, or the leather or lead patch that secured the flint in place. All of the specimens are made of local cherts and may represent Native-made specimens rather than gunflints issued by the Presidio to soldiers stationed at the mission. It is possible the Native inhabitants of the mission manufactured the irregularly shaped gunflints for use in flintlock weaponry. Another scenario is that soldiers produced their own gunflints due to a lack of imported ones from Mexico City (Villalobos 2003).

### Guerrero Arrow Points

Three lanceolate arrow points were recovered from the excavations (Figure 9-2). They fit the Guerrero type definition provided by Turner and Hester (1999:216). The first specimen (Figure 9-2b) is 38-mm long, has a base that expands slightly to a maximum width of 14.2 mm, and retains grinding along the stem edges for a distance of 12.8 mm. The base is concave and verges on a v-shape. The projectile point was made on a flake that was oriented with the bulb of percussion toward the base of the point. Several basal thinning flakes have been removed from the bulbar face of the flake blank to thin the former bulb to a suitable degree. Flake removal scars on the blade of the point tend to be parallel and angled tangentially along the longitudinal axis of the point. The point weighs 2.2 gm, and it has a maximum thickness of 4.3 mm.

The second specimen (Figure 9-2a) is also lanceolate in morphology and retains short, ground blade edges near its base. Grinding only extends 6 mm from the base of the point. The base is concave rather than v-shaped, but the corners of the stem curve outward as in the other complete Guerrero point. The point is 35.7-mm long, has a maximum width of 14.1 mm, and has a maximum thickness of 4.7 mm. The base concavity is 2 mm, and the point weighs 2.1 gm.

The third Guerrero point is incomplete (Figure 9-2c). It was manufactured from dark olive glass and consists of a concave base with parallel flake removal scars. Grinding is evident along the stem edges. The point is 13.2-mm wide at the base and 2.8-mm thick.

### Other Tools

One bifacial adze with a beveled distal end and patches of use-polish along portions of the working edge was recovered. The proximal end of the tool is missing, but small, localized areas of haft polish are present near the break indicating that the tool was hafted while in use. The haft polish is present on both faces of the tool. Small areas of step-fractured flake scars are present on the working edge. This type of wear suggests that the adze was used on a relatively hard substance such as wood.

A large, secondary, hard hammer flake has evidence of retouch along its distal edge and areas of micro-step fractures. The ventral face of the flake retains significant areas of polish that may have resulted from shaving or planing. The step fractures along portions of the tool's edge are consistent with this type of use.

The graver is a secondary flake with minimal retouch along one edge that produced a short, sharp tip likely used for engraving. Small micro-flakes were removed from the tip during use, and a small area of polish is evident on the tool's working edge. Three expedient scrapers and one expedient knife are secondary flakes with relatively little evidence of use-wear.

Table 9-4. Artifact and Tool Categories Recovered

| TU/ Section | Level | Guerrero Arrow Point | Gunflint | Strike-a-lite | Adze | Planer | Expedient Graver | Expedient Knife | Expedient Scraper | Minimally Retouched Knife | Miscellaneous Biface | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TU 4 | 1 | | 1 | | | | | | | | | **1** |
| TU 8 | 3 | | | | | | | | | | 1 | **1** |
| TU 8 | 9 | | 1 | | | | | | | | | **1** |
| TU 8 | 10 | | | | | | | | | | 1 | **1** |
| TU 8 | 11 | | | | | | | | | | 1 | **1** |
| TU 10 | 5 | | 1 | | | | | | | | | **1** |
| TU 10 | 6 | | 1 | | | | | | | | | **1** |
| TU 10 | 13 | | | | | | | 1 | | | | **1** |
| TU 11 | 5 | 1 | | | | | | | | | | **1** |
| TU 14 | 3 | | 1 | | | | | | | | | **1** |
| B | n/a | 1 | 1 | 1 | | | | | | | | **3** |
| C | n/a | | 1 | | | | | | 1 | | | **2** |
| E | n/a | | | | | 1 | | | | | | **1** |
| F | n/a | | | | | | 1 | | 1 | | | **2** |
| H | n/a | | 1 | | | | | | 1 | | | **2** |
| J | n/a | 1 | 7 | | 1 | | | | | 1 | | **10** |
| **Total** | | **3** | **15** | **1** | **1** | **1** | **1** | **1** | **3** | **1** | **3** | **30** |

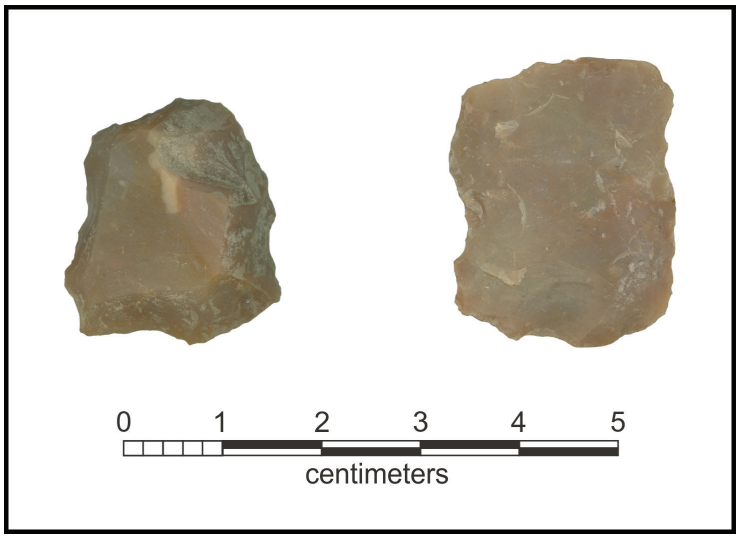


Figure 9-1. *Gunflints from Mission San Juan.*

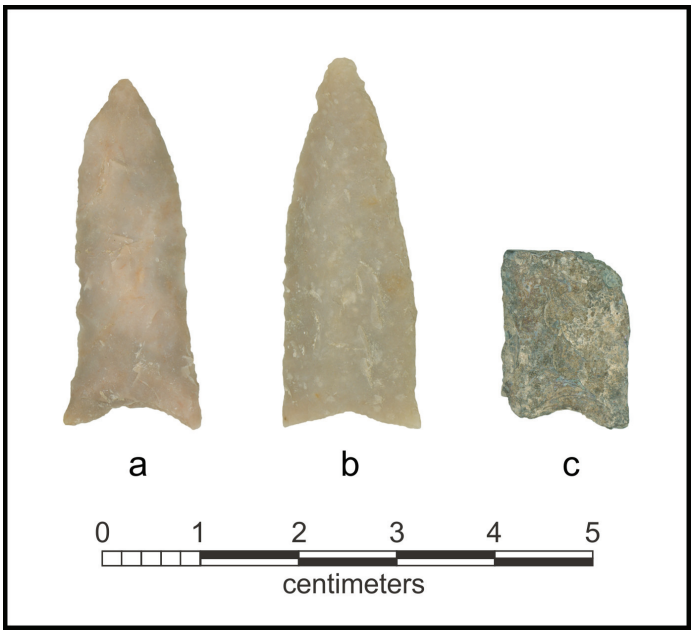


Figure 9-2. *Guerrero arrow points from Mission San Juan.*

## Discussion

Fox (1979) provides a summary of chipped stone associated with four San Antonio Missions collected from excavations conducted in the late 1960s and through the 1970s. These include an analysis of Schuetz's work (1968, 1969) at Mission San Juan, as well as samples from excavations at Mission Concepción, Mission San José, and Mission San Antonio de Valero. Unfortunately, while it appears that all samples were screened, the screen size varied with most of these earlier excavators using both ¼- and ½-inch mesh. It is unclear what samples are associated with which mesh. This makes comparison of chipped stone classes between sites difficult, especially for size dependent lithic classes such as debitage. For example, a review of material presented in Fox (1979:30-31) shows that of the 994 pieces of chipped stone debitage recovered previously from Mission San Juan tertiary flakes make up 36.9 percent (n=367). This is consistent with data from the other mission presented by Fox (1979:30-31), as Mission San José and Mission San Antonio de Valero have 42.9 percent, and Mission Concepción has a tertiary flake percentage of 46.4 percent. In contrast, the material from the test units of the work reported here, which was consistently screened through ¼-inch mesh, produced a tertiary flake percentage of 66 percent. This 30 percent increase in tertiary flakes relative to the early work likely reflects differences in screening rather than differences in past reduction behaviors. Tertiary flakes tend to be smaller, and researchers will differentially miss these items when using larger screen sizes. Again using the San Juan test unit data, the median maximum size of 68 flakes with dimensions is 2.52 cm. Eight (30.8 percent) of the 26 items above this median size lacked cortex, while tertiary flakes make up 88 percent of the items in the smaller size range (<2.52 cm).

While comparisons between debitage groups reflected in the Fox (1979) data and the current data set are problematic, data from chipped stone tools and cores, which tend to be larger than ½-inch screen size, should be more appropriate. As summarized above, gunflints dominated the current tool assemblage, comprising 15 of the 30 stone tools. Bifaces of various types that were not classified as gunflints constitutes a second group, accounting for six tools. This group includes the three Guerrero points. Finally, nine tools are expedient or minimally retouched. Surprisingly, given that core reduction attributes dominate the debitage, there are no cores in the most recent sample. Fox (1979:30-31) reports 21 cores from previous excavations at Mission San Juan. In addition, Fox (1979) notes the recovery of 24 bifaces and 44 gunflints in these earlier excavations. While the number of items recovered clearly is a function of the amount of excavation, ratios between the various types should be broadly consistent if past behavior of use and disposal, post-depositional factors, and recovery methods are consistent. However, ratios between gunflints and other bifaces are significantly higher in the more recent material than in the previous excavations. There are 2.5 gunflints for every "other biface" in the current San Juan sample. Data from Fox (1979) shows that this ratio is 1.83 for earlier work at San Juan, 1.6 for the combined collections from Mission San José and Mission San Antonio

de Valero, and only 0.3 for Mission Concepción. Similarly, the lack of cores in the current assemblage is not consistent with earlier work. The ratios of gunflints to cores, for example, at the earlier excavations for all four mission considered by Fox (1979) is 1.73 to 1 (71 gunflints and 41 cores).

The current San Juan chipped stone tool sample, then, seems skewed towards higher frequencies of gunflints and lower frequencies of other bifacial tools and cores. Assuming broadly similar recovery patterns, post depositional processes, and classification schemes, these differing ratios suggest that the current chipped stone tool sample reflects different activities relative to other mission samples. The relatively high occurrence of gunflints and low frequencies of other bifaces and cores may reflect temporal differences consistent with a low contribution of prehistoric material in this particular assemblage. The gunflints, the glass projectile point, and the two stone Guerrero points are likely associated with the proto-historic and early historic occupations rather than a prehistoric occupation. While we do have a single Late Prehistoric radiocarbon date on a bison (see Appendix 1), most of the remaining dates suggest that the faunal material was primarily generated in the 1800s and the early 1900s. These dates are from a variety of contexts and depths. While these faunal dates do not necessarily date the chipped stone, the 1800s and early 1900s was not a period when occupants would have produced lithic tools.

The possibility that the contributions of prehistoric material in this sample are low relative to previous excavations is also consistent with the low density of debitage recovered in this recent work at the site. While the variable screening and lack of detailed mapping precludes the use of the section data in this consideration, roughly 16 $m^3$ of fill were removed and screened though ¼-inch mesh in the 14 1-x-1 m test units. This produced 70 pieces of debitage, or an average recovery of only 4.3 pieces of debitage per cubic meter of screened material. For comparison, CAR excavated 14 1-x-1 m units at the Granberg site (41XBX17/271) in Bexar County (Munoz et al. 2011). We screened slightly more soil (17 $m^3$) though ¼-inch mesh, recovering 12,118 pieces of debitage (ca. 713 items/$m^3$). While the Granberg site was clearly occupied for a significantly longer period, density figures in excess of several hundred pieces of chipped stone per cubic meter on prehistoric sites are common in this region (see Ahr et al. 2013; Munoz 2014), but densities of 4.3 pieces per cubic meter are not. These low debitage densities at San Juan are consistent with little contribution from prehistoric occupations in this assemblage.

# Chapter 10: Vertebrate Faunal Remains

*Lynn K. Wack*

The bone specimens sampled for this analysis come from Phase 1, Test Units 9 and 10, and Phase 3, Sections B-H and J. Only a subsample of the bone from Sections D, E, H, and J were analyzed. The general goals of this study were to discern the mission period diet, exploitation strategies, and the use of domesticated resources versus wild resources.

## Methods

In the laboratory all bone was washed, dried, and bagged by section or unit and level. Bone that was too fragmented to be identified was excluded from this study. The bone selected for analysis was identified to the most specific taxon possible with the aid of the comparative collection housed at the CAR and reference texts (Adams and Crabtree 2012; Balkwill and Cumbaa 1992; Boessneck 1970; Gilbert 1990; Hildebrand 1955). Identification of the bone specimens was conservative. Cattle-size bone was not classified as *Bos taurus* unless it could be distinguished from *Bison* and *Equus* species. When bone could only be identified by class (such as mammal or bird), the size of the animal was estimated. Elements, portions of elements, and sides (left or right) were recorded whenever possible. When an element could be identified to the species level, measurements were recorded in order to determine the age and sex of the bone specimens. Element data can provide information about the type of assemblage that was deposited (Webber et al. 2002). Additionally, this data can provide information about butchery practices. The absence of leg, feet, rib, and vertebrate elements suggests that bone grease was rendered. A comparison of elemental data types can indicate differences in the way animals may have been used or perceived. For instance, this type of data can help distinguish commensal taxa, which are taxa that are found in close association with humans but are not used as food, from taxa used as food (Webber et al. 2002:276). Since they are not used for dietary purposes, the skeletons of commensal taxa tend to be more complete than those of taxa used as food.

Epiphyseal attributes were recorded to provide further age range estimates. Age at death indicated by size and the fusion of epiphyseal pieces can provide information about animal husbandry or hunting practices. Since the epiphyseal pieces of mammals usually do not fuse until adulthood, high numbers of epiphyseal pieces that are not fused usually indicate animal husbandry that involves the killing of juveniles, usually males, to control the population. A comparison of the number of fused and unfused elements of domesticates with the number of fused and unfused elements of wild species is generally used to determine how fully husbandry practices were adopted (Reitz et al. 2010). This type of comparison is also useful in distinguishing differences between the use of domesticated and wild animals.

The Number of Identified Specimens (NISP) or Minimum Number of Individuals (MNI) is generally used to measure the relative abundance of various taxa within a faunal assemblage. Of course, these calculations are not without their limitations (see Grayson 1984). NISP does not consider the degree of bone fragmentation or whether bone attributed to a certain taxa comes from one or multiple animals. MNI calculations are based on the distinguishing of left and right components of the most abundant elements of the species found. Three left radii, for instance, attributed to the same species would indicate three individuals. Grayson (1984) discovered, however, that MNI is subject to variation depending on how the assemblage was aggregated. Rietz and Wing (1999, 2008) found that age and sex determination can also affect MNI counts. Because MNI can be calculated differently, this type of measurement for relative abundance was not used for comparative purposes, but nevertheless, it was calculated for future research purposes.

All bone was weighed. Bone weight is generally a good indicator of relative dietary importance when the assemblage is dominated by mammalian species (Binford 1981; Meissner 1998; Wack and Meissner 2010). However, the relationship between bone weight and amount of meat vary among different taxa. There are also considerable differences among bone weight from one part of the animal to another. The lower legs of cattle, particularly phalange elements, are dense and heavy but carry little meat (Lyman 1994:389; Meissner 1999). The taxa identifiable to the family level that had the highest bone weights were compared with and without phalange elements.

Sample bias caused by assemblages with dramatic size differences can greatly affect the interpretation of relative abundance and importance (Cannon 2001; Grayson 1989; Kintigh 1984; Leonard 1997; McCartney and Glass 1990; Plog and Hegmon 1993; Robertson 1999). A trend regarding these estimations may be assumed to be present when it is not present or vice versa (Cannon 2001). Sample bias can also affect interpretations of modification variation (Grayson 1989). To compensate for sample size differences and possible sample bias, percentages of NISP values for each category of elements were calculated for the San Juan assemblage.

Exposure to heat was noted along with any butcher marks and animal gnawing. When possible, the thickness of hand-sawed or machine-sawed specimens was measured. The thickness of butcher marks can provide further information about the cuts of meat consumed. Thicker hand-sawed specimens may indicate thicker cuts of meat. Finally, post-depositional damages, such as weathering and root etching, were also recorded.

## Analysis Results

A total of 8,375 bone specimens weighing 31,493.20 gm recovered during the San Juan church underpinning project were sampled for this analysis (Table 10-1). Bone count (NISP) from Phase 1 peaked in Levels 2 (19 percent) and 5 (13 percent) of TUs 9 and 10, and bone weight peaked in Levels 6 (18 percent) and 9 (15 percent). Bone was present in Levels 1-16 with 96 percent by count and 99 percent by weight recovered in the top 12 levels (0-122 cmbs). Of the analyzed bone samples, the largest amount of bone recovered during Phase 3 excavations was from Section B (38 percent by count and 42 percent by weight).

As with many other Spanish Colonial Mission assemblages, most bone specimens could not be identified to the genus or even the family level (deFrance 1999, 2000; Meissner 1999; Wack 2011; Wack and Meissner 2010). As Table 10-2 demonstrates, most bone was identified only as very large and large mammals. See Appendix 6 for faunal data including tables presenting NISP for identified specimens by section and test unit.

Among the elements that could be identified to the family level, bovine (cow or bison) dominate the assemblage (39 percent by count and 76 percent by weight; Table 10-3). White-tailed deer (16 percent by count and 12 percent by weight) and *Capra/Ovis* (goat/sheep; 15 percent by count and nine percent by weight) were also present. Bovinae elements continue to dominate the assemblage identified to the family level from Sections B (51 percent by count and 76 percent by weight), C (39 percent by count and 70 percent by weight), and TUs 9 and 10 (44 percent by count and 90 percent by weight; Table 10-4 and see Appendix 6). The most common animal in Section F was goat/sheep by count (32 percent), but bovinae was most common by weight (73 percent). Goat/sheep elements were also dominate in Section G (43 percent by count and 55 percent by weight), but the total NISP in the section was only seven. Only four elements could be identified to the family level in Section E. Each of these elements was associated with different species. One element, *Bos taurus* (cow), was identified to the family level in Section H. The possibility that phalanges among the identified remains may have skewed the relationship between bone weight and meat content could not be overlooked. However, even when these elements are omitted, bovinae still dominates the assemblage identifiable to the family level (Table 10-5).

As noted above, because calculated MNI can vary by analysts depending on the area determined to be related to an individual burial, results are highly variable. For the purpose of this analysis MNI was determined by Section. Test Units 9 and 10 were combined with Section J. It should be noted that the section boundaries are arbitrary, i.e. the scatter from an individual burial may in actuality spread across sections or may have fallen outside the excavation limits. With this caveat, Table 10-6 presents the MNI by elements identified to the species level. Most species did not have MNI counts

Table 10-1. NISP from TUs 9/10 and Sections B-H and J

| Location | | NISP | Weight (gm) |
|---|---|---|---|
| Phase 1 - TU 9/10 Level | 1 | 10 | 24.28 |
| | 2 | 147 | 264.60 |
| | 3 | 90 | 144.40 |
| | 4 | 76 | 244.84 |
| | 5 | 104 | 232.87 |
| | 6 | 89 | 459.76 |
| | 7 | 27 | 156.15 |
| | 8 | 39 | 160.60 |
| | 9 | 83 | 383.67 |
| | 10 | 5 | 11.35 |
| | 11 | 51 | 237.49 |
| | 12 | 40 | 190.97 |
| | 13 | 11 | 13.73 |
| | 14 | 9 | 6.07 |
| | 15 | 6 | 10.23 |
| | 16 | 7 | 0.20 |
| | 17 | 0 | 0.00 |
| | 18 | 0 | 0.00 |
| | **Total** | **794** | **2541.21** |
| Phase 3 - Section | B | 2905 | 12021.97 |
| | C | 1670 | 6878.35 |
| | D | 10 | 26.76 |
| | E | 14 | 107.05 |
| | F | 2182 | 6406.07 |
| | G | 249 | 1211.81 |
| | H | 10 | 54.68 |
| | J | 541 | 2245.30 |
| | **Total** | **7581** | **28951.99** |
| **Grand Total** | | **8375** | **31493.20** |

= TU 9 only, TU 10 terminated in Level 15

Table 10-2. Identification, NISP, and Weight of the Faunal Sample

| Species | Common Name | NISP | Wt. (gm) | % NISP | % Wt. (gm) |
|---|---|---|---|---|---|
| Actinopterygii | Unidentified Boney Fish | 217 | 95.21 | 2.59 | 0.30 |
| *Anas* sp. | Duck | 3 | 3.76 | 0.04 | 0.01 |
| *Apalone spiniferous* | Spiny Softshelled Turtle | 2 | 10.24 | 0.02 | 0.03 |
| *Apalone* sp. (*Trionyx* sp.) | Softshelled Turtle | 6 | 7.44 | 0.07 | 0.02 |
| Artiodactyla | Deer, Sheep, or Goat | 120 | 388.14 | 1.43 | 1.23 |
| Aves-lg. | Chicken-size | 24 | 18.37 | 0.29 | 0.06 |
| Aves--med. | Pigeon-size | 10 | 1.45 | 0.12 | 0.00 |
| Aves--small | Mockingbird-size | 1 | 0.12 | 0.01 | 0.00 |
| *Bison bison* | Bison | 8 | 236.94 | 0.10 | 0.75 |
| *Bos taurus* | Cow | 41 | 2049.47 | 0.49 | 6.51 |
| Bovinae | Cow or Bison | 64 | 1212.42 | 0.76 | 3.85 |
| *Canis familaris* | Domesticated Dog | 1 | 3.12 | 0.01 | 0.01 |
| *Canis latrans* | Coyote | 1 | 5.11 | 0.01 | 0.02 |
| *Canis* sp. | Dog, Coyote, or Wolf | 17 | 17.08 | 0.20 | 0.05 |
| *Capra hircus* | Domesticated Goat | 13 | 140.83 | 0.16 | 0.45 |
| *Capra/Ovis* | Domesticated Goat/Sheep | 8 | 106.54 | 0.10 | 0.34 |
| Carnivora | Carnivores | 15 | 2.42 | 0.18 | 0.01 |
| *Conepatus mesoleucus* | Hog-nosed Skunk | 1 | 0.34 | 0.01 | 0.00 |
| *Crotalus atrox* | Rattlesnake | 3 | 1.38 | 0.04 | 0.00 |
| *Didelphis virginiana* | Opossum | 3 | 2.04 | 0.04 | 0.01 |
| *Equus* sp. | Horse Family | 1 | 9.80 | 0.01 | 0.03 |
| *Felis catus* | Domesticated Cat | 1 | 3.69 | 0.01 | 0.01 |
| Galliformes | Quail, Chicken, or Turkey | 14 | 11.57 | 0.17 | 0.04 |
| *Gallus gallus* | Chicken | 11 | 13.85 | 0.13 | 0.04 |
| *Gopherus* sp. | Tortoises | 1 | 1.39 | 0.01 | 0.00 |
| *Ictalurus* sp. | Freshwater Catfish | 3 | 1.90 | 0.04 | 0.01 |
| *Lepisosteus* sp. | Gar | 6 | 1.05 | 0.07 | 0.00 |
| Mammal--sm. | Rabbit-size | 80 | 27.65 | 0.96 | 0.09 |
| Mammal--med. | Dog-size | 80 | 53.48 | 0.96 | 0.17 |
| Mammal--lg. | Deer-size | 4622 | 7616.59 | 55.19 | 24.18 |
| Mammal--V. lg. | Cow-size | 2604 | 18613.11 | 31.09 | 59.10 |
| *Meleagris gallopavo* | Turkey | 2 | 5.13 | 0.02 | 0.02 |
| *Mephitis mephitis* | Striped Skunk | 3 | 1.53 | 0.04 | 0.00 |
| *Neotoma* sp. | Wood Rat | 3 | 0.70 | 0.04 | 0.00 |
| *Odocoileus virginianus* | White-tailed Deer | 45 | 555.15 | 0.54 | 1.76 |
| *Ovis aries* | Domesticated Sheep | 23 | 161.54 | 0.27 | 0.51 |
| Passeriformes | Perching Bird | 1 | 0.33 | 0.01 | 0.00 |
| *Pecari tajacu* | Peccary | 2 | 12.71 | 0.02 | 0.04 |
| *Pylodictus olivaris* | Bullhead Catfish | 1 | 1.16 | 0.01 | 0.00 |
| *Rattus rattus* | Black Rat | 1 | 0.19 | 0.01 | 0.00 |
| Rodentia | Rodent | 280 | 46.92 | 3.34 | 0.15 |
| *Sciurus* sp. | Squirrel | 5 | 2.27 | 0.06 | 0.01 |
| Serpentes | Snake | 4 | 1.15 | 0.05 | 0.00 |
| *Sigmodon hispidus* | Cotton Rat | 2 | 0.36 | 0.02 | 0.00 |
| *Sus scrofa* | Domestic Pig | 7 | 20.27 | 0.08 | 0.06 |
| Testudines | Turtle | 13 | 20.95 | 0.16 | 0.07 |
| *Urocyon cinereoargenteus* | Grayfox | 2 | 6.34 | 0.02 | 0.02 |
| **Total** | | **8375** | **31493.20** | **100.00** | **100.00** |

Table 10-3. NISP and Weight of Specimens Identified to the Family Level

| Species | Common Name | NISP | Wt. (gm) | % NISP | % Wt. (gm) |
|---|---|---|---|---|---|
| *Anas* sp. | Duck | 3 | 3.76 | 1.03 | 0.08 |
| *Apalone* sp. (*Trionyx* sp.) | Softshelled Turtle | 6 | 7.44 | 2.07 | 0.16 |
| *Apalone spiniferous* | Spiny Softshelled Turtle | 2 | 10.24 | 0.69 | 0.22 |
| *Bison bison* | Bison | 8 | 236.94 | 2.76 | 5.16 |
| *Bos taurus* | Cow | 41 | 2049.47 | 14.14 | 44.59 |
| Bovinae | Cow or Bison | 64 | 1212.42 | 22.07 | 26.38 |
| *Canis familaris* | Domesticated Dog | 1 | 3.12 | 0.34 | 0.07 |
| *Canis latrans* | Coyote | 1 | 5.11 | 0.34 | 0.11 |
| *Canis* sp. | Dog, Coyote, or Wolf | 17 | 17.08 | 5.86 | 0.37 |
| *Capra hircus* | Domesticated Goat | 13 | 140.83 | 4.48 | 3.06 |
| *Capra/Ovis* | Domesticated Goat/Sheep | 8 | 106.54 | 2.76 | 2.32 |
| *Conepatus mesoleucus* | Hog-nosed Skunk | 1 | 0.34 | 0.34 | 0.01 |
| *Crotalus atrox* | Rattlesnake | 3 | 1.38 | 1.03 | 0.03 |
| *Didelphis virginiana* | Opossum | 3 | 2.04 | 1.03 | 0.04 |
| *Equus* sp. | Horse Family | 1 | 9.80 | 0.34 | 0.21 |
| *Felis catus* | Domesticated Cat | 1 | 3.69 | 0.34 | 0.08 |
| *Gallus gallus* | Chicken | 11 | 13.85 | 3.79 | 0.30 |
| *Gopherus* sp. | Tortoises | 1 | 1.39 | 0.34 | 0.03 |
| *Ictalurus* sp. | Freshwater Catfish | 3 | 1.90 | 1.03 | 0.04 |
| *Lepisosteus* sp. | Gar | 6 | 1.05 | 2.07 | 0.02 |
| *Meleagris gallopavo* | Turkey | 2 | 5.13 | 0.69 | 0.11 |
| *Mephitis mephitis* | Striped Skunk | 3 | 1.53 | 1.03 | 0.03 |
| *Neotoma* sp. | Wood Rat | 3 | 0.70 | 1.03 | 0.02 |
| *Odocoileus virginianus* | White-tailed Deer | 45 | 555.15 | 15.52 | 12.08 |
| *Ovis aries* | Domesticated Sheep | 23 | 161.54 | 7.93 | 3.51 |
| *Pecari tajacu* | Peccary | 2 | 12.71 | 0.69 | 0.28 |
| *Pylodictus olivaris* | Bullhead Catfish | 1 | 1.16 | 0.34 | 0.03 |
| *Rattus rattus* | Black Rat | 1 | 0.19 | 0.34 | 0.00 |
| *Sciurus* sp. | Squirrel | 5 | 2.27 | 1.72 | 0.05 |
| *Sigmodon hispidus* | Cotton Rat | 2 | 0.36 | 0.69 | 0.01 |
| *Sus scrofa* | Domestic Pig | 7 | 20.27 | 2.41 | 0.44 |
| *Urocyon cinereoargenteus* | Grayfox | 2 | 6.34 | 0.69 | 0.14 |
| **Total** | | **290** | **4595.74** | **100** | **100** |

Table 10-4. Percent NISP and Weight of Specimens Grouped by Common Name

| Location | | n | Common Name | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Cow or Bison | White-tailed Deer | Domesticated Goat or Sheep | Dog, Coyote, or Wolf | Chicken/ Duck/ Turkey | Turtle/ Tortoise/ Fish | Domestic Pig |
| | | | NISP % | | | | | | |
| Section | B | 85 | **51** | 22 | 15 | 1 | 1 | 2 | 2 |
| | C | 70 | **39** | 20 | 13 | 1 | 9 | 4 | 1 |
| | E | 4 | 25 | 0 | 25 | 25 | 0 | 0 | 0 |
| | F | 38 | 21 | 8 | **32** | 21 | 8 | 3 | 0 |
| | G | 7 | 14 | 14 | **43** | 0 | 14 | 14 | 0 |
| | H | 1 | 100 | 0 | 0 | 0 | 0 | 0 | 0 |
| | J | 28 | 25 | 11 | 7 | 14 | 11 | **29** | 0 |
| Test Unit | 9/10 | 57 | **44** | 9 | 7 | 7 | 4 | 7 | 7 |
| | | | Weight (gm) % | | | | | | |
| Section | B | 85 | **76** | 16 | 6 | 0 | 0 | 0 | 0 |
| | C | 70 | **70** | 15 | 11 | 0 | 1 | 0 | 0 |
| | E | 4 | 44 | 0 | 51 | 5 | 0 | 0 | 0 |
| | F | 38 | **73** | 4 | 17 | 3 | 1 | 0 | 0 |
| | G | 7 | 21 | 8 | **55** | 0 | 1 | 5 | 0 |
| | H | 1 | 100 | 0 | 0 | 0 | 0 | 0 | 0 |
| | J | 28 | **64** | 16 | 15 | 2 | 2 | 1 | 0 |
| Test Unit | 9/10 | 57 | **90** | 5 | 1 | 0 | 0 | 1 | 1 |

Table 10-5. Weight of Most Common Elements, Excluding Phalanges, Identified to the Family Level

| Species | Common Name | Wt. (gm) | % Wt. (gm) | Wt. w/o Phalanges | % Wt. w/o Phalanges |
|---|---|---|---|---|---|
| *Bison bison* | Bison | 236.94 | 5.16 | 164.13 | 3.77 |
| *Bos taurus* | Cow | 2049.47 | 44.59 | 1669.55 | 40.24 |
| Bovinae | Cow or Bison | 1212.42 | 26.38 | 1144.86 | 29.64 |
| *Capra hircus* | Domesticated Goat | 140.83 | 3.06 | 133.77 | 3.53 |
| *Capra/Ovis* | Domesticated Goat/Sheep | 106.54 | 2.32 | 101.05 | 2.71 |
| *Gallus gallus* | Chicken | 13.85 | 0.30 | 13.85 | 0.37 |
| *Odocoileus virginianus* | White-tailed Deer | 555.15 | 12.08 | 486.35 | 12.79 |
| *Ovis aries* | Domesticated Sheep | 161.54 | 3.51 | 155.41 | 3.89 |
| *Pecari tajacu* | Peccary | 12.71 | 0.28 | 12.71 | 0.34 |
| *Sus scrofa* | Domestic Pig | 20.27 | 0.44 | 20.27 | 0.54 |
| **Total** | | **4509.72** | **98.12** | **3902** | **97.82** |

Table 10-6. MNI for Identifiable Specimens by Section

| Species | Common Name | Section | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | | B | C | E | F | G | H | J, TU9, and 10 | |
| *Anas* sp. | Duck | 0 | 1 | 0 | 1 | 0 | 0 | 1 | **3** |
| *Apalone* sp. (*Trionyx* sp.) | Softshelled Turtle | 0 | 1 | 0 | 1 | 1 | 0 | 1 | **4** |
| *Apalone spiniferous* | Spiny Softshelled Turtle | 0 | 1 | 0 | 0 | 0 | 0 | 1 | **2** |
| *Bison bison* | Bison | 1 | 0 | 0 | 1 | 0 | 0 | 1 | **3** |
| *Bos taurus* | Cow | 1 | 1 | 0 | 1 | 0 | 1 | 1 | **5** |
| *Canis familaris* | Domesticated Dog | 0 | 0 | 0 | 1 | 0 | 0 | 0 | **1** |
| *Canis latrans* | Coyote | 0 | 0 | 0 | 0 | 0 | 0 | 1 | **1** |
| *Capra hircus* | Domesticated Goat | 1 | 1 | 0 | 0 | 1 | 0 | 1 | **4** |
| *Conepatus mesoleucus* | Hog-nosed Skunk | 0 | 0 | 0 | 0 | 0 | 0 | 1 | **1** |
| *Crotalus atrox* | Rattlesnake | 0 | 1 | 0 | 0 | 0 | 0 | 1 | **2** |
| *Didelphis virginiana* | Opossum | 1 | 1 | 0 | 0 | 0 | 0 | 0 | **2** |
| *Equus* sp. | Horse Family | 0 | 1 | 0 | 0 | 0 | 0 | 0 | **1** |
| *Felis catus* | Domesticated Cat | 0 | 0 | 0 | 1 | 0 | 0 | 0 | **1** |
| *Gallus gallus* | Chicken | 1 | 1 | 0 | 1 | 1 | 0 | 1 | **5** |
| *Gopherus* sp. | Tortoises | 0 | 0 | 0 | 0 | 0 | 0 | 1 | **1** |
| *Ictalurus* sp. | Freshwater Catfish | 1 | 1 | 0 | 0 | 0 | 0 | 1 | **3** |
| *Lepisosteus* sp. | Gar | 0 | 0 | 0 | 0 | 0 | 0 | 1 | **1** |
| *Meleagris gallopavo* | Turkey | 0 | 0 | 0 | 0 | 0 | 0 | 1 | **1** |
| *Mephitis mephitis* | Striped Skunk | 1 | 0 | 0 | 0 | 0 | 0 | 1 | **2** |
| *Neotoma* sp. | Wood Rat | 0 | 2 | 1 | 0 | 0 | 0 | 0 | **3** |
| *Odocoileus virginianus* | White-tailed Deer | 3 | 3 | 0 | 1 | 1 | 0 | 1 | **9** |
| *Ovis aries* | Domesticated Sheep | 1 | 1 | 1 | 1 | 1 | 0 | 1 | **6** |
| *Pecari tajacu* | Peccary | 0 | 1 | 0 | 0 | 0 | 0 | 1 | **2** |
| *Pylodictus olivaris* | Bullhead Catfish | 1 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| *Rattus rattus* | Black Rat | 0 | 0 | 0 | 0 | 0 | 0 | 1 | **1** |
| *Sciurus* sp. | Squirrel | 1 | 1 | 0 | 0 | 0 | 0 | 1 | **3** |
| *Sigmodon hispidus* | Cotton Rat | 0 | 1 | 0 | 0 | 0 | 0 | 1 | **2** |
| *Sus scrofa* | Domestic Pig | 1 | 1 | 0 | 0 | 0 | 0 | 1 | **3** |
| *Urocyon cinereoargenteus* | Grayfox | 0 | 0 | 0 | 1 | 0 | 0 | 0 | **1** |
| **Total** | | **14** | **20** | **2** | **10** | **5** | **1** | **22** | **74** |

greater than three. *Ovis aries* (domesticated sheep, MNI=6) and *Odocoileus virginianus* (white-tailed deer, MNI=9) were the cases with MNIs greater than five.

Only a small number (6.2 percent) of the identified bone specimens had epiphyseal attributes (Table 10-7). Most of these specimens (54 percent) could only be identified as large and very large mammals. Most of the identified domesticate specimens, i.e. *Bos taurus*, *Capra hircus*, *Capra/Ovis*, *Gallus gallus*, *Ovis aries*, and *Sus scrofa*, with epiphyseal attributes (n=64) contained epiphyseal ends that were fused with no lines visible (81 percent) as did most wild specimens that were likely used for meat (n=40), i.e. *Bison bison*, *Gopherus* sp., *Meleagris gallopavo*, *Odocoileus virginianus*, and *Pecari tajacu* (83 percent). Of the 299 specimens only identified as mammals, 269 (90 percent) contained epiphyseal ends with no fusion. A combination of the domesticated and wild specimens (n=384) suggests that the majority of the sample (68 percent) was made up of young animals with no evidence of epiphyseal fusion.

Table 10-7. Epiphyseal Attribute Frequency by Species

| Species | Stage of Fusion | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Deciduous | | Line heavily visible | | Line visible | | Line slightly visible | | No line visible | | No fusion | |
| | NISP | % NISP | NISP | % NISP | NISP | % NISP | NISP | % NISP | NISP | % NISP | NISP | % NISP |
| Artiodactyla | 1 | 0.01 | 1 | 0.01 | 0 | 0.00 | 0 | 0.00 | 10 | 0.12 | 22 | 0.26 |
| *Bison bison* | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 5 | 0.06 | 0 | 0.00 |
| *Bos taurus* | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 27 | 0.32 | 3 | 0.04 |
| Bovinae | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 6 | 0.07 | 8 | 0.10 |
| *Canis latrans* | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.01 | 0 | 0.00 |
| *Canis* sp. | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 5 | 0.06 | 1 | 0.01 |
| *Capra hircus* | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 7 | 0.08 | 1 | 0.01 |
| *Capra/Ovis* | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.01 | 3 | 0.04 | 1 | 0.01 |
| *Didelphis virginiana* | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 2 | 0.02 | 0 | 0.00 |
| Galliformes | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 2 | 0.02 | 0 | 0.00 |
| *Gallus gallus* | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 4 | 0.05 | 0 | 0.00 |
| *Gopherus* sp. | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.01 | 0 | 0.00 |
| Mammal--sm. | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.01 | 9 | 0.11 |
| Mammal--med. | 0 | 0.00 | 0 | 0.00 | 1 | 0.01 | 0 | 0.00 | 0 | 0.00 | 8 | 0.10 |
| Mammal--lg. | 0 | 0.00 | 1 | 0.01 | 0 | 0.00 | 2 | 0.02 | 9 | 0.11 | 127 | 1.52 |
| Mammal--V. lg. | 1 | 0.01 | 1 | 0.01 | 0 | 0.00 | 0 | 0.00 | 14 | 0.17 | 125 | 1.49 |
| *Meleagris gallopavo* | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.01 | 0 | 0.00 |
| *Mephitis mephitis* | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.01 | 0 | 0.00 |
| *Odocoileus virginianus* | 0 | 0.00 | 0 | 0.00 | 1 | 0.01 | 1 | 0.01 | 25 | 0.30 | 5 | 0.06 |
| *Ovis aries* | 0 | 0.00 | 1 | 0.01 | 0 | 0.00 | 1 | 0.01 | 11 | 0.13 | 1 | 0.01 |
| *Pecari tajacu* | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.01 | 0 | 0.00 |
| *Rattus rattus* | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.01 | 0 | 0.00 |
| Rodentia | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 10 | 0.12 | 46 | 0.55 |
| *Sciurus* sp. | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.01 | 2 | 0.02 |
| *Sus scrofa* | 3 | 0.04 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| **Total** | **5** | **0.06** | **4** | **0.05** | **2** | **0.02** | **5** | **0.05** | **148** | **1.77** | **359** | **4.29** |

## Meat Consumption from Domesticated and Wild Species

One of the goals of this research is to compare the use of domesticated resources with the use of wild resources. To do this, the types of elements found among domesticated animals were compared to the types of elements found among wild animals. Most of the *Bos taurus* (cow) specimens were feet elements (Table 10-8). Over half of the feet elements identified were phalanges. Lower leg specimens include an ulna, a fused radius/ulna fragment, and a tibia fragment. Upper leg elements consisted of a humerus fragment and femur fragment. One mandible fragment was the only head element, and one thoracic vertebrate element was the only body element identified as *Bos taurus*. For specimens identified as Bovinae, feet and head elements were the most common. Phalanges were the most common type of feet elements, and teeth were the most common head elements. Body elements included one rib and two caudal vertebrae, upper leg elements consisted of one humerus and two femora, and lower legs elements included an ulna fragment and a tibia fragment.

Sixty-eight percent of the goat/sheep bones were identified as feet elements with mostly metapoidial elements for *Capra hircus* and *Capra/Ovis* and phalanges for *Ovis aries*. The only body element was a goat scapula fragment. The upper legs were represented by humerus fragments (two goat, two sheep, and one goat/sheep), and the lower legs included one goat ulna fragment, one goat tibia fragment, and six sheep radius fragments.

Seven recovered elements were identified as *Sus scrofa* (domesticated pig), including four from the head, mainly teeth, two rib fragments, and one ulna fragment. In all, there were too few elements to discern a clear pattern of element representation or skeletal completeness for recovered domesticated animals, i.e. cow, goat/sheep, and pig.

Eighty-eight percent of the Bison bison specimens were feet elements (see Table 10-8). Over half of the feet elements identified were phalanges. One lower leg specimen, a radius, was recovered. Feet elements, including phalanges, carpals, tarsals, and metapodials, were also the most common elements identified as *Odocoileus virginianus* (white-tailed deer). An antler fragment was the only identified head element. Four radius fragments, two ulna fragments, and three tibia fragments were identified as lower leg elements, and one humerus fragment was the only upper leg fragment. As with the domesticate species, there were not enough wild faunal elements to distinguish a clear pattern of element representation or skeletal completeness.

The low counts of elements identified as body or head does not necessarily mean that these elements were not used at the mission. A review of large and very large mammal elements indicates that of the 433 specimens, 22 percent were from the mammals' heads and 65 percent were from the bodies (see Table 10-8). Head elements, e.g. teeth, and body elements, e.g. ribs, usually could not be identified by species. Consequently, a comparison of meat consumption from domesticated and wild animals was not possible for the analyzed San Juan sample.

## Bone Processing

Approximately five percent of the analyzed bone specimens contained evidence of butchering. Some of the elements contained multiple types of butcher modifications (Table

Table 10-8. NISP of Element Types for Domesticated and Wild Species

| Species | Common Name | Head | Body | Upper Leg | Lower Leg | Feet | Total |
|---|---|---|---|---|---|---|---|
| *Sus scrofa* | Domestic Pig | 4 | 2 | 0 | 1 | 0 | **7** |
| *Capra hircus* | Domesticated Goat | 0 | 1 | 2 | 2 | 8 | **13** |
| *Capra/Ovis* | Domesticated Goat/Sheep | 0 | 0 | 1 | 0 | 7 | **8** |
| *Ovis aries* | Domesticated Sheep | 0 | 0 | 2 | 6 | 15 | **23** |
| *Bos taurus* | Cow | 1 | 1 | 2 | 3 | 34 | **41** |
| Bovinae | Cow or Bison | 24 | 3 | 3 | 2 | 32 | **64** |
| *Bison bison* | Bison | 0 | 0 | 0 | 1 | 7 | **8** |
| *Odocoileus virginianus* | White-tailed Deer | 1 | 0 | 1 | 9 | 34 | **45** |
| Mammal--lg. | Deer-size | 39 | 149 | 9 | 5 | 6 | **208** |
| Mammal--V. lg. | Cow-size | 55 | 132 | 8 | 11 | 19 | **225** |
| **Total** | | **124** | **288** | **28** | **40** | **162** | **642** |

10-9). Butcher marks include chops, cuts, fractures, punctures, hand-saw marks, and machine-saw marks. Two elements had indications of machine-sawing suggesting they were deposited after the 1850s. When sorted by location, approximately 3-29 percent of bone specimens had butcher marks (Table 10-10). Appendix 6 presents tables containing butcher data by species and element.

The thickness of hand-sawed specimens ranged from 7.09 to 37.67 mm (Table 10-11). Thickness was measured on elements with two cuts, that is if one end of the element was intact, e.g. an articular surface, or was fractured the element was not included in the thickness sample. Very large mammals had the thickest hand-sawed elements with a mean of 17.72 mm. The one hand-sawed white-tailed deer element was thicker

Table 10-9. Frequency of Bone Evidence of Butchery

| **Modifications** | **NISP** | **% NISP** |
|---|---|---|
| 1 Chop | 44 | 0.53 |
| 1 Chop, 1 Deep Cut | 4 | 0.05 |
| 1 Chop, 1 Fracture | 1 | 0.01 |
| 1 Chop, 1 Shallow Cut | 3 | 0.04 |
| 1 Chop, 2 Deep Cut, 9 Shallow Cut | 1 | 0.01 |
| 1 Chop, 2 Shallow Cut | 1 | 0.01 |
| 1 Chop, 3 Deep Cut | 1 | 0.01 |
| 1 Chop, 3 Shallow Cut | 1 | 0.01 |
| 1 Cleaver Chop | 1 | 0.01 |
| 1 Deep Cut | 25 | 0.30 |
| 1 Deep Cut, 1 Handsaw | 1 | 0.01 |
| 1 Deep Cut, 1 Handsaw, 1 Shallow Cut | 1 | 0.01 |
| 1 Deep Cut, 1 Shallow Cut | 4 | 0.05 |
| 1 Deep Cut, 2 Shallow Cut | 1 | 0.01 |
| 1 Fractured | 161 | 1.92 |
| 1 Fractured, 1 Shallow Cut | 3 | 0.04 |
| 1 Fractured, 3 Shallow Cut | 1 | 0.01 |
| 1 Handsaw | 90 | 1.07 |
| 1 Puncture | 1 | 0.01 |
| 1 Shallow Cut | 33 | 0.39 |
| 11 Deep Cut | 1 | 0.01 |
| 2 Chop | 1 | 0.01 |
| 2 Deep Cut | 2 | 0.02 |
| 3 Chop | 1 | 0.01 |
| 3 Deep Cut | 1 | 0.01 |
| 3 Shallow Cut | 6 | 0.07 |
| 4 Shallow Cut | 4 | 0.05 |
| 5 Deep Cut | 1 | 0.01 |
| 5 Shallow Cut | 2 | 0.02 |
| 1 Deep Cut, 1 Fracture | 1 | 0.01 |
| 1 Handsaw, 1 Shallow Cut | 1 | 0.01 |
| 1 Machine saw | 1 | 0.01 |
| 1 Machine saw, 1 Fracture | 1 | 0.01 |
| 2 Chop, 1 Shallow Cut | 1 | 0.01 |
| 2 Shallow Cut | 2 | 0.02 |
| 4 Deep Cut | 1 | 0.01 |
| **Total** | **405** | **4.84** |

Table 10-10. Bone Specimens with Butcher Modifications by Location

| Location | NISP Butchered | Total NISP | % Butchered |
|---|---|---|---|
| Section B | 86 | 2905 | 2.96 |
| Section C | 113 | 1670 | 6.77 |
| Section D | 0 | 10 | 0.00 |
| Section E | 4 | 14 | 28.57 |
| Section F | 70 | 2182 | 3.21 |
| Section G | 6 | 249 | 2.41 |
| Section H | 1 | 10 | 10.00 |
| Section J | 26 | 541 | 4.81 |
| Test Unit 9/10 | 99 | 794 | 12.47 |
| **Total** | **405** | **8375** | **4.84** |

Table 10-11. Thickness (mm) of Hand-sawed Bone Specimens

| Animal | n | Mean | Minimum | Maximum |
|---|---|---|---|---|
| Artiodactyla | 1 | 10.89 | 10.89 | 10.89 |
| Mammal--lg. | 35 | 11.52 | 7.09 | 25.63 |
| Mammal--V. lg. | 48 | 17.72 | 8.22 | 37.67 |
| *Odocoileus virginianus* | 1 | 28.95 | 28.95 | 28.95 |
| *Ovis aries* | 1 | 17.32 | 17.32 | 17.32 |

(28.95 mm) than the large mammals' mean (11.52 mm) and maximum measurement (25.63 mm). The large mammal category includes specimens that are deer-size. Both the sheep element (17.32 mm) and the Artiodactyla (10.89 mm) fall in the large mammal range.

Most specimens from the analysis showed no evidence of burning. Burned elements (n=383) made up 4.6 percent of the San Juan faunal sample (Table 10-12). Of the 383, 227 (59 percent) were recovered from Section F, located on the west side of the church. Large mammals and very large mammals accounted for 52 percent and 44 percent of the 227, respectively.

## Taphonomy

Seventy-nine specimens from the mission were too burned to determine weathering stage. Table 10-13 describes the weathering stages (Andrews 1990; Behrensmeyer 1978) used to describe the faunal assemblage at Mission San Juan. Ninety-nine percent of the analyzed bone contained some degree of weathering (Table 10-14). Most of the bone (93 percent) showed a low to moderate degree of weathering (Stages 1-3). A high degree was noted on 564 elements (seven percent). Root etching was noted on two percent of the 8,375 analyzed elements.

Animal gnawing was evident on 73 elements (0.9 percent). Of the 73, carnivore tooth marks were noted on 14 (19 percent) and rodent tooth marks on 59 (81 percent; Table 10-15). Rarity of animal gnawing indicates that a high percentage of the bone was rendered or cooked in a way that made it unappealing to animals, that the bone was buried immediately after disposal, or both (Meissner 1999).

## Faunal Diet

An analysis of bone from 41 faunal elements, including 5 bison, 8 cows, 4 goats, 5 sheep, 4 chickens, 1 wild turkey, 5 deer, 3 pigs, 4 turtles, and 2 catfish, was completed to determine the stable carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) ratios in bone collagen and the stable carbon ($\delta^{13}C$) ratios in bone carbonate. The carbon and nitrogen isotopic ratios in faunal bone are related to the animals' diets and provide data on the type of vegetation consumed (Ambrose 1991; Cormie and Schwarcz 1996; DeNiro and Epstein 1978; Tykot 2004). A detailed description of the analysis and results is presented in Appendix 7.

All but two of the 41 samples, one cow and one chicken, resulted in good recovery and C:N ratios, indicating that the bone collagen was of good quality, i.e. not contaminated or degraded (Ambrose and Norr 1992; DeNiro 1985; Van Klinken

Table 10-12. Frequency of Burned Specimens by Location

| Location | Artiodactyla | | Bovinae | | Mammal--lg | | Mammal--V. lg | | Actinopterygii | | Capra/Ovis | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NISP | % NISP | NISP | % NISP | NISP | % NISP | NISP | % NISP | NISP | % NISP | NISP | % NISP | NISP | % NISP |
| Section B | 1 | 0.01 | 3 | 0.04 | 31 | 0.37 | 43 | 0.51 | 0 | 0.00 | 0 | 0.00 | **78** | **0.93** |
| Section C | 1 | 0.01 | 0 | 0.00 | 19 | 0.23 | 18 | 0.21 | 0 | 0.00 | 0 | 0.00 | 38 | 0.45 |
| Section F | 5 | 0.06 | 1 | 0.01 | 119 | 1.42 | 99 | 1.18 | 1 | 0.01 | 2 | 0.02 | **227** | **2.71** |
| Section G | 0 | 0.00 | 0 | 0.00 | 4 | 0.05 | 1 | 0.01 | 0 | 0.00 | 0 | 0.00 | **5** | **0.06** |
| Section J | 0 | 0.00 | 0 | 0.00 | 3 | 0.04 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | **3** | **0.04** |
| Test Unit 9/10 | 0 | 0.00 | 0 | 0.00 | 20 | 0.24 | 12 | 0.14 | 0 | 0.00 | 0 | 0.00 | **32** | **0.38** |
| **Total** | **7** | **0.08** | **4** | **0.05** | **196** | **2.34** | **173** | **2.07** | **1** | **0.01** | **2** | **0.02** | **383** | **4.57** |

Table 10-13. Weathering Stages of Faunal Bone (Andrews 1990; Behrensmeyer 1978)

| Stage | Description |
|---|---|
| **0** | Bone shows no sign of weathering, no modification. |
| **1** | For the large animals, bone shows some longitudinal cracking. Articular surfaces may show mosaic cracking. For small animals there is some slight splitting of bone parallel to the fiber structure. Teeth may be splitting and chipped. |
| **2** | For the large animals, bone shows some flaking, usually associated with cracks. Initially these flakes are long and thin with one or more sides still attached to the bone. Deeper flakes follow until most of the outermost portion of the bone is gone. Cross sections of crack edges are also usually angular. For the small animal, more splitting but little flaking is observed. Chipping and splitting on teeth continue. Parts of the crown are lost. |
| **3** | For the large animals, rough patches emerge on the bone surface leaving a fibrous texture. Cross sections of crack edges are usually rounded. For the small animal, there is deep splitting and some flakes between splits. There is extensive splitting of teeth. |
| **4** | For large animals, bone surface is fibrous and rough in texture. Large and small splinters emerge. Splinters may be loose enough to fall away. Cracks are open and have splintered or rounded edges. |
| **5** | For large animals, bone is falling apart in situ. The original bone shape may be indistinguishable. Cancellous bone is usually exposed. |

Table 10-14. Weathering Stage (Andrews 1990; Behrensmeyer 1978) and Frequency of Root Etching by Location

| Location | Root Etching | | Burned | Weathering Stage | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | | 0 | 1 | 2 | 3 | 4 | 5 | 7 | |
| Section B | 50 | 0.60 | 13 | 6 | 400 | 999 | 1226 | 260 | 0 | 1 | **2905** |
| Section C | 58 | 0.69 | 7 | 17 | 481 | 518 | 486 | 160 | 1 | 0 | **1670** |
| Section D | 1 | 0.01 | 0 | 1 | 1 | 4 | 4 | 0 | 0 | 0 | **10** |
| Section E | 2 | 0.02 | 0 | 1 | 6 | 4 | 3 | 0 | 0 | 0 | **14** |
| Section F | 31 | 0.37 | 40 | 4 | 614 | 1264 | 229 | 31 | 0 | 0 | **2182** |
| Section G | 3 | 0.04 | 0 | 0 | 21 | 69 | 147 | 12 | 0 | 0 | **249** |
| Section H | 3 | 0.04 | 0 | 0 | 1 | 1 | 3 | 5 | 0 | 0 | **10** |
| Section J | 41 | 0.49 | 0 | 6 | 114 | 169 | 178 | 74 | 0 | 0 | **541** |
| Test Unit 9/10 | 9 | 0.11 | 19 | 10 | 374 | 320 | 51 | 20 | 0 | 0 | **794** |
| **Total** | **198** | **2.36** | **79** | **45** | **2012** | **3348** | **2327** | **562** | **1** | **1** | **8375** |

Table 10-15. Frequency of Specimens Containing Signs of Animal Gnawing by Location

| Species | Carnivore | | Rodent | |
|---|---|---|---|---|
| | NISP | % NISP | NISP | % NISP |
| Artiodactyla | 1 | 0.01 | 5 | 0.06 |
| Mammal--med | 0 | 0.00 | 1 | 0.01 |
| Mammal--lg | 4 | 0.05 | 7 | 0.08 |
| Mammal--V. lg | 7 | 0.08 | 12 | 0.14 |
| *Bos taurus* | 1 | 0.01 | 9 | 0.11 |
| Bovinae | 0 | 0.00 | 10 | 0.12 |
| *Capra hircus* | 1 | 0.01 | 1 | 0.01 |
| *Capra/Ovis* | 0 | 0.00 | 4 | 0.05 |
| *Ovis aries* | 0 | 0.00 | 3 | 0.04 |
| *Odocoileus virginianus* | 0 | 0.00 | 6 | 0.07 |
| *Bison bison* | 0 | 0.00 | 1 | 0.01 |
| **Total** | **14** | **0.17** | **59** | **0.70** |

1999). With the exception of chickens, pigs, and turkey, the isotope results indicate that the San Juan fauna were herbivores obtaining their protein and non-protein from the same source (Froehle et al. 2010; Kellner and Schoeninger 2007). Deer, goats/sheep, turkeys, and turtles ate a diet based on $C_3$ plants, while cows and bison relied on $C_4$ dietary sources, most likely corn. Catfish appeared to subsist off $C_4$ resources, and chickens ate a diet of $C_4$/marine foods. Two pigs, that appear to be the same animal, had a $C_4$ total diet, whereas the third pig ate $C_3$ protein with a mix of $C_3/C_4$ non-protein.

## Discussion

Thirty-one kilograms of faunal bone representing at least 74 individual animals were analyzed from the excavations around the foundation of Room 17. The bone from this assemblage was recovered in mixed context with dates from 8 of 9 radiocarbon samples ranging from AD 1800 to the 1930s and one sample, a bison, from AD 1453-1633 (see Appendix 1). The samples were pulled from the upper and lower levels of the excavations. A comparison of the dates suggests that the lower samples are identical to or younger in age than the upper samples. These results suggest considerable mixing of deposits. The absence of machine-sawed bone within most of the assemblage suggests that the majority of the taxa used for food were butchered before the mid-nineteenth century or that butchering at the mission was continued by hand after machine technology became available.

The proportion of domesticated versus wild fauna in this collection is similar to other Colonial period and historic sites in South Texas. Domesticates, such as cattle, chicken, and sheep, are the most abundant elements identified to the family, genus, or species level suggesting domesticated animals were relied on more often than wild resources. As in other Colonial and Post-Colonial assemblages, cattle were the most commonly identified animals at San Juan. The largest meat contribution from non-domesticated mammals was from white-tailed deer. The use of wild resources appears to have slightly increased towards the end of mission occupation at Mission Refugio (41RF1; Webber et al. 2002) and at Missions Nuestra Senora del Rosario (41GD1), Espiritu Santo de Zuniga (41GD1), and Espiritu Santo de Zuniga (41VT11; deFrance 1999).

Because counts of burned bone are low in the assemblage, it appears that burning was not a common disposal practice for bone. The presence of weathered, animal-gnawed, and root-etched bone suggests the bone was instead deposited in an open midden. This disposal method is common among Colonial and Post-Colonial assemblages.

Like many other Colonial and Post-Colonial assemblages, the San Juan assemblage was highly fragmented. A highly fragmented assemblage may indicate a high level of dietary stress (Thompson et al. 2012). Long bones may have been shattered for marrow extraction or to be boiled for bone grease. The numbers of large and very large mammal bone fragments suggest that bone marrow extraction may have been practiced. Bone grease rendering involves breaking the bones into small fingernail-size pieces and boiling the bone for an extended period of time (Vehik 1977:171). If bone grease was rendered, there should be an absence of leg, feet, rib, and vertebrae elements, excepting, perhaps, articular ends (Vehik 1977). Given the low counts and fragmented condition of leg, vertebrae, and rib elements, bone grease extraction may have been practiced; however, complete or almost complete feet elements made up the majority of the identifiable elements in the assemblage. Thus, if bone grease was being rendered, it was not done so consistently. Trampling of bone probably caused some of the fragmentation of this collection. The assemblage is dominated by large and very large mammals, which would not be expected if the inhabitants of Mission San Juan experienced dietary stress. The high counts of feet elements, large, and very large mammals, and the possibility of trampling suggests that the high fragmentation rate does not represent dietary stress at the mission.

Similar counts of lower limb and feet elements among domesticated and wild animals suggest similar butchery practices. A review of epiphyseal fusion indicates that the majority of both the wild and domesticated species were juvenile animals. This suggests that young animals were preferred for consumption. High numbers of juveniles among the identified domesticates may indicate that a rigorous husbandry regime was in place to control the mission's livestock population (Reitz et al. 2010).

# Chapter 11: Results of Phase 4 - Removal of Human Remains

*Cynthia M. Munoz*

The final phase of the archaeological investigations resulting from the underpinning of the Mission San Juan Church involved the removal of human remains encountered during the second and third phases (see Chapter 5).

To stabilize the current chapel at Mission San Juan de Capistrano, a trench, ranging from roughly 1.5 to 2.5-m wide by as much as 2-m deep, was mechanically excavated by Pugh Constructors around the perimeter of the building foundation. Upon trench completion regularly spaced auger bores were drilled at the base of the trench to roughly 6 mbs. Archaeological monitoring was conducted in an attempt to determine if intact archaeological deposits were present and to explore and document the original church foundation (see Chapter 5). In November 2011, while the CAR was monitoring this excavation, human remains were uncovered in three locations along the east side of the church. One additional set of remains was recorded previously in October 2011 during the excavation of BHT 3 that took place in the second phase of investigations (see Chapter 5).

The potential for discovering human remains was considered to be high prior to the excavations. Past excavations have recorded human remains in both disturbed and undisturbed contexts at Mission San Juan and within the APE (see Schuetz 1968, 1969, 1974, 1980a). A series of buttresses flank the church on all sides. For the purpose of this chapter, they are numbered starting with Buttress 1 running south from the northeast corner of the church. Two sets of remains were uncovered during trenching using a Gradall: Burial 1, 1.34 mbs) between Buttresses 3 and 4, and Burial 2h, 1.60 mbs between Buttresses 1 and 2. Two additional burials were disturbed subsequent to the trenching upon the drilling of augur bores to place cement support piers: Burial 3, 1.78 mbs between Buttresses 2 and 3, and Burial 4, 1.63 mbs between Buttresses 4 and 5 (Figure 11-1). These locations are referred to as Areas 1 through 4. These findings strongly suggested that a part of the historic cemetery, or *campo santo*, of Mission San Juan had been encountered.

As per a standing agreement between the NPS and the Archdiocese, work was immediately stopped on the east side of the church between the first and fifth buttresses until the NPS, the Archdiocese, and the THC determined procedures for burial removal, analysis, and reinterment. The exposed portions of the burials were covered over with soil and plywood. Upon completion of a property survey of Mission San Juan, a cemetery tract was selected on the property adjacent to the Late Colonial church ruins (Room 24a) for the eventual reburial of the human remains (Figure 11-2). The cemetery plat was filed by the Archdiocese, and on March 27, 2012, the CAR was notified to begin removal of the human remains.

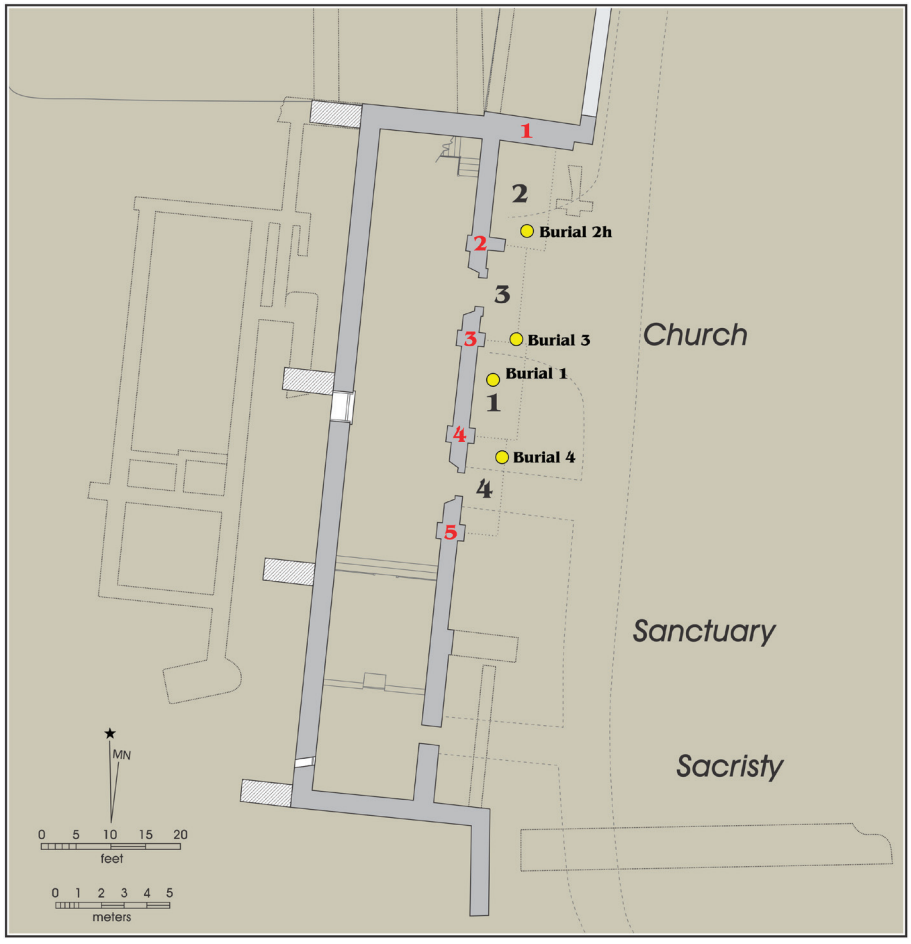


Figure 11-1. *Map of Room 17 of Mission San Juan de Capistrano showing the location of the initial four burials disturbed by construction (buttress number indicated in red and area number in black).*

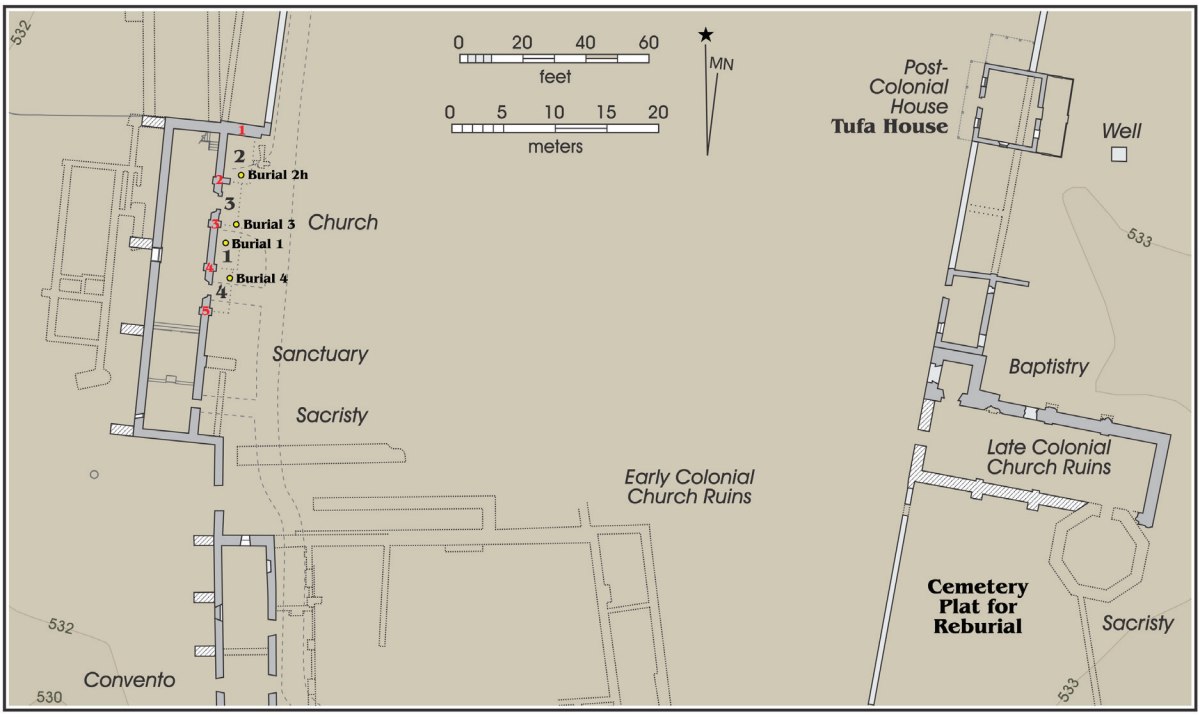


Figure 11-2. *Map of Mission San Juan de Capistrano showing the location of the burials and the location of the cemetery plat selected for reinterment.*

## Field Methodology

To determine the extent of the burial features, the CAR crew, under the direction of physical anthropologist Cynthia M. Munoz, thoroughly investigated Areas 1 through 4 and exhumed all human remains found within the project APE. Remaining overburden was removed by shovel scraping and trowel to limit further damage to the remains from heavy equipment (Figure 11-3). Each of the original four burial features was assigned a number (Burials 1, 2h, 3, and 4). As excavations commenced it soon became apparent that the APE contained multiple interments. Additional burials were labeled alphanumerically by area location (Burials 1a, 1b, 2a, 2b, 2f, 2g, 2j-2n, 2q, and 3a). Each burial was excavated as a single unit based on pit outline when possible, plotted on a site map, and recorded on a burial form and a master burial log. Horizontal and vertical locations were determined with depth measurements recorded as meters below the ground surface (mbs).

Contrast between the burial fill and the surrounding silty alluvial sediments was not always obvious. When a pit outline was not apparent, artificially created units were based on the outline of the remains, any remaining coffin wood, and coffin nails. Each set of remains was pedestalled before recording when possible. However, it soon became apparent that many of the burials were intruding open others. To limit the amount of exposure to the fragile remains, in these cases only one burial was uncovered and removed at a time. Three of the individuals (Burials 1a, 1b, and 2q) extended past the trench border into the mission courtyard, and one (Burial 3) continued under Buttress 3. The CAR contacted the THC, NPS, and Pugh Constructors for advice on how to proceed. The exposed elements of Burials 1a, 1b, and 2q were protected when possible, or removed and recorded when not, until the CAR received the go ahead from the construction company to remove the additional overburden adjacent to Areas 1 and 2. To protect the fragile exposed remains of Burial 3 (see Figure 11-1), the CAR, under THC advisement, recorded and removed the exposed elements until the church was stabilized and the buttress could be removed. At a later date (June 25-29, 2012), Pugh Constructors removed Buttress 3, and the CAR exhumed the remaining elements.

Wooden skewers were used to expose the burials to minimize any further damage to the remains. For each burial an excavation form was used to record burial number, horizontal and vertical provenience by area, position of the skeleton, orientation direction of the skull, and post-depositional shifting of the remains. Stratigraphic relationships with other burials, evidence of post-interment disturbances, grave dimensions, grave fill, and fill into which the grave was excavated were also recorded on the form. Burials were mapped to scale onto a plan map of each area. A photographic record and a photo log with the date and description was made for the excavations.

Figure 11-3. *CAR crew excavating Area 2 via shovel scraping and trowel.*

After the recording procedure was completed, elements were carefully removed and individually bagged. The bags were labeled with the element identification, the area number, the appropriate burial number, the excavator's initials, and the date (i.e. Burial 2q, Area 2, left radius, L. Wack, 5-10-12). These individual packages were placed in temporary curation containers labeled with the burial number and the date. Disarticulated elements (i.e. disassociated bones) that could not be identified as belonging to a burial were bagged and labeled with the element identification, the area number, the location in the area, the excavator's initials, and the date. Soil from each burial was screened through ⅛-inch hardware cloth and all artifacts collected from the fill dirt were labeled to correspond with the respective burial. This process continued until all burials in Areas 1 through 4 were located and removed. The boxes were removed from the APE at the end of each workday and secured at Mission San Juan in the Tufa House (see Figure 11-2). Each evening, the excavations were covered with heavy plastic tarps for protection. The project area was completely fenced in and locked each evening by Pugh Constructors.

After the CAR completed the burial excavations in Areas 1-4, Pugh Constructors continued the church stabilization. Plywood and two-by-fours were used to shore up each of the four areas for the placement of deep auger bores drilled for the placement of concrete piers. Because all burials had been removed in the bore locations, the CAR did not monitor this work. However, without notifying the CAR, Pugh Constructors began to tunnel under the church foundation in Area 2 (see Figure 11-1). This excavation was part of the construction of a 0.9 m-wide support wall under the foundation for church stabilization. In this process, they excavated into the foundation 1.1 m from the outside church wall. On June 6, 2012, a set of human remains was disturbed and partially cut through by mechanical excavation of a section of the foundation approximately 1-m wide. The burial was located roughly 0.9 m into the foundation from the outside of the church wall (Figure 11-4). The skull and upper left side of the body was disturbed. The individual lies on a north-south axis with the lower body appearing to extend southward under the church. Work was immediately stopped until the NPS, the Archdiocese, and the THC determined procedures for burial removal under the church.

Representatives of the NPS, the Archdiocese, the THC, Pugh Constructors, Ford Powell and Carson, and the CAR met at the site on June 8, 2012, to discuss the disposition of the human remains. Because of the position of the remains under the church foundation, it was determined that excavation could potentially endanger the archaeological crew. Given the burial's location and the fact that the construction of the concrete support walls will intrude no more than 0.9 m from the outer face of the church wall, the probability of disturbance to the remains was considered to be low. A decision was reached to leave the interment in place with the following stipulations: 1) the CAR archaeologists will screen the loose dirt that collected under the church foundation as a result of Pugh Constructors' excavation; 2) all disarticulated elements will be collected and bagged to be placed in

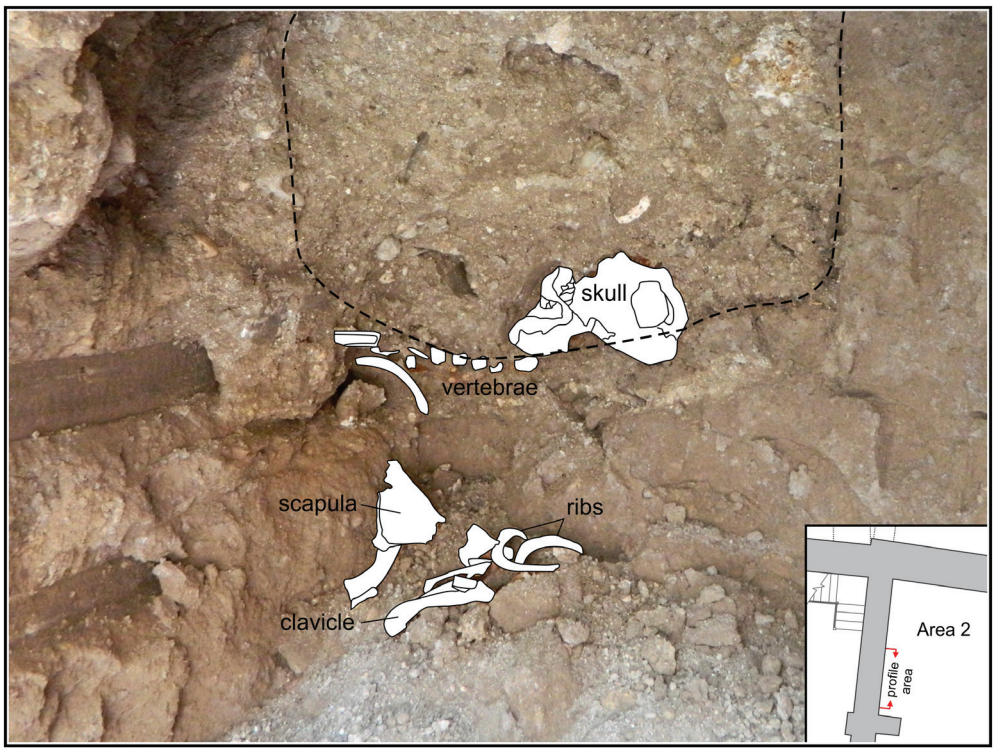


Figure 11-4. *Map of Area 2 showing the location of the exposed burial under the church.*

close association with the remainder of the burial prior to the construction of the concrete support wall; 3) a wooden retaining wall will be built by the contractor and placed along the length of the interment, running north-south, in such a manner that it will not disturb the remains but will protect them from impact from the wall construction; 4) the bagged disarticulated remains will be placed behind the retaining wall by the CAR archaeologist before the construction of the support wall begins; 5) the location of the interment will be recorded by GPS and/or TDS before the support wall is built; 6) the removal of additional matrix in 1-m increments from under the church wall will be monitored by the CAR staff and if necessary carried out by the CAR staff if human remains are identified during monitoring; and 7) decisions regarding the treatment of additional human remains that may still be buried under the church wall will be made on a case by case basis once the specific circumstances of orientation, etc. are known.

A CAR archaeologist screened all the loose dirt resulting from Pugh Constructors' excavation. All elements were collected, bagged, and temporarily stored in the Tufa House until the retaining wall was built. The CAR checked with the Pugh Constructor foreman several times to determine when additional excavation and wall construction would begin in Area 2 and was told that the constructors would notify the CAR before work began. The CAR was notified the week of June 18, 2012, that the bagged remains were needed for placement behind the retaining wall. At this point, it was discovered that the constructors had removed all the matrix under the church wall in Area 2. The retaining wall was complete and the support wall was partially constructed. The CAR did not monitor any of the excavation. It was no longer possible to record the burial location with GPS and/or TDS. The location was estimated from the initial exposure. Pugh Constructors stated that no additional human bone was uncovered. In addition to the excavation under the church foundation in Area 2, the CAR was not notified when foundation support wall work was carried out in the other areas involving human remains (i.e. Areas 1, 3, and 4; see Figure 11-1).

As noted above, Burial 3 was partially under Buttress 3. To protect the fragile exposed remains of Burial 3 (see Figure 11-1), the CAR recorded and removed the exposed elements only until the church was stabilized and the buttress could be removed. The buttress was removed by Pugh Constructors during the week of June 25. On July 2, 2012, the CAR physical anthropologist exhumed the remaining elements. It was evident upon initiation of the excavation that the constructors had not only removed the buttress but also removed the underlying sediments to approximately 1.6 mbs between the church wall and the location of Burial 3. The CAR was not notified in advance of the soil excavation for archaeological monitoring. The sediments directly over the location of Burial 3 were only slightly disturbed below the base of the buttress footing. During the exhumation of

Burial 3 the remains of an infant burial (Burial 3a) were uncovered. It was aligned east-west with the skull to the east. The proximal portion of the infant, skull to lumbar vertebrae, was located above Burial 3 with the body extending toward the church wall. The remains were partially disturbed. The lower portion of the infant, pelvis to phalanges, was missing, presumably blown out during the sediment removal by Pugh Constructors. Burials 3 and 3a were removed following the procedures discussed above.

Upon completion of the exhumations, a bioarchaeological analysis was conducted on the human remains. The results are reported in Chapter 12.

## Reburial

Upon the completion of the osteological analysis, custody of the human remains and associated grave goods was transferred to the Tap Pilam, a local Native American group associated with the Coahuiltecans. The Mission San Juan cemetery tract adjacent to the Late Colonial church ruins (Room 24a) was archaeologically excavated by the NPS prior to the re-interment. Once the plot was cleared, arrangements were made with the Archdiocese, NPS, and the Tap Pilam for a reburial ceremony. All Native American groups that wished to be represented at the reburial were present. The ceremony took place on February 23, 2013 (Figures 11-5 and 11-6).

Figure 11-5. *Reburial ceremony at Mission San Juan in February 2013.*

Figure 11-6. *Reburial plot at Mission San Juan near Room 26.*

# Chapter 12: Bioarchaeological Analysis of Human Remains

*Cynthia M. Munoz*

The purpose of this chapter is to provide a comprehensive analysis of the human skeletal remains recovered by the CAR during excavations related to the stabilization of Mission San Juan de Capistrano.

## Osteological Analysis

The intent of any osteometric analysis is to further knowledge regarding behaviors of a population. Bioarchaeology is the interpretation of the lifeways of the individual and, by extension, of the community through the evidence gleaned from analysis of skeletal elements. The study of human remains contributes to the reconstruction of past lifeways, an understanding of biological and cultural history, and the relationship between a population's culture and its biology (Powell 1994). Bioarchaeology examines the environmental effects (cultural, physical, and social) reflected in the skeletal assemblage (Steele and Olive 1989). Three examples of bioarchaeological syntheses are found in Huebner and Comuzzie's (1992) excavations of the Blue Bayou site (41VT94) in Victoria County, Texas, in the Jantz et al. (2002) analysis of the human remains recovered at Mission Nuestra Senora del Refugio (41RF1), and in the Munoz et al. (2011) study of recovered remains from the Granberg site (41BX17/271). Blue Bayou and the Granberg analyses explore biological affinities and mortuary traditions, respectively, through comparisons with other skeletal collections. The Refugio synthesis used a thorough analysis of recovered human remains to address issues including pathology, dietary variation, demography, ethnicity, and mobility. The remains analyzed in this study are part of a multiple interment archaeological site. Previous analyses of human remains recovered from a 1967 excavation at Mission San Juan report minimum numbers of individuals (MNI) ranging from 92 to 103 (Francis 1999; Humphries 1971; Miller 1989; Schuetz 1968, 1969).

### Methods

The Tufa House at Mission San Juan served as the laboratory for the human remains and associated burial artifacts. The Tufa House was locked at all times and access to the remains was limited to only the group of professionals performing the analysis. Analysis of the skeletal remains was conducted by the CAR's physical anthropologist with the assistance of an UTSA anthropology graduate student. Analysis of burial artifacts was carried out by a CAR employee experienced with ANCS+, the NPS catalog system. Initially, the temporary curation containers were sorted by burial number and a master box list was recorded. All bags of disarticulated elements not associated with individual burials were placed in containers by area of recovery. The elements were carefully cleaned using wooden skewers and dry brushing. All burial data was entered into an Excel® spreadsheet by the physical anthropologist as the analysis progressed.

The analytical methods utilized in the current study are those recommended by Buikstra and Ubelaker (1994) for relatively complete skeletons. The analysis involved standard cranial and postcranial measurements, determinations of the sex, ancestry, and probable age of the individuals, examinations for dental and bone pathologies, and photographic records.

Adult male and female skeletons vary in both size and general shape. Therefore, accurate estimates of sex should be based on multiple factors including measurements of dimorphic dimensions, such as the maximum diameter of the femur head, and observations of morphological features (i.e. traits of the skull and pelvis) known to differ between males and females. Ox coxae morphology presents the most reliable indicator of sex in the human skeleton.

Using the criteria set forth in Standards for Data Collection from Human Skeletal Remains (Buikstra and Ubelaker 1994), age is based on pelvic morphological changes, degree of cranial suture closure, dentition, and morphology of the long bones and joint surfaces. Reliable age-related changes occur in the pubic symphysis and the auricular surface of the ilium. Another indicator of age-related change is the degree of suture closure on the cranium. Eruption and wear of the teeth are commonly used in aging the human skeleton. Because of predictable formation and eruption times for teeth and because the dentition are the most regularly recovered elements in archeological contexts, dental development is the most widely used method for aging subadult remains. In addition to eruption, rates and patterns of attrition are a function of age. When the rate of wear within a population is fairly consistent, the rate can be used to assign dental ages to adult specimens (White 2000).

Postcranial epiphysis fusion is predictable in that an epiphysis fuses at a known age but may vary by individual, population, and sex (White 2000). Because there is substantial interindividual variation in the chronology of epiphyseal closure, data with fusion ranges are available on various

compilational charts for specific elements by sex (Baker et al. 2010; Krogman and Iscan 1986; McKern and Stewart 1957; Redfield 1970; Suchey et al. 1984; Ubelaker 1989a, b). The presence of osteoarthritis in the spine, hip, and knee is inherent as aging progresses. Nearly all individuals older than 60 years show osteoarthritic features, particularly in the lower thoracic and lumbar spine (White 2000). Although not reliable as a lone indicator, indications of osteoarthritis are useful as one element of a multifactorial age estimate.

Geographic ancestral affiliation of a skeleton or individual skeletal elements is at best tenuous, as there exists "no human skeletal markers that correspond perfectly to geographic origin" (White 2000:375). However, the estimation of ancestry is necessary to the extent possible to address legal concerns, especially the Native American Graves Protection and Repatriation Act (NAGPRA). Traditional, primary indicators of general ancestral affiliation are the morphological traits of the dentition (Hillson 1996; White 2000). For example, a 'mongoloid dental complex' (including Native Americans) consisting of upper incisor shoveling and specific cusp morphology, including protostylids, metaconule, deflecting wrinkle, and cusp 6 and 7, has been defined by Hanihara (1967:925, 1969) and Turner (1987). The 'mongoloid dental complex' is further divided into two patterns. Sinodonty characterizes people from north-east Asia and Native Americans, whereas Sundadonty characterizes people of south-east Asia, Micronesia, and Polynesia (Turner 1987, 1989, 1990). Sinodonts express eight dental variations including shoveling and double-shoveling of the upper incisors, one-rooted upper first premolars, and various molar cusp and root expressions (Turner 1990). A 'Caucasoid dental complex' is defined as an absence of shoveling, a high incidence of Carabelli's cusps, along with other morphological traits (Hanihara 1967:925, 1969; Mayhall et al. 1982).

In addition to dental traits, other elements of the human skeleton suggest Native American ancestry. The morphology of the femora, specifically platymeria or the flatness of the subtrochanteric portion of the shaft, suggests a Native American ancestry. In a study of Northern Plains Indians, Gill (1995) demonstrates that this feature effectively discriminates Whites from Northern Plains Indians. White (2000) presents other traits attributable specifically to Mongoloids, Caucasoids, and Negroids. Traits indicating Native American ancestry include complex cranial sutures, wide vertical ascending rami, and the presence of Wormian bones.

In general, the skeletal remains analyzed in the current study are in good condition and, while many elements are fragmented, limited chemical weathering or other biological activity has not affected the fragments significantly enough to hinder their reconstruction. Reconstruction of elements was undertaken only to the degree necessary to aid in determination of the MNI. In lieu of glue adhesive, tape was used to hold fragments together and removed after analysis.

Metric analysis was only performed on elements with the appropriate measurement landmarks intact. Reconstructed elements were not measured due to inherent post-mortem alteration, such as distortion and warping. Only precision implements were employed during the attainment of metric traits of the skeletal remains. A standard wooden osteometric board was used for long bone measurements. Other skeletal measurements were obtained by Mitutoyo® Digimatic Calipers and Spreading Calipers. These data are presented in Appendix 8.

The Forensic Database (ForDisc v. 3.0) maintained by the University of Tennessee at Knoxville (Ousley and Jantz 2005) was used to compile and evaluate the San Juan data. ForDisc consists of a databank, the Forensic Database (FDB), to which an unknown skeletal specimen can be compared. ForDisc allows an investigator to calculate discriminate functions using data from the FDB. These functions allow the user to classify an unknown into a specific ethnic group, male or female. It also has the ability to estimate stature.

Most of the data from the FDB is only appropriate for the analysis of non-native individuals born in the twentieth century. However, the recent version has added Amerindian remains including 20 modern forensic cases and 44 from the nineteenth century. In addition to the FDB, ForDisc contains the Howells populations. This data (cranial only) may be more appropriate for older specimens and includes four Native American groups, the Arikara from South Dakota, the Santa Cruz from California, Eskimo from Greenland, and Amerindians from Peru. For the non-native remains recovered at San Juan, ForDisc contains samples from the nineteetnh century consisting of American Whites (n=173) and Blacks (n=150). Although this analysis used ForDisc to evaluate the San Juan data, it should be noted that the comparison is between earlier groups (i.e. eighteenth-century mission inhabitants) to nineteenth-century samples. ForDisc's primary use is in forensic identification.

Upon completion of analysis each element was double bagged and labeled with tags conforming to the NPS ANCS+ catalog system. All elements from each burial along with associated burial artifacts were placed into large archival boxes for reburial at Mission San Juan on a cemetery tract adjacent to the Late Colonial church ruins (Room 24a). Each individual set of human remains was placed in its own box.

Disassociated remains were placed in boxes by area (e.g. all disassociated remains from Area 2 were placed together in one Area 2 box). All associated documentation including inventories, analysis paperwork, photos, and photo logs was curated at the CAR.

Prior to reburial, the CAR's physical anthropologist examined all the faunal bone removed from San Juan during the church restabilization project (Figure 12-1). Human bone was recovered from five additional areas including TUs 7 and 8 in Area 2 (n=26), BHT 2 (Thompson 2011) in Area 2 (n=10), Section F (n=5), TU 10 between Sections J and K (n=1), Section J (n=63), and Section K (n=2). This bone is discussed in the following report sections.

## Burials

Seventeen burials (Figure 12-2) were excavated from Areas A1-A4 during the 2011-2012 restabilization work at Mission San Juan (Table 12-1). A minimum of 12 additional individuals were identified during analysis of individual ossuary elements, two from Area 1, four from Area 2, and six from misidentified faunal bones from Sections F (n=2) and J (n=4; Table 12-2 and see Figure 12-1). Of the 29 individuals, eight were supine, in the extended position, face up, with arms folded at the midsection and fingers overlapping or intertwined. Three were supine and in the extended position with the skull facing west, one to the east, one to the south, and one to the north. One burial was extended and interred


Figure 12-1. *Map of Mission San Juan Capistrano showing excavations around the church.*

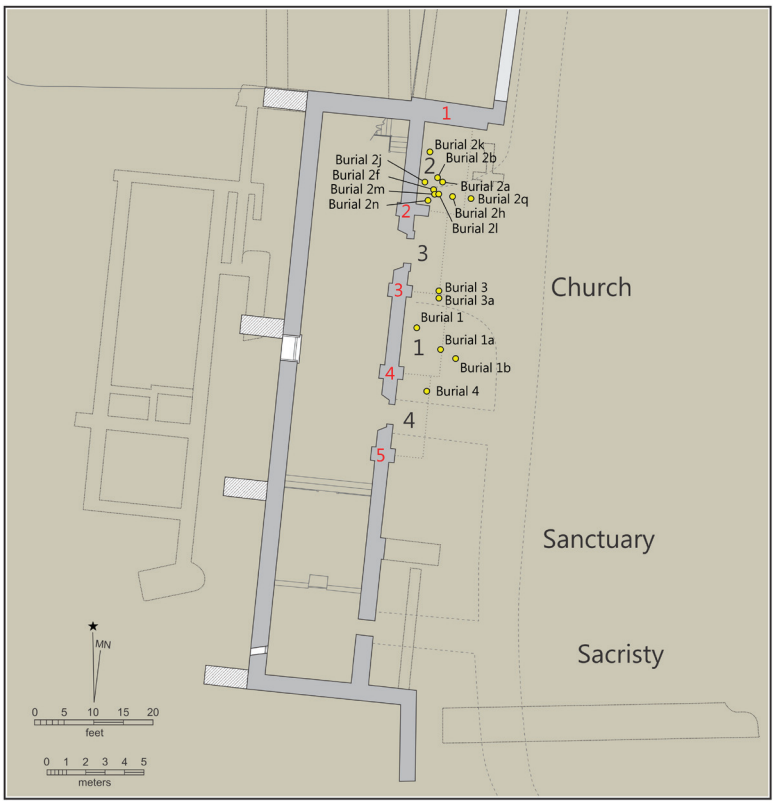


*Figure 12-2. Map of Room 17 of Mission San Juan showing Areas 1-4.*

Table 12-1. Burials Recovered from Areas A1-A4 at Mission San Juan during the 2011-2012 Church Stabilization

| Burial # | Area | Burial Location | Ethnicity | Sex | Age | % Complete |
|---|---|---|---|---|---|---|
| 1 | 1 | 68 cm E of church, 210 cm N of Buttress 4 | Native American | male | young adult 20-35y | 95 |
| 1a | 1 | 236 cm E of church, 127 cm N of Buttress 4 | Caucasian Hispanic | male | young adult 20-35y | 95 |
| 1b | 1 | 300 cm E of church, 72 cm N of Buttress 4 | Probable Native American | unknown | child 5-7y | 100 |
| 2a | 2 | 80-140 cm E of church, 130-170cm N of Buttress 2 | Probable Native American | unknown | child 4y +/- 12m | 10 |
| 2b | 2 | 84 cm E of church, 118 cm N of Buttress 2 | unknown | unknown | infant 9-12m | 100 |
| 2f | 2 | 80 cm E of church, 88 cm N of Buttress 2 | unknown | unknown | newborn +/- 2m | 100 |
| 2g | 2 | 120 cm E of church, 168 cm N of Buttress 2 | unknown | unknown | child 2-4y | 10 |
| 2h | 2 | 172 cm E of church, 62 cm N of Buttress 2 | Caucasian Hispanic | male | old adult 50+y | 95 |
| 2j | 2 | 30 cm E of church, 124 cm N of Buttress 2 | unknown | unknown | newborn +/- 2m | 100 |
| 2k | 2 | 42 cm E of church, 117 cm S of Buttress 1 | Probable Native American | female | young adult 20-35y | 100 |
| 2l | 2 | 108 cm E of church, 60 cm N of Buttress 2 | unknown | unknown | newborn +/- 2m | 70 |
| 2m | 2 | 92 cm E of church, 62 cm N of Buttress 2 | unknown | unknown | newborn +/- 2m | 100 |
| 2n | 2 | 60 cm E of church, 28 cm N of Buttress 2 | unknown | unknown | newborn +/- 2m | 100 |
| 2q | 2 | 272 cm E of church, 64 cm N of Buttress 2 | Native American | unknown | child 5-7y | 100 |
| 3 | 3 | 160 cm E of church, 20 cm N of Buttress 3 | Native American | probable male | old adult 50+y | 100 |
| 3a | 3 | 127 cm E of church, under Buttress 3 | unknown | unknown | fetus 7m gestation | 60 |
| 4 | 4 | 165 cm E of church, 46 cm S of Buttress 4 | unknown | unknown | infant 1y +/- 4m | 95 |

Table 12-2. Individuals Identified from Unarticulated Ossuary Elements

| Burial # | Area | Burial Location | Ethnicity | Sex | Age | % Complete |
|---|---|---|---|---|---|---|
| 1c | 1 | between Buttress 3 and 4 | unknown | unknown | adult | 1 |
| 1d | 1 | between Buttress 3 and 4 | unknown | unknown | newborn +/- 2m | 1 |
| 2r | 2 | between Buttress 1 and 2 | unknown | unknown | adult | 10 |
| 2s | 2 | between Buttress 1 and 2 | unknown | unknown | newborn +/- 2m | 40 |
| 2t | 2 | between Buttress 1 and 2 | unknown | unknown | newborn +/- 2m | 25 |
| 2u | 2 | between Buttress 1 and 2 | unknown | unknown | child ~1.5y | 10 |
| F1 | F | Section F upper strata | unknown | unknown | newborn +/- 2m | 1 |
| F2 | F | Section F upper strata | unknown | unknown | adult | 1 |
| J1 | J | Section J upper strata | unknown | unknown | newborn +/- 2m | 50 |
| J2 | J | Section J upper strata | unknown | unknown | fetus 2nd trimester | 1 |
| J3 | J | Section J TU 10 120-130 cmbd | unknown | unknown | fetus 3rd trimester | 1 |
| J4 | J | Section J lower strata | unknown | unknown | adult | 5 |

slightly on its side facing west, one consisted only of a skull and first cervical vertebra, and one consisted of isolated skull fragments. Of the 15 extended burials, five had head orientations to the east, four to the north, three to the west, and three to the south. The cortical surface of the bones all exhibited some degree of taphonomic change from root etchings. The bone varied in color from light to medium orange-brown. Very few personal goods or ornamentations were found with the burials (Table 12-3). The artifacts that were directly associated with individual burials are described and illustrated in the following sections. Evidence of the use of coffins (i.e. coffin nails and wood) was found with all 15 extended burials.

## Area 1

Area 1 was the location of the first of the original four burials (Burial 1) identified during Phase 2 trenching for the stabilization of Mission San Juan (see Figure 12-2 and Chapter 5). The area is located on the east side of the church approximately 9 m south of the northeast corner of the church. Bounded between Buttresses 3 and 4, Area 1 was approximately 3.8-x-2.15 m. The excavated area was enlarged into the mission courtyard by another 1.6-x-1.5 m to expose two burials (Burials 1a and 1b) that extended past the bounds of the original trench. The entire area was hand-excavated from approximately 0.75 mbs to a terminal depth of approximately 2 mbs at which time sediments changed to gravelly deposits. The area contained a minimum of five individuals based on three articulated burials, consisting of two adults and one child (Burials 1, 1a, and 1b), and disassociated skeletal elements (n=6; Table 12-4). The disassociated elements represent at least two individuals, an adult based on five elements (Burial 1c) and a newborn based on one element (Burial 1d).

### Burial 1

This individual is a male aged 20-35 years of Native American ancestry, represented by a mostly complete skeleton. Burial 1 is an articulated, primary burial uncovered 1.34 mbs. The remains, parallel to the church wall with the distal end of the skeleton lying adjacent to the Buttress 3 footer (Figure 12-3; see Table 12-1), were enclosed in a coffin with the wood actively decomposing but still extant. The coffin lid was collapsed and in some instances adhered to the human remains. Remnants of coffin nails and tacks were recovered from the coffin wood along the sides of the burial and from within the remains.

This burial was the shallowest of the 17 excavated in Areas 1-4. The fair condition of the coffin and the depth of the remains suggest the burial took place at a later date relative to the other recovered burials. This individual was placed in the coffin slightly on his left side. The skull was to the south with the face turned to the west. His left arm was folded across the midsection, and the right arm was extended down the side of the body. The right lower leg and foot were missing with only the upper ⅓ of the tibia and fibula present. Because the coffin wood surrounding the lower legs was intact and the lid was evident lying across the remains, it appears that

Table 12-3. Personal Artifacts Associated with Mission San Juan Capistrano Burial

| Burial # | Area | Ferrous Button | Shell Button | Bone Button | Ceramic Button | Glass Bead | Ferrous Buckle | Ferrous Head Ornament w/ Cross | Cuprous Pin | Cuprous, Beaded Necklace | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 2 | 3 | 2 | | 1 | | | | | **8** |
| 1a | 1 | 1 | | 2 | 3 | | 1 | | | | **7** |
| 1b | 1 | | | | 6 | | | | | | 6 |
| 2b | 2 | | 1 | | 2 | | | | | | **3** |
| 2f | 2 | | | | 1 | | | 1 | | | **2** |
| 2h | 2 | | | 1 | 3 | | | | | | **4** |
| 2m | 2 | | | | 3 | | | | 3 | | **6** |
| 2q | 2 | | | | 6 | | | | 1 | | **7** |
| 3 | 3 | | | 8 | 5 | | | | | | **13** |
| 4 | 4 | | | | | | | | 2 | 1 | **3** |
| **Totals** | | **3** | **4** | **13** | **29** | **1** | **1** | **1** | **6** | **1** | **59** |

Table 12-4. Osteological Summary for Area 1

| | |
|---|---|
| **MNI** | 5 |
| **Age at Death** | 2 young adults (20-35 years old), 1 adult of indeterminate age, 1 child (5-7 years old), 1 newborn (+/- 2 months) |
| **Sex** | 2 male, 3 indeterminate |
| **Ethnicity** | 1 Native American, 1 possibly Native American, 1 Caucasian/Hispanic, 2 indeterminate |
| **Manner of Death** | 1 systemic infection, 4 indeterminate |
| **Temporal Affiliation** | Historic |

this individual's lower right leg was removed before death. The ends of the fibula and tibia were completely fragmented obscuring any evidence of amputation. The lower right arm and hand may also have been amputated. Personal items recovered with Burial 1 include two ferrous, three shell, and two bone buttons, and one glass bead (Figure 12-4).

## *Sex*

Following Buikstra and Ubelaker (1994), the sex of this individual was based on pelvic and skull morphology. Although with a complete skeleton these elements are sufficiently reliable indicators of sex, the overall size of the postcranial skeleton as well as postcranial elements that exhibit sexual dimorphism were also considered. An assessment of pelvic elements indicated a male with certainty. Although the skull was partially crushed in situ, observation of the mastoid process, supraorbital margin, and the mental eminence resulted in a rating of probable male. Measurement of the left femoral head (45.2 mm) falls in the sex indeterminate range (43.5-46.5 mm; Bass 1995). The left femoral midshaft circumference (87.4 mm) indicates a male (>81 mm; Bass 1995; Black 1978; Di Bennardo and Taylor 1979). The second cervical vertebra has been shown to exhibit sexual dimorphism (Bethard and Seet 2013; Wescott 2000). Measurements of eight dimensions of the second cervical vertebra also signify a male.

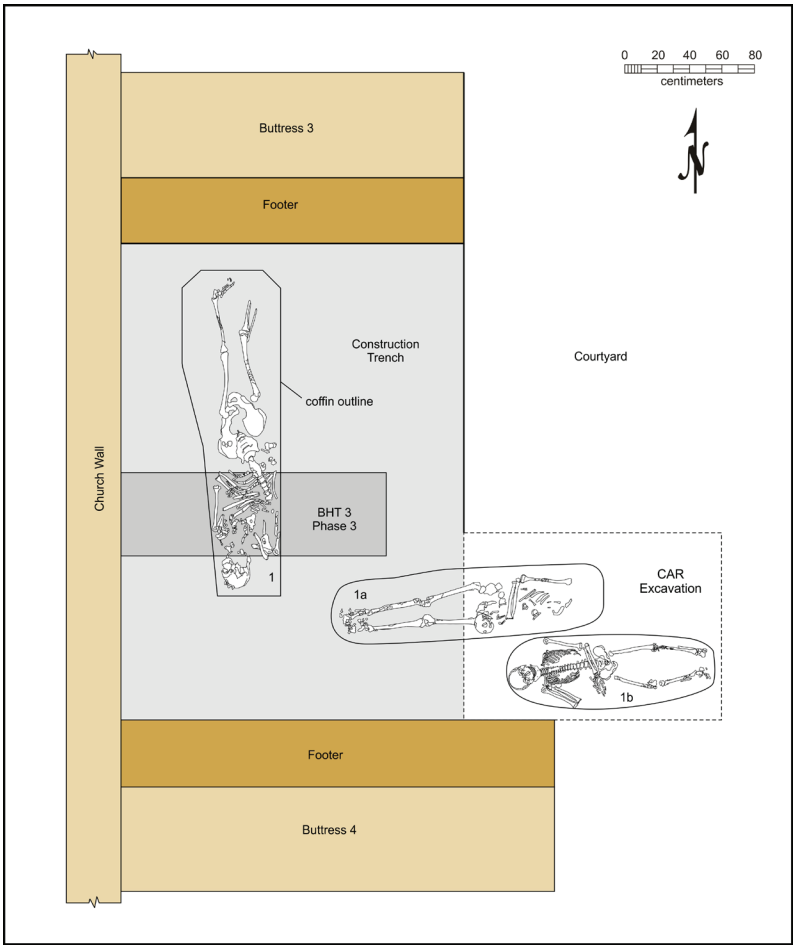


Figure 12-3. *Map of Area 1 showing the locations of Burials 1, 1a, and 1b.*


Figure 12-4. *Ferrous, shell, and bone buttons and glass bead associated with Burial 1.*

### *Age*

The age of Burial 1 is estimated from pelvic morphological changes, degree of cranial suture closure, and morphology of the long bones and joint surfaces (Buikstra and Ubelaker 1994). Both the Suchey-Brooks and the Todd systems use morphological changes of the pubic symphyseal face as criteria for estimating age at death (Brooks and Suchey 1990; Suchey and Katz 1986; Todd 1921a, b). The Todd system indicates an age of 27-30 years, and the Suchey-Brooks suggests a mean age of 23-25 years. The stage of closure for available external and internal cranial vault sutures indicates a young adult (20-35). This conclusion is based on open sutures with no evidence of minimal closure (Meindl and Lovejoy 1985). The long bones and vertebrae were examined for indications of osteoarthritis. No joint surfaces from Burial 1 exhibit evidence of lipping, pitting, or eburnation suggesting that this individual was a young adult.

### *Ancestry*

Morphological traits of Burial 1 indicate Native American ancestry. The central incisors were semi-shovel-shaped with strong ridges converging at the cingulum. The upper first premolars were single rooted (Hillson 1996). The femora are platymeric (<84.9 indicates platymeria) with an index of 78.5 (Bass 1995). Other traits present in Burial 1 suggesting Native American ancestry include complex cranial sutures and the presence of Wormian bones (Hillson 1996; White 2000). Cranial measurements were entered into ForDisc, and discriminate functions were run comparing Burial 1 data to White males (n=238), Hispanic males (n=51), and American Indian males (n=35). ForDisc classified the remains as statistically closest to American Indian (Ousley and Jantz 2005).

### *Dentition*

The dental health of this individual was generally good. Most of the dentition is present. There is no evidence of antemortem tooth loss although four teeth, the right maxillary canine, and the right mandibular molars, along with the associated alveolar bone, have been lost post-mortem. No caries activity is present. Dental attrition is slight to moderate with the most wear on the incisors and maxillary first molars. Calculus deposits are slight and are only evident on the maxillary molars. Enamel hypoplasias are not present.

### *Stature*

Burial 1 postcranial measurements were entered into ForDisc for stature estimation. Stature based on nineteenth-century statistics for males was calculated as 1.66 m. However, it should be noted that the discriminate functions for height estimates are based on data from whites and blacks. Using the Trotter and Gleser (1952, 1958) stature formula for Mongoloid males based on femur length, the burial ranges from 1.63-1.70 m (Bass 1995).

### *Pathology*

The humeri, left radius, ulnae, femora, left tibia, left fibula, left fourth metatarsal, and one rib fragment are pathological exhibiting varying degrees of periostitis/ostemyelitis. The lesions indicate a long-term systemic infection in this individual. The alterations are diagnostic of a treponemal infection (syphilis). However, cranial lesions (e.g., caries sicca) were not evident. Severe osteomyelitis is present on the left ulna and radius. Lytic lesions have affected the proximal and mid diaphysis of the ulna leaving the bone extremely porous, with large sections of the cortical bone destroyed to expose the trabecular bone. At least six cloacae are present on the surface of the shaft, indicating that the infection was active and draining at the time of death. The bone in the area of the infection was obviously unstable and likely immobilized the arm. The mid diaphysis of the radius also contains lesions and three large cloacae, but the trabecular bone is not exposed. The shaft in the area of infection is considerably swollen, and the bone is extremely porous and remodeled. Cloacae were also recorded on the left humerus and the left fourth metatarsal, but the osteolysis is not as severe. The shaft of the left humerus was noticeably swollen from surface apposition as was the proximal shaft of the left tibia.

Moderate periosteal expansion and sclerotic bone deposits were present on the femora, the left fibula, the right humerus, the right ulna, and on a fragment of rib. Activity in the femora is mainly restricted to the middle third of the shaft with some lesions on the left femoral neck and on the posterior of the left distal epiphysis. Periosteal lesions in the fibula are restricted to the mid diaphysis. Activity in the right humerus is present on the middle and lower third of the shaft. The right ulna was shattered, but lesions were noted on the fragments as well as on one small rib fragment.

The severity of infection likely resulted in the amputation of this individual's lower right leg and possibly of his right hand. The widespread osteolysis as well as active cloacae suggests that death was a result of a systemic treponemal infection.

## Burial 1a

Burial 1a is a young adult male aged 20-35 years of Caucasian/Hispanic ancestry, represented by a mostly complete skeleton. This is a partly articulated, primary burial uncovered 1.69

mbs. The burial was disturbed by the interment of Burial 1b resulting in displacement of the skull, the left side of the pelvis, the vertebrae, the left ribs, the left arm, and the right hand. Although no coffin wood was presented, remnants of coffin nails suggest that the remains were buried in a coffin. The burial was located approximately 0.9 m north of Buttress 4, perpendicular to the church wall (see Figure 12-3 and Table 12-1). It extended past the edge of the original construction trench into the mission courtyard. The remains were extended in a supine position with the body positioned on an east-west axis. The skull, before its disassociation, would have been located to the east, presumably face up. His arms were folded across the midsection. Personal items recovered with Burial 1a include one ferrous, two bone, and three ceramic buttons, and one ferrous buckle (Figure 12-5).

### *Sex*

The sex of this individual was based on skull and pelvic morphology and on the size of postcranial elements (Buikstra and Ubelaker 1994). An assessment of complete pelvic elements, including the left and right ventral arc, the left subpubic concavity, and the left ischiopubic ramus ridge indicate with little doubt that Burial 1b is a male. Although the skull was partially crushed in situ, an examination of the supraorbital margin, the right mastoid process, and the mental eminence suggest the burial is a probable male. Using a comparison of Burial 1a cranial measurements to ForDisc American Indian male and female cranial measurements resulted in a classification of male (Ousley and Jantz 2005). Measurement of the right femoral head (48.9 mm) falls in the male range (>47.5 mm; Bass 1995). The left femoral midshaft circumference (96 mm) indicates a male (>81 mm; Bass 1995; Black 1978; Di Bennardo and Taylor 1979).

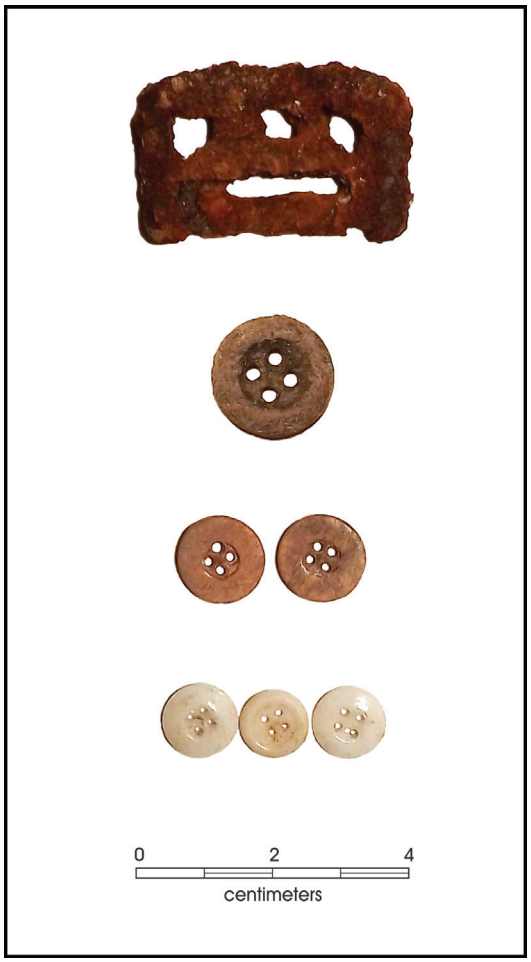


Figure 12-5. *Ferrous, bone, and ceramic buttons and ferrous buckle associated with Burial 1a.*

### *Age*

The degree of cranial suture closure, pelvic morphological changes, and the morphology of the long bones and joint surfaces were examined to estimate the age of Burial 1a (Buikstra and Ubelaker 1994). The Todd system indicates an age of 25-27 years, and the Suchey-Brooks suggests a mean age of 35 years (Brooks and Suchey 1990; Suchey and Katz 1986; Todd 1921a, b). Based on open sutures with no evidence of minimal closure (Meindl and Lovejoy 1985), the cranial vault indicates a young adult (20-35). Moreover, no joint surfaces from Burial 1a exhibit evidence of osteoarthritis.

### *Ancestry*

The upper first premolars from this individual were single rooted. The roots on the lower right first molar were unobservable, and the left was lost post-mortem. Shoveled incisors were not noted. However, the central incisors were lost post-mortem, and the lateral incisors were worn (Hillson 1996). The femora are platymeric (<84.9 indicates platymeria) with an index of 75.0 (Bass 1995) suggesting Native American ancestry, but complex cranial sutures and Wormian bones were absent (Hillson 1996; White 2000). Discriminate functions from cranial measurements were run comparing Burial 1a data to White males (n=238), Hispanic males (n=51), and American Indian males (n=35). ForDisc classified the remains as statistically closest to the Hispanic group indicating admixture (Ousley and Jantz 2005).

### *Dentition*

Most of the dentition for Burial 1a is present. There is no evidence of antemortem tooth loss although five teeth, the left and right maxillary central incisors, and the left mandibular canine, second premolar, and first molar have been lost post-mortem. No caries activity is present. Dental attrition is slight to moderate with the most wear on the incisors and canines. Calculus deposits are slight and are evident on most

of the teeth present. Enamel hypoplasias are present on the canines suggesting systemic stress, possibly from illness or malnutrition, in early childhood (Buikstra and Ubelaker 1994; Ubelaker 1989b).

### *Stature*

Postcranial measurements were entered into ForDisc for stature estimation of Burial 1a. Stature based on nineteenth-century statistics for White males was calculated as 1.78 m. The Trotter and Gleser (1952) stature formula for Mexican males, based on fibula length, suggested a height ranging from 1.69-1.76 m (Bass 1995).

### *Pathology*

This individual appears relatively healthy as indicated by absence of bone pathology.

## Burial 1b

This individual is a child aged 5-7 years, of indeterminate sex, and possibly a Native American. This is a complete, articulated, primary burial uncovered 1.60 mbs. Burial 1b intruded into the upper left side of Burial 1a. Fragments of coffin nails suggest that the remains were buried in a coffin. The burial was located approximately 0.7 m from Buttress 4. The remains were perpendicular to the church wall and extended in a supine position with the body positioned on an east-west axis. The skull, located to the west, was face up, and the arms were folded across the midsection (see Figure 12-3 and Table 12-1). Personal items recovered with the remains consist of six ceramic buttons (Figure 12-6).

### *Sex*

Sex could not be estimated for this individual. Because most of the morphological features related to sexual differences are not present until after the onset of puberty (as early as 12 in males and 10 in females), determining the sex of subadult human remains cannot be achieved with acceptable accuracy. Currently no method for sexing juvenile skeletons is widely accepted (Baker et al. 2010; but see Goode-Null 1996; Loth and Henneberg 2001; Saunders et al. 2007; Scheuer 2002; Stone et al. 1996; Sutter 2003; Yang et al. 1998).

### *Age*

The age of Burial 1b is estimated from a combination of epiphyseal fusion and dental development (Buikstra and Ubelaker 1994). The cervical vertebrae exhibit complete union except for the atlas, which remains unfused. Thoracic and lumbar neural arches are completely fused to each other and partially united to the centrums. The spheno-occipital synchondrosis is open and the occipital (lateral to squama and basilar to lateral) is completely closed. Epiphyseal fusion corresponds to an age of 3-6 years (Krogman and Iscan 1986; McKern and Stewart 1957; Redfield 1970; Suchey et al. 1984; Ubelaker 1989a, b).

The development of the permanent incisors (maxillary and mandibular) correlate to root length ¾ (R3/4) for all but the maxillary second incisors (R1/4) (Moorees et al. 1963a, b). Although in crypt, both the permanent maxillary left canine and first premolar are visible and are developing at stage $R_i$, initial root formation. The maxillary and mandibular six-year molars are completely developed and erupted. All four second permanent molars, maxillary and mandibular, are visible and development correlates to $Cr_c$, crown complete. The alveolar bone is open above the second molars. The dental development is consistent with an individual from 5-9 years old (Buikstra and Ubelaker 1994; Ubelaker 1989b).

### *Ancestry*

The maxillary central incisors, completely shoveled with ridges coalescing at the cingulum, point to Native American ancestry (Hillson 1996). However, Burial 1b is considered a possible Native American due to the absence of more criteria.

### *Dentition*

The dentition of Burial 1b is represented by a complete mandible, a nearly complete maxilla, and 31 teeth. The permanent incisors have erupted with all but the maxillary lateral incisors through the alveolar bone, just reaching the occlusal plane. The maxillary lateral incisors are in crypt with partial root formation. All four permanent first molars are erupted and completely developed. Four permanent second molars with complete crowns and root initiation are evident in crypt with the alveolar bone open over each tooth. The maxillary left and right permanent canines and the first left premolar are in crypt with initial root formation. Attrition and calculus deposits are light. No caries activity is present. Hypoplastic defects are present on six teeth including the maxillary incisors and canines. Three occurrences were noted on each tooth indicating systemic stress between 9 months (+/- 3 months) to 3 years (+/- 12 months) based on developmental standards (Buikstra and Ubelaker 1994; Ubelaker 1989b).

### *Pathology*

Hypoplastic defects are evident in six teeth from this individual indicating systemic metabolic stress such as malnutrition or infectious disease. Pathological bone lesions are absent.

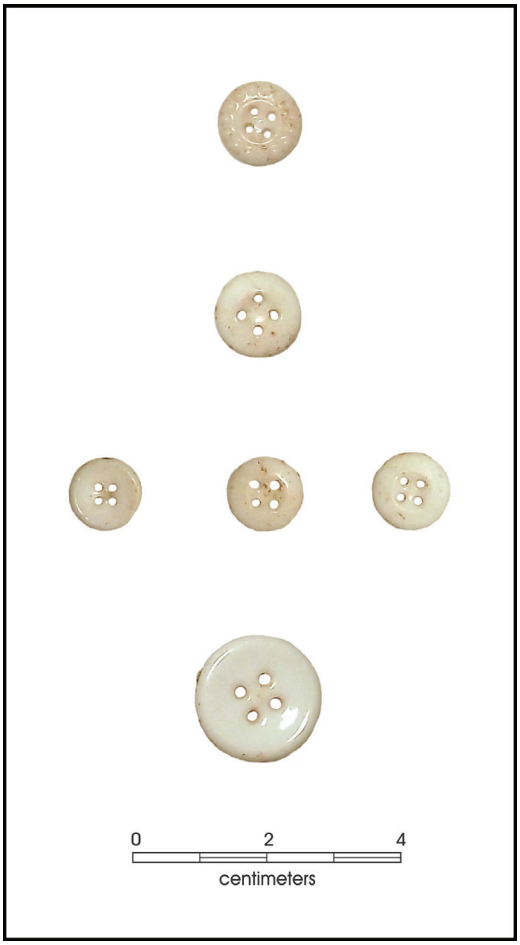


Figure 12-6. *Ceramic buttons associated with Burial 1b.*

## Disassociated Human Remains

Six skeletal elements, disassociated from Burials 1, 1a, and 1b, were recovered from Area 1 (see Table 12-2). The disassociated elements represent a minimum of two individuals, an adult and a newborn. Elements attributed to the adult consist of a right fourth metacarpal, a right lateral cuneiform, a mandibular condyle, a left patella, and a severely worn permanent molar. One deciduous molar in development stage 3, cusp outline complete ($C_{oc}$), represents the newborn.

## Area 2

Area 2, located on the east side of the church adjacent to the northeast corner under the bell tower, was the location of the second burial (Burial 2h) identified during archaeological monitoring of the stabilization of Mission San Juan. Located between Buttresses 1 and 2, the area measures approximately 4-x-2 m (see Figure 12-2). The excavated area was enlarged into the mission courtyard by another 0.8-x-0.8 m at the southeast corner to expose a burial (Burial 2q) that extended past the bounds of the original trench. The entire area was hand-excavated from approximately 1.0 mbs to a terminal depth of 2.5 mbs. A large area, approximately 0.3-x-0.7 m, along the east wall of Area 2, was disturbed by rodent activity. Prior to excavation of the construction trench, two test units (TUs 7 and 8) were dug by the CAR archaeologists (see Chapter 5 and Figure 12-7). The 1-x-2 m unit formed by TUs 7 and 8 was located against the wall of the church approximately 0.3 m south of the Buttress 1 footer and extended 2 m to the east. Two additional test units were excavated in the southwest corner of Area 2, one by Thompson (2011) and the other by Schuetz (1968, 1969).

A minimum of 15 individuals based on nine articulated burials, consisting of two adults (Burials 2h and 2k), one child (Burial 2q), one infant (Burial 2b), and five perinates (Burials 2f, 2j, 2l, 2m, and 2n), one partially articulated child (Burial 2a), one disarticulated child (Burial 2g), and disassociated skeletal elements (n=474), were exhumed (Table 12-5). The disassociated elements represent at least four individuals: one adult (Burial 2r), one child (Burial 2u), and two perinates (Burials 2s and 2t).

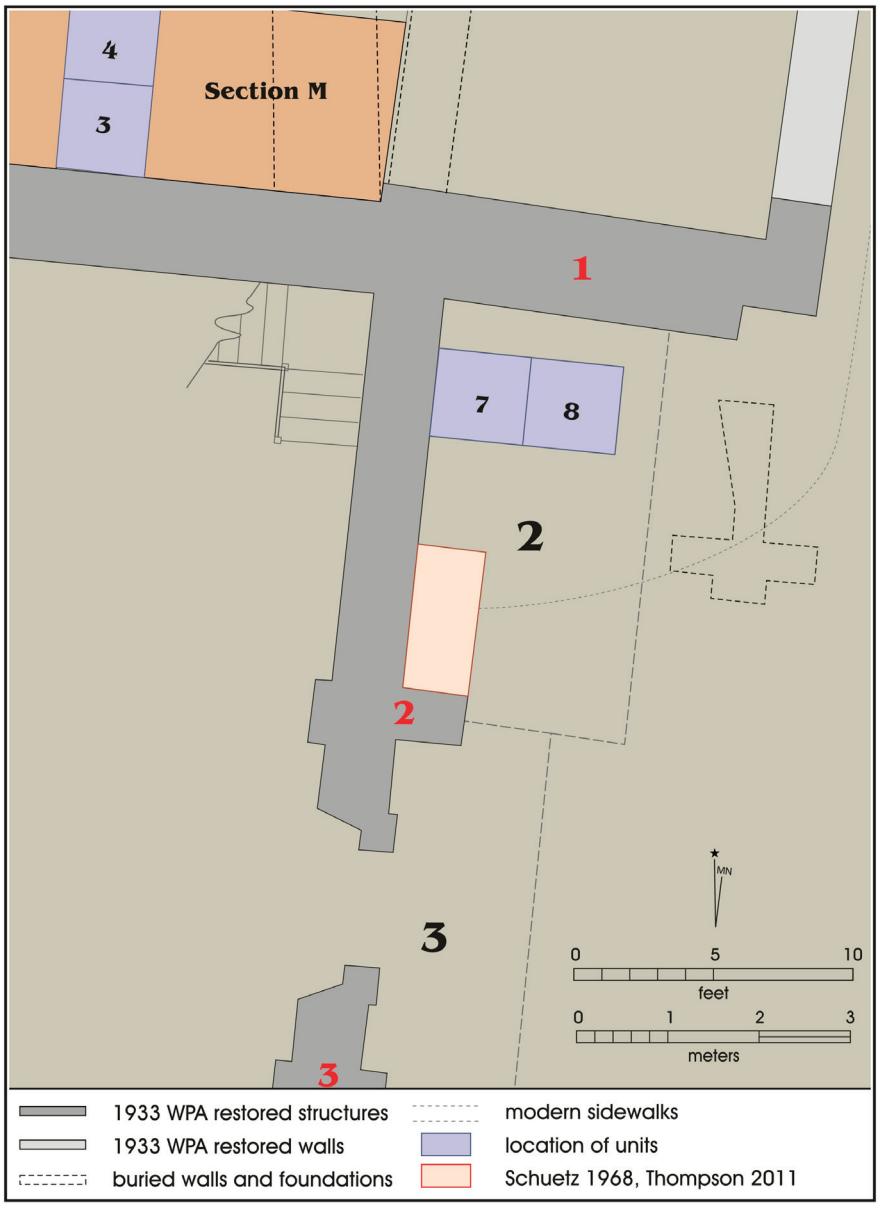


Figure 12-7. *Map of Area 2 showing the locations of test units excavated by the CAR in 2011 and 2012 and by Schuetz in 1968.*

Table 12-5. Osteological Summary for Area 2

| | |
|---|---|
| **MNI** | 15 |
| **Age at Death** | 1 old adult (50+ years), 1 young adult (20-35 years), 1 adult of indeterminate age, 1 child (5-7 years), 1 child (4 years +/- 12 months), 1 child (2-4 years), 1 child (1.5 years), 1 infant (9-12 months), 7 newborns (+/- 2 months) |
| **Sex** | 1 male, 1 female, 13 indeterminate |
| **Ethnicity** | 1 Caucasian/Hispanic, 2 Native American, 1 possibly Native American, 11 indeterminate |
| **Manner of Death** | 1 possibly from systemic infection, 1 possibly from systemic stress/malnutrition, 13 indeterminate |
| **Temporal Affiliation** | Historic |

## Burial 2a

This burial, consisting of an articulated skull (without mandible) and the first cervical vertebra, is a possibly Native American child of 4 years +/- 12 months of indeterminate sex. It appears to have been disturbed by the interment of Burial 2h. The remains were located 1.4 mbs, 1.3 m north of Buttress 2, and were parallel to the church wall. The orientation of the skull suggests that the body was originally positioned on a north-south axis, in a supine position with the skull to the north facing to the west (see Figure 12-8 and Table 12-1). Fragments of coffin nails in proximity of the skull suggest that the remains were buried in a coffin. No personal items were recovered with Burial 2a.

### *Age*

The age of this individual is estimated from dental development and epiphyseal closure. The deciduous maxillary molars are at the apex closed ($A_c$) stage of development. The remaining deciduous teeth were lost post-mortem. Seven permanent maxillary teeth were present. The first molars and one central

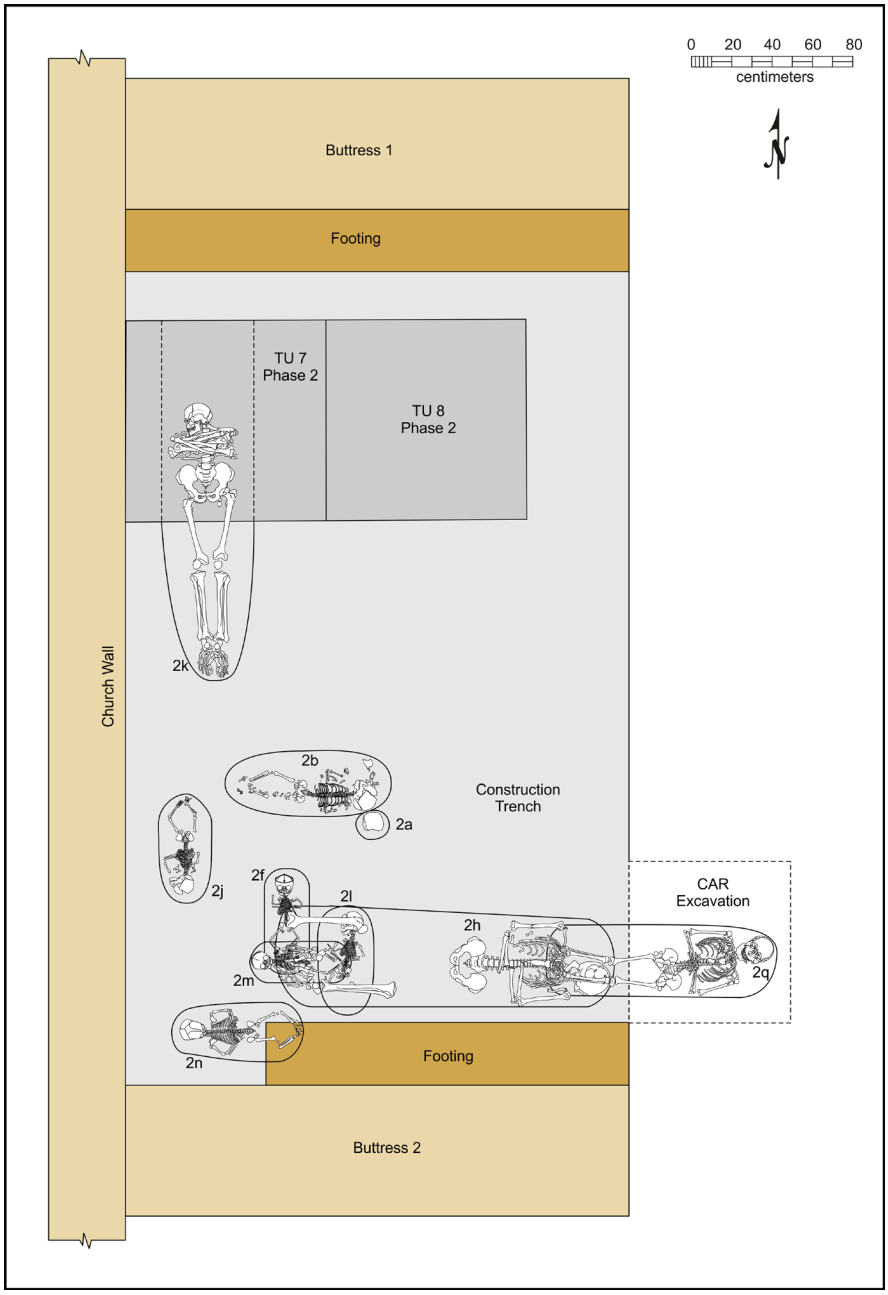


Figure 12-8. *Map of Area 2 showing the locations of Burials 2a, 2b, 2f, 2h, 2j, 2k, 2l, 2m, 2n, and 2q.*

incisor are present in the initial root formation ($R_i$) stage, the premolars in the initial cusp formation ($C_i$) stage, and the canines in the crown ½ complete (Cr1/2) stage (Moorees et al. 1963a, b). This development sequence suggests an estimated age of 4 years +/- 12 months (Buikstra and Ubelaker 1994; Ubelaker 1989b). The stage of epiphyseal fusion in the first cervical vertebra, the posterior arches are completely fused and the anterior arch is not fused, indicate a child of approximately five years old (Baker et al. 2010).

### *Ancestry*

The recovered maxillary central incisor was semi-shovel-shaped with strong ridges converging at the cingulum, suggesting Native American ancestry (Hillson 1996). Due to the absence of additional ancestral markers, Burial 2a is considered a possible Native American.

### *Pathology*

No bone pathology was noted on the elements recovered from Burial 2a.

## Burial 2b

Burial 2b is a 9-12 month old infant of indeterminate sex and ancestry. It is a partially disturbed, complete, articulated, primary burial uncovered 1.4 mbs. The left side of the skeleton is immediately adjacent to a 1968 test unit excavated by Schuetz (Schuetz 1968, 1969; Thompson 2006) and a 2011 unit excavated by Thompson (2011). Most likely as a result of disturbance from the test units the left humerus, radius, ulna, pubic, femur, and fibula were fragmented and slightly displaced. The burial, located 1.5 m north of Buttress 2, was perpendicular to the church wall. The body was positioned on an east-west axis, in a supine position with the skull to the east facing to the north. The arms were folded across the midsection (see Figure 12-8 and Table 12-1). An outline of disintegrated wood and coffin nails was noted running east-west on the south side of the skeleton. Coffin nails were also recovered from above and beneath the body. One shell and two ceramic buttons were found with the burial (Figure 12-9; see Table 12-3).

### *Age*

The age of this individual is estimated from a combination of epiphyseal fusion, dental development, and longbone measurements. With the exception of some of the cervical, thoracic, and lumbar vertebrae neural arches, all epiphyseal ends were unfused. Neural arches commence fusing together at one year and are completely fused by three years. The right and left sides of the frontal are completely fused. Typically, the frontal fuses in the first year of life. The coracoid of the scapula and the distal epiphyses of the fibulae are present. These bones ossify from one to three years and six months to one year, respectively (Baker et al. 2010). The individual's longbone measurements were compared to a template of the longbones of a one and one-half year old in Baker et al. (2010). The burial was smaller suggesting a slightly younger age.

The deciduous maxillary lateral incisors and left central incisor are at a development stage of root length ¾ (R3/4), the right central and mandibular central incisors are at root length ½ (R1/2), the mandibular first molars are at root length ¼ (R1/4), the maxillary right first molar is at stage initial cleft formation ($Cl_i$), and the right second molars are both at the crown ¾ complete (Cr3/4) stage. The right maxillary canine and the left mandibular canine are stage crown complete ($Cr_c$) and initial root formation ($R_i$), respectively. Three permanent molars were recovered, all presenting at the coalescence of cusps ($C_{co}$) developmental stage (Moorees et al. 1963a, b). The maxillary left central incisor and mandibular central incisors were just clearing the alveolar bone. No other teeth were erupted. These stages indicate an age of nine months +/- three months (Buikstra and Ubelaker 1994; Ubelaker 1989b). Based on the combination of age indicators, an age of 9-12 months was determined for Burial 2b

### *Dentition*

Sixteen teeth represent the dentition of Burial 2b. The maxillary left canine and molars, and the mandibular lateral incisors, right canine, and left second molar are missing. The incisors exhibit shovel shaped morphology (Hillson 1996). Because the maxilla and mandible were fragmented and the alveolar bone associated with these teeth is destroyed, it is probable that the teeth were lost post-mortem, possibly during excavation.

### *Pathology*

No bone pathology was noted on Burial 2b.

## Burial 2f

This individual is a newborn +/- two months of indeterminate sex and ancestry. This is a complete, articulated, primary burial uncovered 1.7 mbs. It lies below the feet of Burial 2h (an adult) and above the left side of Burial 2m (an infant; Figure 12-10). The burial is 0.8 m north of Buttress 2 and is parallel to the church wall. It was interred on a north-south axis, in a supine position with the skull to the north and facing up. The arms were folded across the midsection

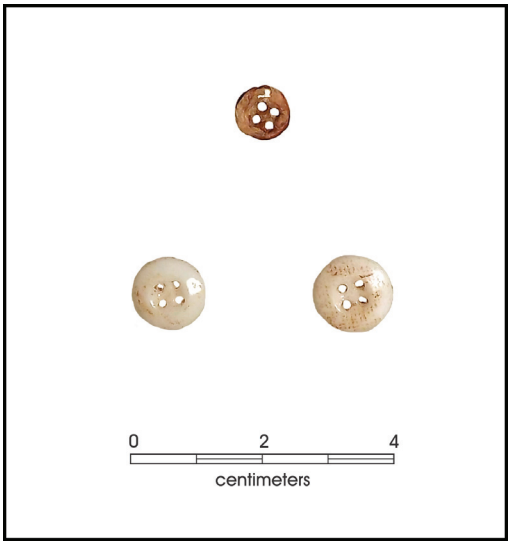


*Figure 12-9. Shell and ceramic buttons associated with Burial 2b.*

(see Table 12-1). Remnants of nails suggest that the remains were buried in a coffin. One ceramic button and a ferrous headpiece were recovered with the burial. The headpiece appears to be a crown or tiara that was topped with a cross. It was wrapped around the baby's parietals and frontal (Figure 12-11, see Table 12-3).

### *Age*

Comparisons of measurements of longbones to templates in Baker et al. (2010) indicate that Burial 2f is a newborn. No epiphyseal ends were fused, and no epiphyses were present except for a proximal tibial epiphysis, also indicating a newborn (Buikstra and Ubelaker 1994; Krogman and Iscan 1986; McKern and Stewart 1957; Redfield 1970; Suchey et al. 1984; Ubelaker 1989a, b). The deciduous incisors are at the crown complete ($Cr_c$) stage of development, the canines are crown ½ complete (Cr1/2), the mandibular first molars are crown ¾ complete (Cr3/4), and the maxillary first molar and mandibular second molars are at cusp outline complete ($C_{oc}$; Moorees et al. 1963a; Moorees et al. 1963b). No teeth are erupted. No permanent teeth are present. These stages give an estimated age of birth +/- 2 months (Buikstra and Ubelaker 1994; Ubelaker 1989b).

### *Dentition*

The dentition consists of the deciduous maxillary right central incisor, both lateral incisors, and the right canine and first molar. All of the mandibular teeth are present with the exception of the right lateral incisor. Incisors exhibit shovel shape morphology.

## Burial 2g

Burial 2g consists of skull fragments only. The fragments were spread out and located 1.45 mbs, immediately under and to the north and east of Burial 2b. The skull represents a child of two to four years old of indeterminate sex and ancestry (see Table 12-1). Because of the close proximity of Burial 2g (two to four years) to Burial 2a (four years +/- 12 months), the skull fragments were carefully analyzed to ensure these were separate individuals. Duplication of elements and size differences confirmed the individuality. Disturbance by Burial 2b obscured any evidence of a burial pit. It is possible some of the coffin nails recovered with Burial 2b were associated with 2g.

### *Age*

The age of this individual is based on a comparison of the size of skull fragments with those of other burials in Area 2.

## Burial 2h

This individual, an old adult male aged 50+ years of Caucasian/Hispanic ancestry, is represented by a mostly complete skeleton. Burial 2h is an articulated, primary burial uncovered 1.6 mbs. Located parallel and adjacent to the Buttress 2 footer, the remains were 2.3 (skull) to 0.85 m from the church wall (see Table 12-1). The burial was disturbed by an auger bore and by the interments of Burials 2l and 2m resulting in displacement of the femora, the right fibula, and the left tibia (Figure 12-12). The right tibia is missing. Because the left tibia was completely fragmented, it is

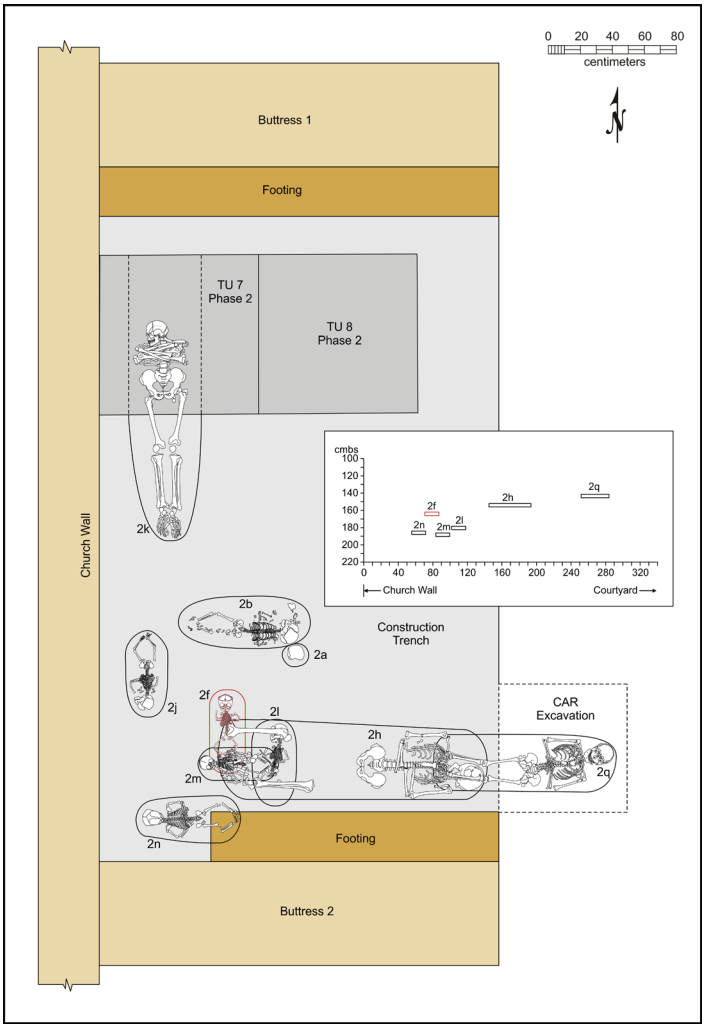


Figure 12-10. *Vertical relationship of Burial 2f to Burials 2h, 2l, 2m, 2n, and 2q.*

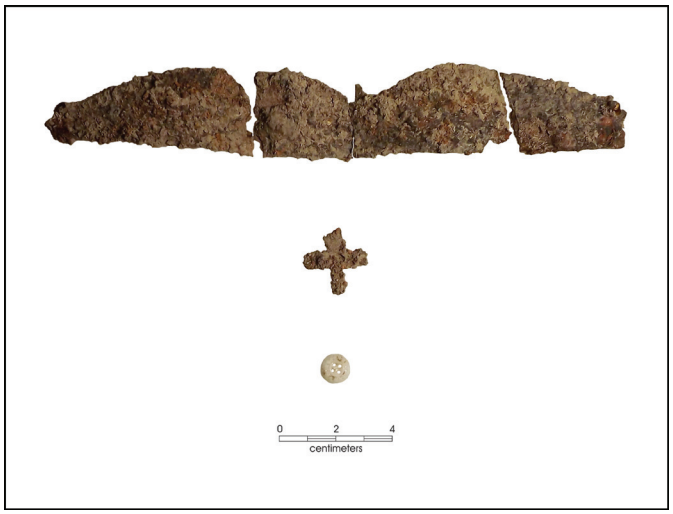


Figure 12-11. *Ceramic button and ferrous headpiece associated with Burial 2f.*

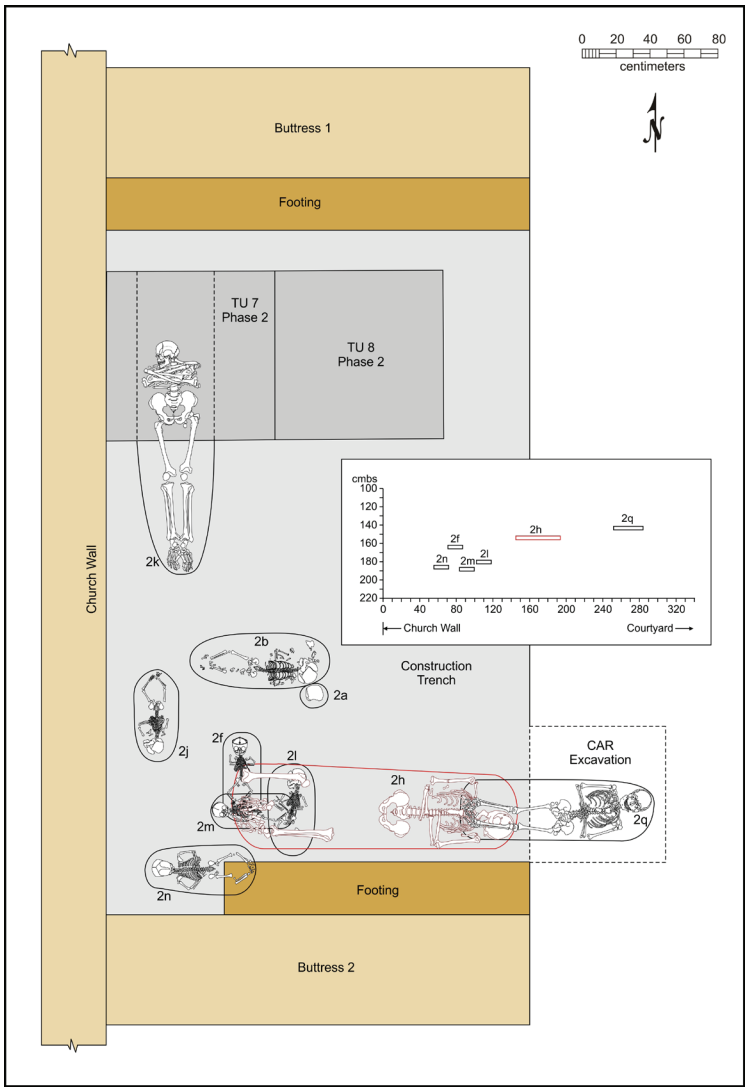


Figure 12-12. *Vertical relationship of Burial 2h to Burials 2f, 2l, 2m, 2n, and 2q.*

highly probable that the right tibia is part of the unidentified fragments for this burial. Remnants of coffin nails and wood suggest that the remains were buried in a coffin. The body was extended on an east-west axis in a supine position. His skull was located to the east facing south, and the arms were folded across the abdomen. Three ceramic and one bone button were recovered with the burial (Figure 12-13).

## *Sex*

As per Buikstra and Ubelaker (1994), the sex of this individual was based on skull and pelvic morphology. The overall size of the postcranial skeleton and the postcranial elements that exhibit sexual dimorphism were also considered. An assessment of pelvic elements, including the left and right ventral arc, subpubic concavity, and ischiopubic ramus ridge, and the left greater sciatic notch and preauricular sulcus, indicates a male with certainty. Although the splanchnocranium was crushed in situ, examination of the nuchal crest, mastoid process, right supraorbital margin, and the mental eminence resulted in a rating of probable male. Measurement of the left femoral head (42.6 mm) falls in the probable female range (42.5-43.5 mm; Bass 1995). The left femoral midshaft circumference (92 mm) indicates a male (>81 mm; Bass 1995; Black 1978; Di Bennardo and Taylor 1979). A comparison of Burial 2h cranial measurements to FDB White male and female cranial measurements resulted in a classification of male (Ousley and Jantz 2005).

## *Age*

This individual's age is estimated from pelvic morphological changes, degree of cranial suture closure, and morphology of the long bones and joint surfaces (Buikstra and Ubelaker

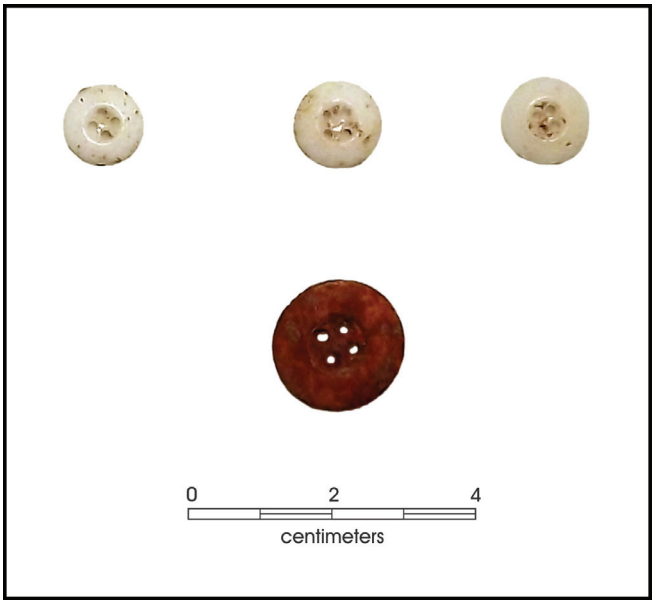


Figure 12-13. *Bone and ceramic buttons associated with Burial 2h.*

1994). The Suchey-Brooks system indicates a mean age of 59 years, and the Todd system suggests an age of 45+ years (Brooks and Suchey 1990; Suchey and Katz 1986; Todd 1921a, b). The stage of closure for available external and internal cranial vault sutures indicates an old adult (50+). This conclusion is based on significantly and completely closed sutures (Meindl and Lovejoy 1985). The long bones and vertebrae were examined for indications of osteoarthritis. The joint surfaces of the left femur, fibulae, and radii, as well as both iliac crests of the os coxae show degenerative changes including lipping. Severe changes, including lipping and bony spurs, are evident on the left and right first metatarsals, the right third and fourth metacarpals, a single foot phalanx, the humeri, the ulnae, the lumbar vertebrae, and one thoracic vertebra. These morphological changes are consistent with an individual over 50 years old.

### *Ancestry*

Morphological traits suggesting Native American ancestry, including shovel-shaped incisors, complex cranial sutures, and Wormian bones are not present on Burial 2h (Hillson 1996; White 2000). The femora with an index of 98.8 (Bass 1995) are not platymeric (<84.9 indicates platymeria). Cranial measurements were entered into the ForDisc, and discriminate functions were run comparing Burial 2h data to White males (n=292), Hispanic males (n=61), and American Indian males (n=34; Ousley and Jantz 2005). The remains were classified as statistically closest to Hispanic (Ousley and Jantz 2005).

### *Dentition*

The dental health of this individual was generally good with the exception of extremely heavy calculus deposits on all but the maxillary incisors and canines. Calculus is light on the incisors and moderate on the canines. Most of the dentition is present. There is no evidence of antemortem tooth loss. The right third maxillary molar is congenitally missing, and the left second and third maxillary molars along with the associated alveolar bone have been lost post-mortem. No carious lesions are present. Dental attrition is moderate to heavy with the most wear on the lateral maxillary incisors, the central and lateral mandibular incisors, and the mandibular canines. The maxillary canines and central incisors show three occurrences each of enamel hypoplastic defects indicating systemic stress between 9 months (+/- 3 months) to 3 years (+/- 12 months) based on developmental standards (Buikstra and Ubelaker 1994; Ubelaker 1989b).

### *Stature*

Burial 2h postcranial measurements were entered into ForDisc for stature estimation. Stature based on nineteenth-century statistics for White males was calculated as 1.60 m. Because the discriminate functions for height estimates are based on data from whites and blacks, the Trotter and Gleser (1952, 1958) stature formula for Hispanic males based on femur length was also calculated. The individual ranges from 1.53-1.59 m (Bass 1995).

### *Pathology*

Osteoarthritis is present on the left and right first metatarsals, the right third and fourth metacarpals, one foot phalanx, the humeri, the ulnae, the left femur, fibulae, radii, the lumbar vertebrae, and one thoracic vertebra, as well as both iliac crests of the os coxae. The arthritic changes range from moderate to severe. Some of these bones exhibit severe osteophytic lipping, porosity, and eburnation. This individual had partial sacral spina bifida. The development of the sacral hiatus occurred between the second and third sacral foramina.

## Burial 2j

The remains belong to a newborn +/- two months of indeterminate ancestry and sex. This is an articulated, complete, primary burial lying 1.52 mbs. No evidence of intrusion was noted. The burial is parallel to and approximately 0.3 m east of the church wall. It was lying on a north-south axis, with the skull to the south and facing west, in a supine position. The arms were folded across the midsection (see Figure 12-8 and Table 12-1). Coffin nails and disintegrating wood were around and within the burial. No personal items were recovered with the remains.

### *Age*

Stage of epiphyseal closure, longbone measurement, and dental development were used to estimate the age of this individual. No epiphyseal ends were fused, and no epiphyses were present indicating a newborn (Buikstra and Ubelaker 1994; Krogman and Iscan 1986; McKern and Stewart 1957; Redfield 1970; Suchey et al. 1984; Ubelaker 1989a, b). Comparisons of measurements of longbones to templates in Baker et al. (2010) suggest that Burial 2j is a newborn. The stage of dental development for the incisors is crown complete ($Cr_c$), for the canines and maxillary first molars is crown ½ complete (Cr1/2), for the mandibular first molars is crown ¾ complete (Cr3/4), and for the mandibular second molars is coalescence of cusps ($C_{co}$; Moorees et al. 1963a; Moorees et al. 1963b). All teeth remain in crypt. No permanent teeth are present. These stages correspond to an estimated age of birth +/- 2 months (Buikstra and Ubelaker 1994; Ubelaker 1989b).

### *Dentition*

Fifteen deciduous teeth were recovered from Burial 2j, including the maxillary central and right lateral incisors, right canine, and right first molar. Shovel-shaped morphology is evident on the maxillary incisors. All of the mandibular teeth are present.

## Burial 2k

Burial 2k contained a young adult female aged 20-35 years of Native American ancestry. Although the skeleton is complete, it was only partially articulated. The skull, clavicles, scapulae, sternum, ribs, cervical and thoracic vertebrae, first lumbar vertebra, and humeri were disassociated and jumbled to the north of their original positions. Previous outside spotlights were located in the northwest corner of Area 2 and may account for some of the disturbance, but it is unlikely the disturbance would have extended as deep as the burial. Another possible explanation is intrusion resulting from rodent activity. A large rodent tunnel was uncovered on the eastern edge of Area 2 during the burial exhumations. Additionally, two test units, TUs 7 and 8 (see Figure 12-7), were excavated directly over the northern portion of Burial 2k by the CAR in September of 2011, seven months before the exhumation of Area 2. There is no documentation of adult human bone in the lower levels of the units, but it is possible that the digging activity may have disturbed the burial directly under the floor of the units.

The individual was uncovered 1.4 mbs and approximately 1.2 m south of the Buttress 1 footer. It was parallel to and located 0.4 m from the church wall (see Figure 12-8 and Table 12-1). Burial 2k was extended on a north-south axis in a supine position. Her skull, disturbed and lying on the lower rib cage, would have originally been located to the north. The arms were crossed on the lower abdomen. Remnants of wood and coffin nails suggest that the burial was enclosed in a coffin. No personal items were recovered.

### *Sex*

An assessment of pelvic elements indicates a female with certainty. The medial surface of the ischiopubic ramus ridge form a pronounced crest like ridge (Buikstra and Ubelaker 1994). Although the skull was partially crushed in situ, observation of the nuchal crest, mastoid process, and the mental eminence suggest a probable female.

### *Age*

The degree of cranial suture closure and long bone and joint surface morphology were examined to determine the age of Burial 2k (Buikstra and Ubelaker 1994). Because the pelvis was crushed in situ, the Suchey-Brooks and the Todd systems were not used. Open external cranial sutures with no evidence of minimal closure indicate a young adult (20-35 years; Meindl and Lovejoy 1985). No joint surfaces from this burial exhibit evidence of lipping, pitting, or eburnation suggesting that this individual was a young adult.

### *Ancestry*

Morphological traits indicate that the remains are of probable Native American ancestry. The central incisors exhibit double shoveling with ridging pronounced for at least half the crown height. The upper first premolars are single rooted (Hillson 1996). Because of skull fragmentation, it was not possible to detect complex cranial sutures or the presence of Wormian bones (Hillson 1996; White 2000). Insufficient cranial measurements were available to run the ForDisc discriminate functions comparing Burial 2k data to White, Hispanic, and American Indian cases. For postcranial measurements, only White and Black cases are available for comparison on ForDisc (Ousley and Jantz 2005). Measurements necessary to assess platymeria were not obtained due to the fractured condition of the epiphyseal ends of the femora.

### *Dentition*

The dental health of this individual was generally good. Most of the dentition is present. There is no evidence of antemortem tooth loss although six teeth are unaccounted

for. The right mandibular second and third molars are missing with no alveolar resorption, and the left mandibular premolars and second and third molars are absent with no associated alveolar bone suggesting all six teeth were lost post-mortem. No caries activity is present. Dental attrition is slight with the exception of the mandibular incisors indicating moderate wear (Scott 1979; Smith 1984). Calculus deposits are slight. Three occurrences of enamel hypoplasias are present on each of the central incisors and canines suggesting the individual experienced systemic stress from approximately 9 months to 4 years of age (Buikstra and Ubelaker 1994; Ubelaker 1989b).

### *Stature*

The postcranial measurements from Burial 2k were entered into ForDisc for stature estimation. Stature based on nineteenth-century statistics for white females was calculated as 1.65 m. Because the discriminate functions for height estimates are based on data from whites and blacks, the Trotter and Gleser (1952, 1958) stature formula for Mongoloid females based on fibula length was calculated. The burial ranges from 1.63-1.69 m (Bass 1995).

### *Pathology*

Pathological bone lesions as well as degenerative changes are absent suggesting that Burial 2k was relatively healthy.

## Burial 2l

This individual is a newborn +/- two months of indeterminate sex and ancestry. This is a mostly complete, articulated, primary burial interred 1.86 mbs. It was located below the lower legs of Burial 2h (an adult) and above the legs of Burial 2m (an infant; Figure 12-14). A displaced adult femur and tarsal from Burial 2h near the skull and to the immediate west of Burial 2l suggest that the burial may have intruded into Burial 2h. The burial was approximately 0.6 m north of and perpendicular to Buttress 2. It was positioned on a north-south axis, with the skull to the north and facing west. The body was in a supine position with the arms folded across the midsection (see Table 12-1). No personal items were recovered with the remains. Remnants of nails around and within the burial indicate a coffin burial.

### *Age*

No epiphyseal ends were fused and no epiphyses were present indicating a newborn (Buikstra and Ubelaker 1994; Krogman and Iscan 1986; McKern and Stewart 1957; Redfield 1970; Suchey et al. 1984; Ubelaker 1989a, b). The right and left halves of the frontal bone are not fused suggesting the individual died in the first year of life. The frontal bones typically fuse in the first year of life, but the metopic suture can take up to four years to completely fuse (Baker et al. 2010). The lengths of the right humerus, radius, ulna, and femur are longer than a third trimester fetus but shorter than those of a neonate (Baker et al. 2010). Based on the postcranial skeleton, Burial 2l appears to be a late stage fetus/preterm or a newborn.

The deciduous maxillary incisors are at the crown complete ($Cr_c$) stage of development, the maxillary canines are crown ¾ complete (Cr3/4), the maxillary first molars are crown ½ complete (Cr1/2), and the maxillary and mandibular second molars are at cusp outline complete ($C_{oc}$; Moorees et al. 1963a; Moorees et al. 1963b). No permanent teeth are present. No teeth are erupted. This developmental stage suggests an age of birth +/- 2 months (Buikstra and Ubelaker 1994; Ubelaker 1989b).

### *Dentition*

Burial 2l is represented by eight deciduous teeth consisting of the left mandibular second molar and the maxillary right canine, right second molar, left incisors, left canine, and left molars.

## Burial 2m

Burial 2m is a newborn +/- two months of indeterminate sex and ancestry. This is a complete, articulated, primary burial lying 1.93 mbs. The body was positioned below the feet of Burials 2h and 2f and below the abdomen of Burial 2l (Figure 12-15). It appears to have intruded into Burial 2h. The displaced adult femur from Burial 2h, mentioned above as lying adjacent to the skull of Burial 2l, paralleled Burial 2m and was positioned immediately north of its postcranial skeleton. The remains, parallel to Buttress 2, approximately 0.6 m to its north, were positioned on an east-west axis, with the skull to the west, face up. The body was lying in a supine position with the arms folded across the midsection (see Table 12-1). Fragments of nails and disintegrating wood around and within the burial indicate a coffin burial. Three ceramic buttons and three cuprous straight pens were found among the remains (Figure 12-16; see Table 12-3).

### *Age*

The age of Burial 2m was estimated from a combination of longbone measurements, epiphyseal fusion, and dental development. No epiphyseal ends are fused, and no epiphyses are present, except for the proximal tibial epiphyses. These epiphyses first ossify from birth to six months (Baker

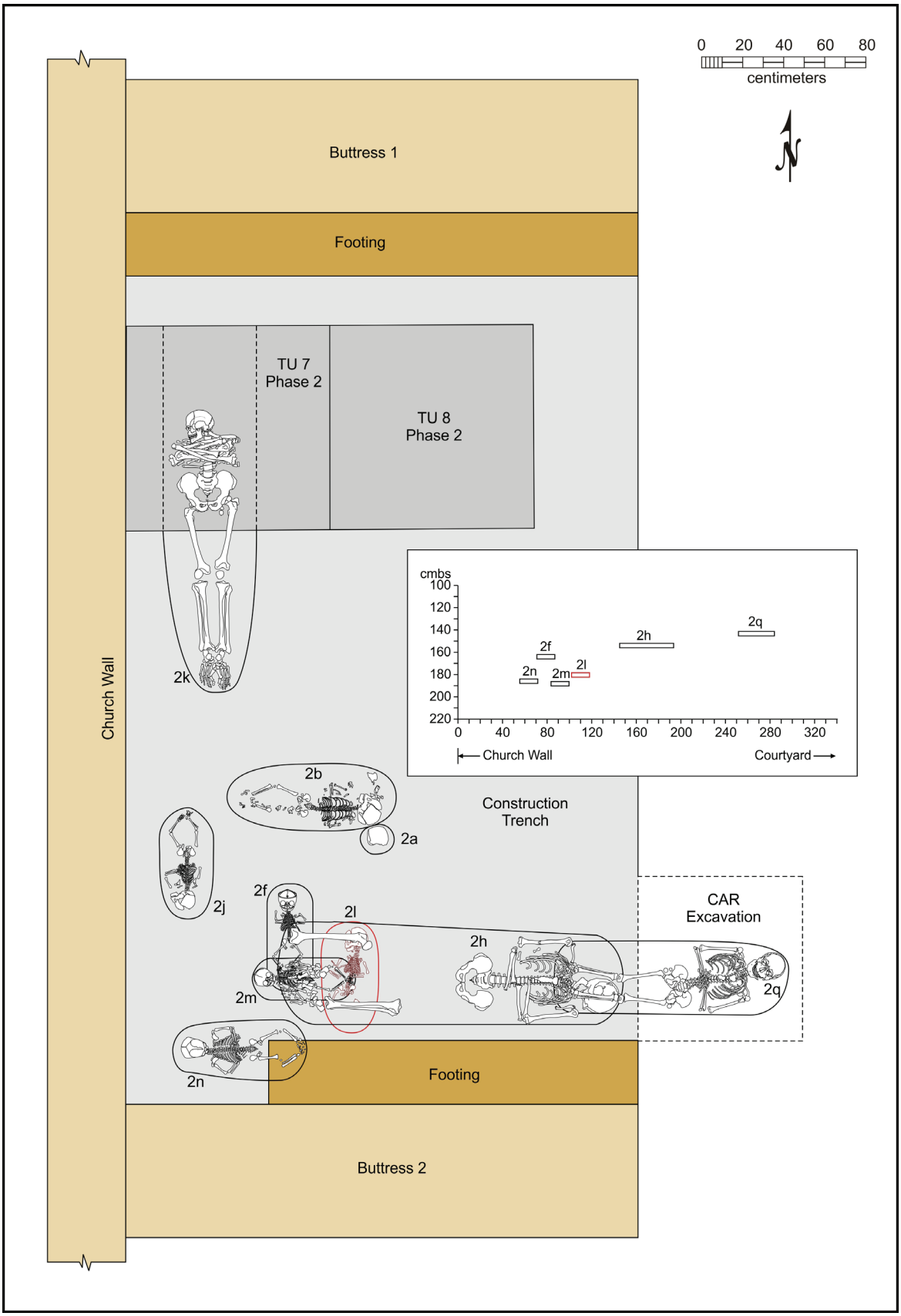


Figure 12-14. *Vertical relationship of Burial 2l to Burials 2f, 2h, 2m, 2n, and 2q.*

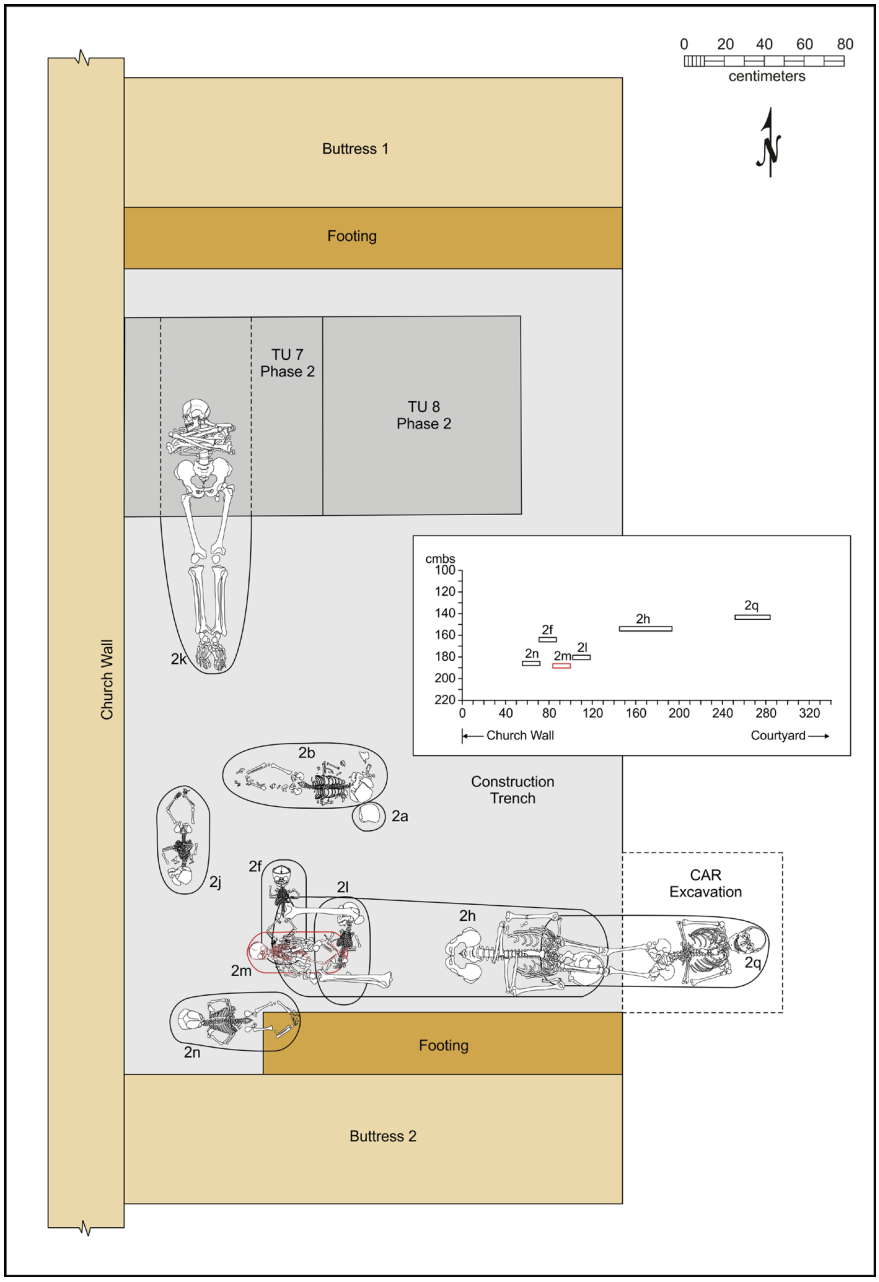


Figure 12-15. *Vertical relationship of Burial 2m to Burials 2f, 2h, 2l, 2n, and 2q.*

et al. 2010). A comparison of the individual's longbone measurements to templates in Baker et al. (2010) suggest that the remains are older than a third trimester fetus but younger than a newborn.

The deciduous maxillary central and right lateral incisors and the mandibular incisors are at the crown complete ($Cr_c$) stage of development. The left lateral maxillary incisor is at the crown ¾ complete (Cr3/4) stage. The canines and mandibular first molars are crown ½ complete (CR1/2), the maxillary first molars and mandibular second molars are at cusp outline complete ($C_{oc}$), and the maxillary second molars are at the coalescence of cusps ($C_{co}$) stage of development (Moorees et al. 1963a, b). All teeth are in crypt. No permanent teeth are present. The developmental stage of the dentition indicates an age of birth +/- 2 months (Buikstra and Ubelaker 1994; Ubelaker 1989b). Based on the combination of age indicators, an age of newborn was determined for Burial 2m.

### *Dentition*

Nineteen teeth were recovered from Burial 2m. All of the deciduous dentition except for the maxillary left canine are present. Slight shoveling is apparent on the maxillary incisors.

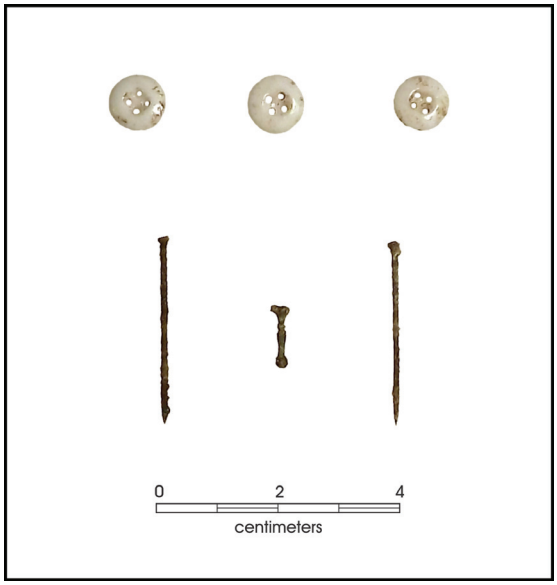


Figure 12-16. *Ceramic buttons and cuprous pins associated with Burial 2m.*

### *Pathology*

The left and right femur exhibit regions of active periostitis, and the left fibula and left os coxae present evidence of a mild periosteal reaction.

## Burial 2n

Burial 2n, located 0.25 m north of Buttress 2, was partly covered by the buttress footer. The remains were perpendicular to the church wall with the pelvis approximately 0.6 m to its east (see Table 12-1). The burial was lying on an east-west axis, with the skull to the west, face up. It was in a supine position with the arms crossed on the midsection. This is a newborn +/- two months of indeterminate sex and ancestry. It is a complete, articulated, primary burial lying 1.85 mbs (Figure 12-17). Fragments of nails and disintegrating wood around and within the burial indicate a coffin burial. No personal items were recovered.

### *Age*

An assessment of dental development, longbone measurements, and epiphyseal fusion suggest that Burial 2n is a perinate. No permanent teeth are present. The incisors are all at the crown complete ($Cr_c$) stage of development. The maxillary right canine and first molar are at the crown ½ complete (Cr1/2) stage. The second molars are at the cusp outline complete ($C_{oc}$) stage of development (Moorees et al. 1963a, b). All teeth are in crypt. These developmental stages indicate an age of birth +/- 2 months (Buikstra and Ubelaker 1994; Ubelaker 1989b). Postcranially, no epiphyseal ends were fused, and no epiphyses were present. Although slightly smaller than a full term newborn, the longbones are too large to belong to a third trimester fetus (Baker et al. 2010). This combination of age indicators suggest that Burial 2n is a newborn +/- 2 months of age.

### *Dentition*

Twelve deciduous teeth were recovered from Burial 2n. Eight teeth, consisting of the left maxillary central incisor, canine, and first molar, and the mandibular canines, first molars, and left second molar, were lost post-mortem. Morphologically the maxillary incisors show a trace of shoveling.

## Burial 2q

This individual is a 5-7 year old, Native American child of indeterminate sex. This is a complete, articulated, primary burial uncovered 1.46 mbs. The child's remains were located parallel to and roughly 0.65 m from Buttress 2. The pelvis was positioned 2.7 m east of the church wall. The remains were extended in a supine position with the body positioned on an east-west axis. The skull, located to the east, was face up and the arms were folded across the midsection (see Table 12-1). The lower legs and feet of Burial 2q were lying directly over the head and shoulders of Burial 2h. Neither burial intruded upon the other (Figure 12-18). Fragments of wood and coffin nails suggest that the remains were interred in a coffin. Six ceramic buttons and one cuprous pin were recovered with the remains (Figure 12-19). Copper staining is evident on the proximal-anterior surface of the third lumbar body. This stain may have resulted from post-mortem contact with the cuprous pin.

### *Sex*

Because most of the morphological features related to sexual differences are not present until after the onset of puberty, sex could not be estimated for this individual with acceptable accuracy.

### *Age*

The age of Burial 2q was estimated from a combination of dental development and epiphyseal fusion (Buikstra and Ubelaker 1994). The dentition of this child consists of 22 fully erupted teeth, two partially erupted teeth, and nine teeth in crypt. The deciduous canines and molars (maxillary and mandibular) are at the apex closed ($A_c$) stage of development. The permanent mandibular incisors, the central maxillary incisors, and the right maxillary first molar correlate to the root length ¾ (R3/4) stage. The permanent left maxillary first molar and the mandibular first molars are at root length ½ (R1/2), and the unerupted permanent canines are at stage $R_i$ (initial root formation). The partially erupted permanent lateral maxillary incisors and the unerupted premolars are all at the crown complete ($Cr_c$) development stage. One maxillary left second molar was present in crypt in the crown ¾ complete stage (Cr3/4; Moorees et al. 1963a; Moorees

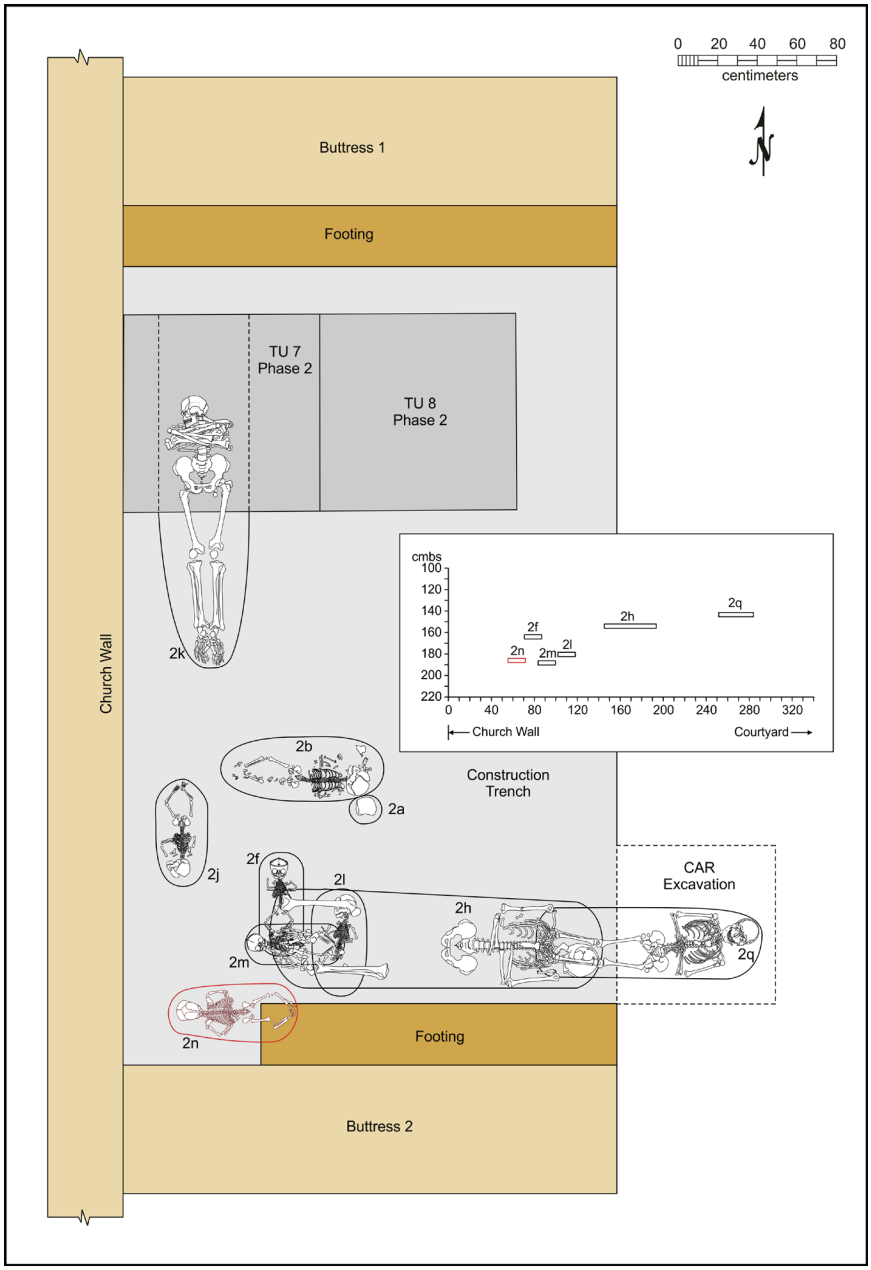


Figure 12-17. *Vertical relationship of Burial 2n to Burials 2f, 2h, 2l, 2m, and 2q.*

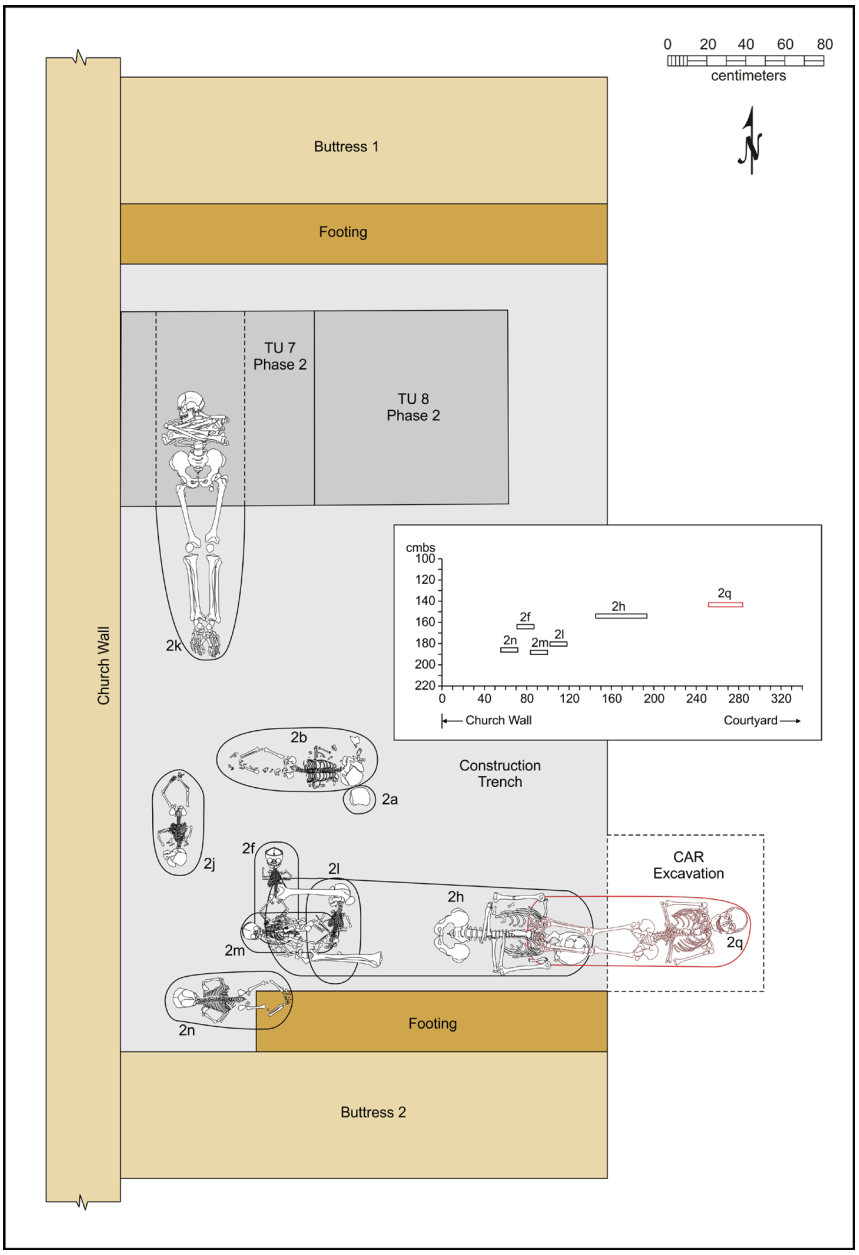


Figure 12-18. *Vertical relationship of Burial 2q to Burials 2f, 2h, 2l, 2m, and 2n.*

et al. 1963b). The dental development is consistent with an individual of 7 years +/- 24 months of age (Buikstra and Ubelaker 1994; Ubelaker 1989b).

The spheno-occipital synchondrosis is open, and the occipital (lateral to squama and basilar to lateral) is completely closed. The cervical vertebrae are completely united. Thoracic and lumbar neural arches are completely fused to each other and partially united to the centrums. Epiphyseal fusion corresponds to an age of 3-6 years (Krogman and Iscan 1986; McKern and Stewart 1957; Redfield 1970; Suchey et al. 1984; Ubelaker 1989a, b).

### *Ancestry*

The maxillary incisors are semi-shoveled with stronger ridges converging at the cingulum. The shovel morphology along with the presence of Wormian bone in the occipital sutures of the cranium indicate that Burial 2q is of Native American ancestry (Hillson 1996; White 2000).

### *Dentition*

The dentition of this individual was represented by 33 teeth (21 permanent and 12 deciduous) in a complete mandible and

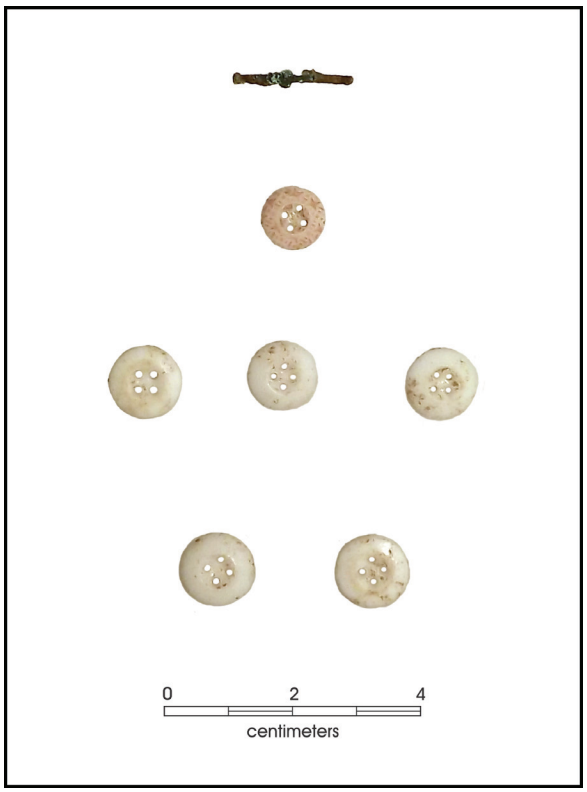


Figure 12-19. *Ceramic buttons and cuprous pin associated with Burial 2q.*

maxilla. The permanent incisors have erupted with all but the maxillary lateral incisors in full occlusion. The maxillary lateral incisors are through the alveolar bone, just reaching the occlusal plane. All four permanent first molars are erupted and mostly developed. The left maxillary permanent second molar with partial crown completion is evident in crypt. All the permanent canines and premolars with the exception of the right mandibular canine, one left maxillary premolar, and both right mandibular premolars were present in crypt. The missing teeth were likely lost post-mortem. All deciduous molars and canines were in occlusion. Attrition and calculus deposits are slight to not evident. No caries activity is present.

Enamel hypoplasias were evident on the permanent maxillary incisors and canines with four lines of enamel disruption on each tooth. These enamel defects indicate systemic stress between 9 months (+/- 3 months) to 6 years (+/- 24 months) based on developmental standards (Buikstra and Ubelaker 1994; Ubelaker 1989b).

### *Pathology*

Burial 2q appears relatively healthy as indicated by absence of bone and degenerative pathology. However, hypoplastic defects suggest systemic metabolic stress, such as infectious disease or malnutrition, was an issue in childhood and may have contributed to this child's death.

## Disassociated Human Remains

Various skeletal elements (n=380) and unidentified fragments (154.3 gm) disassociated from Burials 2a, 2b, 2f, 2g, 2h, 2j, 2k, 2l, 2m, 2n, and 2q were recovered from Area 2 (see Table 12-2). Of the 380 elements, 271 could belong to the articulated burials (i.e. the elements could be attributed to missing bone portions on the articulated burials). More than half of these elements were rib and vertebral fragments. The disassociated elements that could not belong to the articulated burials (i.e., they would replicate recovered elements) represent a minimum of four individuals, one adult, one child of approximately 1.5 years, and two perinates.

Elements attributed to the adult consist of one left fourth metatarsal, one left scaphoid, three right carpals (a capitate, a trapezium, and a trapezoid), one left second and one left third metacarpal, one distal epiphyseal end of a right radius, one sacral fragment, one zygomatic, one temporal fragment, and six skull fragments. Three elements, a partial left femur, a partial right humerus, and a complete right scapula, represent the child.

Eighty-nine elements represent the two newborns. Skull fragments include one zygomatic, one right temporal (squama), one unsided temporal (petrous), one left sphenoid greater wing, one basilar occipital portion, and 62 unidentified fragments. Postcranial elements include one left clavicle, two complete left radii, one complete left ulna, one distal end of an unsided ulna, two left and two right pubes, one left ischium, one right ilium, one complete left and one complete right femur, one diaphysis of a right femur, one unsided femur fragment, one left and one right complete tibiae, one proximal end of a left tibia, two complete right fibulae, and two unidentified, unsided longbone fragments.

## Area 3

Area 3 was machine excavated by Pugh Constructors to approximately 1.35 mbs. To this depth, no human remains were noted by archaeological monitors. Subsequently, an auger bore was drilled into the southeast corner of the area against the footer of Buttress 3. Monitors stopped the drilling when human bone was noted in the bore backdirt. The area, located on the east side of the church approximately 4.75 m south of the northeast corner of the church, is bounded by Buttresses 2 and 3 (see Figure 12-2). It was approximately 3.6-x-1.7 m. The excavated area was enlarged by another 0.7-x-0.6 m to expose a burial (Burial 3) that extended under Buttress 3. Area 3 was hand-excavated from approximately 1.35 mbs to a terminal depth of approximately 2 mbs at which time sediments changed to gravelly deposits. The area contained two articulated burials consisting of one adult and one fetus (Burials 3 and 3a; Table 12-6).

Table 12-6. Osteological Summary for Area 3

| | |
|---|---|
| **MNI** | 2 |
| **Age at Death** | 1 old adult (50+ years old), 1 fetus (7 months gestation) |
| **Sex** | 1 probable male, 1 indeterminate |
| **Ethnicity** | 1 Native American, 1 indeterminate |
| **Manner of Death** | indeterminate |
| **Temporal Affiliation** | Historic |

## Burial 3

Burial 3 is an articulated, primary burial uncovered 1.78 mbs. This individual is an old adult, aged 50+ years, probable male of Native American ancestry, represented by a complete skeleton. The burial was disturbed by an auger bore, discussed previously, resulting in displacement and fragmentation of the left and right hands, radii, ulnae, ribs, the sternum, the sacrum, and the thoracic and lumbar vertebrae. The remains were parallel to the church wall, lying against the edge of the construction trench, with the pelvis, legs, and feet continuing under Buttress 3 (Figure 12-20; see Table 12-1). The body was extended in a supine position with the body positioned on a north-south axis. The skull was located to the north and was facing east. Before disturbance his arms were presumably folded across the midsection. Coffin nails and small fragments of disintegrating wood were recovered from around and from within the human remains suggesting a coffin burial. Eight bone and five ceramic buttons were recovered from Burial 3 (Figure 12-21).

### *Sex*

The sex of Burial 3 was determined from pelvic and skull morphology following Buikstra and Ubelaker (1994). Postcranial elements were also examined. An assessment of the ventral arc, subpubic concavity, and ischiopubic ramus ridge indicates a probable male. Observation of the mastoid process, supraorbital margin, glabella, and the mental eminence resulted in scores from ambiguous sex to probable male. The right femoral midshaft circumference (92 mm) indicates a male (>81 mm; Bass 1995; Black 1978; Di Bennardo and Taylor 1979).

### *Age*

The age of Burial 3 is estimated from pelvic morphological changes, degree of cranial suture closure, morphology of the long bones and joint surfaces, and condition of dentition (Buikstra and Ubelaker 1994). An assessment of morphological changes to the pelvis using the Todd system indicates an age of 50+ years, and the Suchey-Brooks system suggests a mean age of 58-60 years (Brooks and Suchey 1990; Suchey and Katz 1986; Todd 1921a, b). External and internal cranial vault sutures indicate an old adult of greater than 50 years. This conclusion is based on complete obliteration of the sutures (Meindl and Lovejoy 1985). The long bones and vertebrae were examined for indications of osteoarthritis. The third and fourth cervical vertebrae exhibit severe degenerative changes including lipping and bony spurs. Although the lumbar vertebrae were fragmented from the auger bore, lipping and bony growths are evident on the surviving vertebral bodies. The majority of the teeth from Burial 3 were lost before death as evident from complete remodeling of the alveolar bone. The few remaining teeth are extremely worn with the enamel worn away to the roots. Taken together, these indicators are consistent with an individual over 50 years old.

### *Ancestry*

The extreme attrition of the remaining dentition and the shape of the Palatine suture indicate Native American ancestry. White (2000:Table 17.4), in a table of nonmetric cranial traits for determining ancestry, categorizes a straight Palatine suture as "American Indian," a jagged suture as "White," and an arched suture as "Black" (Gill 1995; Rhine 1990). Platymeric femora (<84.9 indicates platymeria) with an index of 80.1 also suggest Native American ancestry (Bass 1995). Because all the cranial sutures were obliterated, it was not possible to examine the skull for complex cranial sutures or Wormian bones (Hillson 1996; White 2000). Multiple comparisons of Burial 3 cranial measurements with American Indians, Whites, and Hispanics were attempted using the Forensic Database, but discriminate functions could not assign an ancestry. It is likely the age of the skeleton is a factor.

### *Dentition*

The dental health of this individual was poor. Eight teeth, the left half of the maxilla, and a complete mandible represent the dentition. The right half of the maxilla fragmented upon removal of the skeleton. The mandible consists of three empty shallow sockets only. The remaining alveolar bone is completely resorbed. The left maxillary bone is completely resorbed except for three empty sockets. Three maxillary teeth, a canine and two premolars, and five teeth represented

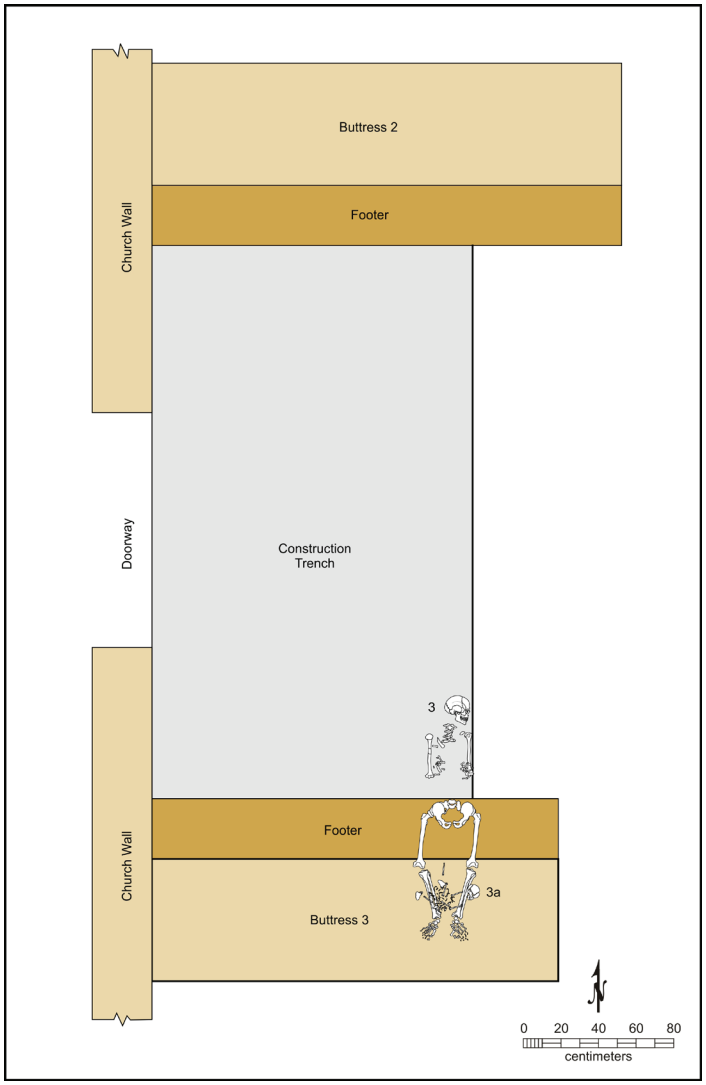


*Figure 12-20. Map of Area 3 showing the locations of Burials 3 and 3a.*

by the roots with all enamel worn away were recovered loose with the skull. The severely worn teeth appear to be incisors, canines, or premolars based on single roots. Large carious lesions are present on the canine and two premolars with roughly half of the mesial-distal occlusal surface completely destroyed on one premolar. The other premolar and the canine have large lesions involving the cemento-enamel junction and root. Hypoplastic defects, two occurrences, were present on the one recovered canine indicating systemic stress between 1 year (+/- 4 months) and 4 years (+/- 12 months) based on developmental standards (Buikstra and Ubelaker 1994; Ubelaker 1989b).

### *Stature*

Burial 3 postcranial measurements were entered into ForDisc for stature estimation. Stature based on nineteenth-century statistics for males was calculated as 1.56 m. However, it should be noted that the discriminate functions for height estimates are based on data from whites and blacks. Using the Trotter and Gleser (1952, 1958) stature formula for Mongoloid males based on femur length, the burial ranges from 1.58-1.65 m (Bass 1995).

### *Pathology*

The right humerus is pathological exhibiting moderate to severe, active periostitis from the middle to lower third of the diaphysis. The shaft in the area of infection is considerably swollen from surface apposition, and the bone is extremely porous and remodeled. Osteoarthritis is present on the third and fourth cervical vertebrae and can be seen on fragments of the lumbar bodies. The arthritic changes range from

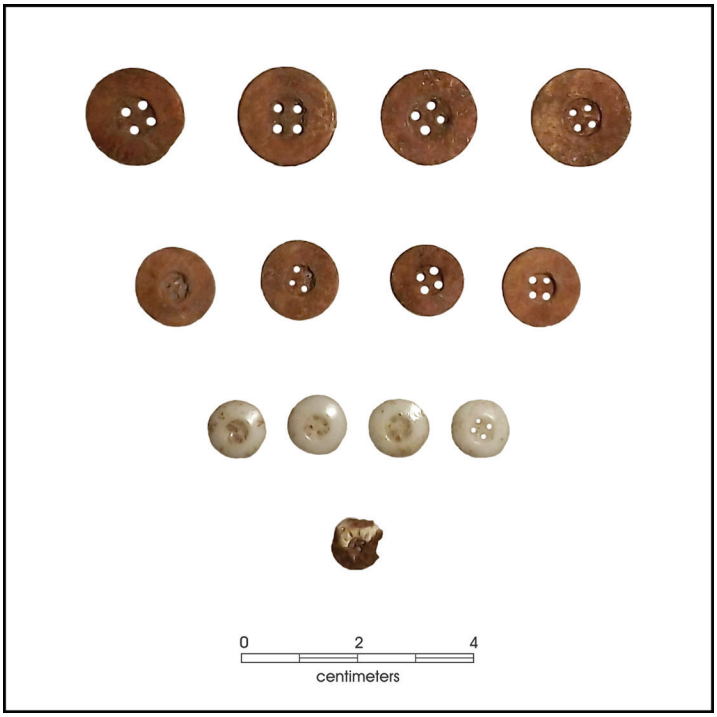


*Figure 12-21. Bone and ceramic buttons associated with Burial 3.*

moderate to severe. The centra of these bones exhibit severe osteophytic lipping, porosity, and slight eburnation. The left parietal exhibits a well-healed depressed fracture. The defect is located adjacent to the sagittal suture approximately 65 mm distal of the coronal suture. The defect is oval-shaped and measures 28 mm long by 15 mm wide. The margins of the defect are smooth and rounded indicating the trauma is not recent. Carious lesions are present on three teeth (see previous section).

## Burial 3a

Burial 3a consists of a fetus of seven months gestation of indeterminate sex and ancestry. This is an incomplete, articulated, primary burial uncovered 1.63 mbs lying directly above the lower legs of Burial 3. The distal portion of the burial from the pelvis to the feet was disturbed and lost during removal of Buttress 3 by Pugh Constructors. The skull and upper cervical vertebrae appear to be in place, but the upper body including the remaining vertebrae, rib cage, and upper limbs are jumbled. Most of the elements from the third lumbar vertebrae to the skull were recovered. Remnants of nails suggest that the remains were buried in a coffin. The burial, located under Buttress 3, was approximately 1.6 m east of the church wall. The body was positioned on an east-west axis, in a supine position with the skull to the east facing up. From the jumbled position of the arms, it can be assumed that they were folded across the midsection (see Figure 12-20 and Table 12-1). No personal items were recovered with the remains.

### *Age*

The age of this individual is estimated from a combination of epiphyseal fusion, longbone measurements, and dental development. No epiphyseal ends are fused, and no epiphyses are present indicating a newborn (Buikstra and Ubelaker 1994; Krogman and Iscan 1986; McKern and Stewart 1957; Redfield 1970; Suchey et al. 1984; Ubelaker 1989a, b). Measurements of the humerus, radius, and ulna produced an age of third trimester developing fetus (Baker et al. 2010). The deciduous incisors are at the crown complete ($Cr_c$) stage of development, the right maxillary canine and first molar are crown ½ complete (Cr1/2), the mandibular first molars are cusp outline complete ($C_{oc}$), and the left mandibular second molar is at the coalescence of cusps ($C_{co}$) stage (Moorees et al. 1963a, b). These stages give an estimated age of birth +/- 2 months (Buikstra and Ubelaker 1994; Ubelaker 1989b). Due to the size of the longbones, the estimated age is third trimester fetus.

### *Dentition*

Upper and lower incisors, the right maxillary canine and first molar, mandibular first molars, and the left mandibular second molar represent the dentition of this individual. The upper incisors exhibit evidence of shovel shaped morphology.

## Area 4

The CAR archaeologists monitored machine excavation of Area 4 by the contractors to a depth of approximately 1.35 mbs. No human remains were noted. Subsequently, an auger bore was drilled into the northeast corner of the area against the footer of Buttress 4. The drilling was halted when monitors recognized human bone in the bore backdirt. The area, on the east side of the church approximately 13.25 m south of the northeast corner of the church, is located between Buttresses 4 and 5 (see Figure 12-2). The construction trench measured approximately 3.8-x-1.7 m. Area 4 was tested with shovel probes from approximately 1.35 mbs to the depth of sediment change, from silt to gravelly deposits. One articulated infant burial (Burial 4) was removed from the area (Table 12-7).

### Burial 4

This individual, a child of one and a half years of indeterminate sex and ancestry, is a disturbed, mostly complete, articulated, primary burial uncovered 1.63 mbs. Auger bore disturbance resulted in displacement and fragmentation of the distal femora, the fibulae, and the tibiae. Small fragments of disintegrated wood and remnants of nails suggest that the remains were buried in a coffin. The burial was located immediately south of Buttress 4 with the feet adjacent to the buttress footer. It was approximately 1.6 m east of and parallel to the church wall. The body was positioned on a north-south axis, in a supine position with the skull to the south facing up and with the arms folded across the midsection (Figure 12-22; see Table 12-1). Two cuprous straight pins and fragments of a cuprous and ferrous necklace with beads, possibly a rosary, were recovered with the remains (Figure 12-23).

### *Age*

The age of this individual was estimated from a combination of epiphyseal fusion, longbone measurements, and dental development. With the exception of lumbar vertebrae neural arches, all epiphyseal ends are unfused. Lumbar neural arches fuse from one to three years (Baker et al. 2010). No longbone epiphyses were recovered. Comparisons of measurements of the humerus and ulna to templates in Baker et al. (2010) suggest an age of approximately one and one-half years. The deciduous maxillary incisors and mandibular central incisors are at the root length ¾ (R3/4) stage of development. The remaining deciduous teeth, the canines, the first and second molars, and the lateral mandibular incisors are at initial root formation ($R_i$). The first permanent molars are present in the crown ¾ complete (Cr3/4) development stage, as well as one permanent maxillary canine ($C_{oc}$), the maxillary lateral incisors (Cr1/2), and one maxillary central incisor (Cr1/2; Moorees et al. 1963a; Moorees et al. 1963b). Only the upper incisors and lower central incisors are erupted. The remaining teeth are in crypt. These stages suggest an estimated age of one year +/- four months (Buikstra and Ubelaker 1994; Ubelaker 1989b). Based on the size of the longbones an age of one and one-half years was determined for Burial 4.

Table 12-7. Osteological Summary for Area 4

| | |
|---|---|
| **MNI** | 1 |
| **Age at Death** | 1 year +/- 4 months |
| **Sex** | indeterminate |
| **Ethnicity** | indeterminate |
| **Manner of Death** | indeterminate |
| **Temporal Affiliation** | Historic |

### *Dentition*

All of the deciduous teeth, except the left mandibular canine, are present. Four permanent first molars, one maxillary canine, one maxillary central incisor, and two maxillary lateral incisors were also recovered. No shoveling was noted on the permanent incisors. The three erupted teeth are free from pathology with no evidence of carious lesions. No hypoplastic defects are present.

### *Pathology*

Burial 4 appears relatively healthy as indicated by absence of bone pathology.

## Section F

All faunal bone removed from San Juan during the church restabilization project was examined by the CAR's physical anthropologist to ensure that no human remains were misidentified. Human bone was identified in Section F faunal remains. The section, on the west side of the church approximately 11 m north of the southwest corner of the church, measured 2-x-2.5 m (see Figure 12-1). The CAR archaeologists monitored machine excavation of Section F to the base of the church foundation, a depth of approximately 1.6 mbs. No intact human burials or disassociated elements were noted in the section. A minimum of two individuals, one newborn and one adult, were identified from five skeletal elements recovered from the faunal bone (Table 12-8). All five elements were recovered from the upper strata, from the surface to roughly 0.7-0.8 mbs. The newborn is represented

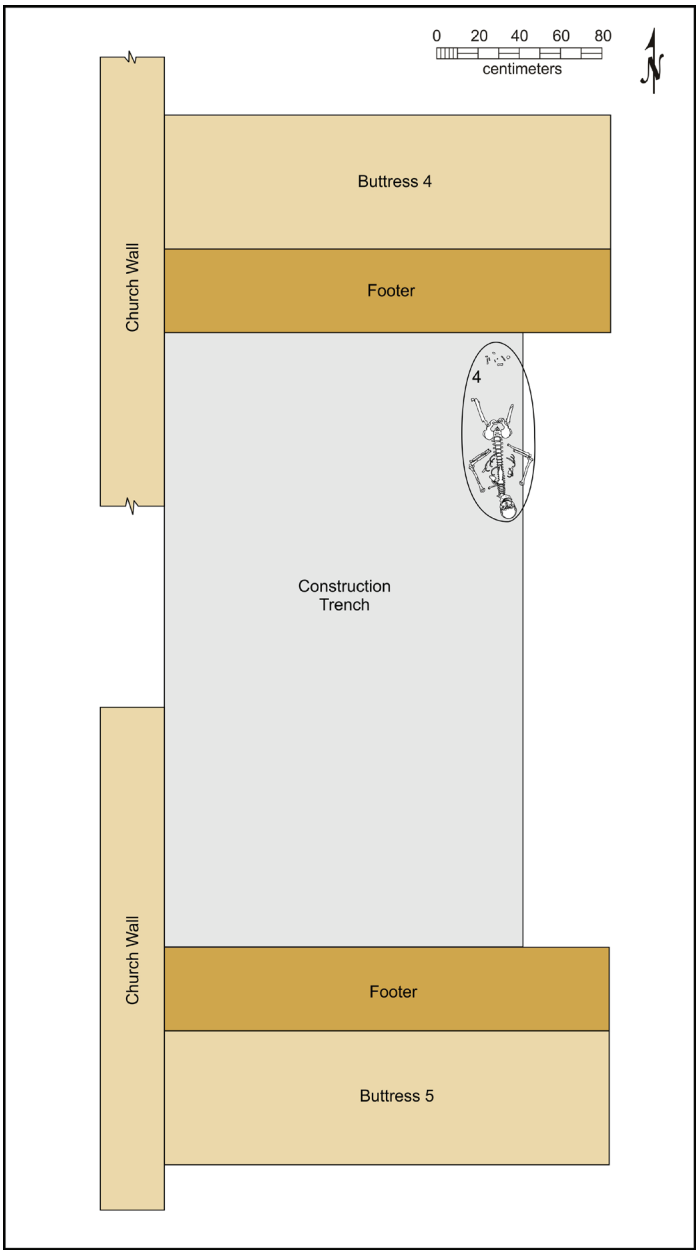


Figure 12-22. *Map of Area 4 showing the location of Burial 4.*

by two rib fragments, one ulna/radius diaphysis, and one fibula diaphysis. A single element, a hand/foot phalanx, is attributed to the adult.

## Section J

Section J, approximately 5-x-2 m, is located on the south wall of the church (see Figure 12-1). Machine excavation was monitored by the CAR to approximately 1.6 mbs, the depth of the base of the church foundation. No articulated burials or disassociated human elements were noted during the excavation. Prior to the mechanical excavation, two test units (TUs 9 and 10) were hand excavated to a depth of 1.6 mbs on the south wall of the church (see Figure 12-1). Human bone mistakenly identified as faunal from the units was analyzed as part of Section J for MNI purposes. A minimum of four individuals were identified from human bone (n=66) previously identified as fauna, a second trimester fetus (n=1), a third trimester fetus (n=1), a newborn (n=63), and an adult (n=1; Table 12-9).

One adult premolar was found from the lower strata (>0.7/0.8 mbs) of Section J. One tibia fragment from the upper strata (<0.7/0.8 mbs) represents the second trimester fetus, and

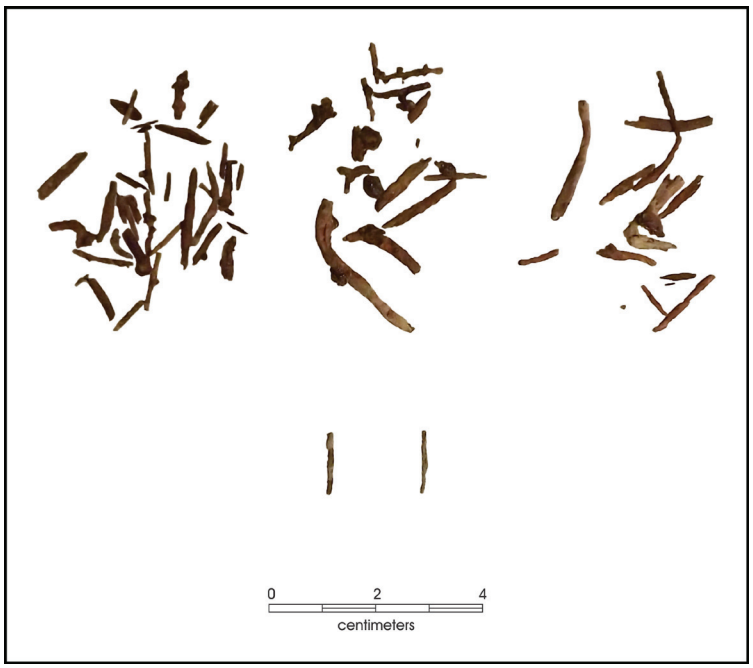


Figure 12-23. *Cuprous necklace and pins associated with Burial 4.*

Table 12-8. Osteological Summary for Section F

| | |
|---|---|
| **MNI** | 2 |
| **Age at Death** | newborn +/- 2 months, adult of indeterminate age |
| **Sex** | indeterminate |
| **Ethnicity** | indeterminate |
| **Manner of Death** | indeterminate |
| **Temporal Affiliation** | Historic |

Table 12-9. Osteological Summary for Section J

| | |
|---|---|
| **MNI** | 4 |
| **Age at Death** | adult of indeterminate age, newborn +/- 2 months, 2nd trimester fetus, 3rd trimester fetus |
| **Sex** | indeterminate |
| **Ethnicity** | indeterminate |
| **Manner of Death** | indeterminate |
| **Temporal Affiliation** | Historic |

one complete right radius found 1.1-1.2 mbs in TU 10 represents the third trimester fetus. All elements attributed to the newborn were recovered from the upper strata. They consist of one right mandible, one left sphenoid greater wing, one sphenoid fused body and lesser wings, and 14 skull fragments. Postcranial elements include one clavicle acromial end, two scapula fragments, one right humerus, one right radius, one proximal half of a left radius, one distal third of an unsided radius, one left ulna, one right ulna fragment, five complete ribs, 15 rib fragments, two vertebral bodies, one vertebra neural arch, one left pubis, one left ilium, one left ischium, one femur fragment, three tibia fragments, one distal end of a fibula, two unidentified longbone diaphyseal fragments, two metacarpal/metatarsals, one fragmented metacarpal/metatarsal, and one phalanx.

## Summary

A minimum of 29 individuals were removed from the excavated areas adjacent to Room 17 of Mission San Juan as part of the 2012 restabilization of the church foundation (Table 12-10). Seventeen burials, all but one articulated, were exhumed from the northeast side of the church. Twelve individuals were identified from disassociated ossuary elements, six from the northeast, four from the south, and two from the southwest side of the church. Although some taphonomic change was evident on the bones, the overall condition of the remains was good. All of the burials with one exception were lying supine in extended positions. The exception was laid slightly on its side. All were either parallel or perpendicular to the church foundation. Although personal items recovered with the remains were sparse, all the articulated individuals were buried in coffins.

Upon completion of exhumation, the remains were sorted, analyzed, cataloged, bagged, and prepared for reburial at Mission San Juan. All work was completed at Mission San Juan. This assessment has determined that the human remains represent two old adults (50+ years), one a male of Caucasian/Hispanic ancestry, and one a probable male of Native American ancestry; three young adults (20-35 years), one a Native American male, one a Caucasian/Hispanic male, and one a Native American female; four adults of unknown age, sex, or ethnicity; one five to seven year old Native American of unknown sex; one five to seven year old and one three to five year old possible Native American of unknown sex; one two to four year old, a single one and one-half year old, one eight to sixteen month old, and one nine to twelve month old of unknown sex and ethnicity; ten newborns of unknown sex and ethnicity; and two third and one second trimester fetus of unknown sex and ethnicity.

Additional human remains were excavated from Rooms 26 (old church) and 17 (present church) of Mission San Juan in 1967 and 1969 (Schuetz 1968, 1969, 1974, 1980b; Tomka and Zapata 2001). The burials from Room 26, built in 1762, were likely interred from 1764 to the 1780s (Schuetz 1968:215). Based on cut nails associated with coffins in Room 17, Schuetz concluded that the remains in the present church were buried from 1792-1862 (Schuetz 1974).

Analyses of the burials, report MNIs of 49, 66, and 92 from Room 26, and 54 and 92 from Room 17 (Francis 1999; Humphries 1969; Miller 1989; Schuetz 1969, 1974). Humphries (1969) examined 53 individuals from Room 26 stating that approximately 10 infants and 3 unassigned mandibles were not included (Table 12-11). Schuetz (1974) reports that a minimum of 92 individuals, representing a racially mixed population, were removed from below the floor of Room 17. In a subsequent analysis of the Room 26 burials Miller (1989) determined a MNI of 92, consisting of 75 adults and 17 subadults. In his Master's thesis, Francis (1999) concluded that the MNI exhumed was 103, 54 from Room 17 and 49 from Room 26. Table 12-12 presents data from Francis (1999) and the present analysis.

Table 12-10. Osteological Summary of Recovered Human Remains from Phase 4

| | |
|---|---|
| **MNI** | 29 |
| **Age at Death** | 2 old adults (50+ years), 3 young adults (20-35 years), 4 adults of indeterminate age, 2 children (5-7 years), 1 child (3-6 years), 1 child (2-4 years), 1 child (1.5 years), 1 infant (9-12 months), 1 child (8-16 months), 10 newborns (+/- 2 months), 2 fetuses (3rd trimester), 1 fetus (2nd trimester) |
| **Sex** | 3 male, 1 probable male, 1 female, 24 indeterminate |
| **Ethnicity** | 4 Native American, 2 possibly Native American, 2 Caucasian/Hispanic, 21 indeterminate |
| **Manner of Death** | 1 systemic infection, 1 possibly from systemic infection, 1 possibly from systemic stress/malnourishment, 26 indeterminate |
| **Temporal Affiliation** | Historic |

Table 12-11. Minimum Number of Individuals
Resulting from Analyses of Mission San Juan Exhumations

| | MNI | |
|---|---|---|
| **Analysis** | **Room 26** | **Room 17** |
| Humphries 1969 | 66 | n/a |
| Schuetz 1974 | n/a | 92 |
| Miller 1989 | 92 | n/a |
| Francis 1999 | 49 | 54 |

Table 12-12. Data from the 1967, 1969, and 2012 Exhumations at Mission San Juan

| | Francis 1999/ Munoz 2013 | | Francis 1999 | | Francis 1999/ Munoz 2013 | |
|---|---|---|---|---|---|---|
| **Sex** | **Room 17** | **%** | **Room 26** | **%** | **Rooms 17 and 26** | **%** |
| Male | 19 | 26.8% | 23 | 46.9% | 42 | 35.0% |
| Female | 17 | 23.9% | 17 | 34.7% | 34 | 28.3% |
| Undetermined | 35 | 49.3% | 9 | 18.4% | 44 | 36.7% |
| Total | 71 * | 100.0% | 49 | 100.0% | 120 | 100.0% |
| **Age** | **Room 17** | **%** | **Room 26** | **%** | **Rooms 17 and 26** | **%** |
| 0-15 | 36 | 50.7% | 12 | 24.5% | 48 | 40.0% |
| 15-35 | 27 | 38.0% | 21 | 42.9% | 48 | 40.0% |
| 35+ | 8 | 11.3% | 16 | 32.7% | 24 | 20.0% |
| Total | 71 | 100.0% | 49 | 100.0% | 120 | 100.0% |
| **Pathology** | **Room 17** | **%** | **Room 26** | **%** | **Rooms 17 and 26** | **%** |
| Porotic Hyperostosis | 3 | 4.2% | 6 | 12.2% | 9 | 7.5% |
| Cribia Orbitalia | 2 | 2.8% | 2 | 4.1% | 4 | 3.3% |
| Periostitis | 13 | 18.3% | 13 | 26.5% | 26 | 21.7% |
| Linear Enamel Hypoplasia | 7 | 9.9% | 2 | 4.1% | 9 | 7.5% |
| Caries (by tooth) | 65/656 | 9.9% | 68/449 | 15.1% | 133/1105 | 12.0% |
| Fractures (cranial) | 5 | 7.0% | 6 | 12.2% | 11 | 9.2% |
| Fractures (post-cranial) | 4 | 5.6% | 11 | 22.4% | 15 | 12.5% |
| Degenerative Joint Disease | 35 | 49.3% | 33 | 67.3% | 68 | 56.7% |

* Sum of Francis 1999 (MNI = 54) and Munoz (MNI = 17)

Subadults represent a substantially higher percentage of the burial population in Room 17 relative to Room 26. The data could represent an increase in childhood mortality or conversely, an increase in fertility, signaling a healthy population growth rate. It is, perhaps, more likely due to differential preservation and the difficulty of recognizing poorly preserved bones of perinate skeletons. Under-enumeration of infants is a common problem because young children, especially infants and newborns, may not be buried in the same area as the adults. Also, small bones are poorly preserved relative to older, larger bones, and because of their small size and undeveloped morphology, they are often disregarded or collected as faunal remains (Milner et al. 2008).

In general, the burial population from Room 17 appears to have experienced less illness and an easier lifestyle physically. Except for an increase in instances of enamel hypoplasias, rates of metabolic and infectious diseases have decreased. The decrease in osteoarthritic change and in traumatic injuries suggest that the mission inhabitants residing at San Juan after 1792 experienced relatively low stress compared to the residents living there before 1780. A caveat to the preceding conclusions is that cemetery samples do not represent living people. The "osteological paradox" (Wood et al. 1992; Wright and Yoder 2003) is caused by the realization that the most vulnerable individuals are the ones most likely to die, so a cemetery sample represents and, thus,

is biased towards the sickest of each age group. The frequency of disease or injuries in a mortuary population is not the same as the prevalence in the living (Milner et al. 2008).

Stable isotope analysis data reflects the variation in the abundance of stable isotopes in various classes of food resources. It has the potential to determine the extent of a population's reliance on terrestrial, agricultural, and/or marine resources. Although a stable isotope analysis of the human remains was outside of the scope of this project, an analysis of archaeological faunal skeletal remains recovered during the Mission San Juan excavations that should reflect the isotopic values of human consumers, i.e., the mission inhabitants, was completed (see Appendix 7). The results indicate that turtles, deer, turkey, and sheep/goat cluster along and below the $C_3$ protein line, developed by Kellner and Schoeninger (see Appendix 7; Froehle et al. 2010; Kellner and Schoeninger 2007), suggesting a subsistence base of $C_3$ plants. Pigs lie on the $C_4$ protein line towards a $C_4$ total diet. Chickens cluster at the 100 percent $C_4$/marine diet area of the graph. Cow and bison fall between the $C_3$ and $C_4$ protein lines but lie toward the $C_4$ non-protein portion of the graph suggesting a reliance on $C_4$ dietary sources, most likely corn. Catfish also appear to have a diet made up from $C_4$ resources.

An analysis by Cargill and Hard (1999) of 19 human individuals from a burial population excavated from Room 26 of the mission in 1968 (Schuetz 1968, 1969) suggests a dietary reliance on $C_4$ protein and non-protein resources reflecting a subsistence strategy that may have focused on $C_4$ plants (maize), CAM plants (possibly prickly pear), and some high nitrogen resource. They concluded that the isotope values of the San Juan individuals do not reflect a typical mission diet of maize and beef but suggest a marine hunting and gathering adaptation. They proposed that the population recently migrated from the coast or relied on a mission diet regularly supplemented with marine resources. A reliance of cow and pig on $C_4$ dietary sources and the presence of chicken and $C_4$ catfish with high $\delta^{15}N$ values would elevate the human population's isotopic values causing it to appear similar to a coastal signature. The results from the analyzed faunal material suggest that the Room 26 population may have been coastal immigrants or may have been local on a diet with high $C_4$ and high nitrogen components. Although the Room 17 population exhumed during Phase 4 were buried a couple decades after the Room 26 interments, previously analyzed domesticates from Room 26 (Cargill and Hard 1999:205) have isotope values similar to the Room 17 fauna suggesting a similarity in domesticate feeding practices over time.

# Chapter 13: Summary of Results and Interpretations

*Kristi Miller Nichols, Steve A. Tomka, and Cynthia M. Munoz*

Fourteen 1-x-1 m test units (TUs 1-14), four backhoe trenches (BHTs 1-4), and four rectangular wall perimeter sections (Sections A1-A4) were excavated by the CAR during this project. In addition, archaeologists monitored the mechanical removal of sediments from the outside perimeter of Room 17 (Sections B-M and S). The work, conducted from September 2011 through July 2012, was completed in four phases. The test units were excavated during Phase 1, the backhoe trenches during Phase 2, the monitoring of perimeter excavations during Phase 3, and the exhumation of human remains (Sections A1-A4) during Phase 4.

The excavations produced 11,489 artifacts, 51.9 kg of faunal material, human remains and grave goods from 17 burials, and disassociated human bone representing a minimum of 12 additional individuals. Radiocarbon dating of faunal bone (n=10), representative of the excavated sediments, indicates that the cultural material was likely deposited between about AD 1800 and the 1930s. One bone sample produced a modern age, and one (Bison bison) had a date range of between AD 1453 and 1633.

Conclusions drawn from the excavators regarding their impressions of the stratigraphy during the Phase 1 test unit work suggested that the church perimeter consisted of sediments representing two strata, a minimally disturbed earlier Colonial deposit and an upper mixed deposit of later Colonial materials with more recent artifacts. Phase 3 section excavation methodology was based on this conclusion resulting in the proveniencing, screening, and collection of artifacts as either upper or lower strata cultural material. Subsequent analysis of the Phase 1 material and the radiocarbon results indicate that the deposits are significantly mixed and, based on the dated fauna, likely do not reflect an early Colonial period occupation. For analysis purposes, artifacts from the two strata designations were combined and treated as one analytical unit.

Phase 1 test units were excavated to determine the extent of cultural materials and to expose the base of the church foundation. Locations were chosen to sample areas outside of the church walls that had either not been previously investigated or had the least amount of disturbance. The excavations revealed that much of the sediments along the east and north walls of the church have been previously disturbed from utility installations (TUs 1, 2, 5, and 6), previously dug trenches (TUs 3 and 4), and human interments (TUs 7 and 8). A previously documented Colonial wall was exposed in TUs 2 and 6, and the base of the church foundation was uncovered in TUs 3, 7, 9, 11, and 13. The foundation ranged from 1.4 mbs along the northeast wall (TU 7) to 1.7-1.9 mbs along the northwest wall (TUs 11 and 13) to 1.8 mbs on the south wall (TU 9) to 2.0 mbs on the north wall (TU 3). Of interest, the subsurface wall/foundation on the west wall of the church contained a shelf-like stone protrusion 58 cmbs in TU 11 and 76 cmbs in TU 13. This may be an indication that the church is seated slightly off the foundation of an older structure.

Test unit excavations removed 16.3 $m^3$ of sediment resulting in 179 artifacts/$m^3$ and 387 gm of faunal material/$m^3$ of sediments screened (Table 13-1). A review of total counts of prehistoric and historic artifacts indicates that the highest recoveries were from TU 4 (n=596) and TU 10 (n=522). A consideration of the amount of sediments removed, however, indicates that the highest density of artifacts were removed from TU 6 (596/$m^3$), TU 1 (523/$m^3$), TU 4 (505/$m^3$), and TU 10 (373/$m^3$). A review of the data by test unit blocks reveals that the excavated sediments from Block 1 (TUs 1, 2, 5, and 6) contained the highest density of artifacts with 300/$m^3$, followed by Block 4 (TUs 9 and 10) with 254/$m^3$, and Block 2 (TUs 3 and 4) with 234/$m^3$. Overall, the test unit excavations suggest that the majority of the cultural material was located in the upper five excavated levels. Because Block 1 contained a Colonial wall and utilities, excavations were limited to the upper sediments. It is probable that if the lower sediments were excavated the density of the block would be lower. An examination of only the upper levels of Blocks 4 and 2 indicate densities of approximately 670 artifacts/$m^3$ and 276 artifacts/$m^3$. The highest densities of faunal material were found in Block 4 (790 gm/$m^3$) and Block 2 (469 gm/$m^3$).

Block 4 (TUs 9 and 10) was located against the south wall of the church. The vertical distribution of cultural material implies that 93 percent of the artifacts were recovered from the upper 50 cm of sediment suggesting the possibility of a midden deposit. Both Colonial and Post-Colonial diagnostics were in these deposits. Because ceramics recovered from below 50 cm only consisted of Spanish Colonial and Goliad types, it is possible that the lower sediments represent a Colonial component. However, the lower sediments also included six pieces of modern construction material and three pieces of modern trash.

Phase 2 backhoe trenches were excavated to obtain additional data on the terminal depth of the church's foundation and to further explore the colonial wall exposed in TUs 2 and 6.

Table 13-1. Summary Information for the Phase 1 Test Unit Excavations

| Block | TU | Artifacts (n) | Artifacts/$m^3$ | | Faunal Material (gm) | Faunal Material/$m^3$ | |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 232 | 523 | 300 | 13.3 | 30.0 | 210.3 |
| | 2 | 61 | 119 | | 200.3 | 391.2 | |
| | 5 | 17 | 81 | | 8.46 | 40.3 | |
| | 6 | 79 | 596 | | 51.1 | 385.4 | |
| 2 | 3 | 103 | 57 | 234 | 864.3 | 480.0 | 469.3 |
| | 4 | 596 | 505 | | 535.29 | 453.6 | |
| 3 | 7 | 220 | 143 | 133 | 287.64 | 186.8 | 177.8 |
| | 8 | 181 | 122 | | 249.3 | 168.4 | |
| 4 | 9 | 286 | 157 | 254 | 1219.33 | 700.0 | 789.9 |
| | 10 | 552 | 373 | | 1387.35 | 937.4 | |
| 5 | 11 | 163 | 109 | 99 | 359.8 | 240.6 | 224.2 |
| | 12 | 98 | 85 | | 233.9 | 202.9 | |
| 6 | 13 | 111 | 63 | 109 | 496.22 | 280.0 | 294.4 |
| | 14 | 221 | 175 | | 397.13 | 314.7 | |
| **Total** | | **2920** | **179** | **179** | **6303.4** | **387.2** | **387.2** |

The base of the foundation was uncovered at 1.55 mbs (BHT 1) and at 1.60 mbs (BHT 4) on the southwest and southeast sides of the church, respectively. Backhoe Trench 3 was terminated early upon the exposure of coffin wood, and BHT 2 was terminated after the Colonial wall was documented. No artifacts were collected during Phase 2.

CAR archaeologists monitored the mechanical excavation of 18 sections of sediment around the perimeter of the church during Phase 3. Of the 14 sections that were fully or partially screened, 8,569 historic and prehistoric artifacts and 45,574 gm of faunal material were recovered. Because the cubic meters of screened soil could not be reconstructed, artifact densities were not calculated. The largest recovery of artifacts (n=4,158) and fauna (16,144 gm) was from Section J along the south wall of the church. When construction material, i.e., mortar, tile, sandstone, cement, concrete, asphalt, tar, etc., are removed from the total counts, Section J returns the highest counts of artifacts (n=2,223) followed by Section B (n=493) and Section K (n=435). The high concentration of cultural material in Section J supports the findings from TUs 9 and 10, located adjacent to Section J, that the area may contain a midden. Large amounts of faunal material (12,087 gm) in Section B, located along the southwest wall of the church, suggest a second midden deposit (Figure 13-1). Both Colonial and Post-Colonial artifacts were recovered in mixed context.

Buried walls and foundations that appear to be part of early structures were encountered on the northwest side of the church in Sections H and I. An architectural feature, constructed of limestone and sandstone, was uncovered under the buttress footing at the northwest corner of the church. Although a few large stones were out of place, the wall appeared to be relatively intact. The remains of a buried mission wall built of limestone and sandstone were uncovered 60 cmbs in the west half of Section I. The wall is likely part of Room 29.

Human remains were exposed along the northeast side of the church wall between Buttresses 1 and 5 (Sections A1-A4) during the Phase 2 and 3 excavations. Phase 4 consisted of the hand-excavation of 17 burials and disassociated human bone representing a minimum of 12 additional individuals.

The human remains, grave goods, and subsamples of the 11,489 recovered artifacts and 51.9 kg of faunal material from Phases 1 and 3 were examined by various analysts to expand the present data on and knowledge about the production of Goliad Ware, the use of faunal resources, the production of Mission period lithic tools, and the health of mission residents. Nichols concluded that the Goliad sherds recovered from Mission San Juan were not produced by the Aranama from Mission Espiritu Santo. Ethnographic records suggest that Mission Espiritu Santo was the predominate distributor of the ware to missions and presidios in central and south Texas (Cardenas 1783). Unlike the Aranama Goliad sherds, the San Juan assemblage is predominantly made of unsandy paste, tempered with calcined bone, and fired in a controlled oxidized atmosphere.

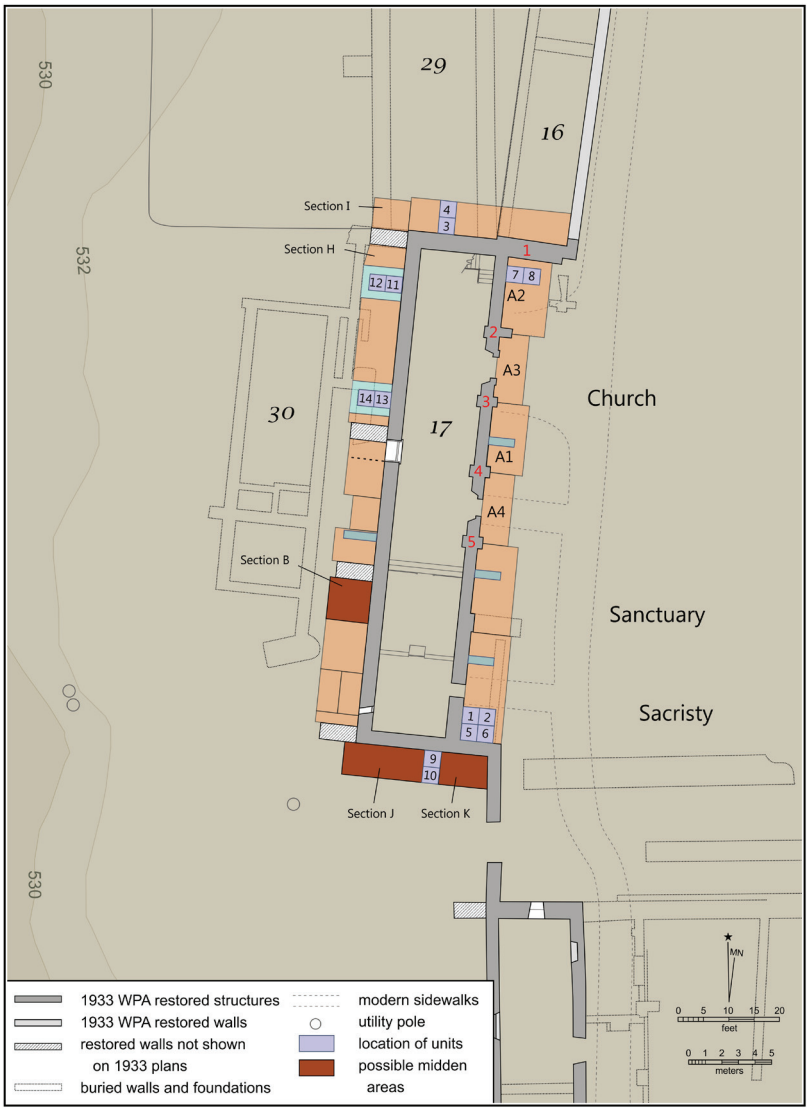


*Figure 13-1. Areas containing possible middens along the south and southwest walls of Room 17.*

Barkwill Love confirmed Nichols findings. Through a petrographic analysis of 48 ceramic samples, she determined that five were produced from very sandy paste with light bone temper (n=1), moderate bone temper (n=1), and sand temper (n=3), one was made of a sandy paste with light bone temper, and that 42 (88 percent) consisted of unsandy paste with light (n=4), moderate (n=16), and heavy bone temper (n=22). Barkwill Love compared the sherds to five clay sources in Bexar County. A petrographic comparison of clay inclusions revealed no clear association with the clay sources.

From an analysis of 134 specimens of debitage and 30 tools, Luzmoor and Tomka concluded that the small collection of unmodified lithic debitage recovered from the site is characteristic primarily of core reduction for the purposes of flake blank production. However, it should be noted that bifacial tools are commonly represented in the assemblage, but no cores were recovered. Mauldin, in a comparison of the lithic tools to data from Fox (1979), noted that the current sample has higher frequencies of gunflints and lower frequencies of cores and other bifacial tools. He suggests this may indicate that the sample reflects different activities in comparison to other mission assemblages and that temporal differences are consistent with a low contribution of prehistoric material in the current San Juan assemblage. Relative to other prehistoric sites in the region, the contribution of prehistoric material is low. Test unit excavations produced an average recovery of 4.3 pieces of debitage/$m^3$ of screened material. Gunflints, Guerrero points, and a glass projectile point are likely associated with proto-historic and early historic occupations rather than a prehistoric occupation.

From an analysis of a subsample of the San Juan faunal bone, Wack suggests that cattle were the most commonly eaten domesticated dietary resource and white-tailed deer the most common wild resource. She concludes that because young animals were preferred for consumption a thorough husbandry system was likely in practice. The lack of machine-saw marks on the assemblage suggests that most taxa were butchered before the mid-nineteenth century or that butchering at the mission was continued by hand after machine technology became available. The condition of the bone indicates that most of the waste was deposited on open middens. Although there is a high bone fragmentation rate, Wack proposes that it does not point to dietary stress at the mission. High counts of large and very large mammals, large numbers of foot elements, and evidence of trampling indicates that bone marrow extraction was unlikely.

Munoz concluded the sediments around the perimeter of the church contained a minimum of 29 human individuals. Seventeen burials were exhumed from Sections A1-A4. An additional 12 individuals were identified from isolated ossuary elements recovered from Sections A1, A2, F, and J. An osteological analysis determined that of the 29, two were old adults, three were young adults, four were adults of indeterminate age, six were children, one was an infant, 10 were newborns, and two were fetuses. Of the adults, three were male, one was a probable male, and one was a female. The sex of the juveniles and other adults could not be identified. Only eight of the individuals' ethnicities were determined. Of the eight, four were Native American, two are possible Native American, and two were of Caucasian/ Hispanic descent.

Munoz, from a comparison of the current burials to previously exhumed remains from Mission San Juan, notes that subadults represent a substantially higher percentage of the burial population in the current sample. The higher numbers of younger individuals may be due to an increase in childhood and infant mortality, or it could be an indication that there was a surge in fertility that is a sign of population growth. Another possibility is differential preservation and the difficulty of recognizing poorly preserved bones of perinate skeletons. Munoz concluded that the mission inhabitants residing at San Juan after 1792 experienced relatively low stress compared to the residents living there before 1780. In general, the individuals excavated during Phase 4 appear to have been healthier than the earlier population interred in Room 26.

Before the current archaeological project was completed, little was known about the Mission San Juan church (Room 17) other than it was a granary converted into a church during the late 1700s. Previous investigations, conducted during the 1970s (Scurlock 1976) and in 2011 (Thompson 2011), produced information concerning the buried walls located on the west side of the church and the depth of the foundation along the northeast and southwest wall of the church, respectively. The removal of matrix around the church revealed previous disturbances as well as small areas of deposits that appeared to be intact. The excavations offered a comprehensive view of what has occurred in the area immediately surrounding the church. Recovered cultural materials have provided data about dietary resources and artifacts commonly used at the mission during the late portion of the 1700s through the 1860s.

Although a large quantity of soil was removed and inspected during the project, future projects conducted in proximity to the church require additional archaeological investigations. An area extending approximately 1.8 m from the church wall around the entire perimeter of the church has been cleared. Excavations beyond this distance or inside of the church will require further investigations. The area near the northeast wall of the church appears to be the *campo santo* used between 1792 and 1862 (Schuetz 1974). Because the area has the potential of containing additional burials, all construction activities requiring excavation in the area should be avoided. It is highly likely that additional burials are located further east, past the current walkway. In addition, the possible middens against the south and southwest walls of the church likely extend past the section excavations, to the south and west, respectively. Further archaeological investigations are recommended before any future construction excavations occur near the middens.

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