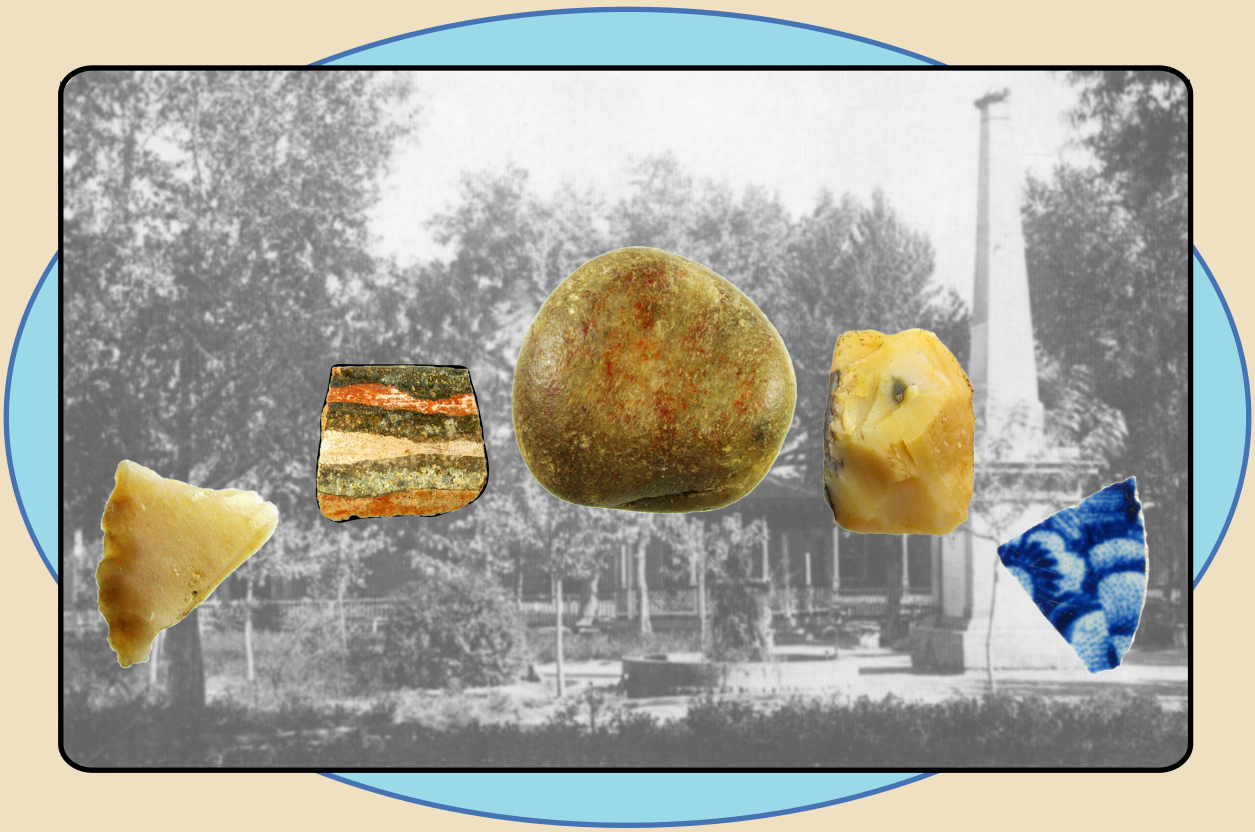
Archaeological Monitoring and Testing for Four Light Posts on the Santa Fe Plaza, Santa Fe, New Mexico

Matthew J. Barbour



Office of Archaeological Studies

Museum of New Mexico

AN 439

2011

MUSEUM OF NEW MEXICO

OFFICE OF ARCHAEOLOGICAL STUDIES

Archaeological Monitoring and Testing for Four Light Posts on the Santa Fe Plaza, Santa Fe, New Mexico

Matthew J. Barbour

with contributions by

Nancy J. Akins
Susan M. Moga
Richard M. Montoya
James L. Moore
Karen L. Wening
C. Dean Wilson

Stephen S. Post
Principal Investigator

ARCHAEOLOGY NOTES 439

SANTA FE 2011 NEW MEXICO

Administrative Summary

At the request of Mr. James Lilienthal and the Public Works Division of the City of Santa Fe, the Office of Archaeological Studies, Department of Cultural Affairs, conducted archaeological monitoring and test excavations associated with the installation of four light posts on the north side of Santa Fe Plaza (LA 80000) in downtown Santa Fe, New Mexico. These archaeological investigations resulted in the documentation of 17 strata and the collection of 1,430 artifacts dating from the seventeenth to the twentieth centuries.

The preservation and accumulation of archaeologically significant strata appears to vary across Santa Fe Plaza. However, in all instances, significant cultural deposits occurred 60 cm or more below the current ground surface. No further work is scheduled by the City of Santa Fe at this time. However, if future ground-disturbing activities are required, it is recommended that monitoring and, if necessary, data recovery be conducted to mitigate effects on buried cultural deposits.

CIP Project No. 427
MNM Project No. 41.912
NMCRIS Activity No. 121557
General Permits NM-10-027-M and NM-10-027-T

Contents

Figures

Tables

Introduction

At the request of Mr. James Lilienthal and the Public Works Division of the City of Santa Fe, the Office of Archaeological Studies (OAS), Department of Cultural Affairs, performed archaeological monitoring and test excavations at Santa Fe Plaza in downtown Santa Fe, New Mexico (Fig. 1 and Appendix 1). This work was conducted between February 14 and 17, 2011, under General Permits NM-10-027-M and NM-10-027-T using a monitoring and testing plan approved by the Historic Preservation Division (HPD) (Barbour 2010a).

The Public Works Division of the City of Santa Fe planned to install four light posts along Palace Avenue across from the Palace of the Governors (Fig. 2). Accomplishing this task required the excavation of four light-post holes roughly 3 ft (90 cm) to 4 ft (1.2 m) in diameter and 7 ft (2.1 m) deep. OAS designated the four light-post holes Test Units (TUs) 1–4. Archaeologists monitored hand excavation of each test unit by Gorman Electric, the contractor for the City of Santa Fe. When intact cultural deposits were encountered, the archaeologist shifted from monitoring the contractor's work to performing systematic test excavation of the light-post hole.

Archaeological investigations resulted in the documentation of 17 stratigraphic units and the recovery of 1,430 artifacts. Artifacts included Native American ceramics (n = 800), Euroamerican ceramics (n = 16), flaked stone (n = 44), ground stone (n = 9), metal (n = 23), glass (n = 50), fauna (n = 486), and miscellaneous items (n = 2) dating from the seventeenth to twentieth centuries.

While part of the stratigraphic sequence coincide with previously published descriptions of test excavations by David and Cordelia Snow in 1990 (Cross Cultural Research Systems 1992), construction of the gazebo in 2004 (Lentz 2004), and light-post installation in the winter of 2008–2009 (Barbour 2010b), the preservation and accumulation of archaeologically significant strata varied across the four test units. This suggests at least some discontinuity or irregularities in the depositional sequence. However, in all instances, significant cultural deposits occurred 60 cm or more below the current ground surface (bgs).

Fieldwork and report production tasks were conducted under the supervision of the project director, Matthew Barbour. Field technicians included Gavin Bird, Isaiah Coan, Lynette Etsitty, Vernon Foster, Susan Moga, Richard Montoya, and Mary Weahkee. Artifact analyses were conducted by Nancy Akins (fauna), Matthew Barbour and Susan Moga (Euroamerican artifacts), Richard Montoya and Dean Wilson (Native American ceramics), James Moore (flaked stone), and Karen Wening (ground stone). Report editing and production were performed by Tom Ireland with illustrations by Rob Turner and Scott Jaquith. Stephen Post served as the principal investigator.

Santa Fe Plaza is a national historic landmark registered in the *National Register of Historic Places* (October 15, 1966, Item No. 66000491) and the *State Register of Cultural Properties* (No. 27). All monitoring and test excavations were conducted in compliance with provisions set forth in Section 106 of the National Historic Preservation Act (36 CFR 800), Executive Order 11593 (1972); the National Environmental Policy Act of 1969 (91 Stat 852); and in conformance with Section 18-6-5 (NMSA 1978) of the Cultural Properties Act (4.10.16 and 4.10.17 NMAC-N, January 1, 2006). The project area is within the Historic Downtown Archaeological District, and the investigation followed guidelines in the Archaeological Review District Ordinance for the City of Santa Fe (adopted October 12, 1987).

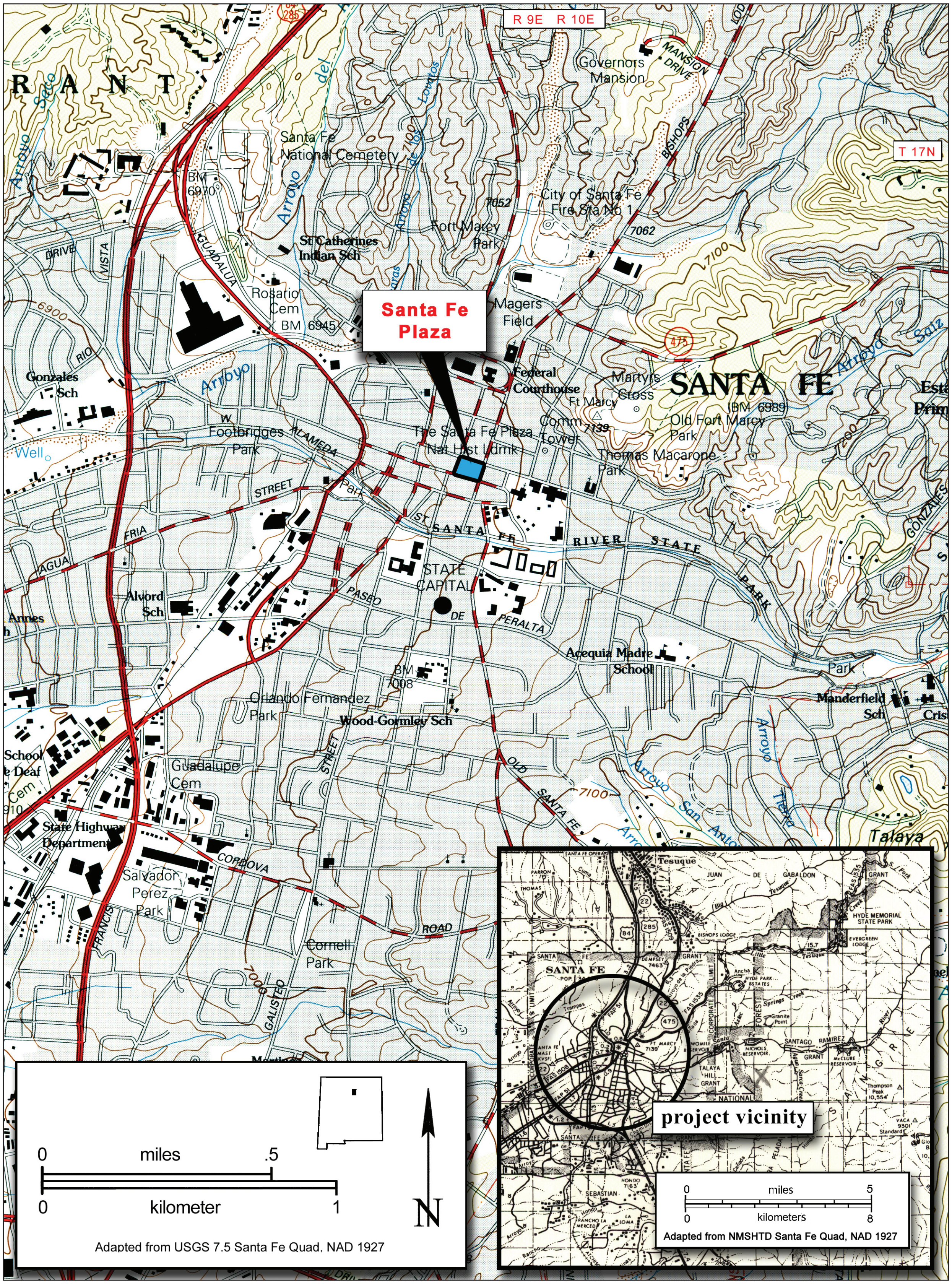


Figure 1. Santa Fe Plaza and project vicinity.

Figure 2. Aerial view of Santa Fe Plaza and location of light-post test units.

Environmental Setting

(adapted from Lentz 2004:5–6)

Physiography

Santa Fe is in a fault zone within a subdivision of the Southern Rocky Mountain physiographic zone known as the Española Basin, one in a chain of basins comprising the Rio Grande rift, which extends from southern Colorado to southern New Mexico (Kelly 1979:281). This basin, which is considered an extension of the Southern Rocky Mountain province (Fenneman 1931), is enclosed by uplands of alternating mountain ranges and uplifted plateaus, and the Rio Grande flows along the long axis of the feature (Kelly 1979:281). The northern boundary of the Española Basin is composed of the eroded edge of the Taos Plateau. The Sangre de Cristo Mountains form the east edge, and the southern boundary is marked by the Cerrillos Hills and the northern edge of the Galisteo Basin. The La Bajada fault escarpment and the Cerros del Rio volcanic hills denote the southwestern periphery. The basin is bounded to the west by the Jemez volcanic field, and the Brazos and Tusas Mountains form the northwestern boundary. Elevations along the Rio Grande through the basin vary from 1,845 m in the north to 1,616 m in the south, and altitudes in the surrounding mountains reach 3,994 m in the Sangre de Cristos, 3,522 m in the Jemez Mountains, and 2,623 m in the Brazos and Tusas (Kelly 1979:281).

Local topography at LA 158037 is a nearly level southern terrace of the Santa Fe River at an elevation of 2,126 m. This area is part of an ancient alluvial fan upon which most of Santa Fe resides. Soils are formed in reworked, mixed alluvial material of the Tertiary/Quaternary-period Santa Fe Formation (Folks 1975).

Geology

The Rio Grande rift was established during the late Oligocene epoch (ca. 30 million years BP), when a cycle of crystal downwarping and extensional faulting succeeded a period of regional uplift (Kelly 1979:281). As the subsidence of the Española Basin proceeded through the Miocene and Pliocene epochs (ca. 3 to 25 million years ago), erosion from the Nacimiento, Jemez, and Brazos uplifts to the north and northwest and the mature Laramide Sangre de Cristo uplift to the east provided most of the sediments for what is known as the Santa Fe Group, the prominent geologic unit within the Española Basin. Other sources of sediments of this geologic unit include volcanic fields in the Jemez, Brazos, and Sangre de Cristos (in an area northeast of the Española Basin). Formations within the Santa Fe Group, such as the Tesuque Formation, consist of deep deposits (over 1 km thick) of poorly consolidated sands, gravels, conglomerates, mudstones, siltstones, and volcanic ash beds (Lucas 1984).

Alluvial deposits of ancient and modern gravels are found in arroyos and on adjacent terraces. Tertiary volcanic deposits, Cenozoic sediments, and Precambrian rock are exposed in surrounding areas. When combined with these alluvial deposits, they provide most of the materials needed for lithic production. In particular, chert is available in the Ancha Formation (Kelley 1980:11–12), and sandstone, siltstone, andesite, basalt, and silicified wood occur in other nearby formations. The most commonly used chert in the study area outcrops in the Madera limestone formation and occurs in local gravel deposits. Small amounts of obsidian are found scattered along the basalt-capped mesas west of Santa Fe (Kelley 1980:12).

The project area is within the Santa Fe River inner valley, or Airport physiographic surface (Spiegel and Baldwin 1963:56). The major soil association is Bluewing gravelly sandy loam (Folks 1975:15–16). This soil occurs on 0–5 percent slopes and may coexist with Pojoaque and Fivemile soils. These well-drained soils formed in alluvium of mixed origin along terraces and floodplains. The gravelly sandy loam has rapid permeability with medium runoff and severe erosion hazard.

Climate

Santa Fe has a semiarid climate. Latitude and altitude are the two basic determinants of temperature; however, altitude is the more powerful variable in New Mexico. In general, mean temperatures decline faster with increased elevation than with increased latitude. Cold-air drainage is a common and well-known feature of New Mexico valleys. Narrow valleys create their own temperature regimes by channeling air flow: the usual patterns are warm, up-valley winds during the day and cool, down-valley winds at night. In contrast, shifts in temperature over broad valley floors are influenced by the local relief (Tuan et al. 1973).

The Santa Fe weather station is at an elevation of 2,195 m. The mean annual temperature reported by the Santa Fe station is 10.5 degrees C (Gabin and Lesperance 1977). The climatological data further indicate that the study area conforms to the general temperature regime of New Mexico, that is, hot summers and cool winters.

The average frost-free period (growing season) in Santa Fe is 164 days. The latest and earliest recorded frosts, respectively, occurred on May 31, 1877, and September 12, 1898 (Reynolds 1956:251). Although a frost-free season of 130 days is sufficiently long to grow most indigenous varieties of maize by dry farming (Schoenwetter and Dittert 1968; Hack 1942), the unpredictability of late spring and early fall frosts creates agricultural risk. The best agricultural strategy is to plant late enough that seedlings will not erupt above the ground until after the last frost, but early enough that they will be able to fully mature prior to the first killing fall frost.

Precipitation in Santa Fe can fluctuate widely. A maximum of 630 mm of precipitation was recorded in Santa Fe in 1855, compared to a minimum of 128 mm in 1917 (Reynolds 1956). The amount of precipitation is even more variable in any given month in successive years. Late summer is the wettest season in the annual cycle of the Santa Fe area, and June is one of the driest months. Precipitation records from Santa Fe indicate that more that 45 percent of the mean annual precipitation falls between July and September (Gabin and Lesperance 1977). Although October is drier than September, it is the fourth wettest month of the annual cycle. Significant precipitation (7.6 percent of the annual total) also falls in Santa Fe during this month. Late summer and fall moisture is derived from the Gulf of Mexico, when air masses from this region push inland to bring the economically important monsoons (Tuan et al. 1973:20). Summer rains tend to be violent and localized. They saturate the ground surface at the beginning of a storm, and much of the moisture is lost to runoff.

Flora

During the historic period, the project area served as the City of Santa Fe's plaza (Figs. 3, 4). However prior to the establishment of the villa, local flora and fauna would have been typical of Upper Sonoran grasslands. In the Santa Fe area, piñon-juniper grassland, which supports a variety of plant and animal species, is the most common habitat. The characteristic vegetation includes piñon, juniper, prickly pear, cholla, yucca, and several species of muhly and grama grass (Pilz 1984). The piñon-juniper community thins as it descends from the Sangre de Cristo foothills and grades into short-grass plains, containing scattered juniper midway between the foothills and the Santa Fe River (Kelley 1980:12). The open, grass-covered valleys contain grama grass, muhly, Indian rice grass, galleta grass, soapweed yucca, one-seed juniper, Colorado piñon, occasional Gambel's oak, and small stands of mountain mahogany. Arroyo bottoms contain various shrubs such as four-wing saltbush, Apache plume, rabbitbrush, big sagebrush, and wolfberry. Wetlands habitat is found only along perennial streams such as the Rio Pojoaque and Rio Tesuque. Modern vegetation includes willow, cottonwood, salt cedar, rushes, and sedges (Pilz 1984). In the wider valley bottoms, ditch irrigation is practiced, including the study area.

Fauna

Fauna found historically within the project area include coyote, badger, porcupine, black-tailed jackrabbit, desert cottontail, spotted ground squirrel, and many species of birds. Mule deer and black bear are known to occur, but in low numbers (Pilz 1984). Use of the area by these animals may have been more common before the twentieth century (Carroll 1984:2). Plains animals such as buffalo and pronghorn may also have been present or available within a few days' travel.

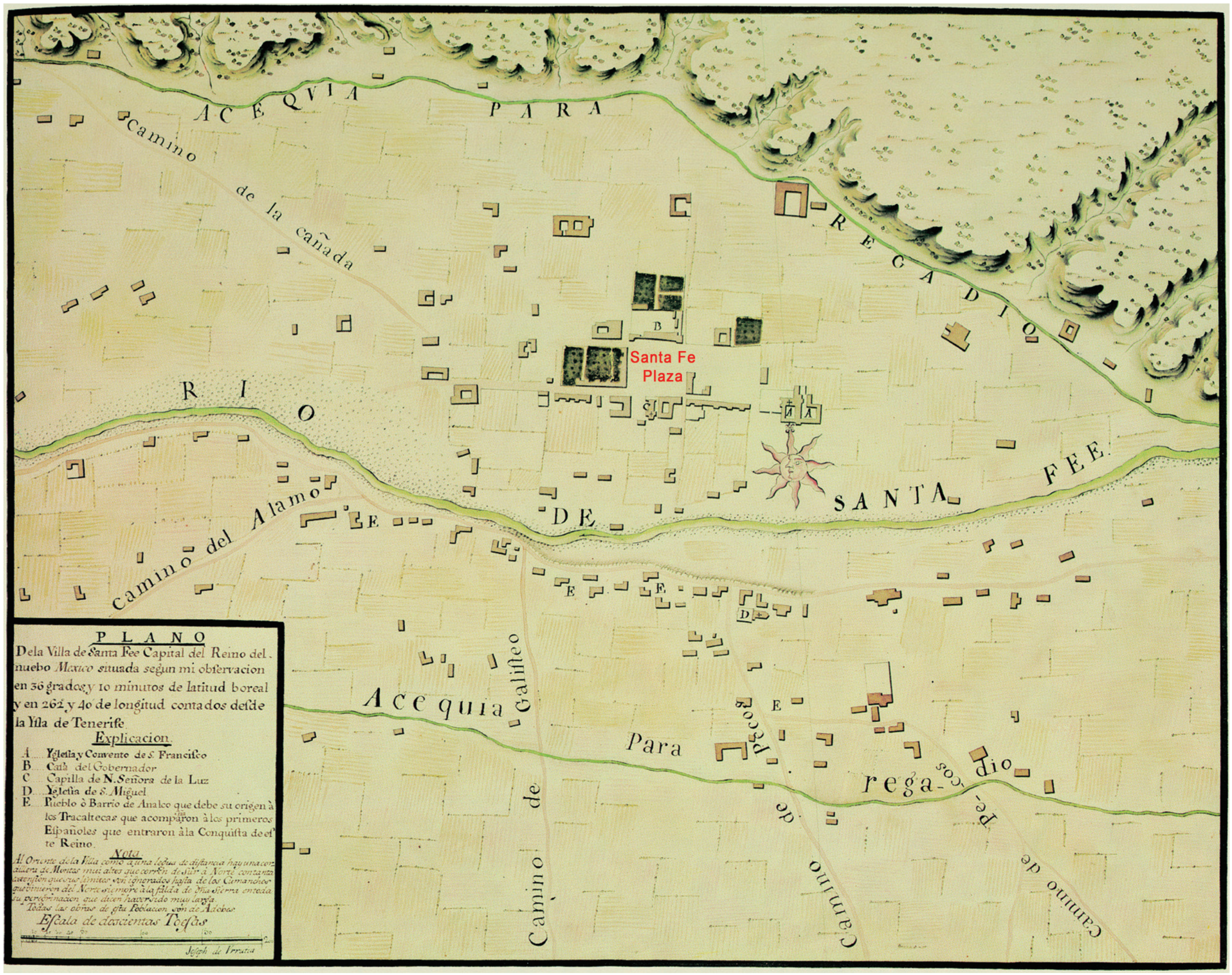


Figure 3. Joseph de Urrutia map of Santa Fe, 1766.

Figure 4. Santa Fe Plaza, ca. 1881. Palace of the Governors Photo Archives, Neg. No. 15282.

Overview of Cultural Context

(adapted from Maxwell and Post 1992; Lentz 2005; Wenker 2005; Hannaford 2007; Barbour 2011; Lakatos 2011)

Two general developmental/chronological frameworks are commonly used to order and classify archaeological sites and materials in the Northern Rio Grande region. One is the Pecos Classification (Kidder 1924; see Cordell 1984:55–59); the other is what Peckham (1984) referred to as the Rio Grande Classification, developed by Wendorf (1954) and Wendorf and Reed (1955). Although several other frameworks have been presented for specific subregions and to refine various temporal phases (e.g., Dickson [1979]; McNutt [1969]; Wetherington [1968]), this study follows the Rio Grande Classification.

The Rio Grande chronological framework, as defined by Wendorf and Reed (1955), begins with a preceramic period, which includes occupations dating from the Paleoindian period (ca. 9500 BC) through the end of the Archaic period (ca. AD 400–600). The beginning of the Pueblo period is punctuated by the appearance of corn, pottery, and regularly patterned pit structures. The Pueblo-period chronology spans AD 600 to 1600 and is subdivided into the Developmental, Coalition, Classic, and historic periods (Wendorf 1954; Wendorf and Reed 1955).

Preceramic Period (9500 BC to AD 600)

Paleoindian Period (9500–6000 BC)

The earliest known occupation of the American Southwest was by mobile big-game hunters referred to collectively as Paleoindians. Evidence of Paleoindian occupation in the Northern Rio Grande region is rare and typically consists of diagnostic projectile points and butchering tools found on the modern ground surface or in deflated settings (Acklen et al. 1990). More recently, two Clovis-period components have been reported in the Jemez Mountains (Evaskovich et al. 1997; Turnbow 1997), and late Paleoindian material was reported along the eastern flank of the Rio Grande west of Santa Fe (Dello-Russo 2010). Data recovery at one Clovis-period component identified two medial Clovis point fragments associated with a single thermal feature and tool manufacture debitage (Evaskovich et al. 1997). Identification of Paleoindian occupations within a montane setting may suggest a changing subsistence adaptation or environmental conditions. An increased focus on hunting smaller game and gathering wild plants compared to previous periods may reflect changes in climate toward the end of the Paleoindian period (Haynes 1980; Wilmsen 1974).

The paucity of reported Paleoindian remains around Santa Fe may be attributed to low visibility of these remains rather than a lack of occupation. Paleoindian remains may be masked by later Archaic and Puebloan occupations. The poor visibility of these remains can also be attributed to geomorphological factors. Surfaces or strata containing Paleoindian remains may be deeply buried and only visible in settings where these geological deposits are exposed (Cordell 1979). Finally, given the land-use patterns in the area over the last 400 years, it is no surprise that Paleoindian sites have not been reported in the Santa Fe area.

Archaic Period (6000 BC to AD 600)

The term *Archaic* applies to the broad-spectrum hunting and foraging populations exploiting the local topography and wild-food sources. Most Archaic sites in the region date from the Bajada phase (4800 to 3200 BC) to the En Medio phase (800 BC to AD 400), identified by distinctive projectile point types, scrapers, knives, and grinding stones. However, relatively few Early and Middle Archaic–period sites have been identified. Most were reported from along the Santa Fe River and its primary tributaries south of town (Post 2001, 2010) and from the piedmont northwest of town (Lakatos et al. 2001). These occupations were represented by a variety of thermal features, shallow house foundations, and scattered lithic, ground stone, and fire-cracked rock artifacts. The variety of feature types combined with evidence for dwellings and patterned artifact distributions indicates the annual reoccupation of favorable camp locations adjacent to a range of subsistence resources during this time (Post 2008).

Consistent with the broader regional data, evidence supports an increase in occupation of the Santa Fe area during the Late Archaic period (Acklen et al. 1990; Lang 1997a; Post 1996, 2001, 2010). This increase in occurrences may be attributed to changes in settlement and subsistence patterns identified during the Armijo phase (1800 to 800 BC; Irwin-Williams 1973). Settlement changes include evidence of seasonal aggregation, longer periods of occupation, and the exploitation of a broader range of environmental settings, while changes in subsistence practices include the adoption of horticulture, identified at a limited number of sites south of La Bajada around the Albuquerque area. In the Santa Fe area, Armijo-phase sites have been identified in the piedmont and along the Santa Fe River (Post 1996; Schmader 1994). These sites range from small foraging camps to larger base camps with shallow structures. Radiocarbon dates obtained from thermal features suggest these sites were occupied between cal 1750 and 900 BC (Post 1996; Lakatos et al. 2001; Schmader 1994).

En Medio–phase (800 BC to AD 400) sites are the most numerous Archaic-period sites reported in the Santa Fe area. These sites are found in riverine, piedmont, foothill, and montane settings (Acklen et al. 1990; Kennedy 1998; Post 1996, 1999, 2010; Schmader 1994). En Medio–phase sites range from isolated occurrences to limited-activity sites to base camps with well-defined structures, intramural and extramural features, and patterned artifact distributions. Increased diversity in settlement patterns and site types suggest population increase, longer or reduced time between occupations, and truncated foraging range.

Although many of these sites contained structures, formal features, and grinding implements, evidence of horticulture remains absent. Excavation of En Medio sites from the Las Campanas Project (Post 1996) recovered diagnostic projectile point types with date ranges that overlap between AD 500 and 850 (Irwin-Williams 1973; Thoms 1977). This temporal observation and the paucity of sites with evidence of horticulture indicate that Archaic subsistence strategies (generalized foraging) may have extended into the early or middle AD 900s north of La Bajada (Dickson 1979; McNutt 1969; Post 1996). No Archaic-period sites are found in the immediate vicinity of the project area.

Pueblo Period (AD 600–1600)

The Pueblo period is subdivided into the Developmental (AD 600–1200), Coalition (AD 1200–1325), and Classic (AD 1325–1600) periods. The Developmental period in the Northern Rio Grande spans AD 600 and 1200. This period is further subdivided into the early Developmental (AD 600 to 900) and late Developmental (AD 900 to 1200) periods. The early Developmental corresponds temporally with the Basketmaker III and Pueblo I periods of the Pecos Classification, and the late Developmental with the Pueblo II and early Pueblo III periods of the Pecos Classification. The Coalition (AD 1200– 1325) period follows the Developmental period and corresponds with the late Pueblo III period. The subsequent Classic period (AD 1325–1600) and historic (postcontact) period AD (1600–1912) are associated with the Pueblo IV and Pueblo V Pecos periods, respectively.

Early Developmental Period (AD 600 to 900)

Most reported early Developmental sites are south of La Bajada, primarily in the Albuquerque area, with a few reported at higher elevations along the Tesuque, Nambe, and Santa Fe River drainages (Peckham 1984; Skinner et al. 1980; Wendorf and Reed 1955). Pueblo sites dating prior to AD 900 are relatively rare in the Santa Fe area; after that date, Pueblo occupations became increasingly more numerous. These occupations are typically represented by limited-activity areas and small residential settlements situated along low terraces overlooking primary and secondary tributaries of the Rio Grande. These locations may have been chosen for their access to water and arable farming land (Cordell 1979). Terrace locations may also have provided access to environmental zones with a wide range of foraging resources (Anschuetz et al. 1997).

Early Developmental residential sites typically consisted of one to three shallow, circular pit structures with little or no evidence of associated surface structures (Allen and McNutt 1955; Peckham 1954, 1957; Stuart and Gauthier 1981). Excavation data indicate a suite of characteristics were employed to construct these early structures. Typically, structures were excavated up to 1 m below ground surface and were commonly 3 to 5 m in diameter. Walls were sometimes reinforced with vertical poles and adobe (Lakatos 2006). Walls, floors, and internal features commonly lacked plaster. Ventilators were commonly along the east to southeast wall of the structures. Common floor features included central hearths, ash-filled pits, deflectors, ladder sockets, and four postholes. Less common floor features included features identified as sipapus, warming pits, and pot rests, as well as subfloor pits of various sizes and depths (Allen and McNutt 1955; Hammack et al. 1983; Peckham 1957).

Ceramics associated with early Developmental sites include plain gray and brown wares, red-slipped brown wares, and San Marcial Black-on-white (Allen and McNutt 1955). These types persist through the early Developmental phase, with the addition of neck-banded types like Alma Neckbanded and Kana'a Gray, and Kiatuthlanna Black-on-white, La Plata Black-on-red, and Abajo Red-on-orange through time (Wendorf and Reed 1955). The accumulation of pottery types and surface textures, as opposed to sequential types and textures, appears to be characteristic of the Rio Grande Developmental, as well as of the Mogollon area (Wilson 2003). Decorated pottery at early Developmental-period sites may suggest cultural affiliation with people to the west and northwest. However, early Developmental assemblages also contain red and brown pottery, suggesting interaction with Mogollon populations to the south and southwest (Cordell 1979). Although cultural affiliation may seem more secure in assemblages clearly dominated by specific ware groups, cultural affiliation is difficult to determine at early Developmental sites that exhibit various frequencies of gray, brown, and white wares.

Late Developmental Period (AD 900 to 1200)

Late Developmental sites have been identified from the Albuquerque area to the Taos Valley. This period is marked by an increase in the number and size of residential sites, habitation of a broader range of environmental settings, and the appearance of Kwahe'e Black-on-white (Cordell 1979; Mera 1935; Peckham 1984; Wendorf and Reed 1955; Wetherington 1968). Late Developmental populations expanded into higher elevations, settling along the Rio Grande, Tesuque, Nambe, and Santa Fe River drainages (Allen 2004; Ellis 1975; McNutt 1969; Peckham 1984; Skinner et al. 1980; Wendorf and Reed 1955). Commonly located along low terraces overlooking primary and secondary tributaries of these rivers, these sites provided access to water, arable farming land (Cordell 1979), and a variety of foraging resources (Anschuetz et al. 1997). Although late Developmental sites are more common at higher elevations than early Developmental sites, there is little evidence for late Developmental occupation of the Pajarito Plateau (Kohler 1990; Orcutt 1991).

Reported late Developmental-period sites typically consist of a residential unit comprised of one to two pit structures, sometimes associated with a surface structure having 5 to 20 rooms, and a shallow midden (Ellis 1975; Peckham 1984; Stubbs 1954; Stuart and Gauthier 1981; Wendorf and Reed 1955). These residential sites occur as single units or in clusters of units referred to as communities (Anschuetz et al. 1997; Wendorf and Reed 1955).

Surface structures were commonly constructed of adobe, with some rock incorporated into the adobe walls or upright slabs used as wall foundations or footers (McNutt 1969; Stubbs 1954). Walls were constructed with multiple courses of adobe, with or without rock, waddle and daub (jacal), or combinations of these techniques. Contiguous rectangular rooms often lacked floor or wall features, and floors were unplastered, with a few reported examples of adobe, cobble, or slab floors. Subrectangular and D-shaped rooms were also reported but less common (Ahlstrom 1985; Boyer and Lakatos 1997; Ellis 1975; McNutt 1969; Stubbs 1954; Skinner et al. 1980).

Variety in size, shape, depth, and construction techniques is typical of late Developmental pit structure construction. Circular pit structures are the most common, followed by subrectangular structures. Pit structure depths range from 30 cm to 2 m bgs and size between 3 and 5 m in diameter. Walls of subsurface structures vary from the unplastered surface of the original pit excavation to construction techniques using multiple courses of adobe, with or without rock, waddle and daub, upright slabs used as foundations, adobe reinforced with vertical poles, or combinations of these techniques (Ahlstrom 1985; Boyer and Lakatos 1997; Allen and McNutt 1955; Lange 1968; Stubbs 1954; Stubbs and Stallings 1953).

Floors ranged from compact use-surfaces to well-prepared adobe surfaces. Common floor features include central hearths, upright "deflector" stones, ash-filled pits, ventilator complexes, ladder sockets, and four postholes toward the interior of the structure. Other, less common floor features include sipapus, subfloor channels, pot rests, and subfloor pits of various sizes and depths. Ventilators were constructed by connecting the exterior vent shaft to the interior of the structure with a tunnel or a narrow trench. This trench was subsequently roofed using latillas, effectively creating a tunnel. Exteriors of shallow structures were connected to the interior through an opening in the wall. Ventilators were commonly oriented to the east and southeast (Boyer and Lakatos 1997; Allen and McNutt 1955; Lange 1968; Stubbs 1954).

Utility ware ceramics associated with late Developmental sites include types with corrugated and incised exteriors in addition to the plain gray, brown, and neck-banded and polished/smudged types associated with the early Developmental period. Decorated white wares were imported and manufactured locally. Common types include Red Mesa Black-on-white, Gallup Black-on-white, Escavada Black-on-white, and Kwahe'e Black-on-white. Less common types include Socorro Black-on-white, Chupadero Black-on-white, Chaco Black-on-white, and Chuska Black-on-white (Allen 1972). Although decorated red wares are found at late Developmental sites, they are reported in very low frequencies, originating from the Upper San Juan, Tusayan, and Cibola regions. Imported ceramic types suggest late Developmental inhabitants obtained limited amounts of pottery from the Mogollon, San Juan Basin, and Upper San Juan regions (Cordell 1979).

An example of a late Developmental site near downtown Santa Fe is the KP site (LA 46300). At this site, Wiseman (1989) identified a single trash-filled and burned structure with a variety of imported and locally produced decorated and utility ware pottery types. Obsidian predominated in the flaked stone assemblage, although local chert types, particularly red jasper, were also reported. The subsistence economy consisted of a wide variety of plant and animal remains, including corn, squash, beeweed, deer, antelope, and cottontail (Wiseman 1989:139). Tree-ring and two radiocarbon dates indicate that the structure was occupied in the mid to late AD 1000s, and the fill accumulated in the early AD 1100s.

Coalition Period (AD 1200 to 1325)

Several researchers assert that the Coalition period is marked by three major changes reflected in the archaeological record: an increase in number and size of residential sites, contiguous surface rooms used more often as domiciles than in previous periods, and a shift from mineral paint to vegetal-based paint for decorating pottery (Cordell 1979; Peckham 1984; Stuart and Gauthier 1981; Wendorf and Reed 1955). An increase in the number and size of residential sites during this period suggests population increase and the extension of the village-level community organization typical of the late Developmental period. Although there is an apparent increase in the number of Coalition-period sites in upland areas that had limited occupation during the Developmental period, like the Pajarito Plateau, the southern Tewa Basin could be the source of this population. Coalition-period sites, whether at higher elevations or in the Tewa Basin, are situated along terraces or mesas overlooking the Rio Grande, Tesuque, Nambe, Santa Fe, and Chama River drainages (Cordell 1979; Dickson 1979). These locations provided access to water, arable farming land, and a variety of foraging resources (Cordell 1979).

Coalition-period residential units typically consisted of one to two pit structures associated with 10 to 20 surface rooms, and a shallow midden (Peckham 1984; Stuart and Gauthier 1981; Wendorf and Reed 1955). Surface structures often consisted of small linear or L-shaped roomblocks oriented north–south. These roomblocks are one or two rooms deep, with a pit structure or kiva incorporated into or east of the roomblock

(Kohler 1990; Steen 1977, 1982). Sites that exhibit this layout are generally considered to date earlier in the Coalition period. Although most Coalition-period sites are relatively small, some are reported to contain up to 200 ground-floor rooms (Stuart and Gauthier 1981). These larger sites are commonly U-shaped, enclosing a plaza or plazas to the east. Generally, large Coalition-period sites with an enclosed plaza are considered to be a later development (Steen 1977; Stuart and Gauthier 1981).

Various construction techniques are identified in excavated Coalition-period surface and subsurface structures. Walls of surface and subsurface structures were constructed with adobe, with or without rock, masonry, or combinations of these techniques. On the Pajarito Plateau, adobe construction incorporated unshaped tuff into the adobe walls. Masonry consists of unshaped or cut tuff block fastened with adobe mortar and sometimes chinked with small tuff fragments (Kohler 1990). Contiguous, rectangular rooms are the most common, with a few reported examples of subrectangular and D-shaped rooms (Kohler 1990; Steen 1977, 1982; Steen and Worman 1978).

Variety in size, shape, and depth of pit structure construction is common during the Coalition period. Circular pit structures are most common, followed by subrectangular structures. Pit structure depths ranged from 30 cm to 2 m bgs and were commonly 3 to 5 m in diameter. Walls of pit structures were constructed using the techniques described for surface-room construction. Common floor features include central hearths, "deflector" stones, ash-filled pits, ventilator complexes, and four postholes located toward the interior of the structure. Other, less common floor features include sipapus, entryways, pot rests, and subfloor pits of various sizes and depths. Ventilators were constructed by connecting the exterior vent shaft to the interior of the structure with a tunnel. Exteriors of shallow structures were connected to the interior through an opening in the wall. Ventilators were commonly oriented to the east or southeast (Kohler 1990; Steen 1977, 1982; Steen and Worman 1978; Stuart and Gauthier 1981; Stubbs and Stallings 1953; Wendorf and Reed 1955).

Utility ware ceramics include types with corrugated, smeared corrugated, and plain exteriors. Less common utility ware types include striated, incised, or tooled exteriors. Decorated white wares include Santa Fe Black-on-white, Galisteo Black-on-white, and Wiyo Black-on-white, and very low percentages of Kwahe'e Black-on-white. Few trade wares are reported from Coalition-period sites compared to sites of previous periods; those that have been found are White Mountain Redware (Kohler 1990; Steen 1977, 1982; Steen and Worman 1978).

Inhabiting higher elevations during the Coalition period may have been afforded by changes in precipitation patterns and access to unclaimed farming land. However, innovative methods were needed for producing sufficient crops in these cooler settings (Anschuetz et al. 1997). Intensification of water management and agricultural practices through the use of checkdams, reservoirs, and grid gardens, especially during the later part of this period and the succeeding Classic period, are examples of this intensification (Anschuetz et al. 1997; Maxwell and Anschuetz 1992).

In the Santa Fe area, large villages such as the Agua Fria School House ruin (LA 2), LA 109, LA 117, LA 118, and LA 119 were established during the early Coalition period. Other large Coalition sites, such as Pindi (LA 1), Tsogue (LA 742), and Tesuque Valley Ruin (LA 746), appear to have been established during the late Developmental period and grew rapidly during the Coalition period (Ahlstrom 1985; Stubbs and Stallings 1953). Near downtown Santa Fe, numerous Coalition-period sites have been recorded. Excavations at the old San Miguel Church site identified deposits dating to the fourteenth and seventeenth centuries (Stubbs and Ellis 1955). Excavations at LA 132712, near the intersection of Guadalupe Street and Johnson Street, had a Coalition component represented by a trash concentration, pits, and burials (Scheick 2003). A Coalition-phase pit structure and associated artifacts were found in the west courtyard of the Federal Courthouse (Scheick 2005). Other sites with Coalition- or Coalition-Classic–period materials in the downtown area include LA 1051 (Lentz and Barbour 2008; Lentz 2011), LA 114261 (Hannaford 1997a), LA 930 (Peckham 1977; Post and Snow 1982), LA 120430 (Post et al. 1998), LA 125720 (C. Snow 1999), LA 126709 (Viklund 2001), and LA 111 (Snow and Kammer 1995).

Classic Period (AD 1325 to 1600)

Wendorf and Reed (1955:53) characterize the Classic period as "a time of general cultural fluorescence." Occupation shifted away from the uplands and began to concentrate along the Rio Grande and the Chama and Santa Cruz Rivers, as well as in Galisteo Basin. Large villages containing multiple plazas and roomblocks were built, and regional populations peaked. The construction of large, multiplaza communities supersedes the village-level community organization typical of the late Developmental and early Coalition periods. In the Santa Fe area, large villages such as the Agua Fria School House ruin (LA 2), Arroyo Hondo (LA 12), Cieneguilla (LA 16), LA 118, LA 119, and Building Period 3 at Pindi (LA 1) flourished during the early part of this period. Although these large villages grew rapidly during the early Classic, only Cieneguilla remained occupied after AD 1425.

Regional ceramic trends include the continued use of carbon-painted pottery, commonly referred to as biscuit wares, in the north, such as the Tewa Basin and Rio Chama Valley; the adoption of glaze wares in southern areas, including the Galisteo Basin; and the production of Jemez Black-on-white in the Jemez Mountains. Along with the development of large, aggregated sites, Glaze A, a red-slipped, locally manufactured pottery type, was introduced. Although the reasons for the appearance and proliferation of glaze-painted pottery from the Santa Fe River south are ambiguous, many researchers believe it developed from White Mountain Redware. Similarities between types in the two regions are viewed as evidence for large-scale immigration into the Northern Rio Grande from the Zuni region and the San Juan Basin (Mera 1935, 1940; Reed 1949; Stubbs and Stallings 1953; Wendorf and Reed 1955). Other researchers attribute the changes during this period to expanding indigenous populations (Steen 1977) or the arrival of populations from the Jornada branch of the Mogollon in the south (Schaafsma and Schaafsma 1974). For whatever reason, this was a time of village reorganization.

Sites such as Pindi (LA 1) and Arroyo Hondo (LA 12) experienced reoccupation of older portions of the pueblo during this time (Creamer 1993; Stubbs and Stallings 1953). Intracommunity changes are also suggested by decreasing kiva-to-room ratios (Lipe 1989; Stuart and Gauthier 1981) and the revival of circular subterranean pit structures with an assemblage of floor features reminiscent of the late Developmental period (Peckham 1984). More clearly delineated plaza space and "big kivas" (Peckham 1984:280) suggest social organization that required emphasizing centrally located communal space.

Emphasizing communal space may have been a means to integrate aggregated populations through ceremonial functions. The need to enhance communal space using architectural units may also be related to the introduction of the Katsina Cult into the Northern Rio Grande during this time (Schaafsma and Schaafsma 1974). A shift from geometric designs to masked figures and horned serpents in kiva murals (Hayes et al. 1981; Hibben 1975) and the occurrence of shield-bearing anthropomorphic rock art figures (Schaafsma 1992) suggest the acceptance of new ideological concepts. Changes in community structure and settlement patterns during the Classic period may reflect indigenous inhabitants adapting to or adopting new populations, ideological elements, and organizational systems.

Few Classic-period sites have been excavated in the immediate vicinity of the project area. One such site is LA 1051, the site of the Santa Fe Community Convention Center (Lentz and Barbour 2008; Lentz 2011). Although excavation data are few, Classic-period structural remains and abundant artifacts have consistently been encountered in the Santa Fe area, suggesting that this temporal component is masked by subsequent land use and development (Deyloff 1998; Drake 1992; Lakatos 2011; Mera 1934; Peckham 1977; Tigges 1990).

Historic Period (AD 1540 to Present)

Spanish Contact, Pueblo Revolt, and Reconquest (AD 1540 to 1692)

The first European contact with the Northern Rio Grande Valley occurred in the late winter or early spring of 1541, when a foraging party of Coronado's men set up camp near San Juan Pueblo

(Hammond and Rey 1953:244, 259). Having heard of Coronado's earlier plundering farther south, these pueblos were hastily abandoned by their occupants. The Spaniards looted the deserted villages (Ortiz 1979:280; Winship 1896:476).

After the Spanish entradas of the mid- and late sixteenth century, Native American groups underwent numerous changes in lifestyle, social organization, and religion. The introduction of new crops and livestock contributed to major changes in subsistence, as did mission programs, which taught new industries such as metalsmithing and animal husbandry, meant to wean the Pueblo people away from traditional ways (Simmons 1979b:181). Incursions by Plains groups caused the abandonment of many pueblos and a contraction of the region occupied by the Pueblos (Chávez 1979; Schroeder 1979). A combination of new diseases to which the Pueblo people had no natural defenses, intermarriage, conflict attendant with the Pueblo Revolt of AD 1680–92, and the abandonment of traditional lifestyles contributed to a significant decrease in Pueblo populations over the next few centuries (Dozier 1970; Eggan 1979).

In 1591 San Juan Pueblo was visited by the Gaspar Castaño de Sosa expedition. Castaño de Sosa erected a cross, received obedience to the king of Spain, and appointed a governor, a mayor, and various other administrators (Schroeder and Matson 1965:121, 129; Lentz 1991:7).

With the goals of missionization, territorial expansion, and mineral wealth, the colonizing expedition of Don Juan de Oñate arrived at Ohkay Owingeh (San Juan Pueblo) on July 11, 1598, and proclaimed it the capital of the province. During the winter of 1600–1601 the Spaniards moved across the river to a partially abandoned 400-room pueblo village, which they renamed San Gabriel de los Caballeros. The first Catholic mission church, called San Miguel, was built at the southern end of the village. Soon, New Mexico was divided into seven missionary districts. A Spanish alcalde (magistrate) was appointed for each pueblo, and all were under Oñate's leadership (Spicer 1962:156). In January 1599, in retaliation for the death of Juan de Zaldívar (one of Oñate's two nephews), 70 of Oñate's men attacked Acoma Pueblo. After a three-day battle, the Spanish troops prevailed. In retribution, 500 Acoma prisoners over the age of 25 had one foot severed and were sentenced to 20 years of hard labor in the mines of Zacatecas.

The Spanish colony at San Gabriel did not survive the first decade of the seventeenth century. Oñate returned to Mexico in disgrace, and in 1610 the capital was moved from San Gabriel to the current site of Santa Fe (Ortiz 1979:281; Pearce 1965:146; Spicer 1962:157). There is some scholarly debate regarding exactly when Santa Fe was initially founded (see Ivey 2010). Bandelier (1893) and Twitchell (1963) argued for Santa Fe as having been founded by Oñate in 1605. However, the most recent interpretations of the archival documents suggest the settlement was initially established by Oñate's Captain Juan Martínez de Montoya sometime between 1605 and 1608. Early in 1610, under the orders of the Viceroy, Peralta organized the Villa of Santa Fe as a royally chartered town (Hammond 1927).

During the next twenty years, churches were built in all the pueblos. Native American secular and church officers were also established in each village. These included governors, alcaldes, and fiscales (tax collectors). During the 1620s the villages were peaceful, population grew, and conversions to the Catholic Church increased. By 1630, 50 Franciscan missionaries were working in 25 missions, and a school was operating in each (Spicer 1962:158).

In 1676, a series of events led to the Pueblo Revolt of 1680. Forty-seven Pueblo religious leaders were jailed and flogged in Santa Fe for their adherence to traditional Pueblo beliefs. Among them was the San Juan moiety chief, Popé, under whose leadership the Pueblo Revolt was subsequently planned and carried out (Spicer 1962:162–163). Twenty-one of the Franciscan friars in the territory were killed, along with 400 Spaniards. Santa Fe was besieged by an alliance of Pueblo forces, and on August 21, 1680, Governor Otermín was forced to surrender and evacuate the city (Hackett and Shelby 1942:11, 56–57; Lentz 2004). Coincidentally, a similar insurrection successfully ousted the Spanish from the isthmus of Tehuantepec, Mexico, that year.

The Pueblos held firm to their independence for 12 years. During the winter of 1681–82, an attempted reconquest by Governor Otermín was turned back. Otermín managed to sack and burn most of the pueblos south of Cochiti before returning to Mexico. Taking advantage of inter-

Pueblo factionalism, the definitive reconquest was initiated in 1692 by Don Diego de Vargas (Dozier 1970:61; Simmons 1979b:186).

Later Spanish Colonial Period (AD 1692 to 1821)

During this period, Spain under Hapsburg (until 1700) and Bourbon (1700–1821) rulers was changed from a world empire to a second-tier political and economic power as its European landholdings dissolved, its New World riches were spent, and the social hold of its missionization effort was diminished (Kamen 2003). At the height of its empire, early in the eighteenth century, Spain had economic ties covering three-quarters of the known world. The empire was based on economic superiority gained through alliances with the rich bankers and royalty of the Italian city states, the Flemish, and its neighbor and sea power, Portugal. New Spain and New Mexico were affected by imperial trends as the structure of the government, the focus of the economy, and pressures on the imperial borderlands changed. New Mexico and Santa Fe were on the frontier of the Spanish Empire and at the end of the Camino Real, the main communication and transport route for public, governmental, and ecclesiastic institutions and individuals. Pressured until 1789 by the French and English advances into the North American interior, Santa Fe soon felt the social and economic pressures brought on by the growing pains of the United States and its rapid institution of Manifest Destiny. These pressures were exerting tremendous influence on New Mexico as Mexico gained its independence from Spain in 1821.

Government and military. During the eighteenth century and into the early nineteenth century, Santa Fe functioned as the provincial capital of Nuevo Mexico in New Spain. The greater territory and military were administered by the governor and his appointed officials (Jenkins and Schroeder 1974; Kessell 1989; Weber 1992). After 1735, the governor ruled under the Audencia of Mexico and the Viceroy of New Spain (Westphall 1983:16–17). Locally, Santa Fe was governed by an *alcalde mayor* and *cabildo*, or town council (Hordes 1990; Snow 1990; Twitchell 1925). The alcalde and cabildo were responsible for carrying out daily operation of the local government, fulfilling the legal requirements of land petitions as assigned by the governor, and the collection of taxes and tithes for the church. These individuals, who were citizens and soldiers, controlled the social and economic well-being and development of the community and surrounding area (Bustamante 1989; Westphall 1983). After 1722, the alcalde mayor in Santa Fe appointed two *juezes repartidores* (allotment judges), one for each side of the river, to inspect farmlands and acequias and to allot water based on need (Baxter 1997:19).

Beginning in 1776 and continuing into the 1800s, the *presidio* system was revamped along with the military importance of Santa Fe and New Mexico. Until the late 1780s, the Santa Fe presidio and the improved and expanded presidio system provided protection against continued Indian raiding of Spanish and Pueblo villages. With a major decrease in the raiding following Governor Juan Bautista de Anza's treaty with the Comanches, the military served as a buffer against French, English, and later American incursions from the north and east (Moorhead 1974; Simmons 1990; Weber 1992). During this time the Spanish governmental organization in Mexico changed three times, but New Mexico remained primarily under its governor, who also remained the commanding military officer.

Settlement and economy. Following Don Diego de Vargas's Reconquest (1692–1696), both pre-Pueblo Revolt and new settlers returned to Santa Fe and the Rio Grande Valley. They allegedly returned to a villa that had been partially destroyed after the escape of Governor Otermín and the surviving colonists, soldiers, and missionaries. The fact that settlers temporarily moved into the Tano pueblo that occupied the former *casas reales* suggests that most of the residences were destroyed or rendered uninhabitable. Early priorities for the returning colonists and administration were rebuilding the casa reales and the acequia system, reallotting grants to former *encomenderos* and landholders or their surviving family members, and expanding on the pre-Revolt settlement (Kessell 1989; Simmons 1979a). With the termination of *encomienda,* settlers were expected to be more independent and self-sufficient and to properly compensate the Indians for their labor and goods (Westphall 1983:7). For defensive purposes, settlers were encouraged to settle lands near Santa Fe. However, the quality and quantity of suitable farmland, combined with the practice of living close to their fields, resulted in an elongated and dispersed settlement pattern along the Santa Fe River and adjacent to acequia-irrigated fields as depicted in the 1766–68 Urrutia map (Fig. 4; Simmons 1979a:105–106; Adams and Chávez 1956:40; Moorhead 1975:148–149).

Presumably, all families were eligible for the typical town lot, which in the seventeenth century was defined as two lots for house and garden, two contiguous fields for vegetable gardens, two others for vineyards and olive groves, and four *caballerías* of land; and for irrigation, the necessary water, if available, obligating the settlers to establish residence for ten consecutive years without absenting themselves (Hammond and Rey 1953:1088). Land documents from the eighteenth century clearly show that house and garden lots were common and that they were bought and sold regularly, once the ten-year residency requirement had been fulfilled (Tigges 1990). The extent to which vineyards and olive groves were actually introduced is unclear and has not be addressed archaeologically or well documented historically.

Obviously, arable land within the *villa* was scarce by the middle 1700s. Individual or family grants within the city league that included the full four caballerías of land or explicit access to the *ejido* (common land) parcels for livestock grazing were relatively few. Only twenty-four are shown on William White's undated *Sketch Map of Grants within the Santa Fe Grant*, reflecting land ownership in the early 1890s and coinciding with land claims filed with the Court of Private Land Claims (CPLC) (Westphall 1983:237). Based on William White's 1895 map, *Showing Owners of Land within the Santa Fe Grant outside of City Limits*, the long-lot land subdivision pattern is clearly evident. These long-lots were the basis of the small-scale agropastoral economic tradition that typified eighteenth- and early nineteenth-century land use within village or urban settings such as Santa Fe. The residences, which may be termed *ranchos* or *rancherías*, were much smaller in scale than *haciendas* (Simmons 1979a; Payne 1999:100–109). They were sufficient for subsistence but did not lead to economic advantage or prosperity. Long-lots allowed access into the ejido for other natural resources, such as wood, game, and stone for construction (Wozniak 1987:23–25). Acequia irrigation that supported intensive wheat and corn cultivation was the backbone of successful settlement in New Mexico (Ackerly 1996; Baxter 1997; Snow 1988; Wozniak 1987).

Class and community. During the eighteenth century, Santa Fe and New Mexico were inhabited by a diverse population. It was a socially stratified society with the governor, high-ranking officials, and officers of the presidio in the upper echelon. The middle class contained the farmers and artisans, who were slightly more prosperous than the common people and the soldiers of the presidio (Bustamante 1989:70). Other divisions within Hispano society reflected a diverse, mixed, and perhaps somewhat discriminatory and arbitrarily defined caste system (Brooks 2002; Bustamante 1989; Frank 2000). Economic-based social stratification was present, but the majority of the population consisted of small landholders of Hispano, Mestizo, Genízaro, or Indio castes. The Urrutia map shows the area south of the Santa Fe River and between San Miguel Church and the Guadalupe Church area as the Barrio de Analco, in which the population was partly composed of Tlaxacalan Indians from Mexico. Men were soldiers, farmers, shepherds, and laborers, with a few skilled blacksmiths, educators, and medical professionals. During this time, churches and secular *cofradías* remained the main avenues by which social and economically defined groups would cooperate and act as a community (Frank 2000). Until the building of the Santuario de Guadalupe in the early 1800s, worship and service would have been connected with the Parroquia or would have occurred at San Miguel Chapel. With addition of the Santuario, the area assumed a more communal organization mediated through church membership and lay organizations (Sze and Spears 1988:37).

Mexican Period (AD 1821 to 1846)

At the beginning of the nineteenth century, Spain's hold on Mexico and the northern territories had diminished significantly. Recognizing that the citizens of New Mexico could not partake in the normal political, economic, and social activities of the declining empire, Spain allowed New Mexico to operate in virtual independence, except for the most important activities (LeCompte 1989; Westphall 1983). The positive effect was that

New Mexico could determine much of its social and economic future. The negative effect was that the economic problems, compounded by limited money, limited access to durable goods, and slow responses to military and administrative issues, created a stagnant economic environment. In addition, pressure from the United States to open economic ties, applied through small-scale economic reconnaissance, increased in frequency between 1803 and 1821.

With Mexico's independence from Spain in 1821, New Mexico became a frontier province and economic avenue to the commercial markets and production centers of the United States. Two major changes instituted by the new government had important consequences in northern New Mexico. These were the establishment of normal economic relations with the United States through overland trade on the Santa Fe Trail and the abolition of the caste system, which meant that everyone was a Mexican citizen.

Government. The political structure of Santa Fe experienced only minor change with the switch to a Mexican administration (LeCompte 1989; Pratt and Snow 1988). The abolition of the caste system meant that any citizen had an equal opportunity to hold a public office. Governors were still appointed by Mexico, and the governor continued to be the military commander. He was also responsible for collecting tariffs and regulating the Santa Fe Trail commerce. The town council and alcalde still oversaw the town business. Santa Fe was divided into six parishes that formed the nucleus through which issues could be advanced to the council and discussed throughout the community.

Economy. In 1821, with Mexico's independence, the New Mexican frontier was opened to trade with the United States. The Santa Fe Trail, extending from Santa Fe to Independence, Missouri, became a major trade route for European goods from the east (Jenkins and Schroeder 1974; Simmons 1989). England also opened formal trade relations with Mexico. Due to these improved trade relations, large volumes of Euroamerican manufactured goods were available and filtered north on the Camino Real. By the 1830s, the dominant source of manufactured goods was the Santa Fe Trail, eclipsing the Camino Real in importance. Trade between the United States traders and Mexico did continue with a special focus on the northern Mexican silver mining region (Scheick and Viklund 2003:14). Americans not only traded in New Mexico, but also became involved in the transfer and allotment of large illegal land grants from Mexican officials (Westphall 1983).

With the opening of the Santa Fe Trail, New Mexico still remained predominantly an agropastoral economy. Most villages and towns barely felt the effects of the increase in commercial and consumer opportunity, except that basic household and work items were more readily available. The opening of the Santa Fe Trail and the effect that it had on northern New Mexico's economy has been explored by many researchers (LeCompte 1989; Pratt and Snow 1988; Boyle 1997). Not widespread immediately, but with greater effect through time, the Santa Fe Trail trade provided access to durable and manufactured goods in quantities and at lower costs than had been available from Camino Real commerce. Seemingly basic household goods, such as window glass, dishware, hand tools, were available to anyone that could afford to buy them or could open a line of credit based on projected farm and ranch production. The beginnings of a more viable cash economy meant that wage labor added to the available options for supporting a family. It also meant that with cash available, land that could not sustain a family's needs could be sold.

Society in transition. Mexican independence from Spain resulted in limited changes to the family-and church-based social structure of Santa Fe and New Mexico. The abolition of the caste system and the granting of equal citizenship to all Mexicans and New Mexicans potentially allowed for changes in the social status of local and provincial officeholders or officials, but there is not strong evidence for such changes in Santa Fe. General historical descriptions indicate that under Mexican rule, Santa Fe and New Mexico continued to have considerable autonomy, resulting in strong organizations that governed secular aspects of religion and other aspects of Hispanic organization (LeCompte 1989:83; Abbink and Stein 1977:160; Frank 2000). Abolition of the caste system and full citizenship had little effect on Hispanic populations but had serious consequences for the Pueblo Indians who had enjoyed special status relative to landholdings under Spanish rule. Their lands could now be sold and were subject to the vagaries of land transactions (Hall 1987).

Perhaps the strongest force for social change in Santa Fe resulted from the opening of the Santa Fe Trail. This officially opened New Mexico to influences and settlement by populations from the United States and added a new layer of cultural diversity to the social setting, which would eventually shift the balance of the social and economic relations in Santa Fe and along the Rio Grande.

American Territorial Period (AD 1846 to 1912)

New Mexico's Territorial–period quest for statehood was one of the longest endured by any state of the Union. Following the United States' acquisition of new southwestern and western territories, there was a disorderly and turbulent rush to own or control land and mineral and natural resources. The struggle for control created a political, economic, and social order that still affects how New Mexico functions as a state today. Two authoritative accounts of this period are Larson (1968) and Lamar (1966). Much of the following summary is derived from those sources.

Santa Fe Trail and Pre-Railroad times (AD 1846 to 1879). On July 30, 1846, rumors that the United States would invade Mexican territory became a reality as Kearny proclaimed his intention to occupy New Mexico. After possible secret negotiations with General Manuel Armijo, the Army of the West arrived in Santa Fe on August 18, and New Mexico was surrendered to the United States (Jenkins and Schroeder 1974:44). Between 1846 and the ratification of the Treaty of Guadalupe Hidalgo on March 10, 1848, the United States army continued to occupy New Mexico, and a civilian government was installed, including a governor (initially appointed by General Kearny) and a territorial assembly.

New Mexico changed politically when it was designated a territory of the United States under the Organic Act of 1851 (Lamar 1966:13). The act set up the territorial governorship, from which important appointments were made in the territorial administration. The territorial legislative assembly dealt with issues on a local level, while the territorial governor's job was to ensure that federal interests were served (Lamar 1966:14). The center of government remained in Santa Fe, as it had been during the Spanish and Mexican administrations.

Between 1848 and 1865, the economy continued to focus on Santa Fe Trail trade, with the inclusion of routes from Texas (Scurlock 1988:95–97). Santa Fe continued to be the economic and political center of the territory. In addition to the mercantile trade, the establishment of military forts such as Fort Union and Fort Stanton expanded the economic markets (Jenkins and Schroeder 1974:50; Scurlock 1988:76–88). Local economies continued to be agrarian and pastoral. The large ranches supplied cattle and wool to the eastern markets and, until the end of the Civil War, to Mexico. A full-scale cash and wage economy was not yet in place because New Mexico was still isolated from the rest of the United States by long distances and hostile Indian tribes (Abbink and Stein 1977:167; Fierman 1964:10).

Changes in the social structure were gradual before the Civil War. Early migration by Anglo-American and European entrepreneurs was slow because industries such as mining had only been established on a small scale. As the terminus of the Santa Fe Trail, Santa Fe attracted immigrant Jewish and German merchants, who brought eastern European business experience into the new territory. These merchants replaced the early traders and established formal businesses (Jenkins and Schroeder 1974:63). Early merchants were not satisfied with dealing only in goods and participated in growing land speculation in Spanish and Mexican land grants.

Between 1865 and 1880, the trends that began with establishment of the territory were amplified. Before 1860 the United States' attention was focused on the sectional conflict and the resulting Civil War. New Mexico was a Union territory, and for a brief period in 1862 the Confederates occupied Santa Fe without a shot's being fired from the cannons of Fort Marcy, which overlooked Santa Fe. However, when the Confederate contingent attempted to move north to the Colorado gold mines, they were engaged, defeated, and exiled from the territory (Jenkins and Schroeder 1974:50–51).

With the end of the Civil War, attention was turned to the settlement of the new territories and their potential for economic opportunity.

Military attention turned to pacification of the Native American tribes that roamed New Mexico outside the Rio Grande and its tributaries (Jenkins and Schroeder 1974:51–56). The new western territories were perceived as a place where lives ruined by the Civil War could be renewed. Eastern professionals with all kinds of expertise were encouraged by associates to come to New Mexico, where the political and economic fields were wide open (Lamar 1966). Much of this migration centered on Santa Fe, which continued to be the economic and political center of the territory.

The newcomers joined forces with and embraced the patron system, thereby gaining acceptance into the existing cultural setting. These alliances were referred to as "rings." The rings were informal organizations of lawyers, cattlemen, mining operators, landowners, merchants, and government officials (Larson 1968:137). Their common goal was to provide a favorable environment for achieving economic and political aims. The most well-known was the Santa Fe Ring, which included territorial governors, land registrars, newspaper owners, lawyers, and elected and appointed officials. Important persons in New Mexico history belonged to the Santa Fe Ring, including Stephen Elkins (secretary of war and US senator), Thomas Catron (territorial delegate and US senator), L. Bradford Prince (US senator and territorial governor), Francisco Chávez (president of the Territorial Assembly), and M. W. Mills (territorial governor), to name a few (Larson 1968:142–144). The Santa Fe Ring crossed party lines and was extremely fluid in its membership; disloyalty resulted in ostracization and often in political or economic ruin. Opposition to the ring was suppressed by law and violence, as demonstrated by the Lincoln and Colfax County Wars in the 1870s (Larson 1968:137–140).

The alliances between the new political and economic entrepreneurs and the old power structure came to dominate the territorial legislature, which through time passed an increasing number of laws benefiting the new structure to the detriment of the Spanish and Native American populations (TANM Roll 102, Frames 78–95). The new westerners often had contacts in Washington through which they influenced territorial political appointments and disbursement of economic aid (Lamar 1966:169–170).

Perhaps the greatest lure in the New Mexico territory was land. Ownership of large tracts of land was intensely sought by Santa Fe Ring members, a pattern typified by Thomas Catron, who was one of largest landholders in the United States by 1883, only 16 years after arriving in the territory (Larson 1968:143). To land speculators, most of New Mexico was unsettled and unused. This was an illusion promoted by the frontier subsistence economy of low-density, land-extensive farming and ranching, which had prevailed before the Territorial period. Lack of transportation to markets, conflicts with Indians, and a general lack of funds had retarded New Mexico's cattle, lumber, and mining industries. Under the Spanish land grants, nonarable land was a community resource and was therefore not overexploited. It was the community land that land speculators obtained, to the detriment of New Mexico's rural economy and social structure (Van Ness 1987).

New Mexico's economy changed after the Civil War because of increases in the number of military forts and the growing Euroamerican-controlled mining and ranching industries. A mercantile system that had focused on Mexican and California trade now supplied the military and transported precious ores from the gold and silver mines of the Santa Rita and Ortiz Mountains to national markets. A marginal cash economy grew as the federal government spent money on military forts and the Indian campaigns. The Santa Fe, California, and Texas trails were the main routes for goods. The Chihuahua trade died after the Civil War (Jenkins and Schroeder 1974:61–62).

The early Railroad era (AD 1879 to 1912). Between 1879 and 1912, political power was concentrated in the Santa Fe Ring, which consisted of several Santa Fe politicians (Dean 2010). The group controlled territorial and local political appointments through a system of patronage and effectively blocked legislation proposed by its opponents. In 1885, Edmund G. Ross was appointed territorial governor and was asked to end the political and economic control of the Santa Fe Ring, a task he was unable to complete.

National attention on New Mexico focused on the continued abuses of the land grant situation.

Between 1870 and 1892, the Santa Fe Ring was able to manipulate land grant speculation to their advantage. Surveyors general were usually appointed with the blessing of the ring and were often involved in land deals with ring members (Westphall 1965). William Julian was appointed surveyor general and given the job of halting the land grant abuses, which he carried out in spectacular if not a little overzealous fashion. His inclination was to deny all claims as fraudulent and recommended very few to Congress for confirmation. The grants within and on the periphery of Santa Fe were at both ends of the spectrum. Julian recommended the Sebastián de Vargas Grant, on the southeast boundary of Santa Fe, for confirmation, even though it lacked the proper documents (CPLC). On the other hand, the Salvador Gonzales Grant, within the northeast corner of the Santa Fe Grant, became the focal point for a national lambasting by Julian (1887) of the abuses of the land grant situation. To the Santa Fe Ring, Julian was an obstructionist, who used his position to advance personal vendettas (Bowden 1969).

At stake in the land grab were millions of acres that would leave private control and enter the public domain if they could not be confirmed as part of a land grant. Julian and Ross believed the public domain should be available to small landholders (Lamar 1966). The Santa Fe Ring supported large-scale ranching and mining interests. Because Santa Fe was the political and economic center of the territory, the land around it was valuable, and large tracts not legitimately included in the Spanish land grants were falsely claimed.

From 1880 to 1912, economic growth in the Santa Fe area began to lag as other areas of the state—Las Vegas, the Mesilla Valley, and Albuquerque—grew in importance. Much of the economic slowdown can be ascribed to the lack of a through railroad (Elliott 1988:40). Santa Fe was no longer an important economic center, but became only a stop at the end of a spur on the Atchison, Topeka & Santa Fe Railway. Although it was also the terminus of the Denver and Rio Grande Railway, which had local and regional significance, that route had little national importance because it did not tie in directly to the east–west transportation corridor (Pratt and Snow 1988:419).

In a move to spur economic growth, a concerted effort was made to advertise Santa Fe and New Mexico as a tourist and health destination (Spude 2010). Sanatoriums sprang up all across New Mexico, even in remote locations such as Folsom, in the northeast corner of the state. The trip on the Denver and Rio Grande Railway was described as an excellent remedy for lung problems (Nims 1881; Williams 1986:129–131). Two notable sanatoriums in Santa Fe were St. Vincent Sanatorium, established in 1883, and Sunmount Sanatorium, started in 1906 (Lewis 2010). John Gaw Meem was treated at Sundermount in 1920–21 and was the lead architect in remodeling and additional construction at St. Vincent in 1954.

New Mexico's unique cultural heritage was recognized as an important tourist draw. Preservation and revival of traditional examples of architecture and Native crafts and ceremony were encouraged. Large-scale tourist corporations such as the Harvey Corporation invested heavily in Native American crafts. Tourism and economic development became a dichotomy of economic goals. The tourist industry emphasized the old and romantic, while the economic development interests portrayed New Mexico as booming and vital, embodying the modern values embraced by the eastern establishment (Wilson 1981:105–159).

Spude (2010:339) notes that during this time Santa Fe went through a period of "Americanization," where progressive-minded citizens strove to reform government, social and cultural values, and the very appearance of their city. These reforms included the incorporation of the city in 1891, the installation of a sewage system, the paving of roads, new laws governing trash disposal, closing saloons on Sundays, and prohibitions against many forms of gambling. While Santa Fe may not have grown, at least it Santa Fe maintained economic stability. The city acquired many federal and territorial expenditures and jobs. Attempts to move the capital to Albuquerque in the early 1880s were defeated, which proved critical to the long-term economic stability of Santa Fe (Lamar 1966). Another choice made by legislators interested in Santa Fe's economic growth was to locate the penitentiary in Santa Fe. As a tradeoff, Albuquerque, Las Cruces, Las Vegas, and Socorro received colleges. The penitentiary was viewed as economically more valuable than schools.

Statehood to Modern Times (AD 1912 to Present)

New Mexico was delayed in its quest for statehood by eastern politicians who viewed the small population, arid climate, and Spanish-speaking majority as liabilities. Most New Mexicans favored statehood but had different conditions under which they would accept it. Some citizens feared statehood because of the potential for increased taxation, domination by one ethnic group over another, and the loss of federal jobs under a state-run system. These factors, combined with political factionalism in New Mexico, resulted in the struggle (Larson 1968:302–304).

On January 6, 1912, New Mexico was admitted into the Union as a state. After statehood the patterns that were established in the Territorial period continued. New Mexico experienced only slow population growth, with most settlement concentrated along the Rio Grande corridor and in the southeast around Roswell. More than half the state land had a population density of fewer than five people per square mile (Williams 1986:135), partly because of the large area that was part of the National Trust and could not be settled. The major industries continued to be mining, ranching, lumber, farming within the Pecos and Rio Grande irrigation districts, and tourism (Jenkins and Schroeder 1974:77).

In Santa Fe, the absence of a major spur into the national railroad lines proved to be a detriment to industrial growth. Instead, development in Santa Fe focused on its state and federal administrative centers and the tourism and art trade (Pratt and Snow 1988; Wilson 1981, 1997). Today, Santa Fe is the centerpiece of a tourism industry that brings more than $1 billion into the state every year. Municipal ordinances and efforts of the art and anthropological community to preserve Santa Fe's cultural heritage in the 1920s and 1930s have made it a desirable location for second residences and professional people who supply services to the national markets. The lack of industry that had retarded Santa Fe's growth was turned into a positive situation. Without heavy industry and the accompanying population density that accompanies it, quality of life became a draw for people seeking to escape the increasingly crowded and polluted cities. As part of the quality of life and the uniqueness of Santa Fe, its multicultural heritage continues to be emphasized.

Previous Archaeological Investigations

(adapted from Post 2002:3–7; Lentz 2004:13–15; Barbour 2010b:11–15)

This chapter summarizes the results of research at the New Mexico Cultural Resource Information System (NMCRIS) for previous archaeological investigations in and around the Santa Fe Plaza. This is followed by a more detailed description of excavations conducted at LA 80000 and in the immediate area.

New Mexico Cultural Resource Information System

Archival research was conducted at NMCRIS to identify archaeological sites within a 500 m radius of the project area prior to monitoring. This search turned up 86 sites representing 132 temporal components (Table 1). Seven of these sites are listed on the *National Register of Historic Places* (NRHP) and ten (including the seven on the NRHP) are listed on the *State Register of Cultural Properties* (SRCP). The project was conducted within LA 80000, a national historic landmark registered in the NRHP (October 15, 1966, Item No. 66000491) and the SRCP (No. 27). Other sites included in the NRHP or SRCP within 500 m of the project area are Fort Marcy (LA 111), La Garita (LA 608), Ogapogeh (LA 930), El Pueblo de Santa Fe (also part of Ogapogeh, LA 1051), Barrio de Analco (LA 1111), LA 1838, LA 1876, the Palace of the Governors (LA 4451), San Miguel Chapel (LA 4449), and the Santa Fe Presidio (LA 35100).

The vast majority of components (n = 87) are historic Hispanic and Euroamerican in origin, representing nearly 400 years of European occupation of the area in and around Santa Fe. These Hispanic and Euroamerican components are a diverse array of governmental, industrial, military, and residential settings, and many of these sites date to the founding of Santa Fe (ca. 1610) or slightly thereafter. Some of the more noteworthy historic sites include the Palace of the Governors, the military and administrative center for New Mexico throughout the seventeenth, eighteenth, and nineteenth centuries; San Miguel Chapel, considered by some to be the oldest church in the United States; and La Garita, which functioned as a military outpost overlooking the city in the nineteenth century.

The remaining cultural components are unknown (n = 7) and Anasazi/Pueblo (n = 35); the vast majority of Anasazi/Pueblo sites date between AD 1100 and 1600. These sites can be linked to a large pueblo, LA 930/LA 1051, which dominated the downtown Santa Fe area during the Coalition and Classic periods (Lentz 2005, 2011).

Archaeological Investigations at LA 80000 and in the Immediate Area

One of the first excavations undertaken near the plaza was at the Palace of the Governors. Jesse Nusbaum, who excavated several rooms in 1909–10, recovered materials and six human burials of Native American affiliation (Peckham 1982). As part of the Palace renovation (1909–13), "twenty-six hundred wagon loads of debris were removed, which was filled up to the level of the windows" (Hewett 1912:5). Undoubtedly, some of the debris referred to in Edgar Hewett's first annual report of the Museum of New Mexico was an accumulation of prehistoric (Coalition and Classic periods) and seventeenth- through nineteenth-century archaeological deposits. Subsequent investigators (Cross Cultural Research Systems 1992) attribute the absence of eighteenth-century materials in the Palace complex to this large-scale "debris" removal. One has to wonder where these voluminous materials were deposited.

In 1956 Marjorie Lambert excavated a well in the southwest corner of the existing Palace courtyard as part of a plan to rebuild the structure (Lambert 1985). Her excavation recovered nails, bottles, and horseshoes dating to approximately the 1860s, reflecting Territorial-period military use. Lambert (1985:220) observed that Well 1 was not shown on the 1868 plan of the Palace of the Governors. This indicated to her that Well 1 was built after 1868, and the Territorial-period

Table 1. Archaeological sites in the vicinity of LA 80000

Component	Dates (AD)	Total
Anasazi/Pueblo		
Anasazi artifact scatter	1050–1600	1
Anasazi artifact scatter	1200–1325	1
Anasazi artifact scatter	1200–1450	2
Anasazi artifact scatter	1200–1600	2
Anasazi artifact scatter	1325–1600	1
Anasazi features and artifact scatter	600–1400	1
Anasazi features and artifact scatter	1050–1450	1
Anasazi features and artifact scatter	1100–1325	2
Anasazi features and artifact scatter	1200–1325	1
Anasazi features and artifact scatter	1200–1600	1
Anasazi features and artifact scatter	1275–1450	1
Anasazi multiple residence	1050–1600	1
Anasazi multiple residence	1100–1325	1
Anasazi multiple residence	1100–1600	1
Anasazi residential complex/community	1100–1240	1
Anasazi single residence	600–1325	1
Anasazi unknown	1–1600	1
Anasazi unknown	900–1300	1
Anasazi unknown	1100–1300	2
Anasazi unknown	1100–1600	4
Pueblo artifact scatter	1692–1821	1
Pueblo multiple residence	1680–1692	1
Pueblo unknown	1539–1680	1
Pueblo unknown	1680–1692	1
Pueblo unknown	1692–1821	4
Subtotal		35
Hispanic		
Hispanic artifact scatter	1539–1680	1
Hispanic artifact scatter	1600–1912	1
Hispanic artifact scatter	1600–1977	1
Hispanic artifact scatter	1610–1800	1
Hispanic artifact scatter	1610–1846	1
Hispanic artifact scatter	1600–1821	1
Hispanic artifact scatter	1650–1900	1
Hispanic artifact scatter	1680–1912	1
Hispanic artifact scatter	1700–1850	1
Hispanic artifact scatter	1700–1945	1
Hispanic artifact scatter	1720–1750	1
Hispanic artifact scatter	1720–1800	1
Hispanic artifact scatter	1720–1821	1
Hispanic artifact scatter	1750–1846	1
Hispanic artifact scatter	1767–1810	1
Hispanic artifact scatter	1800–1899	1
Hispanic artifact scatter	1850–1890	1
Hispanic artifact scatter	1880–1912	1
Hispanic artifact scatter	1886–1960	1
Hispanic simple features	1692–1846	1
Hispanic simple features	1900–1920	1
Hispanic features and artifact scatter	1598–1912	1
Hispanic features and artifact scatter	1610–1680	1
Hispanic features and artifact scatter	1610–1700	1
Hispanic features and artifact scatter	1620–1930	1
Hispanic features and artifact scatter	1835–1945	1
Hispanic features and artifact scatter	1880–1920	1
Hispanic governmental	1605–1680	1
Hispanic governmental	1692–1846	1
Hispanic military	1609–1848	1

Component	Dates (AD)	Total
Hispanic military	1804–1846	1
Hispanic ranching/agricultural	1605–1912	1
Hispanic ranching/agricultural	1620–1949	1
Hispanic residential complex/community	1605–1680	1
Hispanic residential complex/community	1605–1846	1
Hispanic residential complex/community	1692–1846	1
Hispanic residential complex/community	1714–1996	2
Hispanic residential complex/community	1821–1846	1
Hispanic residential complex/community	1846–1999	1
Hispanic residential complex/community	1853–1858	1
Hispanic single residence	1750–1856	1
Hispanic unknown	1539–1680	2
Hispanic unknown	1539–1993	1
Hispanic unknown	1692–1821	3
Hispanic unknown	1821–1846	2
Hispanic unknown	1846–1912	2
Hispanic unknown	1945–1993	1
Subtotal		53
Anglo/Euroamerican		
Anglo/Euroamerican artifact scatter	1848–1945	1
Anglo/Euroamerican simple features	1850–1920	1
Anglo/Euroamerican features and artifact scatter	1821–1859	1
Anglo/Euroamerican features and artifact scatter	1840–1912	1
Anglo/Euroamerican features and artifact scatter	1846–1912	1
Anglo/Euroamerican features and artifact scatter	1846–1955	1
Anglo/Euroamerican features and artifact scatter	1846–1999	1
Anglo/Euroamerican features and artifact scatter	1850–1930	1
Anglo/Euroamerican features and artifact scatter	1870–1880	1
Anglo/Euroamerican features and artifact scatter	1880–1950	1
Anglo/Euroamerican features and artifact scatter	1880–1969	1
Anglo/Euroamerican features and artifact scatter	1900–1971	1
Anglo/Euroamerican commercial	1881–1886	1
Anglo/Euroamerican industrial	1891–1960	1
Anglo/Euroamerican governmental	1846–1945	1
Anglo/Euroamerican military	1846–1851	1
Anglo/Euroamerican military	1846–1867	1
Anglo/Euroamerican military	1846–1912	2
Anglo/Euroamerican military	1848–1920	1
Anglo/Euroamerican multiple residence	1930–1945	1
Anglo/Euroamerican residential complex/community	1846–1912	1
Anglo/Euroamerican single residence	1846–1990	1
Anglo/Euroamerican single residence	1883–1912	1
Anglo/Euroamerican single residence	1930–1950	1
Anglo/Euroamerican unknown	1539–1993	1
Anglo/Euroamerican unknown	1846–1912	5
Anglo/Euroamerican unknown	1846–1945	1
Anglo/Euroamerican unknown	1912–1945	2
Subtotal		34
Unknown		
Unknown artifact scatter	900–1800	1
Unknown artifact scatter	900–1880	1
Unknown features and artifact scatter	900–1945	1
Unknown/reserved		7
Subtotal		10
Total		132

artifacts indicated it was used for only 41 years. Tangentially, water was encountered at a depth of 5 m during the 1956 excavation. Another well at the eastern end of the courtyard may date to 1715 or earlier.

At least two trenches were excavated to 1.5 m below the parking lot behind the Palace of the Governors and monitored by Ellis (1974). A sketch shows the configuration of three foundation remnants. All three segments were exposed between 82 and 86 cm below the pavement, suggesting that they are contemporaneous. They may date to the seventeenth or eighteenth centuries and are comparable to foundations exposed in the Palace of the Governors (Snow 1974).

Superimposed floors from the mid-seventeenth to the early eighteenth century were exposed, as well as large storage and processing features from the Pueblo Revolt period (AD 1680). These storage and architectural features were encountered 10 to 20 cm below what was then the Palace floor. The near-surface context of these features is attributed to the removal of fill by Nusbaum in 1910 and 1911 (Snow 1974). Abundant cultural material from ancestral Puebloan, Spanish, Pueblo Indian, Mexican, and Territorial occupations numbered in the tens of thousands. Rarely recovered vegetal and macrobotanical remains included corn, beans, squash, and chile, as well as pottery and flaked stone from Coalition and Classic periods of the Rio Grande sequence (Wendorf and Reed 1955). Over 27,000 prehistoric and historic pottery artifacts were recovered, and Indian occupation during the Pueblo Revolt was clearly evident in the subsurface remains.

Stratified cultural deposits were present to a depth of 1.5 m. Numerous artifacts were recovered, dating from the fourteenth to the late nineteenth centuries. No structural remains were found, but because of the minimal degree of testing, further excavations were recommended. In 1979, under the direction of Stewart Peckham and subsequently David Snow, excavations were conducted on the site (Post and Snow 1982). Uncovered were the probable foundations of the Fort Marcy quartermaster's offices and an eighteenth-century occupation level. Of particular interest is the eighteenth-century occupation level because it was encountered at 130–145 cm bgs and below the Fort Marcy quartermaster's offices. This indicated that intact seventeenth- and eighteenth-century deposits remained within the bounds of the military reservation despite multiple renovation, construction, and demolition episodes. Overall, within the Museum of Fine Arts addition project area, cultural materials from the thirteenth to twentieth centuries were recovered from depths ranging to 1.9 m below the ground surface.

In 1982 the area then occupied by the First Interstate Bank Building was excavated by Curtis Schaafsma and Stewart Peckham (Schaafsma 1982). An adobe brick wall running east–west is believed to be the south garden wall from the late nineteenth and early twentieth centuries. The wall had been built on top of swamp clays. Excavators also found late Spanish presidio artifacts at 0.5–1.5 m below the present sidewalk.

The OAS excavated a 1 by 1 m pit in the courtyard of the Palace of the Governors in 1987 in advance of a tree-planting ceremony in honor of the visiting king of Spain, Juan Carlos Alfonso Víctor María de Borbón y Borbón (Levine 1990). This 1 m deep unit yielded 664 sherds of Pueblo-made pottery, 817 pieces of animal bone, 68 lithic artifacts, and smaller numbers of miscellaneous artifacts. The dense deposit at 80 to 100 cm bgs contained abundant sherds, animal bone, and a gunflint. The majority of the pottery dated to the seventeenth or early eighteenth century.

In 1989 the OAS monitored the excavation of a 144 m long utility line trench along Washington Avenue on the east side of the Palace (Willmer 1990). The excavation revealed seven subsurface features older than 1900 and a wide range of temporally and functionally variable artifacts. Two pit features contained eighteenth-century pottery but no metal or glass, suggesting that intact deposits were present. Also found was a rock-lined acequia or drain. David Snow reported that the rock-lined ditch was not encountered during excavations in the parking lot to the east. The ditch contained glass shards, indicating that it was open or in use at the end of the nineteenth or early in the twentieth century. Three other cobble features included a cobble pavement and two alignments. All three are immediately east of the First Interstate Bank Building, where Schaafsma encountered considerable evidence of seventeenth- or eighteenth-century gardening and outdoor activity. The top of the cobble pavement was exposed at 1.25 m below the street grade, further indicating it dated to the Spanish Colonial period.

In 1990 and 1991, Museum of New Mexico staff monitored storm drain and drainage ditch installations across Lincoln Avenue between the Palace of the Governors and the Museum of Fine Arts and around the Hewett House (Martinez 1994). Trench profiles contained evidence of Territorial and Spanish Colonial architecture and artifacts from both periods. Nonsystematic artifact collection recovered 425 pieces of Pueblo and Euroamerican pottery, 518 animal bones (primarily cow and sheep or goat), and 64 miscellaneous artifacts including mica sheets, a strike-a-light flint, and a charred corncob. According to the report, the trenches cut through a midden deposit that appeared homogeneous but contained considerable seventeenth-century refuse. Also exposed were the remains of a disarticulated foundation constructed of river cobbles at a depth of 85 to 100 cm below the street level of Lincoln Avenue.

In 1988 the OAS undertook archaeological investigations at the La Fonda Parking Lot (Wiseman 1988). Numerous pits were encountered, some with highly stratified deposits, and materials dating to the early to middle seventeenth century (pre–Pueblo Revolt). Although a variety of activities and buildings have occupied that space since the winter of 1609–10, that location would have been the southeast corner of the original plaza or a sort of generalized public space in front of the early colonial Parroquia. The function of the pits was unknown—perhaps "borrow" pits, pits dug into the side of the Rio Chiquito (which early maps depict in that vicinity), or trash pits.

During the renovation of the Lensic Theater (LA 126709; Viklund 1999), testing revealed Native American ceramic artifacts and a posthole, perhaps suggesting prior indigenous occupation, and midden deposits from the earliest European occupations of Santa Fe to the present. It was speculated that the Lensic property was once adjacent to the seventeenth-century plaza. In the fall of 1990, David Snow excavated 10 sq m on the Santa Fe Plaza (Cross Cultural Research Systems 1992). These test pits were placed on the extreme west side, in the southeast central quadrant, and on the extreme east side. Cultural materials were not recovered below 90 cm. The report concludes that the pre-1974 surface represents a highly disturbed, probably considerably modified plaza level which dates from the pre-Reconquest period of Santa Fe's history.

Across the plaza, opposite the Palace of the Governors, the Military Chapel of La Castrense site was investigated by Stubbs and Ellis (1955). Built by Governor Marín del Valle about 1760, the excavations revealed the foundations of the old church. These findings were compared to Fray Francisco Domínguez's descriptions of the chapel in 1776. Domínguez's measurements were remarkably similar, even though they were estimated. Materials dating to the seventeenth and eighteenth centuries were also exposed. These "date from the Indian occupancy of the Santa Fe Plaza during the 1680–1693 Revolt" (Stubbs and Ellis 1955:16).

When the basement wall at the Museum of Fine Arts was excavated for repairs (Hannaford 1997b), cultural deposits of temporally mixed artifacts were encountered to a depth of 1.15 m. No structural remains or features were observed. The excavation was immediately east of the Palace of the Governors History Museum. The work uncovered an acequia and a plank 4 m long at a depth of between 1.44 and 1.60 m bgs. These features were associated with and covered by eighteenth- and nineteenth-century refuse, including Pueblo and Euroamerican pottery, metal artifacts, and animal bone.

In July and August 2000, David Snow, then a curator at the Palace of the Governors, directed the excavation of nine 1 by 1 m test units along the foundation of the Palace of the Governors in conjunction with an architectural condition assessment. Six units were placed in the patio, and three along the Palace north wall, which forms the south limit of the History Museum Annex project area. Even though this area was cut by water line and telephone cable trenches at two different elevations, there appeared to be integrity to the deposits. A mixed seventeenth- to twentieth-century layer was 40 to 50 cm thick, and a possible seventeenth-century layer was 35 to 60 cm thick and extended 1.8 m below the parking lot surface (based on auger tests in the bottom of the unit). A possible posthole associated with cobbles may be a horizon marker for the Spanish Colonial occupation level. The posthole and cobbles occur at 80 cm below the portion of the Spanish Colonial deposit and may be associated with the Presidio occupation. Below the foundation of the existing building, which is believed to have been built in the 1860s, a massive river cobble foundation may date to between 1700 and 1760. Numerous pit features were documented, among them, a probable metallurgy pit associated with slag, which may date to around 1609. Almost 100,000 artifacts were collected.

Between October 2002 and October 2004, Stephen Post of OAS completed excavations behind the Palace of the Governors in advance of construction of the New Mexico State History Museum in downtown Santa Fe. During fifteen months of fieldwork conducted by our archaeologists and more than thirty volunteers, we recovered more than 800,000 artifacts, and exposed and documented 200 cultural features from early Spanish Colonial to early Statehood occupation of the Palace of the Governors grounds. Post determined that the area behind the Palace was primarily used for refuse disposal, material borrowing, and gardening from the early 1600s into the early or middle 1700s. This Spanish Colonial use was interrupted by the Pueblo Revolt of 1680, of which we encountered no physical evidence. In the middle 1700s the area was used as an informal cemetery, an irrigated garden, and a probable orchard bounded on the south, east, and west by cobble foundation buildings and walls. By the late 1700s, the Palace of the Governors outbuildings covered 18,000 sq ft used as barracks, storerooms, and possibly barns or rooms with animal stalls. Some of these buildings were still standing when the US Army arrived in 1846 and may have been used until 1867, when all buildings behind the Palace of the Governors were demolished. Intermittent use as a governor's garden and refuse disposal characterized Territorial-period activities, except for construction of an assayer's furnace and storeroom between 1879 and 1881, during Governor Lew Wallace's term. The latter facilities were leveled, and the central area remained open space, while twentieth-century downtown Santa Fe grew around it.

Under the direction of Stephen Lentz (2004), OAS excavated 29 whole and partial 1 by 1 m units in the location of the gazebo that now occupies the north central plaza. The excavation exposed seven cultural and natural strata to a depth of 1 m below the current plaza level. Exposed were an 1880s plaza surface (75–85 cm bgs), a seventeenth-century artifact-rich deposit interpreted as a pre-Revolt/Pueblo Revolt plaza surface at 1 to 1.2 m bgs, and an acequia deposit interpreted as one of the seventeenth-century water sources that served the plaza and surrounding buildings. Surprisingly rich artifact content included 234 chipped stone artifacts, of which 78 were formal or informal tools; 18 miscellaneous historic-era artifacts; 78 glass artifacts, 86 Euroamerican ceramics, of which 28 were Mexican-made majolica types; 247 metal artifacts; and 7,260 historic and pre-Hispanic ceramic sherds, of which 190 were analyzed. This work demonstrated the presence of intact cultural deposits from seventeenth- and nineteenth-century plaza use below the 1974 plaza surface and overburden.

In 2008 and 2009, OAS archaeologists (Barbour 2010b) monitored the installation of seven light-post holes at LA 80000. Each light-post hole, roughly 60 cm in diameter and 90 cm in depth, was placed over the location of a previously existing light post. Archaeologists documented and sifted through fill that was mechanically or manually excavated by contractors, using 1/8-inch mesh to systematically recover a sample of artifacts. This resulted in the documentation of three discrete strata and the in-field examination of eleven artifacts. The stratigraphic sequence identified coincides well with previously published descriptions derived from construction of the gazebo in 2004 (Lentz 2004). These similarities suggest culturally significant intact deposits may be widely distributed across the area at depths of 45 to 65 cm bgs.

Field Methods

The Public Works Division of the City of Santa Fe planned to install four light posts. Accomplishing this task required the excavation of a hole roughly 3 ft (90 cm) to 4 ft (1.2 m) in diameter and 7 ft (2.1 m) deep for each of the four light posts. OAS designated these four light-post holes TUs 1–4 (see Fig. 2).

Excavation began with an OAS archaeologist monitoring hand excavation of each light-post hole by Gorman Electric, a contractor for the City of Santa Fe. As major stratigraphic changes became evident in the backfill, the excavations were interrupted, and the archaeologist examined the posthole walls and floor for intact cultural deposits. When intact deposits were encountered, the OAS archaeologist shifted from monitoring to performing systematic test excavations of the light-post hole (Fig. 5).

Prior to hand excavation, each hole was squared to roughly 1 m east–west by 1 m north–south. Excavation was then conducted in arbitrary 10 cm levels. Vertical control was maintained by measuring down from the top of the curb along Palace Avenue. Cultural fill removed from the hole was screened through 1/4-inch mesh to collect artifacts. These excavation methods continued until all intact cultural deposits were removed or until the hole reached the depth necessary for the contractor to install the light post without further impacting cultural resources (2.1 m bgs). Once the excavations exceed 1.3 m in depth, the surrounding area was stepped back by the contractor to a depth not exceeding 60 cm bgs.

When architectural or other feature remains were encountered, the feature was defined and excavated within the confines of the hole. A feature number was assigned, and the artifact content, stratigraphy, morphology, construction methods, and age recorded. A plan view of the feature was drawn and photographed. Feature fill was screened through 1/8-inch mesh to systematically recover artifacts for dating and functional analysis.

After light-post excavation, archaeologists identified and designated all strata within each test unit and generated a stratigraphic profile of the hole. While strata were recognized during hand excavation, OAS archaeologists completed excavations before designating strata within each test unit. This allowed the walls of the test unit time to dry, making strata boundaries more clearly visible, and allowed OAS archaeologists to assess the entire stratigraphic sequence collectively.

Each stratum was assigned a number linked to the test unit number and its vertical position within the profile. Hence, Stratum 2.3 represents the third stratum down from the base of the Palace Avenue curb in TU 2. All strata were described according to color, texture, composition, origin, and artifact content or cultural inclusions, such as charcoal, coal, or fragments of building materials.

Figure 5. Rick Montoya beginning systematic hand-excavation in TU 2.

Archaeological Findings

Matthew J. Barbour and Susan M. Moga

Archaeological monitoring began on February 14 and 15, 2011, when the contractor, Gorman Electric, removed the brick walkway along Palace Avenue (Fig. 2). This was followed by hand excavation by the contractor to expose the existing utilities in the four test units. Fill exposed in these initial excavations was a mix of materials from the seventeenth through twentieth centuries.

On February 16, the utility lines were cut. An OAS archaeologist then entered each of the four light-post holes to assess archaeological deposits beneath the existing utilities. In two instances (TU 2 and TU 3), intact archaeological strata were encountered 80–90 cm bgs. Archaeological work transitioned immediately into systematic excavation. Deposits in these test units yielded materials dating to the seventeenth, eighteenth, and nineteenth centuries (Fig. 6; Table 2).

In TU 1 and TU 4, mixed deposits continued beneath the existing utilities. Because large quantities of asphalt and concrete were present, the contractor was permitted to utilize a mechanical auger to remove the fill. In TU 1, the mechanical auger successfully excavated a hole 1 m in diameter and 2.1 m deep without encountering intact archaeological deposits. One possible explanation for the absence of cultural materials is a storm drain grate 1.5 m northwest of the hole. If the storm drain was overexcavated, it is possible that the fill in TU 1 represents backfill associated with its installation.

In TU 4, the mechanical auger encountered intact archaeological deposits roughly 1.3 m bgs. However, by the time these deposits were recognized, the drill had disrupted the sediments down to 1.8 m bgs. This mixed fill, disrupted by the drill between 1.3 and 1.8 m bgs, was removed by hand but lacked archaeological integrity. The drill had pushed materials from the upper concrete and asphalt laden deposit into the lower stratum. Beginning at 1.8 m bgs, hand excavation was performed by an archaeologist. At this depth a relatively sterile sandy silt sediment was encountered, and only one animal bone was recovered.

TU 1

TU 1 was near the northwest corner of the Santa Fe Plaza, at the intersection of Lincoln and Palace Avenues (Fig. 2). The electricians hand excavated a 1 m diameter pit to find the existing utility lines. Two east–west electric lines were discovered along the southern curb of Palace Avenue at a depth of 35 to 40 cm bgs. After these lines were removed, the sediment beneath the utilities (Stratum 1.1) was examined and found to be a continuation of the fill above the utilities. Stratum 1.1 was light brown clayey sand with some charcoal and mixed seventeenth- through twentieth-century artifacts. Asphalt and concrete fragments were common within the fill. The mixed deposit continued for an unknown depth below the electric utilities, so the contractor was permitted to use a mechanical auger. This auger successfully excavated a hole 1 m in diameter and 2.1 m in depth. Stratum 1.1 continued to the base of TU 1 (Fig. 7).

As discussed above, one possible explanation for the lack of the cultural fill in is a storm drain grate 1.5 m northwest of TU 1. If the storm drain was over excavated, it is possible that the fill in TU 1 represents backfill associated with its installation in the twentieth century. However, this could not be confirmed through the limited excavations undertaken.

TU 2

TU 2 was 10 m northwest of the plaza bandstand, east of Test Pit 1, and immediately adjacent to the south edge of Palace Avenue (Fig. 2). The unit measured 1 m east–west by 1 m north–south and was excavated to a depth of 2.1 m bgs. On the north face of the pit, the cement curb footing was 35 cm in depth, with east–west utility lines visible at the base of the footing. The old light-post electrical line was encountered 80 cm bgs (Figs. 8, 9).

The upper 80 cm of sediment within TU 2

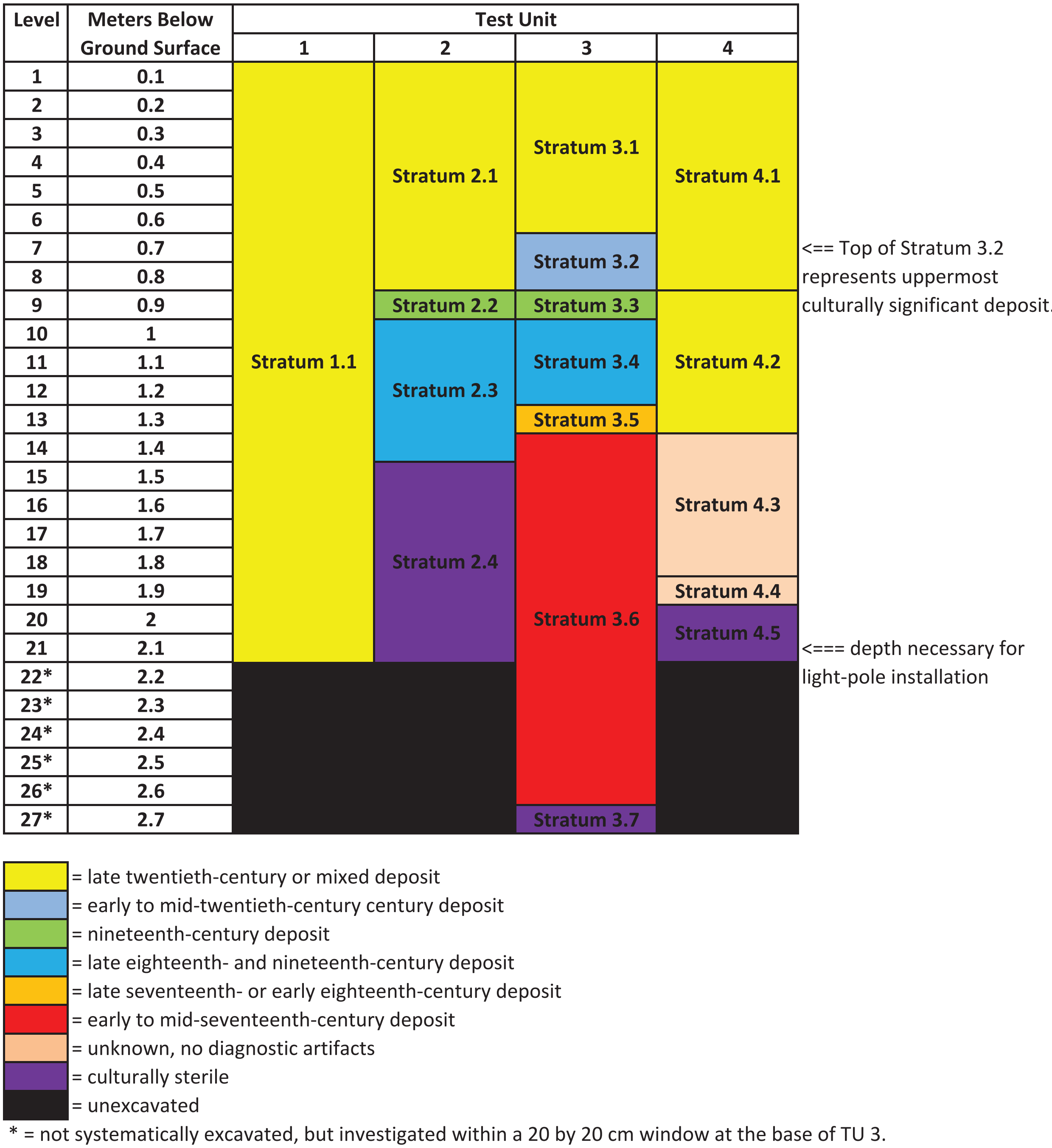


Figure 6. Strata by period of deposition.

Table 2. Artifacts by test unit

Stratum	Level	FS No.	Native Ceramic	Euroamerican Ceramic	Flaked Stone	Ground Stone	Metal	Glass	Fauna	Miscellaneous	Total
Test Unit 2											
2.1	9	4	11	1	2	–	–	2	11	–	27
	10	7	18	2	5	–	1	3	5	–	34
2.2	11	9	32	3	5	1	–	7	15	–	63
2.3	12	11	24	1	–	1	4	3	19	–	52
	13	12	8	–	–	–	–	–	13	–	21
	14	15	15	–	1	–	–	–	11	–	27
Total			108	7	13	2	5	15	74	–	224
Test Unit 3											
3.4	10	1	19	5	–	–	–	8	16	–	48
	11	2	51	–	2	–	4	18	35	–	110
	12	3	45	3	4	1	4	8	37	–	102
3.5	13	5	39	1	5	1	1	1	30	–	78
3.6	14	8	124	–	5	1	3	–	47	1	181
	15	10	41	–	1	–	3	–	25	–	70
	16	13	78	–	3	–	3	–	45	–	129
	17	14	78	–	–	1	–	–	29	–	108
	18	16	80	–	4	1	–	–	60	1	146
	19	17	27	–	2	–	–	–	33	–	62
	20	18	30	–	2	2	–	–	15	–	49
	21	19	80	–	3	–	–	–	39	–	122
Total			692	9	31	7	18	35	411	2	1205
Test Unit 4											
4.4	19	6	–	–	–	–	–	–	1	–	1
Total			–	–	–	–	–	–	1	–	1
Total			800	16	44	9	23	50	486	2	1430

Figure 7. TU 1 after excavation.

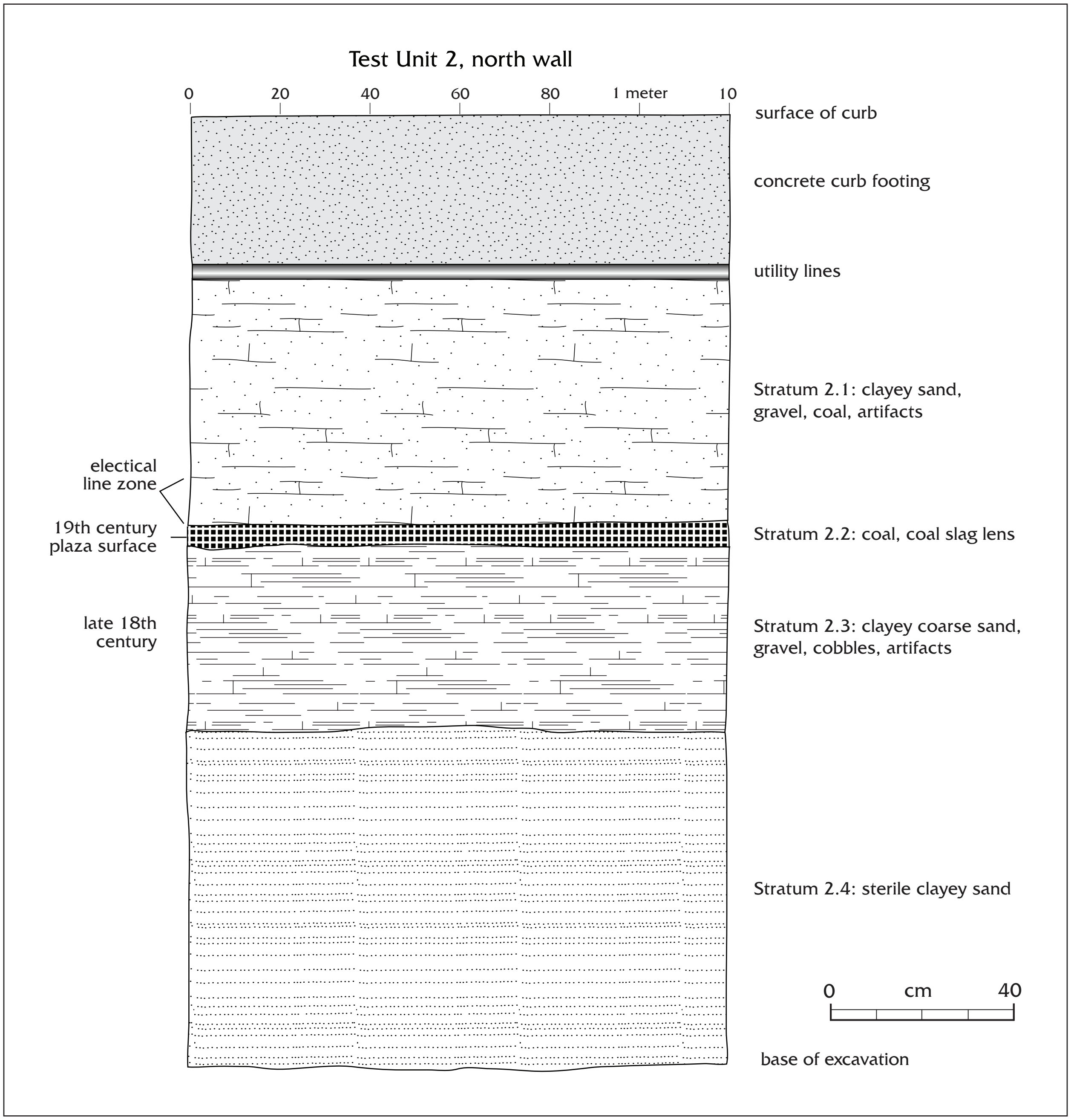


Figure 8. Profile of TU 2.

Figure 9. TU 2 after excavation.

was hand excavated by the contractor to locate and sever the electrical lines used by the old light posts. This upper sediment (Stratum 2.1) consisted of a dark brown (Munsell 7.5YR 3/4) clayey sand with gravels (20 percent), coal, and a mixture of late nineteenth- and early twentieth-century artifacts along with modern construction materials. After the lines were severed, an OAS archaeologist examined the fill beneath the lines and determined that systematic archaeological excavation was necessary. While the deposit beneath the electric lines was similar to that above it in sediment composition, it lacked the modern construction debris encountered above. Hand excavation of TU 2 began with Level 9 (83 to 90 cm bgs).

A clinker lens (6 cm thick) made of coal waste and gravel (Stratum 2.2; Munsell 10YR 2/1, black) was encountered in Level 11 (1 to 1.1 m bgs). The lens was similar to the 1870s or 1880s plaza surface/base course described by Lentz (2004:21) as Strata 2 and 3 during excavation for the bandstand, less than 10 m southeast of TU 2. Lentz characterized the strata as a compact gray surface (Stratum 2) overlying and "welded" to a black layer of gravel, sand, charcoal, and clinker (Stratum 3). Excavations in TU 2 did not hit a compact surface. However, it seems reasonable to assume that these two deposits are the same. If so, this would also match with early findings by David and Cordelia Snow (Cross Cultural Research Systems 1992), who encountered a similar late nineteenth-century deposit.

A small number of artifacts (n = 63) were collected from the stratum. These included bottle and window glass, saw-cut domesticated animal bone, and nineteenth-century Native American ceramic sherds. Manufacture dates for these artifacts suggest a nineteenth-century date for the deposit.

At the base of Stratum 2.2, there was an east–west alignment of five large cobbles (Feature 1) positioned in a narrow trench (30 cm wide and 10 cm deep) (Figs. 10, 11). The trench was filled with a sandy sediment and charcoal flecking. No artifacts were encountered in the trench; the dimensions of the cobbles varied but on average were 22 by 18 by 12 cm. It is unclear what this linear alignment of cobbles represents. The alignment could represent a portion of an east–west foundation fragment, or they may have separated Palace Avenue and the plaza.

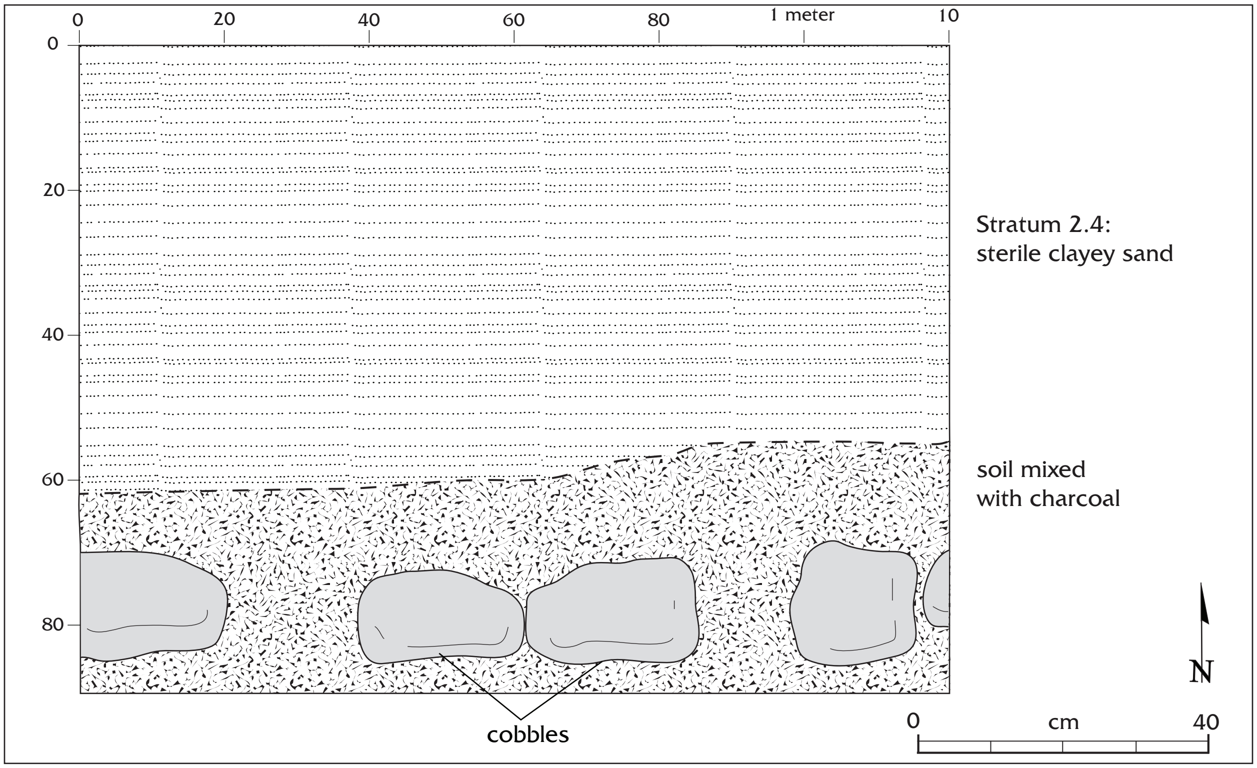


Figure 10. Plan of Feature 1.

Figure 11. Feature 1.

Below and surrounding Feature 1 was Stratum 2.3. This sediment was characterized as a dark brown (Munsell 7.5YR 3/3) clayey coarse-grained sand with 5 percent gravel. It extended from 1 to 1.4 m bgs (Levels 11 to 14); artifacts (n = 110) recovered from Stratum 2.3 consisted primarily of bone (n = 43) and late eighteenth- and early nineteenth-century Native American pottery (n = 47). Collectively these materials appear to represent a Late Colonial- and/or Mexican-period deposit.

At the base of Level 14, the sediment transitioned into a sterile light brown (Munsell 7.5YR 4/4) silty clay devoid of artifacts. This deposit, labeled Stratum 2.4, continued to the base of Level 21 (2.1 m bgs).

TU 3

TU 3 was 10 m northeast of the plaza bandstand, 20 m east of TU 2, 20 m west of TU 4, and immediately adjacent to the south curb of Palace Avenue (Fig. 2). The unit measured 1.5 m east–west by 1 m north–south and was excavated to a depth of 2.1 m bgs. On the north face of the pit, the cement curb footing was 35 cm deep, with east–west utility lines visible at the base of the footing. The old light-post electrical line was encountered at 90 cm bgs (Figs. 12, 13).

The upper 90 cm of TU 3 was hand excavated by Gorman Electric in search of the electric lines servicing the old light posts along Place Avenue. Installation of the old electrical lines had bisected several late nineteenth- and twentieth-century deposits, including Stratum 3.1 (0 to 60 cm bgs), Stratum 3.2 (60 to 80 cm bgs), and Stratum 3.3 (80 to 90 cm bgs). Stratum 3.1 was a yellowish brown (Munsell: 10YR 5/6) compacted silt mixed heavily with pea-size gravel and mid- to late twentieth-century artifacts including bubble gum wrappers and cigarette butts. Stratum 3.2 was a consolidated dark yellowish brown (Munsell: 10YR 4/4) silty loam with 3–5 percent gravels and early to mid-twentieth century artifacts, such as machine-made bottle glass and can fragments. Based exclusively on diagnostic artifacts visible in the side walls of the test unit, it appears that the boundary between Stratum 3.1 and 3.2 represents the 1970s plaza surface identified by Lentz during excavation of the plaza bandstand (Lentz 2004).

Stratum 3.3 was a very dark grayish brown (Munsell: 10YR 3/2) coal- and clinker-rich deposit. It is nearly identical to Stratum 2.2 in TU 2. Presumably both strata represent the same sediment and could be the late nineteenth-century surface described by Lentz and the Snows.

Hand excavation by OAS archaeologists began with Level 10 (0.9 to 1 m bgs). The sediment immediately below the clinker lens, Stratum 3.4, was described as a dark grayish brown (Munsell 10YR 4/2) silty loam with pea-size gravels (5 percent) and charcoal flecks. Artifacts from Stratum 3.4 represented a mix of mid- to late eighteenth- and early nineteenth-century items including hand-wrought nails, window glass, Tewa Polychrome, and Powhoge Polychrome sherds. These materials suggest that the deposit, which extends 0.9 to 1.2 m bgs, dates to the Late Colonial and/or Mexican period.

While Stratum 2.3 and Stratum 3.4 are different in respect to sediment composition and color, the artifact assemblages are nearly identical in terms of date of deposition, derived from temporally sensitive items (see later chapters). It seems plausible that at least some of the inconsistencies in sediment characterization could be the result of recorder error or individual differences in perspective. If so, Stratum 2.3 and Stratum 3.4 would represent the same sediment across TU 2 and TU 3. However, in TU 2 the base of Stratum 2.3 transitions into a noncultural material bearing silty clay.

At or near the top of Level 13 (~1.2 m bgs), Stratum 3.4 abruptly changed to Stratum 3.5, a brown (Munsell 10YR 5/3) consolidated clay with charcoal flecks, pockets of yellow sand, and 50 percent cobbles ranging from 2 to 6 cm in diameter. The sediment block was roughly 10 cm thick and ranged between 1.2 and 1.3 m bgs.

The compactness of the soil, the embedded cobbles, and the interspersed pockets of fine-grained alluvial sand possibly indicating puddling suggested that Stratum 3.5 may have been a surface. Based upon its depth, it is believed Stratum 3.5 is the Stratum 5 documented by Lentz (2004:21, 26) as the "1680 Pueblo Revolt surface" while performing excavations for the plaza bandstand.

Stratum 5 was also described as a brown clay. Likewise, artifact composition was comparable across the two strata (Table 2). Native American

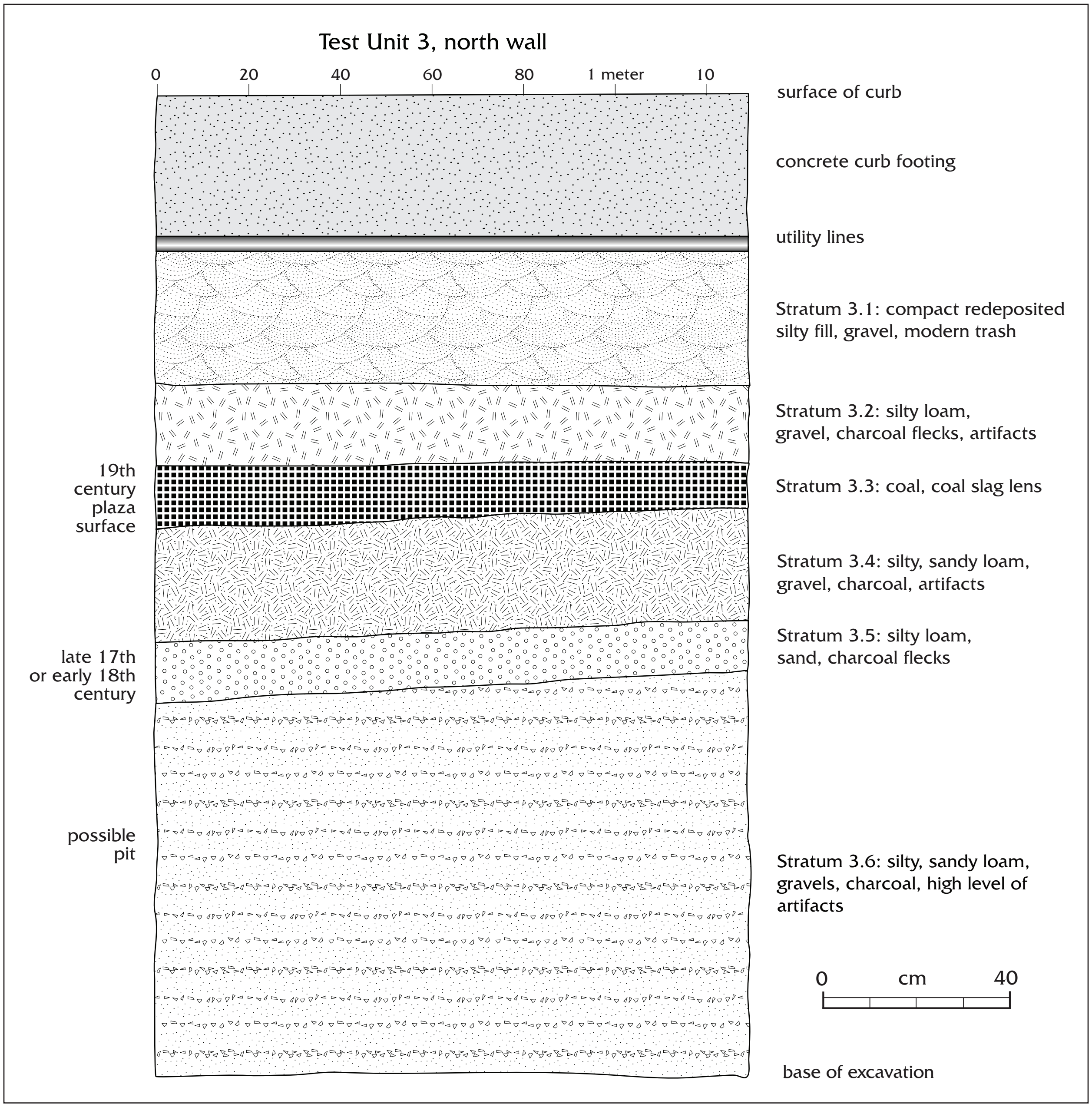


Figure 12. Profile of TU 3.

Figure 13. TU 3 after excavation.

ceramics and faunal remains dominated both assemblages. In Stratum 5, numerous Native American flaked stone projectile points were encountered suggesting a possible battle site. While Stratum 3.5 had no projectile points, the deposit yielded a gunflint, which could also indicate military operations. In both cases, pottery type distribution was also nearly identical. Red wares represent the most frequent type encountered in both studies, with Tewa Polychrome, glaze wares and black-on-cream ceramics in lower frequencies (see Lewis [2004] and the chapter on Native ceramics in this report).

One key interpretation of the strata differs: the date of deposition. Candace Lewis (2004:52) interpreted the distribution of pottery types as indicative of late seventeenth-century consumption and discard, whereas Wilson and Montoya (this report) place deposition in the early eighteenth century. However, both interpretations suffer from having only a small sample of sherds with which to determine the date of deposit. Regardless of whether or not the stratum represents the 1680 Pueblo Revolt, the 1692 Reconquest, or some later deposit not directly tied to a specific military engagement, these similarities appear to indicate that Stratum 3.5 and Stratum 5 represent the same sediment.

Beneath this late seventeenth- or early eighteenth-century deposit was a dark grayish brown (Munsell 10YR 4/2) silty sand with large charcoal flecks and pea-sized gravel inclusions. Artifact counts were extraordinarily high. The average artifact count for strata yielding cultural materials other than Stratum 3.6 were 49 artifacts per 10 cm level. Inside Stratum 3.6, excavators collected on average 108 artifacts per 10 cm level. Individual artifacts in Stratum 3.6 were larger than those noted in previous levels. Typical artifact size outside of Stratum 3.6 was less than 2 cm in diameter. Within Stratum 3.6, many artifacts were over 2 cm in diameter, and many faunal elements were intact. This suggests that the sediment was not redeposited and was less mixed and/or trampled. While no feature boundaries were visible within the 1 by 1.2 m test unit, it appears possible that excavations with Stratum 3.6 were within a large pit with domestic or kitchen waste.

A total of 867 artifacts were collected from the deposit, including Native American ceramics (n = 538), flaked stone (n = 20), faunal elements (n = 293), ground stone (n = 5), metal (n = 9) and miscellaneous (n = 2; Table 2). Decorated pottery sherds included numerous glaze wares and Tewa-produced black-on-cream vessels, suggesting deposition in the early to mid-seventeenth century. Faunal remains consisted of whole and fragmentary elements of primarily large and medium ungulates (i.e., caprines and cattle).

Excavation of Stratum 3.6 extended from 1.3 to 2.1 m bgs (Levels 14 through 21), the depth necessary for installation of the light post. However, it continued deeper into the plaza subsurface. To accurately ascertain deposit depth, a small window (20 by 20 cm) was dug into the base of Level 21 and excavated for an additional 50 cm. At 2.6 m bgs, the sediment transitioned into a natural alluvial deposit of coarse sand and river cobbles (Stratum 3.7; Munsell 10YR 5/4). No floor was identified at the base of the deposit. This appears to rule out the possibility that excavations were being conducted inside of one of the two kivas created during the 1680–92 Native American occupation of Santa Fe.

TU 4

TU 4 was on the northeast corner of the plaza, near the intersection of Palace Avenue and Old Santa Fe Trail (Fig. 2). The pit was northeast of the plaza bandstand, 20 m east of TU 3, and adjacent to the Palace Avenue curb. The unit measured 1.05 m east–west by 1 m north–south and was excavated to a depth of 2.1 m bgs. On the north face of the pit, the cement curb footing was 35 cm deep, with east–west utility lines visible at the base of the footing. The old light-post electrical line was encountered roughly 60 cm bgs and was severed and removed from the unit by Gorman Electric (Figs. 14 and 15).

The majority of TU 4 consisted of cultural mixed deposits inundated with large quantities of asphalt and concrete to a depth of 1.3 m bgs. These mixed deposits were identified as Stratum 4.1 (0 to 0.8 m bgs) and Stratum 4.2 (0.8 to 1.3 m bgs). Stratum 4.1 and 4.2 were both characterized as a 10YR 5/2 grayish brown silty loam with 5 percent gravel. However, the two strata were distinguished by an increase in the number and size of asphalt and concrete inclusions in Stratum 4.2. In Stratum 4.1, asphalt and concrete accounted for less than 5 percent of the sediment, and fragments measured no more than 5 cm in diameter. In Stratum 4.2, these materials accounted for at least 20 percent of the sediment and now included pieces measuring 50+ cm.

Hand excavation of the pit would have been difficult if not impossible. Due to the large quantities of construction debris, archaeologists permitted the contractor to use a mechanical auger to excavate the hole. The auger was monitored by an archaeologist and was stopped at the top of Stratum 4.3, roughly 1.3 m bgs. Stratum 4.3 was characterized as a 10YR 4/2 dark grayish brown silty loams with 1 percent gravel and charcoal flecking. There were no visible artifacts in profile. However, the drill had pushed materials from the upper concrete and asphalt laden deposit into the lower stratum. This created a mixed deposit with TU 4 of dubious analytical value. Most of the artifacts within the hole were twentieth-century bottle glass and can fragments found in conjunction with copious amounts of asphalt and concrete, now shattered into thousands of fragments. Since all of these materials were presumed brought in by the auger, archaeologists removed the fill by hand but did not screen or collect the artifacts. Based on the profile, the stratum extended from 1.3 to 1.8 bgs.

OAS archaeologists did not begin screening fill recovered through hand excavation until Level 19 (1.8 to 1.9 m bgs) and continued for only three more levels, to the base of Level 21 (2 to 2.1 cm). These levels consisted of Stratum 4.4 (1.8 to 1.9 m bgs), a brown (Munsell 10YR 4/3) loose silty sand with river cobbles from which only one animal bone was recovered; and Stratum 4.5 (1.9 to 2.1 m bgs), a yellowish brown (Munsell 10YR 5/4) loose silty sand with no artifacts.

Summary

The preservation and accumulation of archaeologically significant strata varied across the four test units. TU 1 contained mixed twentieth-century deposits associated with the installation of the storm drain, and in TU 4 archaeologists failed to recover any temporally diagnostic artifacts from in situ deposits. TUs

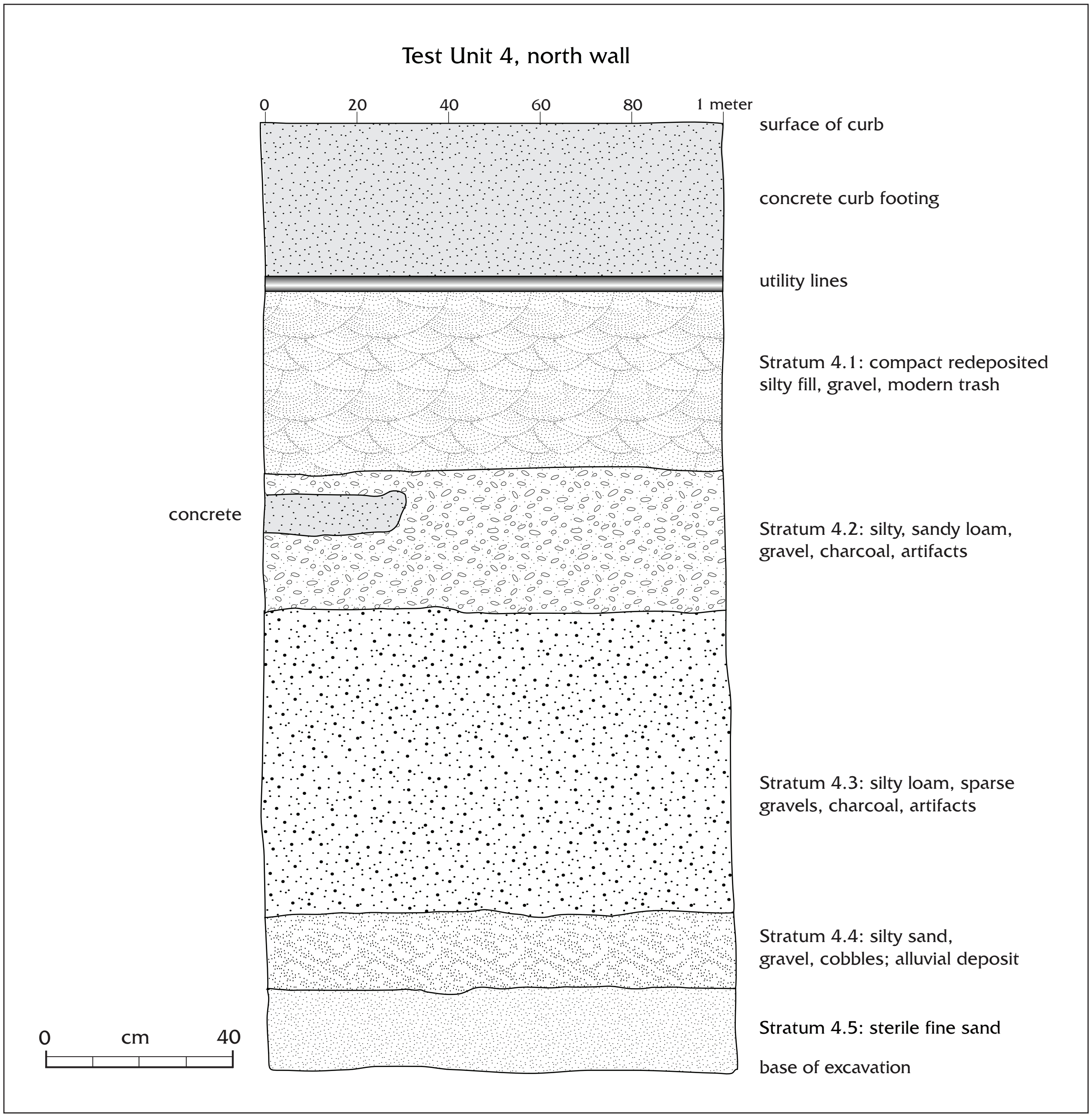


Figure 14. Profile of TU 4.

Figure 15. TU 4 after excavation.

2 and 3 yielded substantial unmixed cultural deposits dating to the late eighteenth and nineteenth centuries. These included a clinker deposit believed to be the late nineteenth-century plaza surface documented by Cordelia and David Snow (Cross Cultural Research Systems 1992) and Lentz (2004).

However, only TU 3 was found to contain lower cultural strata (Strata 3.5 and 3.6) dating to the seventeenth and early eighteenth centuries. Stratum 3.5 appears to represent a late seventeenth- or early eighteenth-century surface on which some sort of military engagement may have taken place. Lentz posits that this is the Pueblo Revolt of 1680, but the current Native American ceramic analysis suggests the deposit dates slightly later (Wilson and Montoya, this report). Stratum 3.6 could represent domestic and kitchen waste deposited within a large pit. Artifacts recovered from this context appear to date to the early to mid-seventeenth century.

Native Ceramics

C. Dean Wilson and Richard M. Montoya

A total of 800 sherds recovered during excavation of three test pits for the Plaza Light Posts Project were assigned to Native ceramic types (Tables 3–5). The great majority (782, or 97.8 percent) of this pottery was assigned to types known to have been produced after the establishment of the Spanish provincial capital at Santa Fe in ca. AD 1607. Data recorded for both prehistoric and historic pottery types include typological categories and descriptive attributes. The assignment of typological categories involved first the recognition of specific Rio Grande traditions based on paste and temper, then ware group based on surface manipulation and form, and finally to previously defined types based on temporally distinct styles and treatments. Attribute classes recorded include temper, pigment type, modification, and vessel form. Distributions and characteristics of ceramic types documented for different excavation grids, levels, and stratigraphic deposits provide for the assignment of ceramic-based dates to various contexts. Distributions of types and descriptive attributes from dated contexts may also be used to examine trends in the production, decoration, exchange, and use of Native pottery vessels.

Analytic Approach

The great majority of the Native pottery analyzed displayed traits indicative of forms produced in surrounding Pueblos from the Early Colonial to Territorial periods. Categories employed during this analysis are based on earlier descriptions of Rio Grande Pueblo types (Adler and Dick 1999; Batkin 1987; Dick 1968; Frank and Harlow 1990; Habicht-Mauche 1993; Harlow 1970, 1973; Hawley 1936; Lang 1997b; McKenna and Miles 1990; Mera 1939; Snow 1982; G. Wilson 2007) as well as recent descriptions by the Office of Archaeological Studies (OAS) of Native pottery recovered from Spanish contexts in the Santa Fe area (C. Dean Wilson 2007, 2011a; Wilson and Lewis 2005). In order to document the range of variability represented in these assemblages, all sherds were assigned to formal and descriptive type categories defined during recent studies. Formal types were assigned to decorated pottery exhibiting temporally distinct painted styles and manipulations. Informal types were given a descriptive name based on a combination of distinct characteristics. Detailed definitions of all types and attributes employed during the present study are presented in earlier reports by OAS, and thus not described in detail here.

Table 3. Prehistoric pottery types

Pottery Type	Count	Column %
Northern Rio Grande Gray Ware		
Plain gray body	4	22.2%
Smeared plain corrugated	2	11.1%
Smeared indented corrugated	1	5.6%
Northern Rio Grande White Ware		
Santa Fe Black-on-white	5	27.8%
Wiyo Black-on-white	2	11.1%
Biscuit A (Abiquiu) Black-on-white	3	16.7%
Middle Rio Grande Glaze Ware		
Probable Aqua Fria glaze body	1	5.6%
Total	18	100.0%

Table 4. Historic pottery types

Pottery Type	Count	Column %
Historic Northern Rio Grande or Tewa Tradition Types		
Unpolished Micaceous Ware		
Highly micaceous paste	14	1.8%
Unpolished micaceous slip	2	0.3%
Polished Micaceous Ware		
Smudged interior, mica-slipped exterior	91	11.6%
Polished interior with mica slip	30	3.8%
Buff Utility Ware		
Tewa buff undifferentiated	106	13.6%
Tewa unpolished buff	16	2.0%
Red Utility Ware		
San Juan Red-on-tan	2	0.3%
Tewa Polished Red	162	20.7%
Gray/Black Utility Ware		
Tewa Polished Gray	75	9.6%
Tewa Polished Black	6	0.8%
Smudged interior, buff exterior	7	0.9%
Tewa Unpolished Black	1	0.1%
Smudged exterior, buff interior	2	0.3%
Smudged interior, unpolished exterior	2	0.3%
Tewa Decorated Ware		
Sankawi Black-on-cream	1	0.1%
Sakona Polychrome	1	0.1%
Tewa Polychrome (type)	5	0.6%
Powhoge Polychrome	8	1.0%
Tewa Polychrome painted, undifferentiated (two slips)	12	1.5%
Black-on-cream, undifferentiated	22	2.8%
Historic organic paint, undifferentiated, no slip	5	0.6%
Historic white cream, slipped, unpainted	23	2.9%
Historic unpainted red and cream, slipped	1	0.1%
Historic Types Associated with Other Rio Grande Traditions or Proveniences		
Jemez White Ware		
Jemez Black-on-white	1	0.1%
Jemez White, unpainted	1	0.1%
Keres Matte Painted Polychrome		
Puname Polychrome, indeterminate	1	0.1%
Santa Ana area red, slipped, unpainted	1	0.1%
Keres Utility Ware		
Smudged interior, mica-slipped exterior (MRG)	1	0.1%
Glaze Ware		
Puaray Glaze-on-yellow (E)	1	0.1%
Puaray Glaze-on-red (E)	1	0.1%
Kotyiti Glaze-on-red (F)	3	0.4%
Kotyiti Glaze Polychrome (F)	2	0.3%
Kotyiti Glaze-on-yellow (F)	1	0.1%
Glaze red, unpainted	37	4.7%
Glaze polychrome, unpainted	4	0.5%
Glaze yellow, unpainted	28	3.6%
Glaze unslipped, unpainted	41	5.2%
Glaze-on-polychrome, undifferentiated	5	0.6%
Glaze-on-red, undifferentiated	18	2.3%
Glaze-on-yellow, undifferentiated	21	2.7%
Glaze unslipped, undifferentiated	4	0.5%
Unpainted glaze, red rim	1	0.1%
Historic glaze polychrome body	8	1.0%
Historic glaze unslipped body	2	0.3%
Historic glaze-on-red-body	2	0.3%
Historic glaze-on-yellow body	4	0.5%
Total	782	100.0%

Table 5. Ceramic ware groups

Ware Group	Count	Column %
Prehistoric gray ware	7	0.9%
Prehistoric white ware	10	1.3%
Prehistoric glaze ware	1	0.1%
Historic unpolished micaceous ware	16	2.0%
Historic polished micaceous ware	121	15.1%
Historic buff utility ware	122	15.3%
Historic red utility ware	164	20.5%
Historic gray/black utility ware	93	11.6%
Historic Tewa decorated ware	78	9.8%
Jemez white ware	2	0.3%
Keres polychrome ware	2	0.3%
Historic or indeterminate glaze ware	184	23.0%
Total	800	100.0%

Prehistoric Ceramic Types

Only 18 sherds (2.3 percent of all Native pottery recovered) were assigned to types known to clearly date prior to the Spanish Colonial period (Table 3). These include seven gray ware (represented by two types), ten white ware (represented by three types) sherds, and one glaze ware sherd. Prehistoric types were not common in any context and appear to be the result of mixing from nearby prehistoric components. This combination of types appears to represent pottery derived from components dating to both the Coalition period (including Santa Fe Black-on-white and possibly Wiyo Black white) and Classic period (including Biscuit A and Agua Fria Glaze-on-red). All white wares identified are tempered with fine tuff. The single Agua Fria Glaze-on-red sherd is tempered with basalt. Gray ware types include plain gray and smeared corrugated, both of which could be associated with either of these two prehistoric periods. All gray wares were tempered with micaceous granite. Prehistoric types indicative of these two periods were also present in nearby deposits at the Palace of the Governors (LA 111322) and in well-defined Coalition- and Early Classic–period contexts at LA 1051, as well as other prehistoric sites in the downtown Santa Fe area (Wilson 2011b; Wilson and Lewis 2005).

Historic Ceramic Types

The great majority of the pottery identified was assigned to historic-period types defined for the Northern Rio Grande (Tewa) ceramic tradition (Fig. 16; Tables 4, 5). Pottery assigned to types of this tradition reflects a range of forms known to have produced by Northern Tewa Pueblo potters in the Tewa Basin just north of Santa Fe. Historic Tewa pottery was assigned to types defined for three basic ware groups: micaceous utility, plain utility, and historic Tewa decorated ware.

Sherds were assigned to historic micaceous types based on combinations of paste, temper, and surface characteristics (Table 4). Unpolished forms were distinguished on the basis of highly micaceous pastes resulting in the recognition of two types. Forms with polished surfaces were assigned to two types based on evidence of interior smudging. Almost half of the sherds were assigned to Tewa plain utility ware types. Plain ware types tend to exhibit polished surfaces, fine tuff temper, and a wide range of vessel forms similar to that noted in Tewa Polychrome vessels (Snow 1982). Tewa plain ware sherds were assigned to different descriptive types based on the presence or type of slipped surface and include types assigned to buff (two types), red (two types), and gray/black (six types) ware groups. Tewa painted types produced during the Early Colonial period resulted from a shift to the production of more highly oxidized black-on-cream forms that began during the late Classic

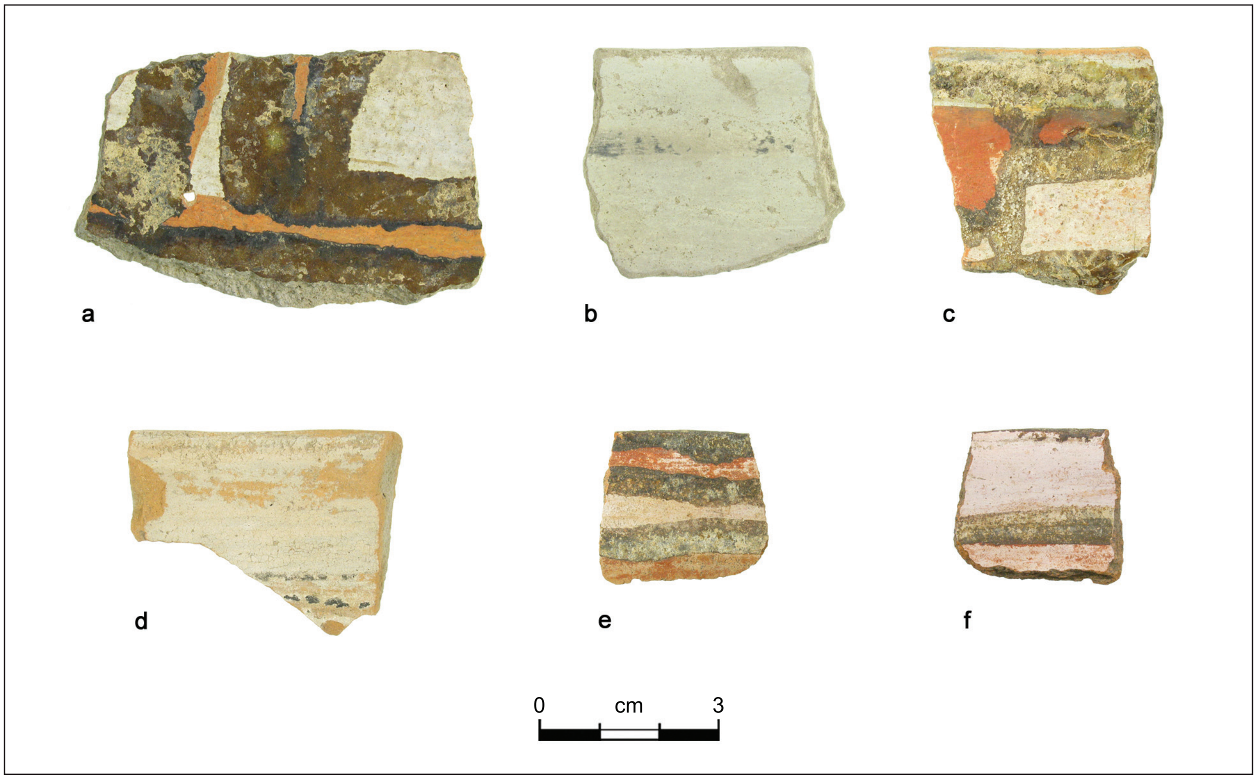


Figure 16. Examples of historic decorated Native American ceramics: (a) glaze polychrome body sherd; (b) Sankawi (?) Black-on-cream; (c) Kotyiti (Glaze F) Polychrome; (d) Sankawi Black-on-cream; (e, f) Glaze F Polychrome.

period (Mera 1932). Pottery assigned to historic Tewa types include black-on-cream and Tewa Polychrome types known to have been produced during the Spanish Colonial, Mexican, and American Territorial periods. Tewa decorated types identified include four formal types produced during distinct time spans and four informal types.

The remaining historic ceramic types identified reflect a range of forms known to have been produced in Pueblo provinces to the south and west of Santa Fe. Most of these appear to have been derived from glaze ware forms. Glaze ware types were assigned to sherds exhibiting painted decorations executed in glaze pigment or to unpainted sherds assumed to have been derived from vessels decorated with glaze paint. Glaze ware types are characterized by the use of lead glaze paint in decorated pottery forms produced in the Middle Rio Grande region from about AD 1325 to the early eighteenth century (Franklin 1997; Kidder and Shepard 1936; Mera 1933; Snow 1982). The basic system of classification of glaze rim sherds utilized here is based on that presented by Mera (1933), which is only applicable to rim sherds. Thus, body sherds that could not be assigned to a specific type were assigned to types based on surface treatments. Unpainted body sherds exhibiting combinations of temper, paste, and surface characteristics indicating probable derivation from glazed, painted vessels were assigned to descriptive type categories based on slip and painted decorations. During the present analysis, pottery assumed to have derived from glaze ware vessels were assigned to five formal and 13 informal types. Pottery assumed to have been produced in the Jemez province is represented by two sherds, one of which is decorated with organic paint, exhibiting a very well-polished pearly white slip, over a dark paste (Reiter 1938). One sherd tempered with basalt appears to have derived from a historic Puname Polychrome vessel known to have been produced at Zia Pueblo, while another tempered with sandstone is assumed to have derived from a historic polychrome produced at Santa Ana Pueblo (Harlow 1973).

Ceramic Dating Periods

The historic occupation of Santa Fe can be divided into several distinct periods reflecting broad political and economic trends (Moore 2001a; Simmons 1979a). Artifacts in assemblages from contexts dating to all but the latest of these periods tend to be dominated by Native Pueblo pottery. The establishment of Spanish control over the New Mexico province initially had little overall impact on Pueblo ceramic technology. The most notable effect was the introduction of European-inspired vessel forms (Snow 1973; Warren 1979a). In fact, the Spanish presence may have partly contributed to the perpetuation of specialized regional ceramic technologies that had developed earlier. The widespread availability of well-made Native pottery seems to have made it unnecessary to bring European pottery manufacturing industries into the New Mexico provinces. Thus, throughout the Northern New Mexico province, Spanish and Hispanic settlers were dependent on Pueblo pottery for the bulk of their household containers and utensils (Snow 1973). The distribution of Pueblo pottery into Spanish and Hispanic villages was part of a widespread economic system that crossed ethnic boundaries for more than 300 years (Snow 1973). Although temporal divisions employed here are largely based on historically documented events and trends, these different spans seem to correlate well with known changes in the technology and decorative practices of Pueblo pottery that dominate artifact assemblages at Spanish and Hispanic sites in the Northern Rio Grande province occupied from the Early Colonial to Late Territorial periods. Many the recent studies of historic-period assemblages in the Northern Rio Grande have focused on the definition and utilization of sherd-based type categories and other criteria that may provide important clues concerning the documentation of time of occupation as well as other trends at historic contexts.

Early Colonial (Seventeenth Century)

Native pottery from Early Colonial assemblages in Northern New Mexico are reflected by a wide range of types and forms. This diversity in part results from the establishment of the provincial capital of Santa Fe in a place surrounded by Pueblo villages that had long produced and exchanged distinct pottery forms that included Sankawi Black-on-cream and a range of glaze ware types. Specialized forms had been produced in and distributed between different Pueblo provinces for centuries before the founding of Santa Fe.

Late Classic–period (AD 1450–1600) components north of Santa Fe are dominated by biscuit ware types and then Sankawi Black-on-cream, which continued to be produced in the Tewa Basin after the establishment of Spanish control. Sankawi Black-on-cream was defined by Mera (1932) to account for pottery exhibiting characteristics transitional between late biscuit ware and historic Tewa Polychrome types. Sankawi Black-on-cream was first produced at villages on the Pajarito Plateau in the middle sixteenth century and continued at villages in the Tewa Basin into the middle seventeenth century. Characteristics common to Sankawi Black-on-white noted in both Late Classic– and Early Colonial–period contexts include the use of stylized designs consisting of fine lines in organic paint over cream slips on both the interior and exterior surfaces. Later expressions of this type are represented by Spanish-influenced vessel forms such as soup plates and shouldered bowls and jars. Another innovation is reflected by Sakona Polychrome, identified by the addition of red slip over limited areas of Sankawi-like vessels. This type was first produced sometime during the middle seventeenth century. Utility wares associated with this period appear to have also been produced in the Tewa Basin and are similar to those occurring in later historic assemblages. Highly polished black ware known as Kapo Black tends to be absent, although plain utility ware is represented by forms exhibiting polished buff, gray, and red exteriors. Micaceous utility forms with smudged interiors and unpolished exteriors are fairly common. Some examples may be represented by a late variety of Sapawe Micaceous, defined by exterior smeared or indented textures.

Much of the decorated pottery at early Spanish Colonial contexts in Northern New Mexico consists of glaze ware types known to have been produced in areas to the south and southwest of Santa Fe occupied by Tanoan- and Keres-speaking groups (Franklin 1997; Kidder and Shepard 1936; Mera 1933; Snow 1982). Glaze-painted decorations on historic forms tend to be drippy, and designs are often difficult to recognize. A polychrome effect was often created through the use of combinations of white and cream to yellow and reddish slips. The only pottery assigned to types definitely indicative of production during the historic periods are bowl sherds assigned to Glaze E or F forms. Glaze E, or Puaray, types are distinguishable by an elongated rim form with some thickening above the base, thought to have been produced from the early sixteenth to middle seventeenth century. Glaze F, or Kotyiti, glaze ware forms are characterized by bowls with thin, even walls often with sharp angles just above the low base; they appears to have been produced from the early seventeenth to the early eighteenth century (Warren 1979b).

The distance and isolation of Santa Fe from the rest of the Spanish Colonial world drastically limited the amount of Mexican and European trade goods that could be supplied by the sporadic caravans that traveled up the Camino Real. Thus, the great majority of goods utilized by Spanish settlers were produced locally. During the early Spanish Colonial period, the economy was controlled by the Church and a small group of citizen solders (Moore 2001a). Local goods often moved into Spanish settlements through the encomienda system, which was introduced into New Mexico by Oñate. This system refers to a privilege extended to favored subjects who could collect an annual tribute from specific towns or Indian villages (Simmons 1979a). In turn, the proprietor receiving this privilege was expected to provide material aid to his subjects' church and offer military protection. Not only did encomenderos receive a range of goods as tribute from surrounding Pueblos, they also acted as the upper level of a redistribution network (Snow 1982). The placement of the provincial capital of Santa Fe on the edge of several Pueblo provinces where distinct pottery was produced allowed colonists access to a system which offered a wide range of high quality ceramic vessels and the opportunity to establish and maintain trade relationships with surrounding Pueblo peoples that could also serve as the basis for the acquisition and distribution of other goods.

Pueblo Revolt (Late Seventeenth to Early Eighteenth Century)

This period largely corresponds to the start of the Pueblo Revolt to just after the Spanish Reconquest (Simmons 1979a; Preucel 2002). The Pueblo Revolt began in 1680, when the Pueblo Indians of the Northern Rio Grande, along with their Navajo and Apache allies, rose up against the Spanish colonies in New Mexico. In a coordinated attack, warriors from Pueblos across Northern New Mexico destroyed the Spanish missions. For nine days, they besieged Santa Fe, forcing the Spanish colonies to retreat to El Paso. The period following the Pueblo Revolt was a time of major shifts in settlement, as many of the Pueblo groups vacated their mission villages and established defensive strongholds on mesa tops. After several failed attempts, in 1692, the Spanish took again took control of Santa Fe and again established it as the colonial capital.

Components coinciding with the Pueblo Revolt and Spanish Reconquest may be identified by new forms of pottery that developed during this period of turmoil. Changes in decorated pottery are characterized by the appearance of polychrome forms. The emergence of Sakona Polychrome and then Tewa Polychrome represents a merging of styles and conventions characteristic of Sankawi Black-on-cream and glaze wares. A distinctive feature of Tewa Polychrome is the application of deep red slips over most of the vessel. While most of this surface is covered by unpainted red slips, a narrow banded area is covered with a whitish slip, over which a painted decoration was applied.

The design field of Tewa Polychrome shouldered bowls is limited to banded designs bounded by the bowl rim and the bowl keel on the outside. In jars, the design field is restricted to a narrow band around the jar bulge (Harlow 1973). The extensive use of red slip to cover some portion of the vessel interior may have allowed for increased expediency in the production of vessels for a growing number of Hispanic and Spanish consumers by limiting the size of area which was painted. Although the design elements occurring on Tewa Polychrome vessels are comparable to those on earlier types, solid designs become increasingly common and elaborate. Thin parallel lines and dot filling the dominate design elements. Designs are commonly represented by the flagged triangle, the elaborated flagged triangle, the appended open-closed triangle, and the solid starburst. Design elements appear to vary little across different forms, and there was considerable consistency across forms assigned to this type.

Tewa Polychrome was produced from about AD 1650 to 1760 (Batkin 1987; Moore 2001a). An accompanying change was the gradual decline in the production of glaze ware, which was limited to Glaze F with poorly executed designs, straight vessel walls, and European-inspired vessel forms. Polished gray ware is rare but more common than in earlier periods. Polished micaceous is exclusively represented by types with plain exteriors. Polished red ware sherds dominate assemblages dating to this period, although they may represent a mixture of sherds derived from slipped red utility ware and the unpainted portions of Tewa Polychrome vessels.

Post-Revolt (Early Eighteenth Century)

By the beginning of the eighteenth century, the Rio Grande Pueblos were firmly under Spanish rule (Simmons 1979a). The encomienda system was not reestablished, and new moderation was introduced into the mission system. A new generation of colonists, mainly from towns in present-day northern Mexico, resulted in a Hispanic population that for the first time surpassed that of the Pueblos. The earlier large haciendas, with constant demands on Native labor, were replaced by small farms whose proprietors were usually content to do their own work (Simmons 1979a). The Pueblo and Spanish colonists were also further united by increasing outside threats from Apaches and Navajos.

Tewa Polychrome continued to be produced and is the dominant decorated pottery in assemblages dating to the first half of the eighteenth century. Pottery that would be classified as Ogapoge Polychrome appears to have been first produced during the middle eighteenth century. Ogapoge Polychrome reflects a shift from a solid red underbody to a cream-slipped underbody and feather designs executed in two distinct paints. This type may have been produced as late as the early nineteenth century, but appears to have never been common (Batkin 1987). Assemblages rich in Tewa Polychrome but lacking Glaze F are indicative of occupations in the middle eighteenth century, while combinations of Tewa Polychrome and Powhoge Polychrome suggest a late eighteenth-century assemblage. Utility wares continue to be dominated by polished micaceous and red-slipped utility wares, although polished gray and black wares appear to have become more common.

Late Colonial to Early Territorial Period (Late Eighteenth to Mid-Nineteenth Century)

This span is exemplified by changes in material culture influenced by a series of transformations in overall identity and organization of villages in Northern New Mexico (Frank 1991; 2000). This period is corresponds to a time of profound changes in the relationship between Hispanicized villagers characterized by Frank (2000) as "Vecinos" and the diminishing Pueblo populations. These changes were influenced by historic events that included the ending of hostilities with surrounding nomadic Indian groups and the reduction of the population from a smallpox epidemic that further changed the balance between the Pueblo Indians and Hispanic settlers. By the late 1790s, the Hispanic population in Northern New Mexico was significantly higher than and continued to increase more rapidly than the surrounding Pueblo population.

These events also appear to have led to a distinct system oriented around culturally innovative and dominating Vecinos (Frank 2000). The expansion of local populations and regional markets created an economic boom, giving the Vecinos the means to take control of aspects of the overall economy, including the local production of textiles and Pueblo pottery (Frank 2000). To fulfill their needs, Hispanic settlers required increasing amounts of pottery vessels from Pueblo potters.

These changes appear to have caused major alterations in the design, shape, and production techniques of pottery vessels produced by Pueblo groups. In areas in Northern New Mexico, demands for increasing amounts of pottery vessels seem to have resulted in an escalation of earlier trends related to the mass production and distribution of distinct utility and decorated pottery forms by Northern Tewa potters, who had long produced most of the pottery for settlers across wide areas. Decorated wares are characterized by the predominance of Powhoge Polychrome, which was mostly produced as bowls.

The increase in production and expansion of trade of Pueblo pottery under the influence of Vecino populations affected the style and quality of decorated Pueblo pottery forms including Powhoge Polychrome, produced by Northern Tewa potters. Decorations on Powhoge Polychrome tended to be fairly simple and applied in organic paint over broad areas covered with a cream slip. A unique polychrome effect was created by the very limited use of a red slip, which usually covered the upper part of the rim on both the interior and exterior surfaces. Earlier patterns of small motifs and thin lines were replaced by bold geometric designs that covered large portions of the vessel field. These design motifs were combined to form bold medallion, floral, or shield patterns. The great majority of pottery in assemblages dating to this period is represented by polished micaceous and gray/black plain wares. Similar patterns in the production and distribution of ceramic forms appear to have continued until the late nineteenth century and changed little despite important economic and political shifts, including increased American trade through the establishment of the Santa Fe Trail and shifts to Mexican and American control of Northern New Mexico through time.

Late Territorial to Statehood (Late Nineteenth to Early Twentieth Century)

A distinct change in Pueblo pottery resulted from the establishment of a railroad system across New Mexico during the late nineteenth century, profoundly affecting production and distribution of Pueblo pottery (Toulouse 1977). The large-scale transportation of manufactured American goods by railroad resulted in the widespread availability of affordable ceramics, china, and crockery across New Mexico. This, along with a market based on cash, reduced Hispanic settlers dependence on locally made Pueblo pottery (Frank 1991; Snow 1973).

Pueblo pottery traditions survived by adapting to the newly developed tourist and collector market. Demands from these new markets resulted in a shift from simply decorated but highly serviceable forms suitable for use in everyday activities to decorated forms primarily represented by decorated jars and knick-knacks. Large and decorated polychrome jars that were previously relatively rare were sought out by collectors, museums, and traders, and served as the prototypes for much of this new market (C. Dean Wilson 2007). These collections, while not typical of most of the pottery produced prior to the coming of the railroad, still form the basis for much of our conceptions about pottery produced in the eighteenth and nineteenth century (Batkin 1987; Chapman 1970; Frank and Harlow 1990; Harlow 1970, 1973; Mera 1939; Toulouse 1977).

This new market resulted in the production of new and distinct forms at the different Northern Tewa villages. These include vessels exhibiting characteristics used to define San Ildefonso Polychrome, Nambe Polychrome, and Tesuque Polychrome. Later vessel forms were large, thick, poorly fired jars, desired by collectors but not suitable for the demands of everyday use.

Pottery Distributions across Test Pits and Strata

Pottery recovered during these excavations indicate a mix of ceramics representing types known to have been produced from the thirteenth to late nineteenth centuries. The great majority of these ceramics represent types dating from the Early Colonial to Territorial periods. Ceramics were recovered from two of the four test units excavated. Initial discussions focus on evidence relating to the dating of contexts from which Native ceramics were recovered (Tables 6, 7). Below, ceramic assemblages are described by test unit and stratum, with the exception of Stratum 3.6, which is described by 10 cm excavation level.

TU 2

TU 2 yielded 108 sherds. Ceramic-bearing deposits within this unit included Strata 2.1, 2.2, and 2.3.

Stratum 2.1 is described as dark brown clayey sand with gravels (20 percent) and coal. This stratum appears to date to the late nineteenth century and was in the upper levels of the test unit. A total of 29 ceramics were recovered from

Table 6. Basic ware groups by stratum

Stratum	2.1		2.2		2.3		3.4		3.5		3.6		Total	
Ware Group	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %
Prehistoric gray ware	–	–	–	–	1	2.1%	–	–	–	–	6	1.1%	7	0.9%
Prehistoric white ware	–	–	–	–	–	–	–	–	5	13.0%	5	0.9%	10	1.3%
Prehistoric glaze ware	–	–	–	–	–	–	–	–	–	–	1	0.2%	1	0.1%
Historic unpolished micaceous ware	–	–	–	–	2	4.3%	5	4.3%	–	–	9	1.7%	16	2.0%
Historic polished micaceous ware	3	10.3%	8	25.0%	6	12.8%	15	13.0%	4	10.4%	85	15.8%	121	15.1%
Historic buff utility ware	8	27.6%	9	28.1%	6	12.8%	24	20.9%	1	2.6%	74	13.8%	122	15.3%
Historic red utility ware	5	17.2%	2	6.3%	13	27.7%	29	25.2%	19	48.1%	96	17.8%	164	20.5%
Historic gray/black utility ware	5	17.2%	5	15.6%	4	8.5%	20	17.4%	3	7.8%	56	10.4%	93	11.6%
Historic Tewa decorated ware	4	13.8%	5	15.6%	9	19.1%	13	11.3%	4	10.4%	43	8.0%	78	9.8%
Jemez white ware	–	–	1	3.1%	–	–	1	0.9%	–	–	–	–	2	0.3%
Keres polychrome ware	1	3.4%	–	–	–	–	–	–	1	2.6%	–	–	2	0.3%
Historic or indeterminate glaze ware	3	10.3%	2	6.3%	6	12.8%	8	7.0%	2	5.2%	163	30.3%	184	23.0%
Total	29	100.0%	32	100.0%	47	100.0%	115	100.0%	39	100.0%	538	100.0%	800	100.0%

Table 7. Ware and type by stratum

Stratum	2.1		2.2		2.3		3.4		3.5		3.6		Total	
Ware Type	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %
Prehistoric Northern Rio Grande Gray Ware														
Plain gray body	–	–	–	–	–	–	–	–	–	–	4	0.7%	4	0.5%
Smeared plain corrugated	–	–	–	–	1	2.1%	–	–	–	–	1	0.2%	2	0.3%
Smeared indented corrugated	–	–	–	–		–	–	–	–	–	1	0.2%	1	0.1%
Prehistoric Northern Rio Grande White Ware														
Santa Fe Black-on-white	–	–	–	–	–	–	–	–	5	13.0%	–	–	5	0.6%
Wiyo Black-on-white	–	–	–	–	–	–	–	–	–	–	2	0.4%	2	0.3%
Biscuit A (Abiquiu) Black-on-white	–	–	–	–	–	–	–	–	–	–	3	0.6%	3	0.4%
Prehistoric Glaze Ware														
Probable Aqua Fria glaze body	–	–	–	–	–	–	–	–	–	–	1	0.2%	1	0.1%
Historic Unpolished Micaceous Ware														
Highly micaceous paste	–	–	–	–	–	–	5	4.3%	–	–	9	1.7%	14	1.8%
Unpolished micaceous slip	–	–	–	–	2	4.3%	–	–	–	–	–	–	2	0.3%
Historic Polished Micaceous Ware														
Smudged interior, mica-slipped exterior	3	10.3%	3	9.4%	5	10.6%	5	4.3%	–	–	75	13.9%	91	11.4%
Polished interior with mica slip	–	–	5	15.6%	1	2.1%	10	8.7%	4	10.4%	10	1.9%	30	3.8%
Historic Buff Utility Ware														
Tewa buff, undifferentiated	8	27.6%	9	28.1%	3	6.4%	24	20.9%	1	2.6%	61	11.3%	106	13.3%
Tewa unpolished buff	–	–	–	–	3	6.4%	–	–	–	–	13	2.4%	16	2.0%
Historic Red Utility														
San Juan Red-on-tan	–	–	–	–	–	–	2	1.7%	–	–	–	–	2	0.3%
Tewa Polished Red	5	17.2%	2	6.3%	13	27.7%	27	23.5%	19	48.1%	96	17.8%	162	20.2%
Historic Gray/black Utility Ware														
Tewa Polished Gray	3	10.3%	5	15.6%	3	6.4%	18	15.7%	3	7.8%	43	8.0%	75	9.4%
Tewa Polished Black	–	–	–	–	–	–	1	0.9%	–	–	5	0.9%	6	0.8%
Smudged interior, buff exterior	–	–	–	–	1	2.1%	–	–	–	–	6	1.1%	7	0.9%
Tewa unpolished black	–	–	–	–	–	–	1	0.9%	–	–	–	–	1	0.1%
Smudged exterior, buff interior	–	–	–	–	–	–	–	–	–	–	2	0.4%	2	0.3%
Smudged interior, unpolished exterior	2	6.9%	–	–	–	–	–	–	–	–	–	–	2	0.3%
Historic Tewa Decorated Ware														
Sankawi Black-on-cream	–	–	–	–	–	–	–	–	–	–	1	0.2%	1	0.1%
Tewa Polychrome (type)	3	10.3%	–	–	–	–	2	1.7%	–	–	–	–	5	0.6%
Powhoge Polychrome	–	–	4	12.5%	2	4.3%	1	0.9%	1	2.6%	–	–	8	1.0%
Sakona Polychrome	–	–	–	–	–	–	–	–	–	–	1	0.2%	1	0.1%
Tewa Polychrome painted, undifferentiated (two slips)	–	–	–	–	2	4.3%	1	0.9%	2	5.2%	7	1.3%	12	1.5%
Black-on-cream, undifferentiated	1	3.4%	–	–	1	2.1%	8	7.0%	1	2.6%	11	2.0%	22	2.8%
Historic organic paint, undifferentiated, no slip	–	–	–	–	–	–	–	–	–	–	5	0.9%	5	0.6%
Historic white cream, slipped, unpainted	–	–	1	3.1%	3	6.4%	1	0.9%	–	–	18	3.3%	23	2.9%
Historic unpainted red and cream, slipped	–	–	–	–	1	2.1%	–	–	–	–	–	–	1	0.1%
Jemez White Ware														
Jemez Black-on-white	–	–	1	3.1%	–	–	–	–	–	–	–	–	1	0.1%
Unpainted Jemez White	–	–	–	–	–	–	1	0.9%	–	–	–	–	1	0.1%

Stratum	2.1		2.2		2.3		3.4		3.5		3.6		Total	
Ware Type	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %
Historic Keres Polychrome Ware														
Puname Polychrome, indeterminate	–	–	–	–	–	–	–	–	1	2.6%	–	–	1	0.1%
Santa Ana area red, slipped, unpainted	1	3.4%	–	–	–	–	–	–	–	–	–	–	1	0.1%
Historic Keres Utility Ware														
Smudged interior, mica-slipped exterior (MRG)	–	–	–	–	–	–	–	–	–	–	1	0.2%	1	0.1%
Historic Glaze Ware														
Puaray Glaze-on-yellow (E)	–	–	–	–	–	–	–	–	–	–	1	0.2%	1	0.1%
Puaray Glaze-on-red (E)	–	–	–	–	–	–	–	–	–	–	1	0.2%	1	0.1%
Kotyiti Glaze-on-red (F)	–	–	–	–	–	–	–	–	–	–	3	0.6%	3	0.4%
Kotyiti Glaze Polychrome (F)	–	–	–	–	–	–	–	–	–	–	2	0.4%	2	0.3%
Kotyiti Glaze-on-yellow (F)	–	–	–	–	–	–	1	0.9%	–	–	–	–	1	0.1%
Glaze red, unpainted	–	–	–	–	1	2.1%	1	0.9%	–	–	35	6.5%	37	4.6%
Glaze polychrome, unpainted	–	–	–	–	–	–	2	1.7%	–	–	2	0.4%	4	0.5%
Glaze yellow, unpainted	–	–	–	–	1	2.1%	–	–	–	–	27	5.0%	28	3.5%
Glaze unslipped, unpainted	–	–	–	–	3	6.4%	–	–	–	–	38	7.1%	41	5.1%
Glaze-on-polychrome, undifferentiated	–	–	–	–	–	–	–	–	–	–	5	0.9%	5	0.6%
Glaze-on-red, undifferentiated	–	–	–	–	–	–	–	–	–	–	18	3.3%	18	2.3%
Glaze-on-yellow, undifferentiated	1	3.4%	2	6.3%	1	2.1%	–	–	–	–	17	3.2%	21	2.6%
Glaze unslipped, undifferentiated	–	–	–	–	–	–	–	–	–	–	4	0.7%	4	0.5%
Unpainted glaze, red rim	–	–	–	–	–	–	1	0.9%	–	–	–	–	1	0.1%
Historic glaze, polychrome body	2	6.9%	–	–	–	–	–	–	1	2.6%	5	0.9%	8	1.0%
Historic glaze, unslipped body	–	–	–	–	–	–	1	0.9%	1	2.6%	–	–	2	0.3%
Historic glaze-on-red-body	–	–	–	–	–	–	–	–	–	–	2	0.4%	2	0.3%
Historic glaze-on-yellow body	–	–	–	–	–	–	2	1.7%	–	–	2	0.4%	4	0.5%
Total	29	100.0%	32	100.0%	47	100.0%	115	100.0%	39	100.0%	538	100.0%	800	100.0%

this stratum. Most of these ceramics represent Tewa utility ware types including polished micaceous, buff, and gray/black utility wares. Glaze ware types were identified in relatively small numbers, including a single sherd from a Santa Anna Polychrome vessel. Three sherds from the same vessel were assigned to Tewa Polychrome based on the small design and white slip. The late nineteenth-century component is supported by all evidence except the three Tewa Polychrome sherds. It is possible they represent mixing from earlier components, but they might also represent the resurgence of finer styles and whitish slips during later periods.

Stratum 2.2 is described as a clinker lens of coal and slag 6 cm thick and was initially interpreted as reflecting the 1870s surface. A total of 32 ceramics were recovered from this stratum. The majority were Tewa utility wares (buff, polished gray and red, and mica-slipped wares). All micaceous sherds were from types exhibiting polished interiors. Most of the plain utility ware types exhibited no surface slip, followed by gray/black forms, and red slip forms were present in very low frequencies. Tewa Polychrome types outnumbered glaze ware types about two to one. Formal decorated types included one Jemez Black-on-white and four Powhoge Polychrome sherds. These distributions are consistent with an occupation in the nineteenth century, with evidence of minimal amounts of mixing from earlier occupations. The dominance of a range of utility ware forms and a lower frequency of decorated types and the absence of types indicative of the tourist trade may indicate an assemblages dating just prior to the Railroad period or sometime during the first three-quarters of the nineteenth century.

Stratum 2.3 is described as dark brown, clayey, coarse-grained sand with gravels and medium-sized cobbles that were postulated to date from the Colonial period (late eighteenth to early nineteenth centuries). A total of 47 ceramics were recovered from this stratum. The majority of these were Tewa utility wares (buff, polished gray and red, and smudged and mica-slipped wares). Micaceous pottery is dominated by polished forms but includes unpolished types. Just over half of the plain ware sherds exhibit a red slip. Tewa Polychrome types slightly outnumber glaze wares. Formal decorated types are limited to two Powhoge Polychrome sherds. This assemblage is mostly consistent with an occupation during the late eighteenth to early nineteenth century, although the Powhoge Polychrome could also be associated with components dating to the later spans of the nineteenth century, as well. The frequency of glaze wares and a single prehistoric gray ware sherd indicates very slight mixing of assemblages from earlier components.

TU 3

TU 3 contained a total of 692 ceramics consisting of several prehistoric wares, but mostly historic wares. Three strata were identified in TU 3, Strata 3.4, 3.5, and 3.6.

Stratum 3.4 is described as a dark grayish brown silty loam with pea-sized gravels (5 percent), charcoal flecks, and a small amount of artifacts. This stratum was initially described as dating to the late eighteenth to early nineteenth centuries. A total of 115 ceramics were recovered from this stratum. The majority of these ceramics consisted of utility ware. Micaceous pottery was dominated by types with polished interiors. Red-slipped types were the most common plain ware types, followed by buff and gray/black forms. Tewa Polychrome types outnumber glaze ware types. Formal decorated types identified include two Tewa Polychrome, one Powhoge Polychrome, and one Kotyiti Polychrome sherds. These distributions seem to be consistent with at least part of the proposed span, including the joint presence of Tewa Polychrome and Powhoge Polychrome. The presence of low frequencies of glaze ware sherds may indicate mixture from earlier components. However, isolated incidences of glaze wares sometimes occur in assemblages clearly dating to the second half of the eighteenth century. These isolated occurrences could reflect a slightly later end date for glaze wares than sometimes assumed, as well as the use of heirloom vessels.

Stratum 3.5 is described as brown consolidated clayey sand with charcoal flecks, pockets of yellow sand, 50 percent cobbles ranging from 1 to 3 inches in diameter, and a moderate amount of artifacts. This stratum was initially interpreted as representing a possible 1680s plaza surface. Only 39 sherds were recovered from this stratum. The assemblage was dominated by Tewa utility ware types. All of the micaceous forms were polished, and the great majority of plain ware forms exhibited red slip. Decorated forms were rare, with Tewa Polychrome types more common than glaze ware types. Formal types included Tewa Polychrome and Powhoge Polychrome. The five Santa Fe Black-on-white sherds suggest some mixture from prehistoric components. While some caution must be exercised given the small sample, Native ceramics suggest this assemblage could reflect an occupation slightly later than the proposed period. It seems plausible to suggest that this deposit dates to sometime in the early eighteenth century.

Stratum 3.6 is described as dark gray brown silty sand with large charcoal flecks and pea-sized gravels. This stratum appears to date to the seventeenth century and may be inside a pit feature. This stratum yielded 538 sherds that ranged from prehistoric wares to historic wares. The small proportion of prehistoric wares consisted of gray utility wares (plain gray and smeared indented corrugated), white wares (Wiyo Black-on-white and Biscuit A Black-on-white), and a glaze ware sherd derived from Agua Fria Red-on-glaze). While most of the pottery is derived from Tewa utility ware types, the overall frequency is lower than that noted for other assemblages. Most of the micaceous utility ware sherds are polished, although unpolished sherds were noted. Slipped red forms represent the dominant plain ware forms, followed by buff and gray/black types. Glaze wares are far more common than in any other stratum and reflect almost a third of the total pottery. Glaze wares outnumber Tewa decorated types by about four to one.

Formal decorated types identified include Sankawi Polychrome, Sakona Polychrome, Glaze E, and Kotyiti (Glaze F) Polychrome. This combination of pottery is clearly indicative of an Early Colonial–period component dating sometime during the seventeenth century with very slight mixing from earlier prehistoric deposits.

Given the relatively large number sherds recovered from Stratum 3.6, ceramic distributions from different levels were compared to document possible changes in ceramics during the Early Colonial period (Tables 8, 9). While all levels are dominated by glaze ware and other types indicative of an Early Colonial–period component, there appears to be a gradual decrease in overall frequency of pottery from the upper six levels excavated (levels to 19), with glaze wares consisting of about 16 to 63 percent of the total pottery. In the lowest levels (20 and 21), the overall frequency of glaze wares declines and is just below 20 percent of the total pottery. Interestingly, the two Puaray or Glaze E sherds were recovered from upper levels, including 15 and 16. The five Kotyiti (Glaze F) sherds were recovered from Levels 18 and 19, the single Sankawi Black-on-cream sherd from Level 20, and the Sakona Polychrome sherd from Level 21.

Examination of Temporal Trends

Data recorded during investigations of the Plaza Light Posts Project indicate the usefulness of ceramic type categories and dating periods employed during previous projects. Even the small number of sherds recovered during this project provide the basis for the assignment of assemblages from different strata to three distinct dating groups (Tables 10, 11). These groupings also provide for the further examination of patterns reflected by Native ceramics from contexts in the downtown Santa Fe area. The three groups defined here seem to partly but not completely correspond to temporal evaluations made prior to this analysis. It is important to note that temporal assignments based on the ceramic observations discussed here represent one of several lines of evidence relating to the dating of these strata. Thus, such evaluations may eventually be modified or refined based on other evidence accumulated during this investigation.

The latest of the temporal groups defined here is based on data from Strata 2 .1 and 2.2. While these contexts were initially interpreted as dating to the late nineteenth century, distributions of associated Native ceramics may indicate a date during the first three-quarters of the nineteenth century (Table 10). The second group consists of Strata 2.3 and 3.4, which were initially interpreted as dating to the late eighteenth and early nineteenth century, and Stratum 3.5, which was originally postulated to date to the time of the Pueblo Revolt at about AD 1680. Ceramic distributions from these three strata seem to

Table 8. Ware group by level for Native American pottery recovered from Stratum 3.6

Level	14		15		16		17		18		19		20		21		Total	
Ware Group	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %
Prehistoric gray ware	–	–	1	2.4%	3	3.8%	2	2.6%	–	–	–	–	–	–	–	–	6	1.1%
Prehistoric white ware	2	1.6%	–	–	–	–	–	–	–	–	2	7.4%	1	3.3%	–	–	5	0.9%
Prehistoric glaze ware	1	0.8%	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	0.2%
Historic unpolished micaceous ware	5	4.0%	–	–	–	–	2	2.6%	1	1.3%	–	–	–	–	1	1.3%	9	1.7%
Historic polished micaceous ware	23	18.5%	8	19.5%	10	12.8%	8	10.3%	13	16.3%	–	–	6	20.0%	17	21.3%	85	15.8%
Historic buff utility ware	14	11.3%	7	17.1%	18	23.1%	20	25.6%	7	8.8%	2	7.4%	2	6.7%	4	5.0%	74	13.8%
Historic red utility ware	40	32.3%	1	2.4%	11	14.1%	14	17.9%	10	12.5%	3	11.1%	5	16.7%	12	15.0%	96	17.8%
Historic gray/black utility ware	10	8.1%	9	22.0%	5	6.4%	2	2.6%	2	2.5%	3	11.1%	7	23.3%	18	22.5%	56	10.4%
Historic Tewa decorated ware	9	7.3%	6	14.6%	4	5.1%	1	1.3%	6	7.5%	–	–	3	10.0%	14	17.5%	43	8.0%
Historic glaze ware	20	16.1%	9	22.0%	27	34.6%	29	37.2%	41	51.3%	17	63.0%	6	20.0%	14	17.5%	163	30.3%
Total	124	100.0%	41	100.0%	78	100.0%	78	100.0%	80	100.0%	27	100.0%	30	100.0%	80	100.0%	538	100.0%

Table 9. Ware and type by level for Native American pottery recovered from Stratum 3.6

Level	14		15		16		17		18		19		20		21			
Ware Type	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %
Prehistoric Northern Rio Grande Gray Ware																		
Plain gray body	–	–	–	–	3	3.8%	1	1.3%	–	–	–	–	–	–	–	–	4	0.7%
Smeared plain corrugated	–	–	–	–	–	–	1	1.3%	–	–	–	–	–	–	–	–	1	0.2%
Smeared indented corrugated	–	–	1	2.4%	–	–	–	–	–	–	–	–	–	–	–	–	1	0.2%
Prehistoric Northern Rio Grande White Ware																		
Wiyo Black-on-white	2	1.6%	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	0.4%
Biscuit A (Abiquiu) Black-on-white	–	–	–	–	–	–	–	–	–	–	2	7.4%	1	3.3%	–	–	3	0.6%
Prehistoric Glaze Ware																		
Probable Aqua Fria glaze body	1	0.8%	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	0.2%
Historic Unpolished Micaceous Ware																		
Highly micaceous paste	5	4.0%	–	–	–	–	2	2.6%	1	1.3%	–	–	–	–	1	1.3%	9	1.7%
Historic Polished Micaceous Ware																		
Smudged interior, mica-slipped exterior	20	16.1%	8	19.5%	10	12.8%	7	9.0%	11	13.8%	–	–	6	20.0%	13	16.3%	75	13.9%
Polished interior with mica slip	3	2.4%	–	–	–	–	1	1.3%	2	2.5%	–	–	–	–	4	5.0%	10	1.9%
Historic Buff Utility Ware																		
Tewa buff, undifferentiated	14	11.3%	7	17.1%	13	16.7%	15	19.2%	6	7.5%	2	7.4%	2	6.7%	2	2.5%	61	11.3%
Tewa unpolished buff	–	–	–	–	5	6.4%	5	6.4%	1	1.3%	–	–	–	–	2	2.5%	13	2.4%
Historic Red Utility Ware																		
Tewa Polished Red	40	32.3%	1	2.4%	11	14.1%	14	17.9%	10	12.5%	3	11.1%	5	16.7%	12	15.0%	96	17.8%
Historic Gray/black Utility Ware																		
Tewa Polished Gray	10	8.1%	9	22.0%	5	6.4%	2	2.6%	1	1.3%	3	11.1%	7	23.3%	6	7.5%	43	8.0%
Tewa Polished Black	–	–	–	–	–	–	–	–	1	1.3%	–	–	–	–	4	5.0%	5	0.9%
Smudged Interior, buff exterior	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6	7.5%	6	1.1%
Smudged exterior, buff interior	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	2.5%	2	0.4%
Historic Tewa Decorated Ware																		
Sankawi Black-on-cream	–	–	–	–	–	–	–	–	–	–	–	–	1	3.3%	–	–	1	0.2%
Tewa Polychrome, painted, undifferentiated (two slips)	5	4.0%	1	2.4%	–	–	–	–	1	1.3%	–	–	–	–	–	–	7	1.3%
Black-on -cream, undifferentiated	–	–	–	–	2	2.6%	1	1.3%	3	3.8%	–	–	2	6.7%	3	3.8%	11	2.0%
Historic organic paint, undifferentiated, no slip	–	–	–	–	1	1.3%	–	–	–	–	–	–	–	–	4	5.0%	5	0.9%
Historic white cream, slipped, unpainted	4	3.2%	5	12.2%	1	1.3%	–	–	2	2.5%	–	–	–	–	6	7.5%	18	3.3%
Sakona Polychrome	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1.3%	1	0.2%
Historic Keres Utility Ware																		
Smudged interior, mica-slipped exterior (MRG)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1.3%	1	0.2%
Historic Glaze Ware																		
Puaray Glaze-on-yellow (E)	–	–	–	–	1	1.3%	–	–	–	–	–	–	–	–	–	–	1	0.2%
Puaray Glaze-on-red (E)	–	–	1	2.4%	–	–	–	–	–	–	–	–	–	–	–	–	1	0.2%
Kotyiti Glaze-on-red (F)	–	–	–	–	–	–	–	–	3	3.8%	–	–	–	–	–	–	3	0.6%
Kotyiti Glaze Polychrome (F)	–	–	–	–	–	–	–	–	–	–	1	3.7%	–	–	1	1.3%	2	0.4%
Glaze red, unpainted	9	7.3%	–	–	5	6.4%	6	7.7%	7	8.8%	4	14.8%	1	3.3%	3	3.8%	35	6.5%
Glaze polychrome, unpainted	–	–	–	–	–	–	–	–	2	2.5%	–	–	–	–	–	–	2	0.4%
Glaze yellow, unpainted	1	0.8%	5	12.2%	4	5.1%	3	3.8%	4	5.0%	4	14.8%	2	6.7%	4	5.0%	27	5.0%
Glaze unslipped, unpainted	2	1.6%	–	–	13	16.7%	8	10.3%	13	16.3%	2	7.4%	–	–	–	–	38	7.1%
Glaze-on-polychrome, undifferentiated	–	–	–	–	–	–	1	1.3%	1	1.3%	1	3.7%	–	–	2	2.5%	5	0.9%
Glaze-on-red, undifferentiated	1	0.8%	1	2.4%	2	2.6%	5	6.4%	4	5.0%	2	7.4%	3	10.0%	–	–	18	3.3%
Glaze-on-yellow, undifferentiated	–	–	–	–	2	2.6%	5	6.4%	6	7.5%	2	7.4%	–	–	2	2.5%	17	3.2%
Glaze unslipped, undifferentiated	–	–	–	–	–	–	1	1.3%	1	1.3%	1	3.7%	–	–	1	1.3%	4	0.7%
Historic glaze polychrome body	4	3.2%	1	2.4%	–	–	–	–	–	–	–	–	–	–	–	–	5	0.9%
Historic glaze-on-red-body	2	1.6%	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	0.4%
Historic glaze-on-yellow body	1	0.8%	1	2.4%	–	–	–	–	–	–	–	–	–	–	–	–	2	0.4%
Total	124	100.0%	41	100.0%	78	100.0%	78	100.0%	80	100.0%	27	100.0%	30	100.0%	80	100.0%	538	100.0%

Table 10. Ware group by stratum group

Group	1		2		3		Total	
Ware	Count	Column %	Count	Column %	Count	Column %	Count	Column %
Prehistoric gray ware	–	–	1	0.5%	6	1.1%	7	0.9%
Prehistoric white ware	–	–	5	2.5%	5	0.9%	10	1.3%
Prehistoric glaze ware	–	–	–	–	1	0.2%	1	0.1%
Historic unpolished micaceous ware	–	–	7	3.5%	9	1.7%	16	2.0%
Historic polished micaceous ware	11	18.0%	25	12.5%	85	15.8%	121	15.1%
Historic buff utility ware	17	27.9%	31	15.5%	74	13.8%	122	15.3%
Historic red utility ware	7	11.5%	61	30.2%	96	17.8%	164	20.5%
Historic gray/black utility ware	10	16.4%	27	13.5%	56	10.4%	93	11.6%
Historic Tewa decorated ware	9	14.8%	26	13.0%	43	8.0%	78	9.8%
Jemez white ware	1	1.6%	1	0.5%	–	–	2	0.3%
Keres polychrome ware	1	1.6%	1	0.5%	–	–	2	0.3%
Historic or indeterminate glaze ware	5	8.2%	16	8.0%	163	30.3%	184	23.0%
Total	61	100.0%	201	100.0%	538	100.0%	800	100.0%

Table 11. Wares and types across stratum groups

Group Ware Type	1 Count	Column %	2 Count	Column %	3 Count	Column %	Total Count	Column %
Prehistoric Northern Rio Grande Gray Ware								
Plain gray body	–	–	–	–	4	0.7%	4	0.5%
Smeared plain corrugated	–	–	1	0.5%	1	0.2%	2	0.3%
Smeared indented corrugated	–	–	–	–	1	0.2%	1	0.1%
Prehistoric Northern Rio Grande White Ware								
Santa Fe Black-on-white	–	–	5	2.5%	–	–	5	0.6%
Wiyo Black-on-white	–	–	–	–	2	0.4%	2	0.3%
Biscuit A Abiquiu Black-on-white	–	–	–	–	3	0.6%	3	0.4%
Prehistoric Glaze Ware								
Probable Aqua Fria glaze body	–	–	–	–	1	0.2%	1	0.1%
Historic Unpolished Micaceous Ware								
Highly micaceous paste	–	–	5	2.5%	9	1.7%	14	1.8%
Unpolished micaceous slip	–	–	2	1.0%	–	–	2	0.3%
Historic Polished Micaceous Ware								
Smudged interior, mica-slipped exterior	6	9.8%	10	5.0%	75	13.9%	91	11.4%
Polished interior with mica slip	5	8.2%	15	7.5%	10	1.9%	30	3.8%
Historic Buff Utility Ware								
Tewa buff, undifferentiated	17	27.9%	28	13.9%	61	11.3%	106	13.3%
Tewa unpolished buff	–	–	3	1.5%	13	2.4%	16	2.0%
Historic Red Utility Ware								
San Juan Red-on-tan	–	–	2	1.0%	–	–	2	0.3%
Tewa Polished Red	7	11.5%	59	29.4%	96	17.8%	162	20.3%
Historic Gray/Black Utility Ware								
Tewa Polished Gray	8	13.1%	24	11.9%	43	8.0%	75	9.4%
Tewa Polished Black	–	–	1	0.5%	5	0.9%	6	0.8%
Smudged interior, buff exterior	–	–	1	0.5%	6	1.1%	7	0.9%
Tewa unpolished black	–	–	1	0.5%	–	–	1	0.1%
Smudged exterior, buff interior	–	–	–	–	2	0.4%	2	0.3%
Smudged interior, unpolished exterior	2	3.3%	–	–	–	–	2	0.3%
Historic Tewa Decorated Ware								
Sankawi Black-on-cream	–	–	–	–	1	0.2%	1	0.1%
Sakona Polychrome	–	–	–	–	1	0.2%	1	0.1%
Tewa Polychrome (type)	3	4.9%	2	1.0%	–	–	5	0.6%
Tewa Polychrome, painted, undifferentiated (two slips)	–	–	5	2.5%	7	1.3%	12	1.5%
Powhoge Polychrome	4	6.6%	4	2.0%	–	–	8	1.0%
Black-on-cream, undifferentiated	1	1.6%	10	5.0%	11	2.0%	22	2.8%
Historic organic paint, undifferentiated, no slip	–	–	–	–	5	0.9%	5	0.6%
Historic white cream, slipped, unpainted	1	1.6%	4	2.0%	18	3.3%	23	2.9%
Historic unpainted red and cream slipped	–	–	1	0.5%	–	–	1	0.1%
Jemez White Ware								
Jemez Black-on-white	1	1.6%	–	–	–	–	1	0.1%
Unpainted Jemez white	–	–	1	0.5%	–	–	1	0.1%
Historic Keres Polychrome Ware								
Puname Polychrome, indeterminate	–	–	1	0.5%	–	–	1	0.1%
Santa Ana Area Red, slipped, unpainted	1	1.6%	–	–	–	–	1	0.1%
Historic Keres Utility Ware								
Smudged interior, mica-slipped exterior (MRG)	–	–	–	–	1	0.2%	1	0.1%

Group Ware Type	1 Count	 Column %	2 Count	 Column %	3 Count	 Column %	Total Count	 Column %
Historic Glaze Ware								
Puaray Glaze-on-yellow (E)	–	–	–	–	1	0.2%	1	0.1%
Puaray Glaze on-red (E)	–	–	–	–	1	0.2%	1	0.1%
Kotyiti Glaze-on-red (F)	–	–	–	–	3	0.6%	3	0.4%
Kotyiti Glaze Polychrome(F)	–	–	–	–	2	0.4%	2	0.3%
Kotyiti Glaze-on-yellow (F)	–	–	1	0.5%	–	–	1	0.1%
Glaze red, unpainted	–	–	2	1.0%	35	6.5%	37	4.6%
Glaze polychrome, unpainted	–	–	2	1.0%	2	0.4%	4	0.5%
Glaze yellow, unpainted	–	–	1	0.5%	27	5.0%	28	3.5%
Glaze unslipped, unpainted	–	–	3	1.5%	38	7.1%	41	5.1%
Glaze-on-polychrome, undifferentiated	–	–	–	–	5	0.9%	5	0.6%
Glaze-on-red, undifferentiated	–	–	–	–	18	3.3%	18	2.3%
Glaze-on-yellow, undifferentiated	3	4.9%	1	0.5%	17	3.2%	21	2.6%
Glaze unslipped, undifferentiated	–	–	–	–	4	0.7%	4	0.5%
Unpainted glaze red rim	–	–	1	0.5%	–	–	1	0.1%
Historic glaze polychrome body	2	3.3%	1	0.5%	5	0.9%	8	1.0%
Historic glaze unslipped body	–	–	2	1.0%	–	–	2	0.3%
Historic glaze-on-red-body	–	–	–	–	2	0.4%	2	0.3%
Historic glaze-on-yellow body	–	–	2	1.0%	2	0.4%	4	0.5%
Total	61	100.0%	201	100.0%	538	100.0%	800	100.0%

indicate occupations sometime during the mid-eighteenth or early nineteenth centuries. The third group consists of Stratum 3.6, which was described as dating to the seventeenth century.

Ceramic distributions noted for assemblages assigned to Group 1 and 2 are similar. Assemblages associated with both groups consist of low frequencies of glaze ware, since decorated pottery appears to be dominated by sherds derived from later Tewa Polychrome types (Powhoge Polychrome and Tewa Polychrome). Sherds assigned to Tewa Polychrome in the Group 1 assemblages could indicate mixing from earlier contexts or a later form with fine designs common in Tewa Polychrome. While the small number of sherds from these contexts limits comparisons, there is some evidence for a slightly earlier date for Group 1 than for Group 2 contexts. These include a higher frequency of buff utility and gray/black utility wares and lower frequencies of red utility, historic glaze ware, and prehistoric types for assemblages placed into Group 1. The dominance of well-made utility ware forms and the general absence of thick, poorly fired jars and other forms attributed to the tourist market associated with the arrival of the railroad in assemblages assigned to Group 1 seems to indicate components dating just prior to AD 1870. The joint presence of Tewa Polychrome and Powhoge Polychrome and the high frequency of red utility types in assemblages assigned to Group 2 may indicate components dating from the very late part of the eighteenth century to the first half of the nineteenth century.

The earliest group is associated with the various levels at Stratum 3.6, which reflects a depositional sequence encompassing the seventeenth century. Ceramic assemblages from contexts assigned to Group 3 are most notably distinguished by relatively high frequencies of glaze wares and much lower frequencies of Tewa decorated types. Glaze ware types may make up about a third of the assemblage, and bowl rim forms appear to be exclusively represented by Glaze E and Glaze F types. Tewa decorated types are present in extremely low frequencies (less than 10 percent of the total assemblage). Tewa decorated types noted in later assemblages (such at Powhoge Polychrome and Tewa Polychrome) are absent in Group 3 assemblages, although single examples of Sankawi Black-on-cream and Sakona Polychrome were noted. In contrast, forms and frequencies of utility ware types tended to be fairly similar to those noted at assemblages noted for earlier components, particularly for those assigned to Group 2. Thus, the most dramatic differences noted in assemblages associated with different occupational periods is reflected by decorated types from Group 3 assemblages as compared those assigned to Groups 1 and 2.

Decorated pottery from assemblages dating to the seventeenth century is represented by forms produced in a number of areas. This is most obviously reflected by the mixture of very distinct pottery forms assigned to Tewa decorated and glaze ware types. It is also reflected in diversity of pastes and temper noted in glaze ware types produced during the seventeenth century (Table 12). While the majority of glaze ware types examined are tempered with crushed latite, which is indicative of production in the Galisteo Basin, a wide range of temper groups are represented. These include examples tempered with fine tuff, sand, and crystalline basalt, which appear to reflect glaze ware production in villages of the Pajarito Plateau, Pecos Valley, and Middle Rio Grande Valley (Table 10). Thus the drop in glaze ware pottery reflects a significant decline in the areas from where pottery used by Spanish occupants of Santa Fe was obtained. After the Spanish reconquest of New Mexico, almost all of the pottery used in Santa Fe and nearby Spanish habitations was obtained from Northern Tewa villages to the north. For later components (post–seventeenth century) examined during this study, pottery known to have been produced in other provinces is limited to single sherds derived from vessels produced at Santa Ana and Zia Pueblos and two sherds from vessels probably produced at Jemez Pueblo.

Ceramics from these assemblages reflect similar shifts in decorated forms as noted in other contexts in the Santa Fe area (Wilson 2011b). Decorated pottery from early Spanish Colonial–period assemblages tend to be very variable, consisting of a range of Tewa decorated and glaze ware forms indicative of production by different Pueblo groups. While glaze ware pottery was no longer produced after the early part of the eighteenth century, Tewa decorated vessels continued to be produced but underwent significant changes in applications of slip, designs, and overall shape. Such changes are reflected in a sequence of very distinct Tewa decorated types produced from the early seventeenth through the nineteenth century. These changes reflect a series of stylistic and functional change resulting from the interplay between Pueblo tradition and expression and the everyday needs and tastes of Spanish and Hispanic consumers.

In contrast, the overwhelmingly majority of Tewa decorated and plain ware forms from components associated with all historic occupational periods exhibit similar soft pastes and tuff temper that seem to reflect a long span of production in the Tewa Basin (Table 12). Except for a shift to an increasing number of black utility wares during the middle nineteenth century, there appears to have been little change in plain utility ware forms. Distributions noted in micaceous utility also indicate very little change in overall frequencies or temper and other characteristics. Most of the polished micaceous wares exhibit a similar granite temper, while unpolished forms commonly exhibit micaceous pastes that were adopted by other groups as well (Eiselt 2006; Eiselt and Ford 2007) . Thus, the overall technology associated with the production and distribution of utility ware in the Northern Rio Grande, while very distinct from that noted in gray utility wares dominating Classic-period assemblages, appears to have changed very little from the early seventeenth to the end of the nineteenth century. Such trends reflect the sudden appearance and long-term conservatism of mass-produced utilitarian vessels by potters in the Tewa Basin (Snow 1973). While similar vessels were utilized at Northern Tewa villages, the great majority of Tewa vessels produced during this time span appear to have been traded to rapidly increasing populations in Spanish villages and other settlements.

Vessel forms represented by different ware groups also appear to have been relatively consistent from the early seventeenth to the late nineteenth century. Almost all the micaceous utility wares examined appear to have derived from wide-mouth jars that were probably utilized for cooking (Table 13). Thus, similarities in overall frequency and characteristics of this pottery represent the conservative nature of the production and use of these wares. Distributions of rim forms indicate that the majority of pottery assigned to Tewa plain ware, Tewa decorated ware, and glaze ware types were derived from bowls, although a wide range of forms are represented in all these ware groups. Many of the bowls produced after the late eighteenth century tend to be smaller and shallower. Initially, the majority of such vessels were represented by a range of Tewa decorated and glaze ware forms but in later assemblages are represented by increasing numbers of plain ware forms, which display similar ranges of forms as noted in the decorated wares (Table 13).

Changes that occurred after the Pueblo Revolt

Table 12. Ware group by temper type for historic-period ceramics

Ware Group	Historic Unpolished Micaceous Plain		Historic Micaceous Polished		Historic Buff Utility		Historic Red Utility		Historic Polished Gray/Black Utility		Historic Tewa Polychrome	
Temper	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %
Sand	–	–	–	–	–	–	–	–	–	–	–	–
Granite with abundant mica	–	–	12	9.9%	–	–	–	–	–	–	–	–
Granite without abundant mica	6	37.5%	108	89.3%	–	–	–	–	2	2.2%	1	1.3%
Highly micaceous residual paste	9	56.3%	–	–	–	–	–	–	–	–	–	–
Sherd and sand	–	–	–	–	–	–	–	–	–	–	–	–
Fine tuff or ash	1	6.3%	1	0.8%	104	85.2%	158	96.3%	88	94.6%	71	91.0%
Fine tuff and sand	–	–	–	–	14	11.5%	3	1.8%	1	1.1%	1	1.3%
Fine sandstone	–	–	–	–	–	–	–	–	2	2.2%	–	–
Gray crystalline basalt	–	–	–	–	–	–	–	–	–	–	–	–
Latite	–	–	–	–	–	–	–	–	–	–	–	–
Tuff, mica and sand	–	–	–	–	4	3.3%	3	1.8%	–	–	5	6.4%
Latite and sand	–	–	–	–	–	–	–	–	–	–	–	–
Sherd and latite	–	–	–	–	–	–	–	–	–	–	–	–
Total	16	100.0%	121	100.0%	122	100.0%	164	100.0%	93	100.0%	78	100.0%

Table 13. Ware group by vessel form for historic-period ceramics

Ware Group	Historic Unpolished Micaceous Plain		Historic Polished Micaceous		Historic Buff Utility		Historic Red Utility		Historic Polished Gray/Black Utility		Historic Tewa Decorated	
Vessel Form	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %
Indeterminate	–	–	–	–	1	0.8%	2	1.2%	4	4.3%	5	6.4%
Bowl rim	–	–	–	–	11	9.0%	11	6.7%	2	2.2%	6	7.7%
Bowl body	–	–	–	–	–	–	–	–	–	–	38	48.7%
Olla rim	–	–	–	–	–	–	1	0.6%	–	–	–	–
Jar neck	1	6.3%	20	16.5%	3	2.5%	12	7.3%	17	18.3%	4	5.1%
Jar rim	–	–	4	3.3%		–	4	2.4%	1	1.1%	4	5.1%
Jar body	5	31.3%	–	–	3	2.5%	3	1.8%	1	1.1%	13	16.7%
Gourd dipper	–	–	–	–	–	–	–	–	–	–	–	–
Effigy	–	–	–	–	–	–	–	–	–	–	–	–
Body sherd, polished interior/exterior	8	50.0%	–	–	63	51.6%	96	58.4%	49	52.7%	6	7.7%
Body sherd, unpolished both sides	2	12.5%	–	–	18	14.8%	3	1.8%	1	1.1%	–	–
Body sherd, unpolished interior, polished exterior	–	–	–	–	6	4.9%	20	12.2%	12	12.9%	–	–
Body sherd, polished interior, unpolished exterior	–	–	97	80.2%	16	13.1%	11	6.7%	6	6.5%	–	–
Indeterminate rim	–	–	–	–	1	0.8%	–	–	–	–	–	–
Soup plate	–	–	–	–	–	–	–	–	–	–	–	–
Tewa bowl rim	–	–	–	–	–	–	1	0.6%	–	–	2	2.6%
Total	16	100.0%	121	100.0%	122	100.0%	164	100.0%	93	100.0%	78	100.0%

may reflect slight alterations in earlier-developed conventions and technologies, allowing for the mass-production of vessels by Tewa potters for increasing Spanish and Hispanic populations. These include a drop in the proportion of painted pottery and a shift to bolder, simpler, and less traditional styles. These changes are mainly reflected by the increase in plain utility ware forms. Much of this pottery seems to be derived from vessels that are assigned to San Juan Red-on tan and exhibit red slip near the rim, which is often similar in thickness and color similar to that noted in Powhoge Polychrome vessels. The rest of the vessel is unpolished and brown to tan. Vessel forms are similar to those noted in Powhoge Polychrome. A similar red slip was applied on smudged black and gray ware to produce a black-on-gray effect. Forms noted in these vessels are similar to those noted for San Juan Red-on-tan and Powhoge Polychrome. The overall effect noted in plain ware bowls and soup plates is similar to that noted in Powhoge Polychrome, and many of the plain ware vessels are essentially unpainted Powhoge Polychrome. Thus, the great majority of the pottery from later assemblages reflects changes that ultimately allowed for the increased mass production of polished bowls and other forms settlers required.

Faunal Analysis

Nancy J. Akins

Faunal remains were recovered from three of the four test units in the Santa Fe Plaza. TU 1 produced no fauna, and TU 4 a single piece of large ungulate bone. The majority of the sample is from TU 3 (84.6 percent), mainly from the lowest stratum (60.3 percent). Upper fill in TU 2 (Strata 2.1 and 2.2) dates to the late nineteenth century, The lower stratum in TU 2 (Stratum 2.3) and upper stratum in TU 3 (Stratum 3.4) date to late eighteenth and early nineteenth century. Lower fill in TU 3 and that from TU 4 are from the seventeenth century.

Recent excavations in Santa Fe and northern New Mexico provide an abundance of comparative faunal data from the Territorial and Spanish Colonial periods. In most assemblages, sheep or goat (caprines) are more common than cattle specimens. Pig, horse, and chicken occur in small numbers, and the use of the native fauna is rare (Akins in prep. a, in prep. b).

Methods

Bone from the test units was identified using the OAS comparative collection following the established OAS computer coded format, which identifies the animal and skeletal element, how and if the animal and part was processed for consumption or another use, and how taphonomic and environmental conditions have affected the specimen.

Provenience-Related Variables

Provenience and stratigraphic information are linked to the data file through the field specimen (FS) number. At LA 80000 this information includes the test unit, the level, the starting and ending depths, and screen size. A lot number identifies a specimen or group of specimens that fit the description recorded in that line, and the count indicates how many specimens are described by that line of data. A bone broken into a number of pieces during excavation or cleaning is counted as a single specimen.

Taxon

Taxonomic identifications are made to the most specific level possible. Identifications that are less than certain are flagged in the certainty variable. Specimens that cannot be identified to the species, family, or order are assigned to a range of indeterminate categories based on the size of the animal and whether it is a mammal, bird, other animal, or cannot be determined. Unidentifiable fragments often constitute the bulk of a faunal assemblage. Identifying these as precisely as possible supplements the information gained from the identified taxa.

Element Characteristics

The skeletal element (e.g., cranium, mandible, humerus) is identified, then described by side, age, and the portion recovered. Side is recorded for the element itself or for the portion recovered when it is axial, for example, the left transverse process of a lumbar vertebra. Body part information is crucial for examining whether complete or partial animals are represented and can aid in determining site function. Two other variables describe the body part and commercial cuts. Body parts combine adjacent units into butchering packets: unknown, long bone, flat bone (for unidentifiable elements), cranial, vertebral, thorax, pelvis, front limb (or wing), hind limb, and feet or wing tip. Commercial cuts are head, tongue, neck, chuck, rib, short loin, sirloin, rump, round, hind shank, tail, short rib, short plate, brisket, arm, fore shank, and feet.

Age is estimated at a general level as fetal or neonate, immature (up to two-thirds mature size), young adult (near or full size with unfused epiphysis or young-textured bone), and apparently mature. The criteria used to assign the age is also recorded: generally, the size, dental development or wear, epiphysis closure, or whether the texture of the bone is compact, as in mature animals or porous as in less than mature animals. Aging based on texture alone is not absolute, since most growth in mammals takes place near the articular ends; diaphyseal bone can be compact and dense, while the bone near an end retains a roughened or trabecular structure (Reitz and Wing 1999:73). As a result, fragments from the same bone can be coded as different ages, and juvenile bone is probably undernumerated. The portion of the skeletal element represented by a specimen is recorded in detail for estimating the number of individuals represented in an assemblage and to aid in discerning patterns related to processing. Indeterminate fragments are generally recorded as long bone shaft or end fragments, or as flat bone.

Completeness

Completeness refers to how much of the skeletal element is represented by the specimen (analytically complete, more than 75 percent complete but not analytically complete, between 50 and 75 percent complete, between 10 and 50 percent, or less than 10 percent complete). Completeness is used in conjunction with the portion represented to estimate the number of individuals present. It also provides information on whether a species was intrusive and on the degree of processing, environmental deterioration, animal activity, and thermal fragmentation.

Taphonomic Variables

Taphonomy, or the study of preservation processes and how these effect the information obtained, has the goal of identifying and evaluating some of the nonhuman processes affecting the condition and frequencies found in a faunal assemblage (Lyman 1994:1). Taphonomic processes monitored include environmental, animal, and some types of burning. Environmental alteration includes pitting or corrosion from soil conditions, sun bleaching from extended exposure, checking or exfoliation from exposure or soil conditions, root etching from the acids excreted by roots, polish or rounding from sediment movement, a fresh or greasy look, and damage caused by soil or minerals.

Animal alteration is recorded by source or probable source. Choices include carnivore (gnawing, punctures, and/or crushing), probable scat, rodent gnawing, carnivore and rodent, and altered but the agent is uncertain. Bones recorded as probable scat have rounding on edges, and portions of the inner and outer tables can be partially dissolved.

Burning, when it occurs after burial, is also a taphonomic process. Furthermore, burning influences the preservation and completeness of individual bones. Heavily burned bone is friable and tends to break more easily than unburned bone (Lyman 1994:389–391; Stiner et al. 1995:223).

Burning can occur as part of the cooking process, part of the disposal process when bone is used as fuel or discarded into a fire, or after it is buried. Burn color is a gauge of burn intensity. A light brown, reddish, or yellow color or scorch occurs when bones are lightly heated; charred or blackened bone becomes black as the collagen is carbonized; and when the carbon is oxidized, it becomes white, or calcined (Lyman 1994:384–388). Burns can be graded, reflecting the thickness of the flesh protecting portions of the bone; or dry—light on the surface and black at the core, or blackened on only the exterior or interior, indicating the burn occurred after disposal, when the bone was dry. Graded or partial burns can indicate a particular cooking process, generally roasting, while complete charring or calcined bone does not. Uniform degrees of burning are possible only after the flesh has been removed (Lyman 1994:387) and generally indicate a disposal practice. While a wide range of colors and intensities occur, this information is summarized in the burn type variable, which identifies intent rather than giving a detailed visual description of the specimen. Complete and some graded burns represent discard processes and are recorded as discard. Patterns that suggest the part was roasted (e.g., graded burns that are scorched, where the flesh is thick and burned black at the end, where there is little or no flesh) are recorded as roasted. In other cases, the burn appears accidental or intentional (e.g., dry burns or a burned tip) and is recorded as such. Potential boiling is recorded as boiled (color change, waxy, rounded edges) or boiled (?) when it is less clear.

Butchering and Processing

Evidence of butchering is recorded as a combination of morphology, tool type, and intent. Variables identify substantial cuts, chops, fine cuts (defleshing), impact breaks, spiral breaks, marrow breaks, snaps, and saw cuts. The location of these on the element is also recorded. A conservative approach is taken to the recording of marks and fractures that could be indicative of processing animals for food, tools, or hides, since many natural processes result in similar marks and fractures. Spiral fractures were recorded based on morphology, recognizing there are other causes and that these can occur well after discard. Impacts require some indication of an impact, generally flake scars or evidence of percussion. These were not recorded when they were ambiguous or accompanied by carnivore gnawing. The condition of the bone in many faunal assemblages often obscures or destroys much of the evidence of processing.

Comments

The comment section is used to flag specimens with verbal comments. For example, when a more specific age can be assigned, it would be recorded as a comment.

Data Analysis

Once the data was entered and checked, the provenience, provenience groups, and chronological information was added. Data are tabulated and analyzed using SPSS (Version 11).

Taxa

A narrow range of taxa were identified (Table 14). The majority (58.8 percent) of the bone recovered is small fragments that could not be identified as a specific animal. Most are from large and small ungulates (58.0 percent), probably cattle and sheep/goat. Nearly all of the identified specimens are from domestic animals (possible dog, cattle, sheep/goat, pig, horse, and chicken). The exceptions are probable bison and raven specimens.

The bison specimen is a hoof (phalanx 3) that is the same size as a comparative modern-day bison and far larger than cattle specimens (Fig. 17). In addition, a large distal metatarsal, closer to bison than cattle and not fully grown, is considered *Bos* (cattle or bison). Four other specimens are from large bovids but are considered cattle based on size. Other cattle specimens from LA 80000 are consistent with probable longhorn comparative specimens. While it is possible that a very large breed of cattle was present, the cattle during this period were generally *criollos*, the progenitor of the longhorn, which was not as large as bison. The Iberian, or criollo, cattle brought to the New World were valued for their tough hides and stringy beef rather than for draught or dairy products (Myres 1979:82–83). It was not until 1750, when Europeans began selectively breeding cattle (Porter 1991:308–309), that more variability occurred. None of the LA 80000 cattle specimens are from very young animals. All are full or nearly full-sized, with a slight preference for probable mature (59.3 percent) over juvenile specimens (40.8 percent).

The sheep/goat from this site represents at least two varieties, one considerably larger than the other. Early Spanish sheep were mainly *churros*, a small, sedentary breed from southern Spain that produced a small quantity (1 to 2.5 pounds, 0.45 to 1.13 kg) of coarse, long-staple wool suited to hand processing, and readily adapted to the semiarid pastures of the New World (Baxter 1987:20). A few merinos and merino crosses were also brought to the New World. Merino sheep are known for their kinky, high-yielding fleece, and a livestock culture that involved long seasonal drives between mountains and plains. While wool for clothing was important to the padres of the missions, the early sheep were valued for their meat rather than wool or tallow (Baxter 1987:20; Carlson 1969:26, 42). Oñate is said to have had merino sheep, but this was unusual for the time (Towne and Wentworth 1945:7). Spanish shepherds found that goats were more dependable than rams for leading flocks, and they provided milk, cheese, and butter. The Spanish goats brought to Texas were described as long-legged and small bodied (Scurlock 1998: 9–10). Unlike cattle, the LA 80000 sheep specimens contain a range of ages, including one from a newborn and an immature. None were positively identified as sheep or goat.

The few pig bones are all from the same stratum and could represent a single full-sized but young animal. Too few specimens are present to speculate on the variety found. The same is true for the horse or possible mule specimens.

Table 14. Faunal remains recovered from light pole pits by test unit and stratum

	Test Unit 2						Test Unit 3						Test Unit 4		Total	
Stratum	2.1		2.2		2.3		3.4		3.5		3.6		4.4			
	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %
Common Name																
Unknown small	–	–	–	–	–	–	–	–	1	3.3%	–	–	–	–	1	0.2%
Small mammal/ bird	–	–	–	–	–	–	–	–	1	3.3%	–	–	–	–	1	0.2%
Medium-to-large mammal	–	–	–	–	–	–	–	–	–	–	1	0.3%	–	–	1	0.2%
Large dog or wolf	–	–	–	–	–	–	–	–	–	–	1	0.3%	–	–	1	0.2%
Small ungulate	4	25.0%	2	13.3%	4	9.3%	15	17.0%	4	13.3%	28	9.6%	–	–	57	11.7%
Large ungulate	4	25.0%	4	26.7%	10	23.3%	15	17.0%	14	46.7%	60	20.5%	–	–	107	22.0%
Medium-to-large ungulate	2	12.5%	–	–	11	25.6%	17	19.3%	5	16.7%	81	27.6%	1	100.0%	117	24.1%
Cattle	1	6.3%	2	13.3%	7	16.3%	11	12.5%	3	10.0%	47	16.0%	–	–	71	14.6%
cf Bison	–	–	–	–	–	–	–	–	–	–	1	0.3%	–	–	1	0.2%
Cattle or bison	–	–	–	–	–	–	–	–	–	–	1	0.3%	–	–	1	0.2%
Sheep or goat	5	31.3%	7	46.7%	11	25.6%	27	30.7%	2	6.7%	60	20.5%	–	–	112	23.0%
Pig	–	–	–	–	–	–	–	–	–	–	4	1.4%	–	–	4	0.8%
Horse/large equid	–	–	–	–	–	–	–	–	–	–	6	2.0%	–	–	6	1.2%
Medium-large bird	–	–	–	–	–	–	1	1.1%	–	–	–	–	–	–	1	0.2%
Common raven	–	–	–	–	–	–	–	–	–	–	3	1.0%	–	–	3	0.6%
Chicken	–	–	–	–	–	–	2	2.3%	–	–	–	–	–	–	2	0.4%
Total	16	100.0%	15	100.0%	43	100.0%	88	100.0%	30	100.0%	293	100.0%	1	100.0%	486	100.0%
Age																
Fetal, neonate	–	–	–	–	–	–	–	–	–	–	1	0.3%	–	–	1	0.2%
Immature	1	6.3%	–	–	–	–	2	2.3%	–	–	3	1.0%	–	–	6	1.2%
Juvenile	11	68.8%	11	73.3%	27	62.8%	74	84.1%	17	56.7%	219	74.7%	1	100.0%	360	74.1%
Mature	4	25.0%	4	26.7%	16	37.2%	12	13.6%	13	43.3%	70	23.9%	–	–	119	24.5%
Total	16	100.0%	15	100.0%	43	100.0%	88	100.0%	30	100.0%	293	100.0%	1	100.0%	486	100.0%
Completeness																
<10%	–	–	10	66.7%	33	76.7%	60	68.2%	26	86.7%	218	74.4%	1	100.0%	359	73.9%
10–50%	4	80.0%	4	26.7%	9	20.9%	25	28.4%	3	10.0%	57	19.5%	–	–	102	21.0%
50–75%	1	20.0%	1	6.7%	1	2.3%	2	2.3%	1	3.3%	4	1.4%	–	–	10	2.1%
75–95%	–	–	–	–	–	–	–	–	–	–	7	2.4%	–	–	7	1.4%
Complete	–	–	–	–	–	–	1	1.1%	–	–	7	2.4%	–	–	8	1.6%
Total	5	100.0%	15	100.0%	43	100.0%	88	100.0%	30	100.0%	293	100.0%	1	100.0%	486	100.0%
Environmental Alteration																
None	9	56.3%	6	40.0%	26	60.5%	51	58.0%	11	36.7%	129	44.0%	–	–	232	47.7%
Pitting/corrosion	–	–	2	13.3%	–	–	1	1.1%	6	20.0%	6	2.0%	1	100.0%	16	3.3%
Checked/exfoliated	7	43.8%	7	46.7%	17	39.5%	34	38.6%	13	43.3%	158	53.9%	–	–	236	48.6%
Root etched	–	–	–	–	–	–	2	2.3%	–	–	–	–	–	–	2	0.4%
Total	16	100.0%	15	100.0%	43	100.0%	88	100.0%	30	100.0%	293	100.0%	1	100.0%	486	100.0%
Animal Activity																
Carnivore	1	6.3%	1	6.7%	–	–	2	2.3%	–	–	2	0.7%	–	–	6	1.2%
Rodent	–	–	1	6.7%	–	–	–	–	–	–	–	–	–	–	1	0.2%

Stratum	Test Unit 2						Test Unit 3						Test Unit 4		Total	
	2.1		2.2		2.3		3.4		3.5		3.6		4.4			
	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %
Scat	–	–	–	–	1	2.3%	5	5.7%	–	–	14	4.8%	–	–	20	4.1%
Burning or Boiling																
Discard burn	–	–	–	–	–	–	–	–	1	3.3%	–	–	–	–	1	0.2%
Boiled	–	–	–	–	1	2.3%	2	2.3%	–	–	1	0.3%	–	–	4	0.8%
Processing Type																
Chops	1	6.3%	–	–	–	–	3	3.4%	1	3.3%	9	3.1%	–	–	14	2.9%
Cut through	–	–	–	–	–	–	1	1.1%	–	–	4	1.4%	–	–	5	1.0%
Substantial cut	–	–	1	6.7%	–	–	1	1.1%	–	–	3	1.0%	–	–	5	1.0%
Impact	–	–	–	–	–	–	4	4.5%	3	10.0%	8	2.7%	–	–	15	3.1%
Spiral break	–	–	–	–	–	–	2	2.3%	–	–	1	0.3%	–	–	3	0.6%
Defleshing	–	–	–	–	4	9.3%	7	8.0%	–	–	4	1.4%	–	–	15	3.1%
Second Processing Type																
Substantial cut	–	–	–	–	–	–	2	2.3%	1	3.3%	1	0.3%	–	–	4	0.8%
Impact	–	–	–	–	–	–	–	–	–	–	2	0.7%	–	–	2	0.4%
Defleshing	–	–	1	6.7%	–	–	2	2.3%	–	–	5	1.7%	–	–	8	1.6%
Stratum total (row %)	16	3.3%	15	3.1%	43	8.8%	88	18.1%	30	6.2%	293	60.3%	1	0.2%	486	100.0%

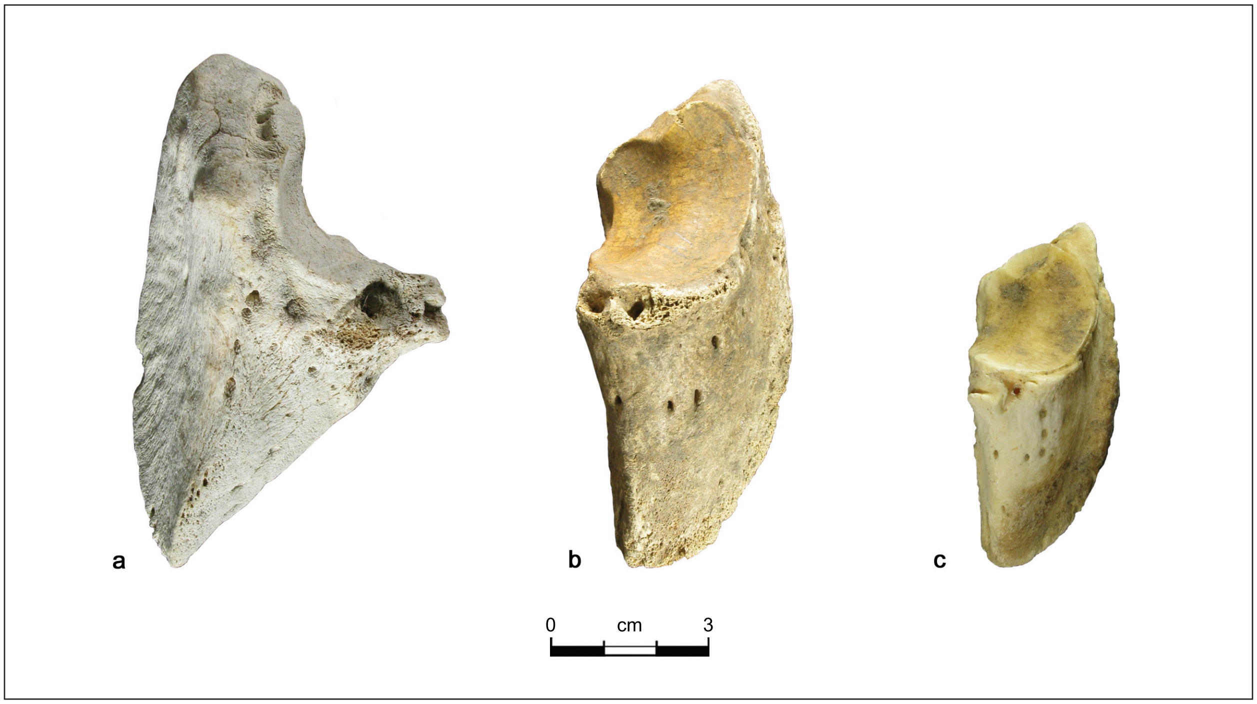


Figure 17. A morphological comparison of the bison specimen (b) to modern bison (a) and cattle (c) hooves.

The horse/mule specimens are from large animals and are fairly large portions of elements that have no obvious evidence of butchering. Yet their presence in deposits that contain food debris suggests that horses may have been eaten. Butchered horse bone was found in early and middle Spanish Colonial deposits at the Palace of the Governors (Akins in prep. a).

The single large dog or wolf bone is a baculum, an unusual find, especially considering that it is the only canid bone (Fig. 18). Both of the chicken bones (a complete humerus and partial femur) are from the upper stratum of a test pit dating to the late eighteenth and early nineteenth century. Chicken bones have been recovered from early and late Spanish Colonial deposits in Santa Fe (La Fonda, Palace of the Governors, Nusbaum House; Akins in prep. b) but generally in small numbers. Its absence in the early deposits is probably due to the relatively small sample size. More unusual are the three raven bones (a coracoid and fragments of a carpometacarpus and a radius, probably from the same individual). Native fauna is relatively rare in Spanish Colonial deposits; however, bison was found in early deposits at the Palace of the Governors (Akins in prep. a) and raven in deposits of similar age in previous OAS excavations at the plaza (Akins 2004:35). Historic records indicate that the more elite Spanish Colonial residents did some hunting, including organized communal bison hunts to the east by way of Pecos. In the late 1700s, hunters killed as many as 12,000 bison a year, providing many with meat. *Ricos* hunted in a luxurious fashion, and *peones* came behind to skin, butcher, and dry the meat (Fergusson 1967:85, 242–243).

Temporal Comparisons

Dividing the assemblage into three time periods (Table 15), the seventeenth-century deposits (Strata 3.5, 3.6, 4.4) account for 66.7 percent of the sample. Late eighteenth- and nineteenth-century deposits (Strata 2.3 and 3.4) account for less (27.0 percent), and the late nineteenth century (Strata 2.1 and 2.2) for very little (6.4 percent). In these divisions, the proportion of sheep or goat increases over time, with a slight decrease in cattle. This remains true when the large ungulate is added to the cattle and the small ungulate to the sheep or goat (Fig. 19). All of the pig, horse or mule, raven, and bison are from the earliest deposits, probably due in part to the larger sample size.

Figure 18. A morphological comparison of the baculum of a large dog (a) and the specimen (b).

Table 15. Taxa by time period, LA 80000

Time Period	Late 19th Century		Late 18th and Early 19th Century		17th Century		Total	
Taxon	Count	Column %	Count	Column %	Count	Column %	Count	Column %
Small mammal/bird	–	–	–	–	1	0.3%	1	0.2%
Medium-to-large mammal	–	–	–	–	1	0.3%	1	0.2%
Large dog or wolf	–	–	–	–	1	0.3%	1	0.2%
Small ungulate	6	19.4%	19	14.5%	33	10.2%	58	11.9%
Large ungulate	8	25.8%	25	19.1%	74	22.8%	107	22.0%
Medium-to-large ungulate	2	6.5%	28	21.4%	87	26.9%	117	24.1%
Cattle	3	9.7%	18	13.7%	50	15.4%	71	14.6%
cf Bison	–	–	–	–	1	0.3%	1	0.2%
Cattle or bison	–	–	–	–	1	0.3%	1	0.2%
Sheep or goat	12	38.7%	38	29.0%	62	19.1%	112	23.0%
Pig	–	–	–	–	4	1.2%	4	0.8%
Horse or mule	–	–	–	–	6	1.9%	6	1.2%
Medium-large bird	–	–	1	0.8%	–	–	1	0.2%
Common raven	–	–	–	–	3	0.9%	3	0.6%
Chicken	–	–	2	1.5%	–	–	2	0.4%
Total	31	100.0%	131	100.0%	324	100.0%	486	100.0%

The age distribution, body parts, and evidence of processing are consistent with family or low-level bartering as opposed to a market purchase tradition (e.g., D. Snow 1999:49), especially for sheep/goat. Bones from immature sheep/goat are found in all three time periods, and neonate in the seventeenth century deposits (Table 16). More specific aging methods (dental development and wear and epiphyseal union based on Reitz and Wing 1999) indicate that at least one sheep/goat over the age of two years is present in the middle-period deposits, and at least two ages (less than 6 to 16 months and greater than 6 to 16 months) plus the neonate in the seventeenth-century deposits. Ages indicated by other parts (e.g., 3–4 years) are subsumed by these two age ranges. The general age information (Table 16) suggests that young animals were preferred, but mature animals were also consumed. The body part distribution (Table 17) suggests that entire animals were butchered, since cranial and foot parts are well represented in all three time periods. Processing (Table 18) was mainly with axes, cleavers, or large knives used to render

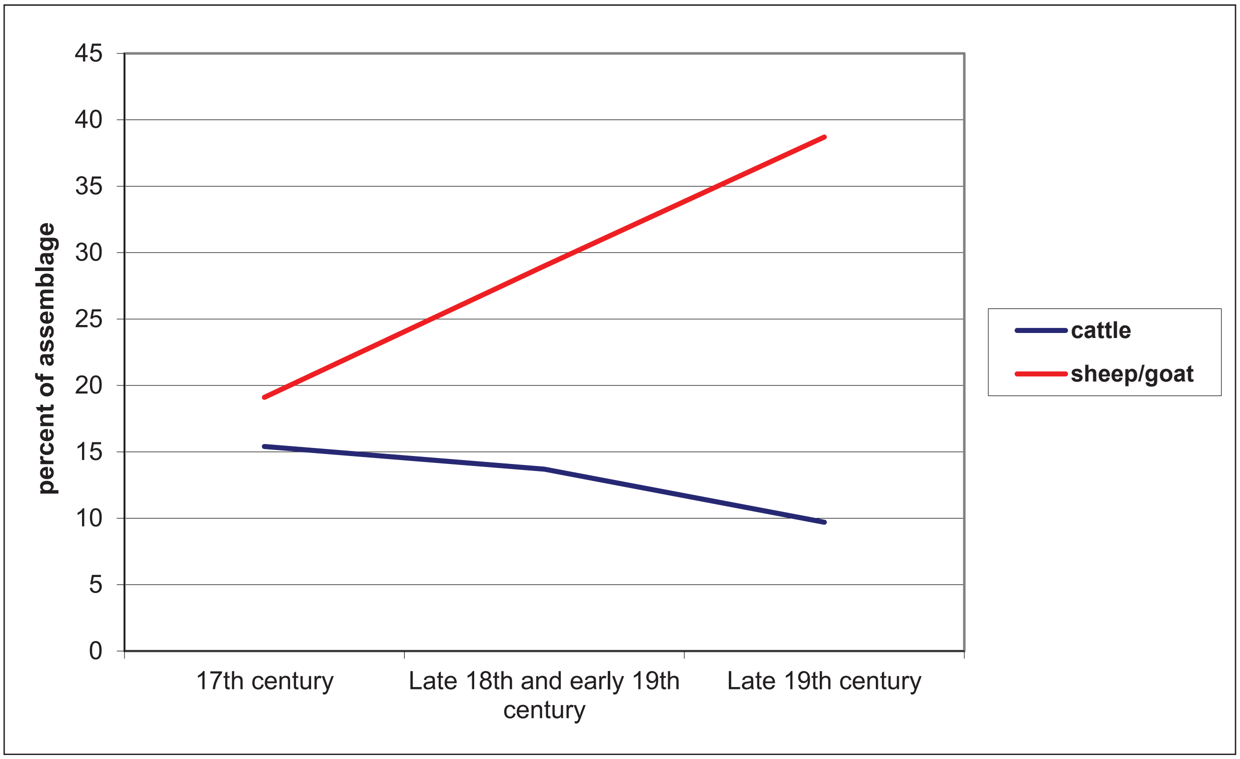


Figure 19. Relative frequency of cattle and sheep/goat bone in early Spanish Colonial, late Spanish Colonial/Mexican, and American Territorial faunal assemblages analyzed in the downtown Santa Fe area.

Table 16. Sheep/goat and cattle age by time period

	Fetal, Neonate		Immature		Juvenile		Mature		Total	
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
Late 19th Century										
Cattle	–	–	–	–	–	–	3	100.0%	3	100.0%
Sheep or goat	–	–	1	8.3%	8	66.7%	3	25.0%	12	100.0%
Late 18th and Early 19th Century										
Cattle	–	–	–	–	13	72.2%	5	27.8%	18	100.0%
Sheep or goat	–	–	1	2.6%	30	78.9%	7	18.4%	38	100.0%
17th Century										
Cattle	–	–	–	–	16	32.0%	34	68.0%	50	100.0%
Sheep or goat	1	1.6%	2	3.2%	44	71.0%	15	24.2%	62	100.0%

Table 17. Body part distribution for cattle and sheep/goat by time period

Body Part	Long Bone		Flat Bone		Cranial		Vertebral		Thorax		Pelvis		Front Limb		Rear Leg		Foot		Total	
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
Large Ungulate																				
Late 19th century	3	37.5%	5	62.5%	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8	100.0%
Late 18th and early 19th centu	15	60.0%	5	20.0%	–	–	1	4.0%	4	16.0%	–	–	–	–	–	–	–	–	25	100.0%
17th century	45	60.8%	20	27.0%	4	5.4%	1	1.4%	2	2.7%	–	–	1	1.4%	–	–	1	1.4%	74	100.0%
Cattle																				
Late 19th century	–	–	–	–	–	–	–	–	1	33.3%	–	–	1	33.3%	–	–	1	33.3%	3	100.0%
Late 18th and early 19th centu	–	–	–	–	3	16.7%	4	22.2%	7	38.9%	–	–	–	–	1	5.6%	3	16.7%	18	100.0%
17th century	–	–	–	–	14	28.0%	3	6.0%	15	30.0%	3	6.0%	2	4.0%	2	4.0%	11	22.0%	50	100.0%
Cattle and Large Ungulate																				
Late 19th century	3	27.3%	5	45.5%	–	–	–	–	1	9.1%	–	–	1	9.1%	–	–	1	9.1%	11	100.0%
Late 18th and early 19th centu	15	34.9%	5	11.6%	3	7.0%	5	11.6%	11	25.6%	–	–	–	–	1	2.3%	3	7.0%	43	100.0%
17th century	45	36.3%	20	16.1%	18	14.5%	4	3.2%	17	13.7%	3	2.4%	3	2.4%	2	1.6%	12	9.7%	124	100.0%
Small Ungulate																				
Late 19th century	6	100.0%	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6	100.0%
Late 18th and early 19th centu	19	100.0%	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	19	100.0%
17th century	26	78.8%	3	9.1%	–	–	1	3.0%	2	6.1%	–	–	1	3.0%	–	–	–	–	33	100.0%
Sheep or Goat																				
Late 19th century	–	–	–	–	2	16.7%	2	16.7%	2	16.7%	–	–	2	16.7%	2	16.7%	2	16.7%	12	100.0%
Late 18th and early 19th centu	–	–	–	–	6	15.8%	6	15.8%	8	21.1%	2	5.3%	9	23.7%	4	10.5%	3	7.9%	38	100.0%
17th century	–	–	–	–	8	12.9%	14	22.6%	21	33.9%	1	1.6%	6	9.7%	8	12.9%	4	6.5%	62	100.0%
Sheep or Goat and Small Ungulate																				
Late 19th century	6	33.3%	–	–	2	11.1%	2	11.1%	2	11.1%	–	–	2	11.1%	2	11.1%	2	11.1%	18	100.0%
Late 18th and early 19th centu	19	33.3%	–	–	6	10.5%	6	10.5%	8	14.0%	2	3.5%	9	15.8%	4	7.0%	3	5.3%	57	100.0%
17th century	26	27.4%	3	3.2%	8	8.4%	15	15.8%	23	24.2%	1	1.1%	7	7.4%	8	8.4%	4	4.2%	95	100.0%

Table 18. Primary (n = 58) and second butchering (n = 12) by taxon, element, and time period

Taxon	Element	Chop	Impact	Spiral Break	Cut Through	Substantial Cut	Defleshing	Total
				Late 19th Century				
Sheep or goat	humerus	1	–	–	–	2	–	3
				Late 18th and Early 19th Century				
Small ungulate	long bone	–	1	–	–	–	1	2
Large ungulate	long bone	–	–	–	–	–	1	1
	flat bone	1	–	–	–	–	–	1
	rib	–	1	–	–	–	–	1
Medium-to-large ungulate	long bone	–	2	–	–	–	–	2
Cattle	rib	–	–	–	–	1	2	3
Sheep or goat	thoracic vertebra	–	–	–	–	–	1	1
	rib	–	–	–	2	–	1	3
	scapula	2	–	–	–	–	–	2
	innominate	1	–	–	–	–	–	1
	humerus	–	–	2	–	–	2	4
	radius	–	1	–	–	–	1	2
	femur	–	–	1	–	–	2	3
				17th Century				
Small ungulate	long bone	–	3	2	–	–	–	5
Medium-to-large ungulate	rib	–	–	–	–	1	–	1
Large ungulate	long bone	–	1	–	–	–	1	2
	flat bone	1	–	–	–	–	–	1
Cattle	mandible	1	–	–	–	–	1	2
	lumbar vertebra	1	–	–	–	–	–	1
	rib	2	–	–	–	–	–	2
	scapula	1	–	–	–	–	–	1
	innominate	2	–	–	–	–	–	2
	metacarpal	1	1	–	–	–	–	2
	tibia	–	2	–	–	–	–	2
	metatarsal	–	2	–	–	–	–	2
Sheep or goat	cranium	–	–	–	–	1	–	1
	thoracic vertebra	2	–	–	–	–	–	2
	lumbar vertebra	–	–	–	1	–	–	1
	rib	–	–	–	3	1	1	5
	humerus	–	1	–	–	–	–	1
	radius	–	2	–	–	–	–	2
	femur	1	2	–	–	1	–	4
	tibia	–	1	–	–	–	1	2
Total		17	20	5	6	7	15	70

animals into smaller packets, and sharp knives used for defleshing. This relatively small sample has little evidence for a standardized method of processing animals. All of this information is consistent with households' raising and/or acquiring large parts of or entire animals and predominantly with home processing.

Cattle are large enough that households were more likely to have shared or traded for beef. All of the cattle specimens are from full or nearly full-sized animals (Table 16), a possible indication that few households in downtown Santa Fe raised cattle. Specific ages noted include one less than 42 months of age from the middle deposits, and at least one less than 18 to 24 months and one older than 24 months from the seventeenth-century deposits. All body parts are represented (Table 17), suggesting that households shared animals or that local butchers deposited their waste along with that of nearby residents. Processing (Table 18) was mainly with chopping implements (axes, cleavers, large knives) with little defleshing. No saw cuts were found, and none of the cuts resemble modern steak, chop, or roast cuts, again suggesting that the cattle parts deposited in the plaza were more likely to have been obtained by low-level barter than from commercial markets.

The few pig bones suggest that pork was not a common menu item. The parts (partial humerus, patella, partial fibula, phalanx epiphysis) suggest that most of at least one animal is represented. None have evidence of butchering.

Several elements from a horse or mule (portions of two cervical vertebrae, a segment of a sacrum, a metatarsal, a vestigial metapodial, and a hoof fragment) also have no evidence of butchering. The pieces are large, and half are foot parts. These could be food-processing remains, but they could also be general debris.

Chicken is confined to the middle time period. Its absence in the larger early Spanish Colonial sample may suggest that households depositing trash in the plaza had less access to chickens than those from other parts of the city, such as the Palace of the Governors, where features with samples sizes similar to or larger than those from the plaza generally have some chicken (Akins in prep. a). Alternatively, the sample size may be too small for this species to appear.

Santa Fe Cuisine

The three plaza samples are fairly consistent with a selection of assemblages from Santa Fe that have sufficient sample size, have specimen counts reported, and are reasonably well dated (Table 19). For the early Spanish Colonial period, these include the 2004 plaza excavations (Akins 2004), the OAS Palace of the Governors excavations (Akins in prep. a), and excavations at La Fonda and the Nusbaum House (Bowen 1995). Middle to late Spanish Colonial assemblages are less common and include those from the Palace of the Governors (Akins in prep. a) and Baca Garvisu House (LA 1051 [Akins 2010]). Territorial-period assemblages are again from the Palace of the Governors (Akins in prep. a), East San Francisco Street (Feature 8 [Cordero and Deyloff 2002]), and Fort Marcy (LA 1051 [Akins 2010]). All have considerably larger samples of fauna, so any comparisons are at a fairly general level.

We cannot know exactly who the economic units or individuals were that generated the assemblages in the most of the samples. However, we can examine aspects of the samples both within and between the general time periods represented and contrast these with those from more rural settings.

The early Spanish Colonial assemblages all have relatively low ratios of caprines to cattle. In two, the ratio is less than one, indicating there are more cattle than caprine specimens in these assemblages. All have small numbers of pig specimens, indicating a consistent presence regardless of sample size. Chicken is relatively rare; only the OAS Palace of the Governors assemblage had more chicken than pig. It is absent in the two plaza assemblages. Horse is found in only three of the samples. Only six horse specimens comprise the sample from the plaza—on the same order as that from the Nusbaum House. Only the plaza samples (2004 and 2011) lack fish, and native fauna is found in half of the

Table 19. Domestic animal and fish counts by time period for Santa Fe assemblages

Assemblage	Sample Size	Sheep/ Goat	Cattle	Ratio	Pig	Chicken	Horse/ Mule/Burro	Fish	Native Fauna*
Early Spanish Colonial									
Plaza 2011	324	62	50	1.24	4	0	6	0	0
Plaza 2004	4020	203	208	0.98	1	0	0	0	0
Palace of the Governors (1995)	1010	28	56	0.50	2	1	0	6	19
Palace of the Governors (OAS)	8568	1621	924	1.75	25	72	24	28	878
La Fonda	2397	160	119	1.34	14	11	0	4	0
Nusbaum House	1493	180	130	1.38	7	1	26	10	11
Middle to Late Spanish Colonial									
Plaza 2011	131	38	18	2.11	0	2	0	0	0
Palace of the Governors	5596	1583	305	5.19	34	117	4	39	138
Baca-Garvisu House (LA 1051)	5066	1898	632	3.00	48	90	0	0	56
Territorial									
Plaza 2011	31	12	3	4.00	0	0	0	0	0
Palace of the Governors	2047	511	169	3.02	8	20	0	0	17
East San Francisco Street (Featur	556	153	49	3.12	6	1	0	0	0
Fort Marcy	5070	738	1740	0.42	174	447	3	185	35

* rabbit, deer, pronghorn, bison, turkey
Sources: Bowden (1995) (Palace 1995, La Fonda, Nusbaum); Akins data files (Plaza 2004, OAS Palace of the Baca-Garvisu [LA 1051]); Cordero and Deyloff (2002) (East San Francisco).

samples.

Samples dating from the middle to late Spanish Colonial periods have a higher ratio of caprines to cattle than the early Spanish Colonial–period assemblages, and like the early-period assemblages, generally have small amounts of pig and chicken. Horse and fish occur only in the Palace of the Governors sample. Native fauna occurs in the two larger samples, but considerably more occurs at the Palace of the Governors.

With the exception of the Fort Marcy sample, the Territorial assemblages continue to have more caprines than cattle specimens. They have small amounts of pig and chicken, horse and fish are absent, and native fauna are found only in the two largest samples. The Fort Marcy sample is a different kind of sample, and this is well illustrated by this comparison. It is the refuse from a military establishment, where feeding soldiers required a different "cuisine" than found at the household level.

Even though sheep/goat specimens usually outnumber those from cattle, the ratios suggest that the primary animal food in early Santa Fe was beef. Few of the caprine to cattle ratios in Table 19 are large enough to suggest that mutton provided more of the meat, given the relative size of the two animals (about 150 kg for early steers (Snow and Bowen 1995:23) and 36 kg for churro sheep (Wentworth 1948:123). Only the middle to late Spanish Colonial Palace of the Governors and the small plaza 2011 samples have ratios of 4.0:1 or above, and some of the features at the Palace of the Governors (Akins in prep. a, in prep. b) have larger ratios.

Assemblages from some more rural areas indicate a substantially greater reliance on caprines. For example, two late Spanish Colonial sites in the Cochiti area (LA 12161 and LA 10114) have very large ratios (90.5:1 and 41:0); while LA 67321, near Valencia, has a fairly high ratio (8.9:1). Ratios for the Territorial-period sites of Old Alameda (41:1) and the Mexican Territorial (25.6:1) and American Territorial (21.2:1) assemblages at La Puente (LA 54313), near Abiquiu, are also high. This could suggest that caprines were more available and favored in some rural locales. While the age structure for the domestic animals in some Santa Fe assemblages suggests that sheep were raised in Santa Fe and their contribution cannot be denied, these ratios suggest that beef that was more readily available or favored.

It is difficult to interpret the effects of sample size; however, assemblages from the Palace of the Governors have the greatest variability in domestic animals and native fish and fauna, perhaps reflecting the higher status or wealth of its residents. The Nusbaum House has a similar variety, especially fish and native fauna. The Baca-Garvisu House has an unusually large proportion of pig, and an immature pig skeleton was found, indicating that this particular household raised pigs. Thus, while we can suggest that more beef was consumed in early Santa Fe, these assemblages also reflect some degree of differential preference or access to a variety of other animal resources within Santa Fe. The plaza assemblages are consistent with other findings, but the samples are too small to tell us more about those who left the deposits.

Flaked Stone Analysis

James L. Moore

Forty-four flaked stone artifacts were recovered during excavations conducted prior to the installation of light posts on the north edge of the Santa Fe Plaza at LA 80000. Though this assemblage is small, these materials represent use of the Santa Fe Plaza over nearly 300 years, encompassing the seventeenth century and extending well into the nineteenth century.

Analytic Techniques

Flaked stone artifacts were analyzed using a standardized format developed by the Office of Archaeological Studies (OAS 1994a) that includes both typological and attribute-based approaches. In typological approaches, individual artifacts are classified into types that have some kind of technological or functional meaning (Andrefsky 2001:6). A benefit of this type of analysis is that behavior can be immediately inferred from the identification of a single artifact (Andrefsky 2001:6). For instance, the presence of a single notching flake indicates that a notched tool was made at a site, even if no notched tools were found. However, this method can be criticized because there is often a lack of verification between artifact type and functional or technological interpretation (Andrefsky 2001:7). Attribute analysis examines the distribution of characteristics through an entire population, usually of debitage (Andrefsky 2001:7). Among other things, various attributes can be used to assess the prevalence of specific reduction methods in a debitage population. However, problems can also crop up when using this analytic strategy for a variety of reasons related to the small size of attributes and the number of observations (Andrefsky 2001:12). Typological and attribute analyses vary in scale; typological analysis is applied to individual artifacts, while attribute analysis is applied to entire assemblages (Andrefsky 2001:12). There is no one right approach to debitage analysis, and the approach used can vary according to the types of information desired (Andrefsky 2001).

The analysis methods employed by the OAS assign typological interpretations to individual artifacts, while at the same time gathering attribute data that can be used to test and augment the typological data. For instance, a rigorous set of characteristics is used to define flakes struck from bifaces versus those struck from cores. Flakes that do not fulfill the set of characteristics used to define biface flakes are, by default, classified as core flakes. However, the definition used to assign debitage to the biface flake category models ideal examples, and all flakes struck from bifaces (especially during the early stages of manufacture) do not always fit that ideal. By combining attribute analysis with a typological approach we are able to determine which flakes were definitely struck from bifaces (typological approach), as well as those that were probably struck from bifaces but do not exactly fit the model (attribute analysis). In essence, the two approaches can complement one another and help provide a deeper understanding of reduction technology and tool use.

Since these methods are routinely applied to flaked stone artifacts studied by the OAS, their use provides comparability for assemblages from sites of varying date and cultural affiliation excavated across New Mexico. Indeed, a composite data base has been developed and is used for comparative purposes in this discussion. A series of mandatory attributes is included in all analyses. The mandatory attributes describe materials, artifact type and condition, cortex, striking platforms on flakes, and dimensions. Optional attributes are useful for examining specific questions, and several were used in this analysis in addition to the mandated attributes.

The main questions the OAS analytic scheme was designed to explore include what types of materials were selected for reduction, where those materials were obtained, what techniques were used for reduction, and what types of flaked stone tools occur in an assemblage. These topics can provide information about ties to other regions, mobility patterns, and site function. Material selection studies will not always reveal *how* materials were obtained, but they can usually provide information on *where* materials came from. For instance, the type of cortex on artifacts can be used to determine whether materials were obtained at outcrops or from secondary gravel deposits. Studies of reduction technologies can show how different peoples solved the problem of producing the types of tools they needed from resources at hand. Examination of the array of flaked stone tools recovered from a site can help define the range of activities that occurred there, and in many cases this will also aid in defining site function. Flaked stone tools can sometimes be used to provide temporal data but are less time sensitive than many other artifact classes. For this reason, the flaked stone assemblage from this site is only used to provide relative temporal data.

Each flaked stone artifact was examined using a binocular microscope to define morphology and material type, examine flake platforms, and determine whether they were used as tools. The level of magnification varied between 10x and 80x, with higher magnification used to identify wear patterns and platform modifications. Utilized and modified edge angles were measured with a goniometer; other dimensions were measured with a sliding caliper, and artifacts were weighed on a digital scale.

Four general classes of flaked stone artifacts were recognized: flakes, angular debris, cores, and tools. Flakes are debitage that exhibit definable dorsal and ventral surfaces, bulbs of percussion, and/or striking platforms. Angular debris are debitage that lack these characteristics. Cores are nodules from which debitage were struck and on which negative flake scars originating from one or more platforms are visible. Tools are debitage or cores whose edges were damaged during use or that were modified to create specific shapes or edge angles for use in certain tasks.

Analytic Attributes

Attributes recorded for all artifacts included material type and quality, artifact morphology and function, amount of surface covered by cortex, portion, evidence of thermal alteration, edge damage, and dimensions; platform, shape, and dorsal surface information was recorded for flakes only, as was termination type. Two attributes were used to record information on materials used in flaked stone reduction. *Material type* was coded by gross category unless specific sources or distinct varieties were recognized. Codes were arranged so that major material groups fell into sequences of numbers, progressing from general groups to specific varieties. *Material texture and quality* provided information on the basic flaking characteristics of materials. Texture subjectively measured grain size *within* rather than *across* material types and was scaled from glassy to coarse, with glassy textures exhibiting the smallest grains and coarse the largest. *Quality* recorded the presence of flaws that could affect flaking, including crystalline inclusions, fossils, visible cracks, and voids. Inclusions that did not affect flaking, such as specks of different-colored material or dendrites, were not considered flaws. Material texture and quality were recorded together in a single code.

Two attributes were used to provide information about artifact form and use. The first was *artifact morphology*, which classified artifacts by general form as well as more specific attributes, placing them in categories like flake or early-stage biface. The second was *artifact function*, which placed artifacts into typological categories by inferred use, such as utilized debitage or scraper. These attributes were coded separately.

Cortex is the chemically or mechanically weathered outer rind on nodules. The amount of cortical coverage was estimated and recorded in 10 percent increments for each artifact. The percentage of dorsal surface covered by cortex was estimated on flakes, while for all other artifact classes the percentage of the total surface area covered by cortex was estimated, since artifacts other than flakes lack definable dorsal and ventral surfaces. *Cortex type* can be a clue to the origin of an artifact. Waterworn cortex indicates that a nodule was mechanically transported by water and that its source was a gravel bed. Nonwaterworn cortex suggests that a material was obtained where it outcrops naturally. Cortex type was identified for artifacts on which it occurred; when identification was not possible, it was coded as indeterminate. Dorsal cortex coverage and cortex type were recorded separately.

All artifacts were coded as whole or fragmentary; when broken, the *portion* was recorded if it could be identified. Artifact portions can provide important functional information for sites. For example, the occurrence of mostly whole formal tools has a completely different meaning than if the tools were predominantly broken and worn out. Proportions of flake sections can also provide data on postreduction impacts to an assemblage. If most flakes are broken, the assemblage may have been exposed on the surface for a long period of time and damaged by traffic across the site. In this case, any wear patterns observed on edges could have been caused by noncultural impacts rather than cultural use. Thus, an examination of the condition and distribution of artifact portions can provide critical interpretive information.

Three attributes were examined for flake platforms, when present. *Platform type* recorded the shape of and any modifications to the striking platform on whole flakes and proximal fragments. *Platform lipping* recorded the presence or absence of a lip at the ventral edge of a platform. This attribute provides information on reduction technology and can be used to help determine whether a flake was removed from a biface or core. Platform lipping was coded as present or absent. *Platform angle* provided an estimate of the angle formed by the dorsal surface of a flake and its striking platform; it was recorded as greater or less than 45 degrees. Platform angles of less than 45 degrees can be an indication of removal from a tool edge during manufacture or resharpening.

Thermal alteration was recorded for all artifacts on which it occurred. Cherts in particular can be modified by heating at high temperatures to improve their flaking characteristics. However, evidence of thermal alteration can be hard to detect unless mistakes were made during processing or there is an obvious, visible difference between untreated and treated specimens from the same source. When present, the type and location of thermal alteration were recorded to determine whether an artifact was purposely or incidentally altered.

Three characteristics related to shape were recorded for flakes only. These characteristics were also among those used to typologically distinguish between core and biface flakes. During initial analysis, these attributes were part of a set used to differentiate between these types of flakes, a process that is discussed in more detail later. Recording these attributes separately provided a way in which to define potential biface flakes that were not identified during the initial typological assignment because of the limitations of the attribute set used for that purpose. *Bulb* recorded the presence of diffuse or pronounced bulbs of percussion and can provide information on reduction technique. Flakes removed from the surface of a bifacial tool are often distinctly curved, and the presence or absence of this attribute was recorded as *flake curvature*. Flake removal using soft indenters (soft hammer or pressure flaker) can also result in the formation of a waist between the platform and main body of a flake and is often present on biface flakes. The presence of this characteristic was recorded as *waisted*.

Use of debitage or cores as informal tools can cause damage, producing patterns of scars that may be indicative of the use to which they were put. Two attributes were used to record edge damage caused by cultural use. The first described the type of *wear pattern* observed. Different series of codes were used for informally used debitage or cores and formal tools. The utilized *edge angles* of all formal and informal tools were measured and recorded separately; edges lacking cultural damage were not measured.

Maximum length, *width*, and *thickness* were measured in millimeters for all specimens. On angular debris and cores, length was the largest dimension, width was the longest dimension perpendicular to the length, and thickness was perpendicular to the width and was the smallest measurement. On flakes and formal tools, length was the distance between proximal and distal ends, width was the distance between edges paralleling the length, and thickness was the distance between dorsal and ventral surfaces. *Weight* was measured in grams.

Flake Categories

Several types of flakes can occur in an assemblage, and one analytic goal was to distinguish between flakes removed from cores and bifaces. Flakes were initially divided into these categories using a polythetic set of variables (Fig. 20). The polythetic set contains an array of conditions that model an ideal biface flake; it includes data on platform morphology, flake shape, and earlier removals from the parent artifact. In order to be considered a biface flake, an artifact needed to fulfill at least 70 percent of these conditions

Whole Flakes

1. Platform:
   a. has more than one facet.
   b. is modified (retouched and/or abraded.
2. Platform is lipped.
3. Platform angle is less than 45degrees.
4. Dorsal scar orientation is:
   a. parallel
   b. multidirectional
   c. opposing
5. Dorsal topography is regular.
6. Edge outline is even.
7. Flake is less than 5 mm thick.
8. Flake has a relatively even thickness from proximal to distal end.
9. Bulb of percussion is diffuse.
10. There is a pronounced ventral curvature.

Broken flakes or flakes with collapsed platforms

1. Dorsal scars orientation is:
   a. parallel
   b. multidirectional
   c. opposing
2. Dorsal topography is regular.
3. Edge outline is even.
4. Flake is less than 5 mm thick.
5. Flake has a relatively even thickness from proximal to distal end.
6. Bulb of percussion is diffuse.
7. There is a pronounced ventral curvature.

Figure 20. Polythetic set for defining biface flakes.

in any combination. Those that did not match this percentage were classified as core flakes by default. This percentage was considered high enough to isolate flakes produced during the later stages of biface production from those removed from cores, while at the same time it was low enough to permit flakes that did not fulfill the entire set of conditions to be properly classified. While not all flakes removed from bifaces can be identified in this way, those that were can be considered definite evidence of biface reduction.

Core and Tool Categories

Cores are nodules of raw material that were modified by having debitage removed from them. Some cores were efficiently reduced in a standardized fashion, while flakes were removed from others in a more haphazard manner. Cores were classified by the direction of removals.

Tools were separated into formal and informal categories. Formal tools are debitage or cores that were intentionally altered to produce specific shapes or edge angles. Alterations take the form of unifacial or bifacial retouch, and artifacts were considered intentionally shaped when retouch scars obscured their original shape or significantly altered the angle of at least one edge. Informal tools are debitage that were used without being purposely altered to produce specific shapes or edge angles. This class of tool was defined by the presence of edge scarring caused by use. While informal tools can also provide direct evidence of the reduction process, formal tools tend to provide indirect evidence unless they were discarded before being finished.

Formal tools were divided into cobble tools, unifaces, and bifaces. Cobble tools are usually massive and were shaped by unifacial or bifacial flaking along one or more edges while retaining enough unflaked surface that their original form was recognizable. Unifaces are pieces of debitage that were intentionally modified by flaking across a single surface. Bifaces are pieces of debitage that were intentionally flaked across two opposing surfaces.

Reduction Strategies

An assessment of strategies used to reduce lithic materials at a site often provides evidence of residential mobility or stability. Two basic reduction strategies have been identified for the Southwest. Efficient, or curated, strategies entail the manufacture of bifaces that served as both unspecialized tools and cores, while expedient strategies were based on the removal of flakes from cores for use as informal tools (Kelly 1985, 1988). Technology was usually related to lifestyle. Efficient strategies were associated with a high degree of residential mobility, while expedient strategies were typically related to sedentism. The reason for this type of variation is fairly simple. Groups on the move needed to reduce the risk of being caught unprepared for a task by carrying tools with them. Such tools needed to be transportable, multifunctional, and easily modified. Sedentary groups did not necessarily need to consolidate tools into similar multifunctional, lightweight configurations (Andrefsky 1998:38). The analytic scheme used in this study was designed to determine what type of reduction strategy was used, allowing us to compare degrees of efficiency or expediency in reduction technology through time. These data can provide a context in which to examine the nature of mobility in different areas and time periods, allowing us to potentially examine temporal changes in land-use patterns.

Analysis of the Plaza Assemblage

Flaked stone artifacts were recovered from five temporal contexts: a possible seventeenth-century pit feature (n = 21), a surface provisionally dated to the 1680 Pueblo Revolt (n = 5), a surface dated to the 1870s (n = 5), late eighteenth- to early nineteenth-century deposits (n = 6), and late nineteenth-century deposits (n = 7). None of these samples are large enough to provide a detailed view of flaked stone technology and use in those temporal periods, but they can provide relevant information on some aspects of that technology. In particular, limited information on material selection, reduction technology, reduction strategy, and tool use may be available from this small sample.

Material Selection

Table 20 shows the array of material types identified in this assemblage by the presumed date of the deposits from which they were recovered. Cherts dominate in most temporal components, comprising nearly 80 percent of the overall assemblage and 85.71 percent of the seventeenth-century pit feature artifacts, all artifacts from the 1680 surface and late eighteenth- to early nineteenth-century deposits, 60 percent of those from the 1870s surface, and 42.86 percent of artifacts from the late nineteenth-century deposits. This is the expected pattern, since cherts tend to dominate historic Spanish flaked stone assemblages (Moore 1992, 2001a, 2001b, 2003a, 2003b, in prep.). This dominance is due to physical qualities of cherts, including their hardness, strength, and tendency to yield very sharp edges when flaked. These qualities allow cherts to be used along with steel tools in fire-making kits to produce sparks for the ignition of tinder or gunpowder. While fire-making was not the only task in which flaked stone tools were used during the historic period, this was the primary task for which they were consistently used. This suitability comes from a level of hardness that allows chert tools to withstand impacts with metal without completely shattering and enables them to shave minute slivers off of the steel tools they were used against. The force of the blow that removes those minute slivers also ignites them, providing the necessary sparks for fire ignition.

Table 20. Material type by date

Date Material Type		17th Century, Possible Pit Feature	1680 Surface	Late 18th–Early 19th Century	1870s Surface	Late 19th Century	Total
Chert	Count	5	1	2	1	–	9
	Column %	23.8%	20.0%	33.3%	20.0%	–	20.5%
Pedernal chert	Count	3	3	2	2	–	10
	Column %	14.3%	60.0%	33.3%	40.0%	–	22.7%
Madera chert	Count	10	1	2	–	3	16
	Column %	47.6%	20.0%	33.3%	–	42.9%	36.4%
Metaquartzite	Count	1	–	–	–	4	5
	Column %	4.8%	–	–	–	57.1%	0.8%
Quartz	Count	2	–	–	2	–	4
	Column %	9.5%	–	–	40.0%	–	9.1%
Total	Count	21	5	6	5	7	44
	Row %	47.7%	11.4%	13.6%	11.4%	15.9%	100.0%

Though the assemblage of flaked stone artifacts recovered during this study is small, it includes at least three varieties of chert obtained from a variety of sources. The cherts identified in this study are mostly of sedimentary origin, precipitating out of seawater and forming as nodules or bubbles within other types of sedimentary rocks, especially limestones (Andrefsky 1998:52). This process can be extremely complex, and requires multiple steps that pass through a variety of siliceous minerals (Luedtke 1992). Nine artifacts are categorized as generic chert, meaning that no definite source can be assigned to them. The largest number of specimens (n = 16) are Madera chert, which outcrops in the Madera limestone formation of the Magdalena group in the Sangre de Cristo Mountains (Banks 1990; Lang 1995). Madera chert is locally available at quarries in the adjacent mountains as well as in gravel deposits along the streams that drain the Sangre de Cristos. Pedernal chert, another sourced variety, outcrops in limestone in various locations in the Chama Valley and on San Pedro Mountain (Banks 1990; Warren 1974). Pedernal chert also commonly occurs as float in gravel beds along the Rio Chama as well as along the Rio Grande below its confluence with the Rio Chama.

Only two other material categories were recorded, and both lack specimens with identified sources. Metaquartzites were transformed from sandstone through metamorphic processes and tend to be quartz rich, with traces of other minerals imparting various colors to materials from different sources. The quartz crystals in metaquartzites were fused together; thus, they break conchoidally, with fractures traveling through quartz grains rather than around them, as is the case with unmetamorphosed sandstone (Andrefsky 1998:55). Metaquartzite cobbles and boulders are common in the Tesuque and Ancha Formations, which are parts of the Santa Fe Group in the study area (Miller 1963:50–51). Metaquartzites also form much of the Precambrian basement rock in the northern Sangre de Cristos (Montgomery 1963:7–8).

Quartz is a macrocrystalline material that formed in plutonic deposits. The type of quartz that was identified in this study consists of clusters of small fused crystals rather than large individual crystals. This material does not break conchoidally and is unsuitable for many of the tasks in which flaked stone was used. However, quartz is very durable and is often found in small percentages in many prehistoric as well as historic assemblages. The durability of quartz made it suitable for many of the same tasks in which metaquartzites were used.

Examination of the type of cortex that remains on some flaked stone artifacts often makes it possible to determine the types of sources that were exploited to obtain suitable materials for reduction. Thirteen specimens, or 29.54 percent of the assemblage, exhibit cortex, which in all cases is waterworn. Specimens exhibiting waterworn cortex occur in all five of the major material categories, comprising 55.56 percent of the generic cherts (n = 5), 10.00 percent of the Pedernal chert (n = 1), 12.50 percent of the Madera chert (n = 2), 60.00 percent of the metaquartzite (n = 3), and 50.00 percent of the quartz (n = 2). This distribution suggests that all materials in this assemblage were obtained from gravel deposits rather than at outcrops. However, two distinct types of gravel sources are also indicated by this distribution. Pedernal chert is not available in local gravels and in this area can only be obtained from gravel beds along the Rio Grande. Madera chert, on the other hand, is locally available and was undoubtedly obtained from nearby gravel beds along streams that drain the Sangre de Cristos.

Metaquartzite and quartz were probably obtained from the same gravel deposits that were used for procuring Madera chert, though they could also have been collected from Rio Grande gravels like the Pedernal chert. Another potential source for some, or all, of these materials are nearby prehistoric sites, which are common in the downtown Santa Fe area, especially with a Coalition- and Classic-period village (LA 1051) underlying the modern convention center and City Hall, just a few blocks north of the plaza. While there is no direct evidence for the salvaging of materials from earlier sites, this possibility cannot be ruled out.

Table 21 shows the distribution of material types by material quality, which recorded texture and the presence of flaws that could potentially hinder flaking. Material texture, a subjective measure of grain size within material types, is difficult to compare across materials. For example, cherts lack a visible crystalline structure at low magnification, with surfaces that often have a smooth appearance, unbroken except by occasional flaws even when classified as coarse-grained. The difference in chert textures is based on appearance: smooth, glossy cherts were fine-grained, while cherts with a dull, sugary luster were medium- or coarse-grained. In contrast, even when fine-grained, materials like quartzite and quartz have crystalline structures that are visible to the naked eye. Thus, while fine-grained materials tend to be more easily flaked within their particular material categories, all fine-grained materials do not flake with the same ease. Overall, a tendency toward the selection of fine-grained materials is exhibited by this assemblage. Nearly 80 percent were classified as being fine-grained, 16 percent medium-grained, and less than 5 percent coarse-grained. This distribution suggests a need for materials that were easily and accurately flaked to produce sharp edges.

Artifacts were also examined for the presence of obvious flaws that could affect flaking qualities. Flaws were visible in 27.27 percent of the assemblage, and all flawed specimens are cherts. Since the presence of flaws is fairly common, they do not seem to have been considered an important impediment to material selection or reduction. Indeed, since there is no evidence for formal tool manufacture in this assemblage, the presence of small flaws may not have been a consideration at all.

The results of this analysis can be compared to a composite data base on file at the OAS that includes information from 15 historic Spanish sites in northern New Mexico dating from the early Spanish Colonial period into the Railroad period and contains 5,097 artifacts. The only early Spanish Colonial–period site in this assemblage is LA 54000, the La Fonda Parking Lot Site, southeast of the Santa Fe Plaza. This assemblage contains 133 flaked stone artifacts. Like the results from LA 80000, cherts dominate the comparative Spanish data base, comprising over 89 percent of the total, and 82.71 percent of the LA 54000 assemblage. When two assemblages in the comparative data base that contain less than 50 artifacts and a

Table 21. Material type by material quality

Material Quality Material Type		Fine-grained	Fine-grained and Flawed	Medium-grained	Medium-grained and Flawed	Coarse-grained	Coarse-grained and Flawed	Total	Column %
Chert	Count	4	3	1	–	–	1	9	20.5%
	Row %	44.4%	33.3%	11.1%	–	–	11.1%	100.0%	2.3%
Pedernal chert	Count	6	3	–	–	1	–	10	22.7%
	Row %	60.0%	30.0%	–	–	10.0%	–	100.0%	2.3%
Madera chert	Count	9	4	2	1	–	–	16	36.4%
	Row %	56.3%	25.0%	12.5%	6.3%	–	–	100.0%	2.3%
Metaquartzite	Count	3	–	2	–	–	–	5	11.4%
	Row %	60.0%	–	40.0%	–	–	–	100.0%	2.3%
Quartz	Count	3	–	1	–	–	–	4	9.1%
	Row %	75.0%	–	25.0%	–	–	–	100.0%	2.3%
Total	Count	25	10	6	1	1	1	44	100.0%
	Row %	56.8%	22.7%	13.6%	2.3%	2.3%	2.3%	100.0%	

third assemblage that represents only tools are eliminated from consideration, chert percentages range from 72.93 to 95.28 percent. Fine-grained materials make up over 85 percent of this part of the composite data base, and with the same three sites eliminated from consideration, percentages of fine-grained materials range from 67.72 to 93.65. Medium-grained materials comprise over 9 percent of the composite date base, ranging from 7.67 to 19.48 percent. Coarse-grained materials comprise just over 1 percent of the composite data base, ranging from 0.00 to 5.26 percent. The distribution for LA 80000 fits well into these ranges, though there may be some skewing attributable to small sample size.

In terms of material selection parameters, LA 80000 fits fairly well with other Spanish sites in northern New Mexico. The Spanish appear to have relied heavily on locally available raw materials. Chert is well suited for gunflints and strike-a-lights and was the primary material selected for reduction and use, although an array of other materials were also selected and probably reflect needs for tasks other than fire-making.

Reduction Strategy

Table 22 shows the distribution of artifact morphologies for each temporal component. Artifacts with indeterminate morphologies are debitage that were heavily enough used as strike-a-light flints that their original forms were obscured and can no longer be identified. The only biface (Fig. 21) is a medial section that exhibits nondiagnostic snap fractures at both ends, and could have been broken at any time between initial manufacture to archaeological recovery. No debris that can be specifically linked to tool manufacture was found. Using the polythetic set to discriminate between core and biface flakes resulted in only core flakes being identified. However, since the polythetic set tends to mainly identify ideal examples of biface flakes, specimens removed from bifaces that fit fewer than 70 percent of the conditions necessary for assignment as a biface flake were classified by default as core flakes. The possibility exists that less than ideal specimens of biface flakes might still be present, a possibility that is explored in this section. If the lack of evidence for biface manufacture is correct, then the distribution of artifact morphologies suggests the dominance of an expedient core-flake reduction trajectory.

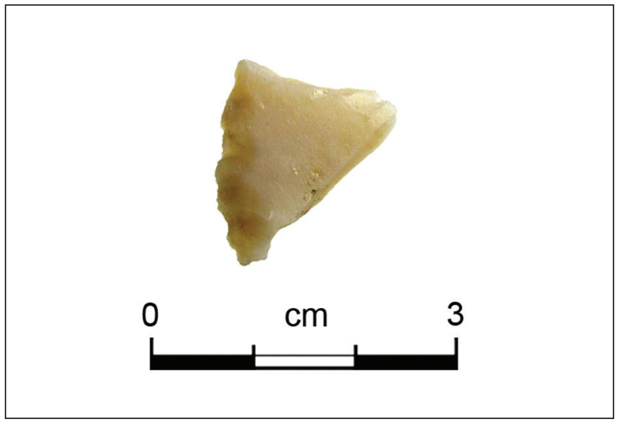


Figure 21. A medial fragment of an early-stage biface.

This conclusion can be examined using other attribute data that allow us to assess the accuracy of morphological assignment for the core flakes. Striking platforms are often modified by abrasion during tool manufacture to facilitate the removal of long, thin, consistently shaped flakes. Evidence of this process usually occurs at the juncture of

Table 22. Artifact morphology by temporal component

Temporal Component		Indeterminate	Angular Debris	Core Flake	Early-Stage Biface	Total	Column %
17th century, possible pit feature	Count	–	8	12	1	21	47.7%
	Row %	–	38.1%	57.1%	4.8%	100.0%	2.3%
1680 surface	Count	1	3	1	–	5	11.4%
	Row %	20.0%	60.0%	20.0%	–	100.0%	2.3%
Late 18th–early 19th century	Count	1	–	5	–	6	13.6%
	Row %	16.7%	–	83.3%	–	100.0%	2.3%
1870s surface	Count	1	1	3	–	5	11.4%
	Row %	20.0%	20.0%	60.0%	–	100.0%	2.3%
Late 19th century	Count	1	1	5	–	7	15.9%
	Row %	14.3%	14.3%	71.4%	–	100.0%	2.3%
Total	Count	4	13	26	1	44	100.0%
	Row %	9.1%	29.5%	59.1%	2.3%	100.0%	

the rear edge of platform remnants on flakes and their dorsal surfaces. None of the flake platforms in this assemblage evidence any type of modification related to tool manufacture. All existing platforms are fairly simple; they include 2 cortical platforms (7.41 percent), 10 (37.04 percent) single facet, 8 (29.63 percent) multifacet, 2 (7.41 percent) collapsed, and 5 (18.51 percent) that are absent. With the exception of the missing platforms, these types tend to be indicative of core reduction, though they can also occur during tool manufacture in cases where biface edges were not ground prior to retouching. Thus, the lack of evidence for platform modification does not necessarily eliminate the possibility that a particular specimen was struck during tool manufacture.

Certain other technological attributes can also be used to help determine whether flakes were removed from cores or tools, including platform lipping, type of bulb of percussion, platform angle, degree of ventral curvature, and evidence of waisting. The only evidence of platform lipping was found on a single Pedernal chert core flake recovered from the 1870s surface. Platform lipping usually results from the use of soft indenters to remove flakes, techniques that are most often used during tool manufacture. However, Crabtree (1972) notes that lipped platforms can sometimes also occur during hard hammer percussion, so while this attribute is a fairly good indicator of reduction technique, it is not definitive evidence for the technique used. The type of bulb of percussion represented is another fairly accurate indicator of reduction technique, with pronounced bulbs generally occurring during hard hammer percussion and diffuse bulbs resulting from use of a soft indenter. Nineteen flakes (82.61 percent) have pronounced bulbs of percussion, while diffuse bulbs occur on only 4 (17.39 percent). Diffuse bulbs were identified on a metaquartzite flake from late nineteenth-century deposits, a Madera chert flake from the possible seventeenth-century pit feature, and a quartz flake and a Pedernal chert flake from the 1870s surface. The latter is also the specimen that exhibits a lipped platform, adding credence to the possibility that it was removed using soft hammer percussion.

Platform angle can also be used as a reduction strategy indicator, since most core flakes have platform angles greater than 45 degrees, and most biface flakes have platform angles that are less than 45 degrees. Platform angle, as used in this discussion, represents the angle between the platform remnant at the proximal end of a flake and the dorsal surface of the flake—the angle present on the surface of the core or tool from which the flake was struck. None of the flakes with remaining platforms have platform angles that are less than 45 degrees, again suggesting that all were removed from cores rather than during tool manufacture.

Flakes struck from tool surfaces tend to exhibit visible ventral curvature, though this is not always the case. Ventral curvature is less common on core flakes, though it does occur. Thus, this attribute is similar in its implications to several of the others used in this analysis—it suggests but does not demonstrate a particular condition. While 20 flakes (90.91 percent) do not exhibit ventral curvature, 2 (9.09 percent) do, including the metaquartzite flake from nineteenth-century deposits that also has a diffuse bulb of percussion, and the Pedernal chert flake from the 1870s surface that also has a lipped platform and a diffuse bulb of percussion.

The occurrence of waisting on flakes is usually attributable to removal from a biface and occurs as a distinct curved outflaring of flake margins below the platform. Cotterell and Kamminga (1987:690) note that waisting results from bending flake initiations that are usually coincident with soft indenter use and an acute platform angle. Exceptions to this can occur when a hard hammer is used to strike a platform with an acute angle or when a soft indenter is used on a larger edge angle, but in the latter case the probability of bending initiation is much lower. Thus, in most cases, waisting occurs as a result of tool manufacture where flakes are removed using a soft indenter and platform angles are acute. Waisting was not observed at any of the 22 whole or proximal flake portions in this assemblage, suggesting that none were removed by soft indenters during tool manufacture.

Even though a few flakes possess attributes that are often considered indicative of removal during tool manufacture, none of those attributes are, by themselves, definite indicators of this type of removal. The best candidate is the Pedernal chert flake from the 1870s surface that exhibits three characteristics of soft hammer reduction but lacks some of the more important indicators of removal during tool manufacture, including a modified platform, an acute platform angle, and a waisted outline. Thus, while this flake may have been struck using a soft indenter, that appears to have occurred during core reduction rather than tool manufacture.

While this analysis of flake characteristics is sufficient to demonstrate the prevalence of an expedient core-flake reduction strategy, several assemblage ratios are also often useful in examining this question, including the ratio of flakes to angular debris, the ratio of biface flakes to core flakes, and the ratio of flakes to cores. Unfortunately, the utility of these indicators decreases severely with small assemblage size, and such is the case here. The total lack of biface flakes and cores in this assemblage limits the utility of two of these indicators, and the third can only be applied to the assemblage as a whole because of the small size of the individual temporal component assemblages. This is the ratio of flakes to angular debris. Overall, the flake to angular debris ratio is 2.00:1, which can be considered low and indicative of an expedient core-flake reduction strategy. Low flake to angular debris ratios is characteristic of Spanish flaked stone assemblages. The sample of Spanish flaked stone assemblages in the composite data base can be used for comparison, with assemblages containing fewer than 50 specimens eliminated to reduce sample error. The range of flake to angular debris ratios in this sample is 1.20:1 to 3.44:1, with 10 of 13 examples having ratios of just over 2.00:1 or smaller. In addition to the flake-based analysis, the flake to angular debris ratio also indicates that the small flaked stone sample from LA 80000 reflects an expedient core-flake reduction strategy, similar to that seen at other Spanish sites in northern New Mexico.

Tool Use

Two formal tools and eight informal tools were recovered during this phase of investigations at LA 80000. The formal tools include a generic chert gunflint from the possible 1680s surface (Fig. 22) and a medial section of a Pedernal chert early-stage biface that was recovered from the possible seventeenth-century pit feature.

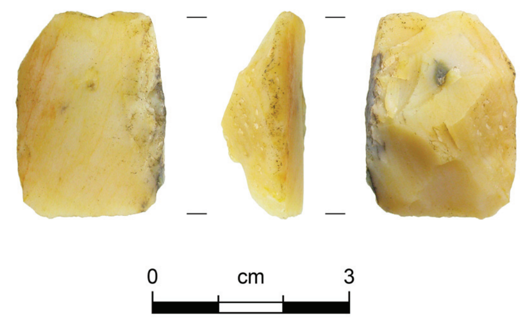


Figure 22. Gunflint found in association with Stratum 3.5, a late seventeenth- or early eighteenth-century surface.

Because of the fragmentary nature of the latter, its function cannot be defined with any degree of certainty. However, characteristics of its shape and flaking pattern suggest that it may be a section of an expediently made projectile point displaying marginal retouch. Examination of the break patterns on the biface does not clarify this, because both breaks are snap fractures, which are nondiagnostic because they could have occurred at just about any time including during manufacture, use, and postdeposition. If this functional assignment is correct, the marginally flaked, expedient nature of this tool suggests Spanish manufacture (Moore 2001b, in prep.). Unfortunately, this conclusion must remain tentative because Pueblo flintknappers also sometimes made expedient projectile points.

Seven of the eight informal tools are strike-a-light flints, while the last is an informally used piece of debitage. Strike-a-light flints were recovered from every temporal component, with two specimens apiece coming from the late eighteenth- to early nineteenth-century and late nineteenth-century components, and one apiece from the other three components. The informally used piece of debitage also came from the late nineteenth-century component, so three of the seven artifacts from that level are informal tools. Six of the strike-a-light flints are chert (two each of generic chert, Pedernal chert, and Madera chert), while the last specimen is metaquartzite. While most strike-a-light flints are made of chert debitage because that material is best suited to this type of use, quartz and metaquartzite will also work, as shown by limited experimentation, and they were used for this purpose on occasion (Moore in prep.). One of the characteristics of chert that apparently made this the material of choice in fire-making tasks is that continued use tended to remove flakes until edges reached an angle of stability between about 61 and 72 degrees. As flakes were removed, edges were rejuvenated, extending the use lives of individual tools. Quartz and metaquartzite do not share this characteristic, though they can be used to strike sparks. In the limited experiments mentioned above, only small flakes tended to be removed from edges used on quartz and metaquartzite, and were insufficient to resharpen those edges. Thus, those edges quickly became too dull to produce further sparks. While they produce sparks when struck with a steel, quartz and metaquartzite were only rarely used in fire-making kits because they were not the best material for this task.

The number of utilized edges varied from specimen to specimen. A single strike-a-light flint recovered from late eighteenth- to early nineteenth-century deposits exhibited four utilized edges. Two specimens, one apiece from the possible seventeenth-century pit feature and the 1870s surface, exhibited three utilized edges. Three specimens exhibited two utilized edges, including one apiece from the 1680 surface, the late eighteenth- to early nineteenth-century deposits, and the late nineteenth-century deposits. The latter was the only strike-a-light flint made from metaquartzite. The last specimen exhibited only a single utilized edge and was recovered from the late nineteenth-century deposits. There is no special significance to the number of utilized edges other than it shows that some of these tools were probably used for longer periods of time than others because they possessed multiple edge areas considered usable.

The single piece of utilized debitage was a Madera chert core flake, which exhibited unidirectional wear and rounding on one edge. This type of use-wear pattern tends to be indicative of tools used to work dry hides by scraping (Robertson and Attenbrow 2008). Thus, we can suggest that this informal tool was used as a scraper to process leather.

Though several tools were identified, few tasks could be defined with any degree of certainty. This was undoubtedly due to the small size of the assemblage, because both the number of material types and number of tasks represented in assemblages tend to increase with assemblage size. Still, evidence for two to three nonreduction-related tasks was found. Of obvious importance was the use of stone tools in fire-making, and this is a characteristic of Spanish flaked stone assemblages (Moore 1992, 2001a, 2001b, 2003a, 2003b, 2008, in prep.).

Discussion and Comparisons

Though the temporal components represented in this assemblage all yielded very small numbers of flaked stone artifacts, they exhibit a remarkable consistency through time. Chert remains the dominant material type used throughout the period represented by this assemblage, though quartz debitage comprise a large percentage of the very small assemblage recovered from the 1870s surface. While error associated with small sample size is probably responsible for this distribution, a change in material type selection parameters cannot be ruled out. A focus on an expedient reduction strategy is also reflected in each temporal component.

However, the nature of these deposits may be affecting artifact distributions. Nearly half the assemblage was recovered from a possible seventeenth-century pit feature. This may reflect trash disposal practices, with this possible feature containing domestic refuse. If this is so, then these materials are more representative of typical activities in early Spanish-occupied Santa Fe. The other components more likely represent informal disposal of unwanted objects or rubbish, especially those found on the two occupational surfaces. Thus, most components in this assemblage are not necessarily representative of the breadth of flaked stone tool production and use during the historic occupation of Santa Fe.

A significantly larger sample of 234 flaked stone artifacts was recovered during earlier archaeological excavations on the north edge of the Santa Fe plaza (Lentz 2004). Essentially the same temporal components were encountered during that study as were defined during the current project, enhancing the comparability of these assemblages. Cherts, including chalcedony and silicified wood, comprised 85.26 percent (n = 266) of Lentz's (2004) assemblage in comparison with the 79.07 percent found in the present study. The rest of the assemblage from the earlier study was comprised of 9.94 percent metaquartzite (n = 31), 0.64 percent quartz (n = 2), and 4.17 percent obsidian (n = 13). One of the obsidian artifacts appeared to be a prismatic blade made from Pachuca obsidian, the source of which is in Mesoamerica.

The material profile for the earlier study is very similar to that of the present study, in which cherts make up 79.07 percent of the assemblage, metaquartzite 11.63 percent, and the remaining 9.30 percent quartz. The lack of obsidian in our assemblage as well as some of the variability in material type percentages is probably attributable to the large difference in sample sizes. The absence of definite projectile points in the current study also contributes to this lack, since 10 of the 13 obsidian artifacts from the earlier study were projectile points. The flake to angular debris ratio for the earlier study was 1.53:1, which is somewhat lower than the ratio for the present study, but well within the range demonstrated by the composite Spanish flaked stone assemblage. In contrast with the current study, the earlier project recovered 3 biface flakes and numerous formal and informal tools including 5 bifaces, 2 gunflints, 17 projectile points, 1 strike-a-light flint, 2 drills, 1 scraper, and 48 pieces of utilized debitage. Part of this assemblage is attributed to deposits related to battles fought during the Pueblo Revolt of 1680, and this may account for the rather large number of projectile points. Indeed, 10 of the 17 projectile points appear to have been recovered from those deposits, 8 of which exhibit impact fractures indicative of use-related breakage. Far fewer flaked stone artifacts from the present study were recovered from the probable 1680 plaza surface, including four pieces of debitage, one of which was used as a strike-a-light flint, and a gunflint.

The near lack of strike-a-light flints in the earlier study is interesting, especially in light of the number of informally used pieces of debitage identified in that assemblage. Since 91.67 percent of the utilized debitage was made from chert, there is a very high likelihood that the use-wear scars on many if not most of these informal tools were created by use as strike-a-light flints rather than in other tasks. Examining the Spanish assemblages in the composite comparative data base indicates that, with small samples eliminated, utilized debitage tends to comprise well less than 5 percent of assemblages, while strike-a-light flints tend to make up between 15 and 37 percent of assemblages, though there are exceptions in which the percentages are much smaller. Utilized debitage comprised only 3.76 percent of the LA 54000 assemblage, and strike-a-light flints make up 14.29 percent of that assemblage. Thus, while we cannot say for certain that most of the utilized debitage from the earlier plaza study actually represent strike-a-light flints, it is quite likely that they do.

By comparing the two assemblages from the plaza it becomes obvious that neither provides a complete picture of flaked stone reduction and use in downtown Santa Fe. The greatest similarity is in the types of materials that were selected, which in both cases was dominated by a variety of cherts and chertic materials like chalcedony and silicified wood. Metaquartzite and quartz were also used, but in much smaller percentages. A similar distribution was found in the LA 54000 assemblage. These distributions signify the need for materials that produce sharp and at least moderately durable edges, a niche filled by cherts. However, the excavation conducted by Lentz (2004) also recovered several obsidian artifacts, mostly projectile points. Obsidian was a valuable tool stone that does not occur in our small assemblage, probably because of sample error. In the composite comparative data base of Spanish assemblages, obsidian occurs in all but 1 of those 15 assemblages and is absent from that one because of the sampling procedures that were followed—in that instance, there was a mixture of prehistoric and historic artifacts, and only definite historic artifacts were included in the data base, excluding all potentially related debitage. Obsidian comprises 6.77 percent of the artifacts in the LA 54000 assemblage, confirming the use of this material in seventeenth-century Santa Fe.

A number of formal tools were also identified during the earlier study that are missing from the present analysis. Those tools are indicative of a much wider array of tasks than are visible in the present assemblage, though some of those tasks may have actually been related to the historic Pueblo occupation of Santa Fe during the Pueblo Revolt period, when the Spanish were absent from New Mexico. However, the assemblage from the earlier study indicates that stone tools were also used in leather working (scraper), wood or bone working (drills), hunting/warfare (projectile points), and miscellaneous undefinable tasks (bifaces and utilized debitage). This is in addition to fire-making, as indicated by the presence of strike-a-light flints and gunflints. Gunflints and projectile points were also recovered from LA 54000, again indicating the that our assemblage is not representative.

As many studies have shown, flaked stone tools were an integral part of the historic Spanish tool kit throughout New Mexico, acting as substitutes for metal tools in an array of tasks that included the historic-period additions of fire-making and firearms ignition systems. Analysis of the distribution of artifacts in the assemblage recovered during this examination of the Santa Fe plaza shows that flaked stone tools continued to be used to make fire until at least late in the nineteenth century, and perhaps for other tasks as well.

Ground Stone Analysis

Karen L. Wening

Despite its small size, the ground stone assemblage collected during installation of the light posts on Santa Fe Plaza is surprisingly diverse and has a number of interesting characteristics. The assemblage is comprised of nine artifacts: polishing stones (n = 3), metates (n = 1), manos (n = 1), abrading stones (n = 1), shaped stones (n = 1), and indeterminate fragments (n = 2). Because of the low frequency of ground stone artifacts, each item is individually described, followed by a discussion of the assemblage as a whole.

Analysis Methods

OAS ground stone standard analysis methods (OAS 1994b) were employed for the assemblage. All artifacts were analyzed for material type, texture and induration, function, portion, preform morphology, production input, plan view outline, transverse and longitudinal cross-section shapes, shaping methods, number of uses, number of wear surfaces, evidence of heating, presence of residues, artifact dimensions, and weight.

Several attributes were added for this analysis. These focused on use-surface morphology, tool manipulation, and companion tools. These are based on Adams's (2002, 2010) use-wear experiments. Use-surface attributes have great information potential. The stroke(s) used to manipulate tools (both horizontal and vertical movement), the degree of desired control, multiple uses, the type of netherstone or handstone companion tool, and degree of use represent information potentials for this trait. All analysis attributes recorded are discussed below, followed by a brief discussion of each of the four material types encountered: sandstone, andesite, tuff, and quartzite.

Analysis Attributes

Material type. All artifacts were monitored for material type, color, and degree of cementation. Any combination of these three characteristics denotes a specific material type. For instance, red, friable sandstone is a specific material type, as is red cemented sandstone. Sandstone containing hematite is additionally specified.

Material texture. Stone material types were monitored as fine, medium, coarse grained, or cryptocrystalline. Grain size is identified with the aid of an American/Canadian stratigraphic card. *Large-grained* refers to particle sizes larger than 710 microns, *medium-grained* refers to particles between 350 and 710 microns, and *fine-grained* refers to particles 350 microns and smaller. No large-grained materials were recovered from the project. Quartzite was the only conchoidally fracturing material found.

Raw material. *Form* refers to the form of the ground stone source material. Artifacts were recorded as having been manufactured from a rounded cobble, a flattened cobble, a thick slab (10+ cm), a thin slab (5–10 cm), or a very thin slab (<5 cm). Artifacts whose manufacturing techniques completely obscured the raw material form were recorded as indeterminate.

Plan shape. This attribute is the outline of the top, or dorsal, view of the artifact. If the artifact is fragmentary, this attribute is indeterminate.

Transverse cross-section shape (TXS). This attribute defines the outline shape of the mano or metate across the width axis. For some wedge- and truncated wedge-shaped manos in the assemblage, these shapes did not appear to be solely the result of use, but of intentional shaping. This is discussed in detail with the analysis results.

Longitudinal cross-section shape (LXS). This attribute is the outline shape of the mano or metate across the length axis. Both TXS and LXS attributes were added to the standard OAS ground stone analysis, as was use-surface contours.

Use-surface contour. This attribute describes the biaxial shape of each use surface. Surfaces which are convex on both axes are biaxially convex, those which are flat across both axes are biaxially, flat, and so on.

Ventral stroke. This attribute refers to motion used to manipulate handstones when the ventral surface is in contact with the netherstone. Ventral and dorsal stroke attributes are based on Adams's (2002:41–42, 102–112) use-wear experiments. The more heavily used surface is labeled the ventral surface, and the more lightly worn surface, the dorsal. This applies to metates as well. In the case of equally worn surfaces, a random assignment is made. This attribute is also to define the stroke used on metate use surfaces.

Dorsal stroke. This attribute records the manner in which the mano was manipulated while the dorsal surface was in contact with the netherstone. If a metate is bifacial, the less worn use-surface is the dorsal surface. For unifacial metates, this attribute is inapplicable.

Production input. This attribute describes the level of manufacturing effort expended on a specific tool. This is defined by the percentage of a tool's surface area that has been shaped. *Fully shaped* refers to 100 percent, *mostly modified* 50–99 percent, and *slightly modified* less than 50 percent of the surface area. This was applied subjectively to fragments. If a fragment exhibited a high degree of shaping, the artifact was recorded as mostly modified even though the missing portions could not be observed. This was done to obtain the maximum possible information from fragmentary artifacts.

Shaping. This attribute refers to the methods used to shape a ground stone tool. Grinding, flaking, pecking, and combinations of these methods were recorded. Pecking to shape an artifact is differentiated from pecking to resharpen a grinding surface, which is recorded under wear surface rejuvenation. Fragments are analyzed as with production input.

Heat alteration. Heat alteration describes the degree of heat exposure an artifact has received. Attributes consist of reddened, crazed, fractured, burned and sooted, and combinations of these attributes.

Adhesions. This attribute refers to any foreign substance on the artifact such as caliche or pigment. The amount and location of caliche coverage is also included in this attribute, as well as the pigment type and color.

Function. This attribute records the tool type using Adams's (2002) definitions for ground stone tools.

Number of functions. This attribute is the number of identifiable functions an artifact has had.

Number of wear surfaces. This attribute is recorded for every ground stone artifact. For metates, if the base is worked only to shape, then that surface is not analyzed as a wear surface.

Condition. This attribute describes the extant portion of the artifact.

Wear-surface rejuvenation. This attribute is the presence or absence of pecking to resharpen the grinding surface. It is recorded for all wear surfaces.

Wear-surface degree. This attribute describes the extent of use of each utilized ground stone surface as light, moderate, or heavy. While this is an admittedly subjective attribute, an attempt was made to objectify the values. *Light* refers to grinding wear, which occurs only on the high points of a surface, leaving unused areas. The boundaries of the use surface are not well defined. The unmodified raw material texture is still visible after light use. *Moderate* refers to wear that is extensive enough to grind down the entire use-surface, leaving no unused areas. Moderate wear obscures the original raw material texture. *Heavy* refers to wear that completely alters the raw material texture and often results in striated surfaces. Rough materials such as sandstone are worn smooth, and the use-surface contour can become faceted or well delineated. Very fine-grained or conchoidally fracturing material such as quartzite can become polished and striated from heavy use. If a tool is resharpened and some of the original use surface remains, wear degree is based on that.

Wear type. This attribute refers to every individual type of wear observed on each ground surface. Adams (1988, 2002, 2010) has repeatedly stressed that tool form does not necessarily determine function and that artifacts of identical morphology can be functionally distinguished only when wear patterns are carefully examined. Both the type and location of tool wear are essential components of function. Wear pattern location may also indicate the nature of the substance being processed (Adams 2010:132).

Wear striations are additionally monitored as parallel or random. Wear surfaces are examined under 40x microscope power to identify microscopic striations, grain shearing, tribochemical wear, and grain melting. These wear pattern types are based on Adams's (1988;

1999; 2002:29–42; 2010) use-wear experiments. The *melting* term is borrowed from Adams (1988:308) and is used to describe areas ground flat with the surrounding matrix, virtually eliminating all interstices and creating a melting effect. It is important to note here that these worn areas are compared to unmodified artifact surfaces to eliminate confusion with natural erosion.

Length. Length in centimeters is recorded for each artifact. If the original long axis of the artifact could be determined, this measurement is recorded as length even if it is not the longest dimension. If the long axis cannot be identified, the longest dimension is recorded. If metate fragments display parallel striations on the use surface, this axis is assumed to be the length.

Width. Width in centimeters is recorded for each artifact. As with length, if the length and width orientation can be determined, measurements are taken along this axis even if the width is not the second largest dimension.

Thickness. Thickness in centimeters is recorded for each artifact.

Weight. Weight in grams is recorded for all artifacts. If fragments can be determined to be part of the same artifact, they are weighed together.

Material Types

Light brown, micaceous sandstone. Three artifacts are manufactured from this material. It is very fine grained and well indurated. Micaceous inclusions are interspersed uniformly throughout the sandstone material. Based on surface composition, micaceous inclusions comprise about 5–10 percent of this material. This material sometimes contains sparse soft hematite inclusions which split open when the material is broken, leaving a powdery residue.

Andesite. This material is almost entirely comprised of very fine-grained hornblende, with a lighter mineral matrix and sparse quartz grain inclusions. Basalt and andesite derive from the Cerros del Rio volcanic field. These volcanic flows are interbedded with quartzite cobbles of the Ancha Formation, both of which are eroding into the Santa Fe River (Koning et al. 2002:82). The quartz grains in this material are larger than the hornblende grains and range in color from clear to light reddish brown. It occurs only in cobble form in the assemblage. It is very fine grained, and minimally abrasive, displaying a texture similar to cryptocrystalline basalt. Microscopic and macroscopic use-wear striations are easily distinguished on this material.

Tuff. White volcanic pumice deposits are numerous throughout the Santa Fe area, many of which are contemporaneous with those of the Jemez Mountain volcanic field (Koning et al. 2002:82–83). The tuff deposits in the Santa Fe area derive from the Guaje pumice bed, which are overlain by thick deposits of the quartzite cobble-bearing Ancha Formation in some areas (Koning et al. 2002:82). The Jemez volcanic field also borders the Rio Grande on the west, which may result in erosion of tuff deposits into river gravels. Carried downstream, this material would be available in the portion of the Rio Grande west of Santa Fe.

Quartzite. Quartzite cobbles occur in locally outcropping formations and nearby river gravels. Rounded quartzite cobbles comprise significant percentages of the Chamita and Ancha Formations, which outcrop along the southwestern flank of the Sangre de Cristo Mountains (Koning et al. 2002:79–80). Quartzite cobbles also occur in the gravels of the nearby Santa Fe River and Rio Grande west of the site (Koning et al. 2002:80–82).

Artifact Descriptions

Polishing Stones (n = 3)

All three polishing stones are unmodified cobbles of hornblende or brown quartzite. The most heavily worn specimen is a round, brown quartzite cobble. It displays two biaxially convex surfaces, one of which is very heavily polished and striated (Fig. 23). This surface also exhibits the smooth, shiny texture which results from a combination of friction and accumulated residue (Adams 2002:31–32). Adams stresses that this type of wear is additive, contrasting with the abrasive wear typically associated with manos and metates, and the polished surface is also heavily striated. The striations are parallel, indicating use of a reciprocal or unidirectional stroke. The striations are oriented at a slight angle to the length of the cobble. The opposing surface is also polished and identically striated, but the

Figure 23. Quartzite cobble polishing stone.

tribochemical wear is less in evidence.

Tribochemical buildup can occur when polishing ceramic vessels (Adams 2002:91). The contact of two smooth, hard surfaces allows tribochemical residues to accumulate on both the stone and vessel. This sheen is amplified when the clay is moistened and polished dry with the stone. Quartz grains in clay temper can cut through tribochemical residues, leaving macroscopically visible striations (Adams 2002:92).

The whole artifact measures 6.4 cm long, 6.1 cm wide, and 3 cm thick, and weighs 165 g. It was recovered from Stratum 3.5 of TU 3 (FS 5). The cobble may have been selected for use from immediately available gravels of Stratum 3.5, which contains 50 percent cobbles ranging from 2.54 to 7.53 cm (1–3 in) in diameter.

The second polishing stone employs an unmodified, hornblende cobble. In plan, it displays an ergonomic, notched triangle shape. The stone may have been handled with the thumb placed against the notch and two fingers gripping the edge of the triangle base (Fig. 24). The cross section is also triangular, resulting in an overall wedge-shaped cobble with two tangentially oriented surfaces. Both of these surfaces are polished and striated from use. The more heavily used surface would have involved manipulation with the right hand, if held in the described manner. Unlike the quartzite polishing stone, both surfaces are randomly striated, and no tribochemical wear is evident. The whole artifact measures 6.1 cm long, 4.1 cm wide, and 3.2 cm thick, and weighs 85 g. It was recovered from Stratum 3.6 of TU 3 (FS 14).

Figure 24. Hornblende cobble polishing stone.

The third polishing stone is the largest of the three, employing a flattened, oval hornblende cobble. It is polished and striated on two opposing surfaces. These surfaces are not uniformly flat or convex, as with the previous two stones. Rather, they are slightly undulating, smooth cortical surfaces which are moderately worn on the high spots. Similar to the quartzite cobble, all wear striations are parallel but oriented along the artifact length. The hornblende and quartz grains are also sheared. The stone is 8.3 cm long, 6.4 cm wide, and 2.2 cm thick, and weighs 216 g. It is one of two ground stone artifacts recovered from TU 2, Stratum 2.2 (FS 9).

Handstone (n = 1)

The handstone artifact is classified as such based on the biaxially convex use-surface. The artifact is broken on all four edges, and the thickness is split, leaving a portion of the artifact's use-surface intact. It is formed from the minimally abrasive hornblende material. Though none of the cortex remains, it is likely that this artifact is an expedient cobble tool. The use-surface is moderately ground. Even at this degree of use, polish is beginning to form, characteristic of the hornblende material. The use-surface also displays sheared grains and random striations. The striations and convex contour suggest that this artifact was manipulated with a random, rocking stroke. No surface rejuvenation is evident. All dimensions are incomplete (6.1 cm long, 4.3 cm wide, 2.1 cm thick, weight 112 g). It was recovered from Stratum 3.4 of TU 3 (FS 3).

The material and wear of this artifact suggest that it served a function identical to that of the hornblende polishing stone, above. This small fragment differs only in the degree of wear.

Metate (n = 1)

The metate edge fragment was a thick slab of light brown micaceous sandstone. Occasional hematite inclusions are also visible in the sandstone material. The use-surface is moderately ground, displaying parallel, macroscopically visible striations. No evidence of surface rejuvenation is present. Both the base and the edge consist entirely of cortex, suggesting that the metate is either unshaped or minimally modified. The base displays very light grinding, which appears to result from contact with the ground while in use. Only the thickness of this artifact is complete, measuring 7.7 cm. The fragmentary length and width are 11.4 and 5.2 cm, respectively, and the metate weighs 801 g. It was recovered from Stratum 3.6 of TU 3 (FS 18).

Shaped Tuff (n = 1)

This small fragment of white volcanic tuff is fully ground to shape. The extant section suggests that the whole artifact was a rounded, subrectangular form. The cross section is biconvex. Both the plan outline and the cross-section shape are evenly contoured. Perhaps the most interesting characteristic of this artifact is the effect that the material grain size has on shaping modification.

The tuff material is comprised of very fine-grained ash and much larger quartz grains. As the artifact was ground to shape, the quartz grains were dragged across the soft ash, leaving deep scratches. These shaping striations are roughly parallel to the width axis. Many quartz grains remain embedded, protruding above the ash. An oily residue is microscopically visible on a small percentage of the highest grains, possibly the result of handling, either from shaping or use. Many of these polished quartz grains may have been dislodged during handling. The artifact measures 4.6 cm long (incomplete), 4.1 cm wide, and 1.7 cm thick; it weighs 38 g. It is the second of two ground stone artifacts recovered from TU 2, Stratum 2.3 (FS 11).

The function of many shaped stones is unknown and is sometimes linked with ritual and symbolic meaning, particularly in contexts which are thought to be ceremonial (Adams 2002:208–209). However, Stratum 2.3 is believed to represent a late eighteenth- or early nineteenth-century context and is likely not a ceremonial setting. The presence of the artifact in this context could simply represent unrecognized disturbance or mixing of the historic materials with earlier prehistoric deposits.

Small Abrading Stone (n = 1)

This small abrading stone appears to be a naturally formed round disk of a tabular micaceous schist. The edges and flat surfaces are lightly ground. Microscopic examination reveals parallel striations on both surfaces. One surface is more heavily used. Interestingly, the striations and grain shearing on this surface are confined to central area of the stone, increasing the likelihood of contact with a curved surface. If the stone was abraded against a flat surface, the use-area would extend to the edges.

The micaceous schist material is coarser grained and more abrasive than hornblende, but less abrasive than sandstone. This mid-level abrasion quality may have been ideal for some stages of ceramic manufacture to smooth, rather than polish, vessel walls. Adams (2002:93) notes that more granular materials are used to smooth imperfections, not intended to create sheen. The rounded edges are smoothed, which could result from shaping or handling. It measures 5.2 cm long (fragmentary), 3.4 cm wide (complete?), and 1.0 cm thick (complete), and weighs 28 g. It was recovered from Stratum 3.6 in TU 3 (FS 8).

Indeterminate Fragments (n = 2)

Both of the indeterminate fragments are tabular fragments of light brown sandstone with micaceous inclusions. The sandstone material is very fine grained and less abrasive than the material from which the above metate is made. Both fragments are ground on biaxially flat surfaces.

One of the two fragments is ground on two opposing surfaces, both of which display macroscopically visible, parallel striations. These striations are oriented differently, with the more heavily used surface ground parallel to the width, and the more lightly used surface parallel to the length. A few random scratches are visible on each surface as well. These axes are based on fragmentary dimensions, but they are useful in illustrating that this thin, bifacially worn fragment may have functioned like a lapidary stone or palette.

Such tools are often manufactured from thin sandstone slabs and serve as a netherstone for smoothing strings of bead blanks. Lapidary stones ethnographically documented for the Zunis (Ladd 1979: Fig. 5) appear to be shaped slabs. Jernigan (1978:202–203, Fig. 95) describes a process used by the Anasazis to manufacture stone beads with a "flat abrasive slab." Adams (2002:143–145) differentiates between netherstones and lapstones, both of which could be used in lapidary activity. Both of these tools serve as base stones against which objects can be shaped or materials processed. They are primarily distinguished by size: lapstones are the smaller of the two. The most important consideration in the material choice for these artifacts is the appropriate texture for the task (Adams 2002:145). This sandstone material may have been ideal for shaping as well as smoothing.

For the first indeterminate fragment, length and width dimensions are fragmentary (4.2 cm long, 3.3 cm wide). Only the thickness is complete, measuring 1.6 cm. It weighs 37 g. The second indeterminate fragment also displays macroscopically visible parallel wear striations. These striations are more reminiscent of mano or metate wear in that they are uniformly straight and cover the entire use-surface. The flat surfaces of the fragment are slightly tangential to one another, which may indicate that the thickness is split or that the stone is irregular in cross section. Length and width dimensions are fragmentary (4.5 cm long, 3.4 cm wide). The thickness may be complete, measuring 1.8 cm. It weighs 39 g. Both indeterminate fragments were recovered from Stratum 3.6 in TU 3 (FS 16 and 18).

Summary and Discussion

While the ground stone assemblage collected during installation of the light posts on Santa Fe Plaza is small, some overall traits emerge. Ground stone artifacts were recovered from five strata in TUs 2 and 3 (Table 23). Six of the nine artifacts originate in seventeenth-century strata: the quartzite polishing stone, the large hornblende polishing stone, the micaceous schist abrading stone, the metate fragment, and the two indeterminate fragments. Only the heavily used quartzite polishing stone was found in Stratum 3.5, associated with the possible 1680 surface. All other seventeenth-century ground stone was recovered from Stratum 3.6, in the possible pit feature. The shaped tuff, handstone fragment and triangular hornblende polishing stone originate from late eighteenth- and nineteenth-century deposits in TU 2 and TU 3 (Strata 2.2, 2.3, and 3.4).

Virtually all of the ground stone artifacts employ unmodified cobbles, regardless of strata association. Cobble raw material occurs in all three strata from which ground stone originates, constituting the largest percentage in Level 13, where the brown quartzite polishing stone was found. This may indicate that the choice of raw material is at least partially based on this availability. It is also interesting to note that minimally abrasive materials are used in every instance except the shaped tuff. While cobble cortex is typically less abrasive, this low abrasion trait also pertains to the sandstone artifacts. Only very fine-grained sandstones are selected, presumably for their low abrasion quality. This material may have been well suited not only for shaping, but also for smoothing.

No evidence of surface rejuvenation is present on the admittedly small surface area of the sandstone, handstone, and metate artifacts. Obviously, this may be expected on lapidary stones but is not a given with metates or handstones, particularly those used for grain grinding. Surface rejuvenation can be a wear-management strategy, performed less often to prolong tool life (Adams 2002:114). Adams notes that resharpening hastens wear and shortens mano life. Bartlett (1933:4) came to the same conclusion regarding metates used by the Hopis. Extending tool life may be desired for other reasons, such as raw material scarcity, and the

Table 23. Ground stone artifact and material type by test unit

Stratum	Level	FS No.	Artifact Type	Material Type	Count
			TU 2		
2.2	11	9	polishing stone, nfs	hornblende	1
2.3	12	11	shaped stone	tuff, white	1
Subtotal					2
			TU 3		
3.4	12	3	handstone fragment	hornblende	1
3.5	13	5	polishing stone, nfs	brown quartzite	1
3.6	14	8	abrading stone	micaceous schist	1
	17	14	polishing stone, nfs	hornblende	1
	18	16	indeterminate, fragmentary	sandstone, light brown micaceous	1
	20	18	indeterminate, fragmentary	sandstone, light brown micaceous	1
	20	18	metate, nfs	sandstone, light brown micaceous	1
Subtotal					7
Total					9

conservation of the energy required to produce a new tool.

However, the lack of rejuvenation may also be related to function. The characteristics of a particular material type are more important to artifact function than form (Adams 2010:134, after Horsfall 1987:369). Ethnographic studies of the highland Mayas revealed that materials such as quartzite are preferred for their ability to produce more finely ground materials (Horsfall 1979:24–25). Also, coarser-grained materials are less preferred because they can trap processed food in grain interstices.

It is also interesting to note that striations are macroscopically visible on every artifact except the micaceous schist disk. For polishing stones, striation wear may be partially caused by quartz grains. Adams notes that quartz grains in ceramic temper can scratch tribochemical wear. While such scratches are evident on the brown quartzite polishing stone, sand temper was not used in the locally produced seventeenth-century ceramics (Richard Montoya, personal communication, 2011). Tuff is the primary temper material for locally manufactured pottery, possibly designating the project ground tuff artifact as raw material for that purpose. However, quartz grains inclusions within clay raw material are not uncommon (Eric Blinman, personal communication, 2011) and could scratch polishing stone surfaces almost as effectively as temper.

The ubiquity of striations is likely the result of the tendency of the fine-grained and cryptocrystalline materials to retain this wear, but it is also related to function. Adams (2010:139) observed that crushed grains and striations "happen immediately" during food processing. The accumulation of meal on the use-surface retards wear until the surface is cleaned, at which point the abrasion quality improves. This observation is interesting in view of the heavily striated surfaces of the ground stone assemblage. While the facets and tribochemical wear of the quartzite polishing stone indicate heavy use, the heavy striations of the remaining artifacts may only denote light or moderate use. This wear level combined with the cobble raw material suggests that many of these tools may be more expedient than strategic.

Several factors concerning seventeenth-century interactions suggest that the ground stone tools from LA 8000 are of Native American manufacture and use. The ceramic assemblage from the 2004 excavations at LA 8000 display evidence that Tewa potters were producing vessels for seventeenth-century Spanish colonists (Lentz 2004:54, 67). While both Euroamerican and Native American ceramics were recovered from the Santa Fe light post excavations, the latter overwhelmingly dominate seventeenth-century deposits.

The three polishing stones described above were likely used by Pueblo people to manufacture Native ceramics but could also have been used to produce vessels commissioned by colonists. These tools may have been more in demand in the historic period, when polishing of vessel interiors expanded to include both jars and bowls (Lewis 2004:48).

Trigg (2003) documents the numerous ways in which goods and services were exchanged between the Pueblo and Spanish people of New Mexico. The exchange of corn and wheat by trade, theft, compensation for services, and other means must have involved the processing of both grains. Spanish colonists in seventeenth-century Santa Fe were not only consuming Old World crops such as wheat, but also native foods such as maize and goosefoot seeds (Trigg 2003:67). Corn and wheat were also staples of the Pueblo diet; the latter became rapidly incorporated following Spanish introduction (Trigg 2003:70). Maize and corn were among the "standard goods used for exchange" (Trigg 2003:77). Botanical remains from the Palace of the Governors excavations yielded wild native plants and Old and New World domesticates (Siefert 1979:127). Large quantities of corn and plum, along with wheat, bean, squash, and several Old World fruits were found in trash pits used primarily by Pueblos, and for a short time, by the Spanish (Seifert 1979:130–131).

The grinding used to process these grains into flour would involve milling tools. Metal was in short supply, dictating conservation of this material and possibly restricting the use of these tools for some tasks (Lentz 2004:70). As such, stone may have continued to be the material of choice for tool manufacture, both by colonists and Natives. However, stone tools may also have been employed by the Spanish for some tasks, given the limited availability of metal (Lentz 2004:70).

Ethnographic studies on historic use of ground stone tools is extensively documented for numerous southwestern and Central American Native groups. The Zunis used polished stone slabs for yucca-fruit processing (Bell and Castetter 1941:12–13, after Stevenson 1915:72–73), mashing of yucca to make soap (Bell and Castetter 1941:54). Sotol was pounded into flour using a stone mortar (Bell and Castetter 1941:58). Maize-milling techniques involving manos and metates are described in detail for the Walapais and Havasupais (Euler and Dobyns 1983). The same study documents use of manos to process piñon nuts and jackrabbit meat, and yucca, agave, and prickly pear fruit.

The processing of a single plant type, agave, involves a varied and specialized tool kit for the Otomi community of Orizabita, in Highland Central Mexico (Parsons and Parsons 1990). Grinding and pulverizing with stone tools are documented for the Papagos of southern Arizona to process yucca fruit, cholla fruit, and mesquite beans, and to manufacture wooden tools (Castetter and Underhill 1935:6, 16, 23). This list is by no means exhaustive, but it points up the considerable diversity of materials which are processed using a grinding, pounding, or pulverizing activity with stone tools.

Polishing stones, lapidary stones, handstones, and metates are common constituents of Anasazi ground stone tool kits. The use of manos and metates for food processing continued into historic times for Native peoples. Other stone tools and their specific uses abound as well. These studies are but a few of the many which document use of stone tools by Native Southwest peoples into the twentieth century. Their use in seventeenth- and eighteenth-century Santa Fe reflect this pattern.

Euroamerican Artifact Analysis

Euroamerican artifact analysis was conducted by Matthew Barbour and Susan Moga following the standards and methodology outlined in Boyer et al. (1994), specifically created to quantify Euroamerican assemblages.

Euroamerican artifacts represent objects that were not available in the American Southwest prior to the establishment of European settlements in the late sixteenth century. Assemblages typically include a variety of artifact types such as bottle glass, can or metal fragments, and wheel-thrown ceramics reflecting domestic, commercial, agrarian, and industrial activities and behaviors. Collected and analyzed Euroamerican artifacts from LA 80000 (n = 91) represent just under 6.4 percent of the total artifact assemblage (n = 1,430) recovered during monitoring and test excavations.

Analysis Methods

The OAS Euroamerican analysis format and procedures were developed over the last 10 years and incorporate the range of variability found in sites dating from the sixteenth to twentieth centuries throughout New Mexico (Boyer et. al. 1994). These methods are loosely based on South's (1977) Carolina and Frontier artifact patterns and the function-based analytical framework described by Hull-Walski and Ayres (1989) for dam construction camps in central Arizona. This detailed recording format allows for the examination of particular temporal and spatial contexts and for direct comparisons with contemporaneous assemblages from other parts of New Mexico and the greater Southwest. Recorded attributes were entered into an electronic data base (in this case, the Statistical Package for the Social Sciences, or SPSS) for analysis and comparison with similar data bases on file at the OAS.

Functional in nature, the Euroamerican artifact analysis focused on quantifying the utility of various objects. One benefit to this type of analysis is that "various functional categories reflect a wide range of human activities, allowing insight into the behavioral context in which the artifacts were used, maintained, and discarded" (Hannaford and Oakes 1983:70). It also avoids some of the analytic pitfalls associated with frameworks focused on categorizing artifacts strictly by material type (e.g., glass, metal, ceramic, and mineral).

One weakness of material type–based analyses is that only a limited number of functional categories are represented in a single material class. For instance, metal, while beneficial for examining construction and maintenance materials such as nails and wire, would not incorporate patent medicines or other bottled goods in the same analysis. In addition, variables such as finish, often chosen to analyze glass artifacts, are appropriate for glass containers but not for flat glass, decorative glass, or other glass items like light bulbs that can serve different roles within a single spatial and temporal context. As such the OAS analytic framework was designed to be flexible, documenting not only the qualities of each material type but the functional role of particular items. Like all analysis, there are inherent assumptions which require explicit explanation.

In this function-based analysis, each artifact is assigned a stratified series of attributes that classify an object by assumed functional category, artifact type, and its specific role within that matrix. These attributes are closely related and provide the foundation for additional variables that, with increasingly more detail, strive to specify an artifact's particular function. In this analysis, 12 functional categories were used: economy/production, food, indulgences, domestic, furnishings, construction/ maintenance, personal effects, entertainment/ leisure, transportation, communication, military/ arms, and unassignable.

Each category encompasses a series of artifacts types whose specific functions may be different, but related. For example, a whiskey bottle and soda bottle are both categorized as indulgences. However, the type of indulgence, in this case liquor and carbonated beverage, represent very different activities or behaviors.

Hence, the whiskey bottle would be classified as indulgence (functional category), liquor (artifact type), and whiskey bottle (artifact function).

In essence, this function-based analysis represents an inventory of different artifact attributes where variables are recorded in sequential order to amplify the functional categories and provide a detailed description of each artifact, when possible. Attributes that commonly provide detailed information about individual artifacts and in turn functional categories include material type, date and location of manufacture, and artifact form and portion.

Chronometric data are derived from a variety of descriptive and manufacturing attributes, especially the latter. If an artifact retains enough information to derive a begin or an end date, those variables are recorded under the date attribute. *Manufacturer* records the name of the company that produced a particular object. Together these data can be used to assign specific date ranges to an artifact based on known manufacture periods or the dates of operation for manufacturing companies. A related attribute is brand name. Many brand names also have known production periods that can provide temporal information. The manufacturer or brand name is generally listed as labeling/lettering on an artifact and is used to advertise the product, describe its contents, or specify its suggested use.

When evident, manufacture technique, such as wheel-thrown or forged, was also recorded. Since some manufacturing techniques have changed over time, this attribute can often provide a general period of manufacture. A related attribute is seams, which records how sections of an artifact, particularly cans and bottles, were joined together during the manufacturing process. Through time these processes were altered and are reflected in the types of seams used to construct various containers. The type of finish/seal was recorded to describe the opening of a container prior to adding the contents and the means of sealing it closed. Like seams, many finish/seal types have known manufacturing periods offering general temporal information. In addition, opening/closure records the mechanism used for extracting the contents of a container.

For some artifacts, attributes such as color, ware, and dimensions can also provide information on the period of manufacture. Thus, the current color of an artifact was recorded if determined to have diagnostic value. A good example is glass, where the relative frequency of various colors in an assemblage can provide some temporal information, since the manufacture and preservative processes have changed over time. *Ware* refers to china artifacts and categorizes the specific type of ceramic represented. Because temporal information exists for most major ware types, this attribute provides relatively more refined dating information compared to seams and color. Dimensions of complete artifacts can also provide chronometric data, especially artifacts like nails or window pane glass, where the thickness or length of the object can be temporally sensitive.

In addition to temporal information, the manufacturing process of a particular object can be used to support functional inferences. Material records the type of material(s) from which an object was manufactured (e.g., glass, metal, paper, clay). Paste describes the texture of the clay used to manufacture ceramic objects and is further defined by porosity, hardness, vitrification, and opacity. Decoration and design describe the technique used to apply distinctive decorative motifs to an object, such as china or glassware.

In addition to the attributes discussed above, several others were used to quantify an object's condition and use-life. For each item, the fragment/part variable described what portion of a particular form was represented. However, fragments of objects which refit to complete or partial objects recovered from a single excavation context were recorded together as a minimum number of vessels (MNV) of one, and the number of specimens present represented by count.

Cultural alteration of an item to extend its use-life was recorded as reuse. This variable describes any evidence of a secondary function, and the condition/modification variable monitors any physical modifications associated with that secondary use. If environmental conditions have altered the surface of an artifact through glass patination or metal corrosion, it was recorded as aging.

The appearance of an artifact was monitored using the shape variable, generally used to describe the physical contours of complete objects.

Finally, quantitative data including volume, length/height, width/diameter, thickness, and weight were recorded for most Euroamerican artifacts. Where appropriate, some measurements were recorded using industry standards (e.g., pennyweight, caliber, gauge).

Analysis Results

The 91 Euroamerican artifacts recovered from the LA 80000 included an array of products that encompassed five of the twelve broad functional categories used in the OAS Euroamerican artifact analysis (Fig. 25; Table 24). Food, indulgences, personal effects, entertainment and leisure, communication, transportation, and military/arms items were not recovered during testing. Their absence may be a function of sample size. However, over half of the Euroamerican artifacts recovered were objects assigned to the construction and maintenance category (n = 48). These items may be indicative of fabrication and/or remodeling of structures adjacent to the Santa Fe Plaza, particularly the Palace of the Governors, which is immediately north of the four test units. In this section, the analyzed Euroamerican artifacts are discussed collectively by function-based category to examine broad patterns in artifact distribution and the range of variability inherent in these distribution patterns.

Unassignable/Unidentifiable Items

In all, 22 artifacts (24.2 percent) of the total Euroamerican assemblage could not be assigned a particular activity or behavior. These items comprised exclusively of small glass shards, 16 of which can be positively identified as bottle glass. It is possible to speculate that many of these artifacts represent fragments of indulgence or food containers. None of the fragments were large enough to determine the technique used in their manufacture. However, based on the lack of patina and small bubbles, it seems likely that the glass shard recovered from Stratum 3.5 is not Spanish Colonial glass, but instead represents some form of unrecognized nineteenth- or early twentieth-century disturbance.

Economy and Production Items

Economy and production items include objects associated with subsistence, industrial,

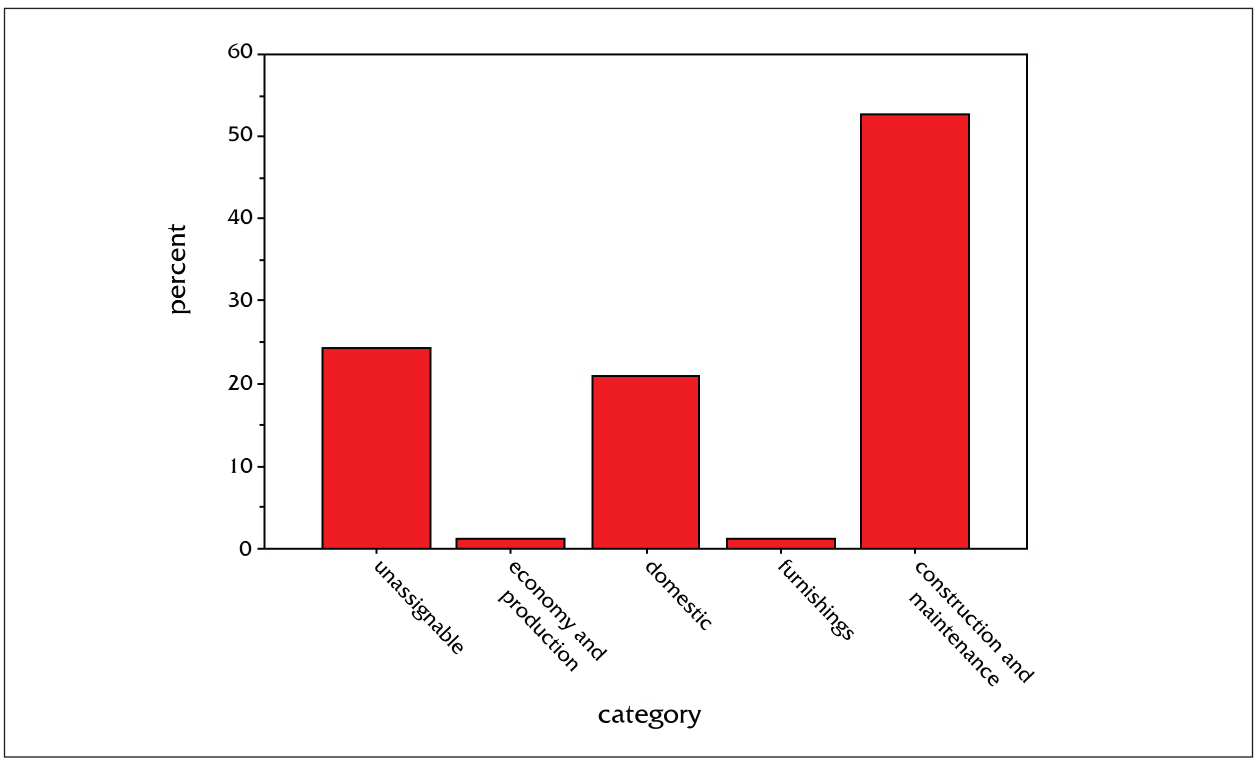


Figure 25. Distribution of Euroamerican artifacts across function-based categories.

Table 24. Euroamerican artifact type and function by stratum

Artifact Type	Artifact Function	Stratum No.						Total
		2.1	2.2	2.3	3.4	3.5	3.6	
				Unassignable				
Unidentifiable	unidentifiable	–	–	–	5	1	–	6
	bottle	4	3	–	9	–	–	16
				Economy and Production				
Smithing	slag	–	–	–	–	–	1	1
				Domestic				
Dinnerware	bowl	–	–	1	–	–	–	1
	soup plate	–	1	–	–	–	–	1
	vessel, indeterminate	3	1	–	5	–	–	9
	plate/saucer	–	1	–	–	–	–	1
Glassware	vessel, indeterminate	–	1	–	2	–	–	3
Canning and storage	crock	–	–	–	3	–	–	3
	olive jar	–	–	–	–	1	–	1
				Furnishings				
Heating, cooking, and lighting	isinglass	–	–	–	–	–	1	1
				Construction and Maintenance				
Unidentifiable	unidentifiable	1	–	1	1	–	–	3
Hardware	nail, machine cut	–	–	3	–	–	–	3
	nail, hand wrought	–	–	–	7	1	9	17
Building materials	window glass	1	3	3	18	–	–	25
Total		9	10	8	50	3	11	91

and commercial endeavors. A small piece of metallurgical slag was found in Stratum 3.6. Slag is often associated with the metallurgical processes of assaying, smelting, or blacksmithing, but may simply be the by-product of burning coal for heating a room or cooking a meal. The Spanish were aware of coal by the beginning of the seventeenth century, and blacksmiths lived in Santa Fe. The degree to which coal-based blacksmithing occurred is poorly known, and coal's use for heating and cooking is even less well documented. Conversely, it is possible to create slag by smelting ores or working metals with only charcoal or wood, since the item is formed by the fusing of silica and trace metallurgical elements.

Domestic Items

Domestic items include products used in food service, preparing or preserving food, child care, and the care of household furnishings. Items within this category represented roughly 20.9 percent (n = 19) of the total Euroamerican assemblage (n = 91; Fig. 26).

The most common type of domestic artifact was ceramic dinnerware (n = 12, mnv = 9). Analysis of the dinnerware was accomplished by distinguishing vessel form, ware, and technique used in decorating the vessel (Table 25). Most were found in nineteenth-century contexts. After the opening of the Santa Fe Trail in 1821, cheap, mass-produced white ware (n = 3, mnv = 3) and ironstone (n = 6, mnv = 3) from the eastern United States and Europe flooded Santa Fe markets quickly. replacing handmade majolica and lead-glazed earthenwares as the product of choice. Identifiable vessels included a majolica soup plate, a transfer print bowl, and an undecorated plate or saucer.

Glassware (n = 3, mnv = 2) and canning and storage (n = 4, mnv = 2) items were also present, albeit in much smaller frequencies. Canning and storage items included three fragments of a nineteenth-century stoneware crock and a body sherd from a Spanish olive jar. The glassware artifacts could not be tied to a specific vessel form.

Furnishing Items

Furnishing items are typically represented by nonconsumptive consumer products that occur within a domestic structure or dwelling such

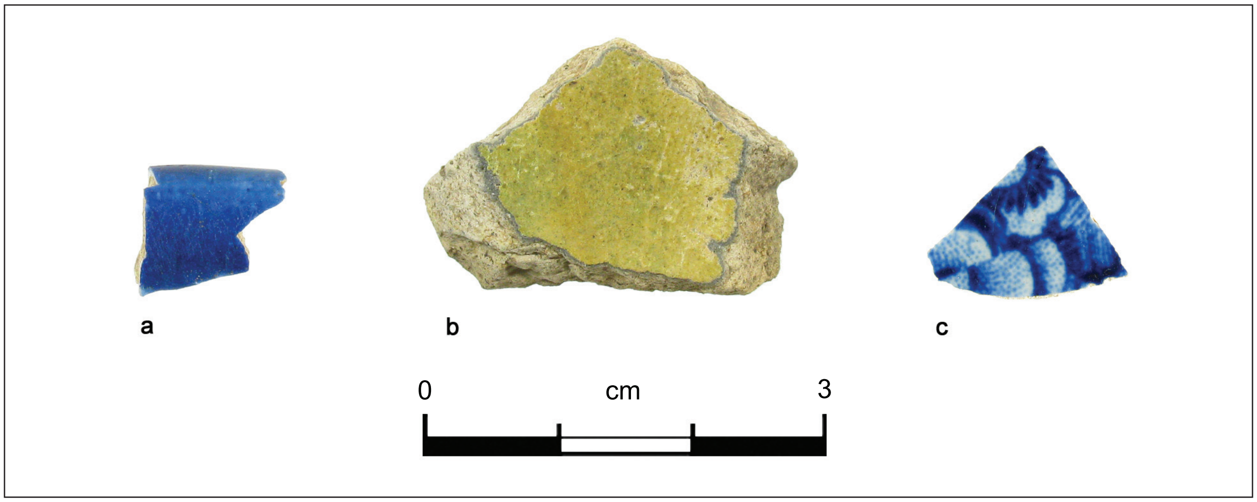


Figure 26. Domestic items: (a) rim sherd from a majolica Huejotzingo Blue-on-white soup plate, ca. 1700–1850; (b) body sherd from a Spanish olive jar, ca. 1600–1850; (c) body sherd from a transfer print on white-bodied earthenware bowl, ca. 1830–1900.

Table 25. Ceramic dinnerware across strata

Function	Ware Type	Decoration	Stratum No.				Total
			2.1	2.2	2.3	3.4	
Bowl	white ware	transfer print	–	–	1	–	1
Soup plate	Majolica, Huejotzingo Blue-on-white	hand painted	–	1	–	–	1
Vessel, indeterminate	white ware	transfer print	–	–	–	1	1
	white ware	undecorated	–	–	–	1	1
	ironstone	undecorated	2	1	–	3	6
	Majolica, unknown	hand painted	1	–	–	–	1
Plate/saucer	white ware	undecorated	–	1	–	–	1
Total			3	3	1	5	12

as fragments from furniture, light fixtures, or appliances. The only furnishing item identified was a small piece of isinglass (i.e., cut mica) found in Stratum 3.6. During the Spanish Colonial period, isinglass was commonly used as a substitute for glass in the construction of buildings. At San Marcos Pueblo, pieces of cut mica were used as decorative embellishments on the altar of the mission.

Construction and Maintenance Items

Over half of all Euroamerican artifacts fall within the construction and maintenance category (n = 48, or 52.7 percent). Construction and maintenance items can include tools, hardware, building materials, electrical items, storage items, fencing materials, objects with plumbing and gas, lubricants and solvents, and tent-related materials. At LA 80000, the construction and maintenance category was represented by nails (machine-cut = 3, hand-wrought = 17), window glass (n = 25), and unidentifiable scrap metal (n = 3). Many of these materials are presumably associated with construction and remodeling of the Palace of the Governors.

The first historical mention of window glass at the Palace of the Governors was in 1831 (Weber 1974:37–45). Before this time, windows were made of cut selenite or mica. The presence of window glass in Strata 2.1, 2.2, 2.3, and 3.4 is strong indication that these deposits date to the Mexican and American Territorial periods.

Contextual Assemblage Summaries

Euroamerican artifacts were collected and analyzed in association with six strata at LA 80000. Items recovered from each stratum can be used to date the deposit and provide information on land use in the area at the time of deposition.

Stratum 2.1

Nine Euroamerican artifacts were recovered from Stratum 2.1. These artifacts were distributed across the unassignable (n = 4), domestic (n = 3), and construction and maintenance (n = 2) categories. Specific items included unidentifiable bottle glass (n = 4), sherds associated with indeterminate ironstone (n = 2, mnv = 1) and majolica (n = 1, mnv = 1) vessels, scrap metal (n = 1), and window glass (n = 1). As previously suggested, it seems unlikely given the presence of window glass that this assemblage dates prior to the start of the Mexican period (1821+), confirmed by the presence of ironstone (1840+; Majewski 2008) and mold-blown bottle glass. However, it is impossible to assign a specific date of deposition. Ostensibly, the stratum appears to date to the mid- to late nineteenth century. Similarly, there are too few Euroamerican artifacts to accurately gauge activities in the area at the time of deposition.

Stratum 2.2

Ten Euroamerican artifacts, distributed across the unassignable (n = 3), domestic (n = 4), and construction and maintenance (n = 3) categories, were recovered from Stratum 2.2. Specific items included unidentifiable bottle glass (n = 3), a shard from an indeterminate glassware vessel, a white ware plate or saucer body fragment, the rim of a Huejotzingo Blue-on-white (1700–1850; Deagan 1987) majolica soup plate, a sherd from an indeterminate ironstone vessel, and three pieces of window glass. The specific types of artifacts and their distribution across function-based analytic categories are nearly identical to those found in Stratum 2.1. Artifact counts are too small to infer activities occurring in the area and accurately assign a date of deposition, but like Stratum 2.1, the presence of ironstone and window glass suggest the assemblage dates to the mid- to late nineteenth century. This would coincide well with the interpretation that Stratum 2.2 is the 1870s or 1880s "old plaza surface" recorded by Lentz (2004:21) as Stratum 2.

Stratum 2.3

Eight Euroamerican artifacts were recovered from Stratum 2.3. These artifacts were distributed across the domestic (n = 1) and construction and maintenance (n = 7) categories. Specific items included a body sherd from a transfer print bowl, machine-cut square nails (n = 3), window glass (n = 3), and an unidentifiable scrap metal. The preponderance of construction and maintenance items suggests construction and or remodeling activities occurring in the area at the time of deposition. The presence of both window glass (1821+) and machine-cut square nails (ca. 1830–1890; Fontana and Greenleaf 1962:52) are strong indicators that the deposit dates to the mid-nineteenth century.

Stratum 3.4

Over half of all Euroamerican artifacts (n = 50) analyzed were collected in association with Stratum 3.4. Distribution across function-based analytical categories was similar to Strata 2.1 and 2.2, represented by the unassignable (n = 14), domestic (n = 10), and construction and maintenance (n = 26) categories. Specific artifact types were also similar: unidentifiable mold-blown bottle glass (n = 9), undecorated ironstone and white ware vessels (n = 5, mnv = 2), and window glass (n = 18), among other items (see Table 24). However, the date of this assemblage may be substantially earlier. All seven nails analyzed were hand-wrought, suggesting manufacture sometime prior to the 1850s (Nelson 1968:3). Combined with the presence of window glass (1821+), the Euroamerican artifacts seem to suggest deposition during the relatively brief Mexican period (1821–1846). However, a more plausible explanation may be that Stratum 3.4 represents a mix of late eighteenth- and early nineteenth-century materials. This latter interpretation is confirmed by the distribution of temporally sensitive Native American pottery sherds (see Wilson and Montoya, this report).

Stratum 3.5

Stratum 3.5 is believed to represent the "1680s Pueblo Revolt surface" described by Lentz (2004:21–23) as Stratum 5. Three Euroamerican artifacts distributed across the unassignable, domestic, and construction and maintenance categories were encountered. Specifically, these artifacts consisted of a bottle glass shard, a Spanish olive jar body sherd, and a hand-wrought nail. The three artifacts cannot collectively be used to date the deposit. Both the olive jar and nail could date to the late seventeenth century. However, the bottle glass was blown into a mold and lacks the characteristics commonly associated with Spanish Colonial glass (i.e., heavy seeding and a thick patina). If Stratum 3.5 does indeed date to the Pueblo Revolt of 1680, this glass would at the very least point towards rodent or unrecognized mechanical disturbance. Artifact counts are too small to infer activities in the area at the time of deposition.

Stratum 3.6

Eleven Euroamerican artifacts were collected in association with Stratum 3.6. These artifacts were distributed across the economy and production (n = 1), furnishings (n = 1), and construction and maintenance (n = 9) categories; they included slag (n = 1), cut mica (n = 1), and hand-wrought nails (n = 9). None of these items are particularly temporally diagnostic. However, based upon Native American sherds, the stratum appears to date to the seventeenth century (see Wilson and Montoya, this report). Both the mica and hand-wrought nails could be indicative of construction and/or remodeling activities during this time. Meanwhile, the slag could suggest metal working was occurring somewhere in the nearby vicinity.

Summary and Interpretation

A total of 91 Euroamerican artifacts were collected during archaeological monitoring and test excavations at LA 80000, the Santa Fe Plaza. Many of the items analyzed were recovered from strata believed to date to the late eighteenth and nineteenth centuries. Euroamerican artifacts from these contexts do not challenge these assertions but also do not offer more refined chronological control. In this case, assemblage size is clearly a limiting factor in the ability of Euroamerican artifacts to accurately date the archaeological deposits.

Similarly, pattern recognition across function-based analytic categories is made difficult by the relatively small number of Euroamerican artifacts collected. However, the vast majority of these artifacts were associated with construction and maintenance category (Fig. 25). This is atypical of Euroamerican artifact assemblages found in residential settings in the Capitol Complex Historic Neighborhood (LA 158037; Barbour 2011) or industrial/commercial settings in the Santa Fe Railyard Historic District (LA 146201; Badner in prep.).

Analysis of Euroamerican artifacts in these other downtown Santa Fe contexts demonstrates a greater diversity of Euroamerican artifacts across function-based analytic categories. This might suggest that the overwhelming dominance of construction and maintenance items at LA 80000 is indicative specifically of building fabrication or remodeling activities. If so, many of these items may have been used in constructing and/or refurbishing the Palace of the Governors. However, without refined assemblage dates, it is impossible to link any of the strata and their associated Euroamerican artifact assemblages with specific construction or renovation events mentioned in the historic record.

Given the scarcity of supplies and the irregularity of trade caravans along the Camino Real, the near absence of Euroamerican artifacts from Spanish Colonial contexts is not unexpected. Euroamerican artifacts represent 4 percent of the overall artifact assemblage recovered from Stratum 3.5 (n = 78) and 1 percent of the overall artifact assemblage recovered from Stratum 3.6 (n = 1,430; Figs. 27 and 28). Similar findings were reported in seventeenth-century deposits at the La Fonda Parking Lot (Wiseman 1992) and in later eighteenth-century contexts associated with the Baca-Garvisu estate, excavated prior to construction of the Santa Fe Community Convention Center (Lentz and Barbour 2010). Metal in particular was too valuable to be thrown away. Often a metal tool was rejuvenated or reworked into a new creation rather than discarded. Spanish families often went so far as to will small scraps of metal to subsequent generations (Moore et al. 2003). These disparities speak to the challenges of settling New Spain's northern frontier.

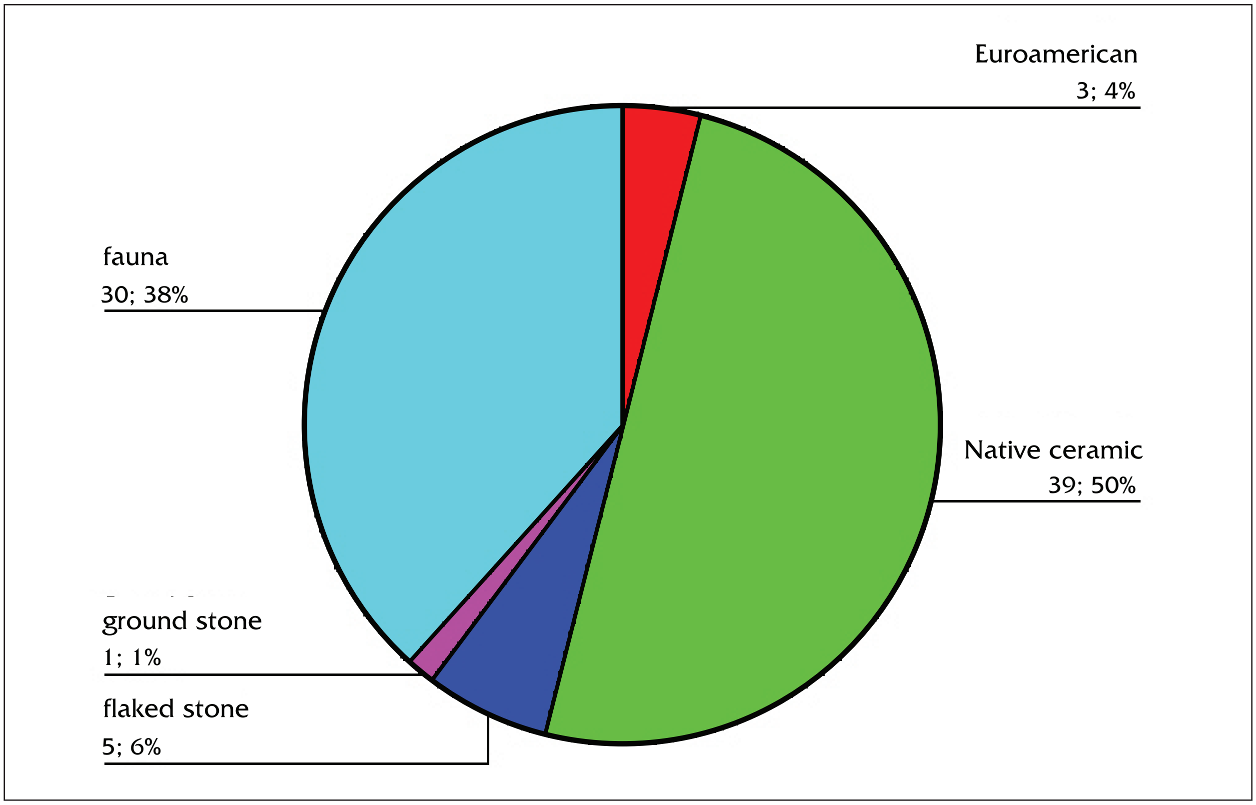


Figure 27. Artifact distribution across Stratum 3.5.

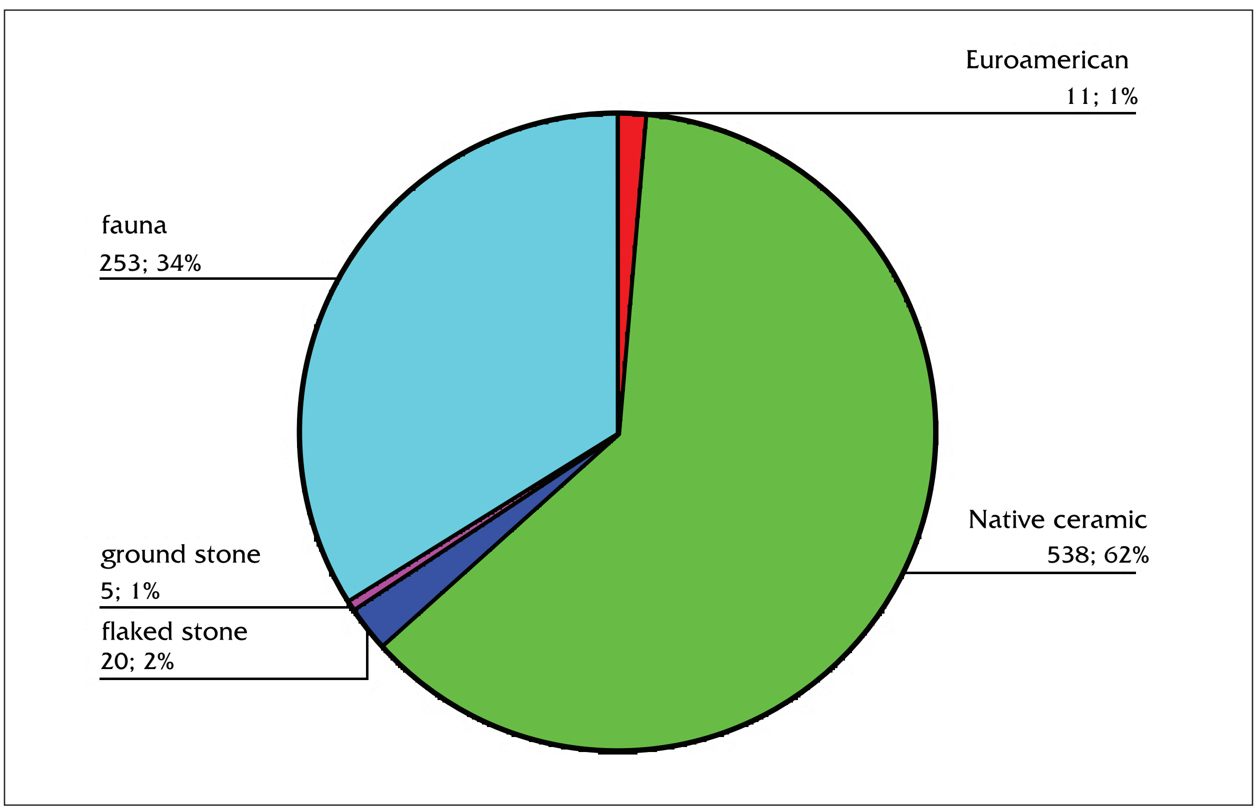


Figure 28. Artifact distribution across Stratum 3.6.

Summary and Recommendations

Santa Fe Plaza, LA 80000, is a national historic landmark registered in the *National Register of Historic Places* (October 15, 1966, Item No. 66000491) and the *State Register of Cultural Properties* (No. 27). It has been the commercial, social, and political center of Santa Fe since at least 1610, if not earlier. However, debates continue to erupt regarding its initial location, size, layout, and use (most recently Hordes 2010; also see Ellis 1975; Hordes 1990; Noble 2008; Snow 1990; Wilson 1981).

Archaeological monitoring and excavations associated with the four test units needed to install light posts along the northern boundary of the Santa Fe Plaza provided the opportunity to add to our knowledge of this culturally important and enigmatic location. Over the course of four days in the spring, OAS archaeologists documented 17 strata and collected 1,430 artifacts.

Small portions of the stratigraphic sequence coincided with previously published descriptions. In the case of the clinker deposit, Stratum 2.2, TU 2; and Stratum 3.3, TU 3 appear to represent the same late nineteenth-century surface described by Cordelia and David Snow (Cross Cultural Research Systems 1992) and Stephen Lentz (2004). If so, this deposit can be found across much of the plaza at depths ranging from 60 to 90 cm bgs.

Another deposit which could be identified across different excavations was Stratum 3.5, TU 4, which correlates well with Lentz's (2004:21) Stratum 5. These strata represent a late seventeenth- or early eighteenth-century surface on which some sort of military engagement may have taken place. Lentz's posits that this is the infamous Pueblo Revolt of 1680, but the current Native American ceramic analysis suggests the deposit dates slightly later (Wilson and Montoya, this report). If not associated with the Pueblo Revolt of 1680, it is quite possible that this stratum is archaeologically representative of the battle to recapture Santa Fe in 1693. Unfortunately, the deposit was only encountered in a single test unit and appears to be preserved only in and around the vicinity of the Santa Fe Plaza bandstand.

The majority of deposits encountered and characterized could not be tied into one another or with archaeological findings elsewhere on the plaza. The preservation and accumulation of cultural strata varied significantly across the four test units and suggests at least some discontinuity or irregularities in the depositional sequence. However, in all instances, culturally significant deposits were only encountered at or beneath a depth of 60 cm bgs. Even below the initial 60 cm, many of the artifacts residing in the sediment are small. This could suggest that most of the sediments were collected from elsewhere, churned, and thrown onto the plaza at various times in the past for wagons, horses, and humans to trample on. The exception is Stratum 3.6, which may represent domestic and kitchen waste deposited within a large pit. Artifacts recovered from this context appear date to the early to mid-seventeenth century.

Most of the Spanish documents in Santa Fe from the seventeenth century have been destroyed (Elliot 1988:27), and archaeology remains one of the few sources of information available regarding early Colonial life in Santa Fe. As a result, particular attention was given to this stratum and the cultural materials recovered therein.

Wilson and Montoya (this report) note that within the Native American ceramic assemblage, glaze wares outnumbered Tewa decorated wares four to one. This could indicate greater reliance on and contact between the settlers in Santa Fe, with Native Americans living in the Galisteo Basin and regions along the Rio Grande south of La Bajada Hill during the seventeenth century. Conversely, in the eighteenth century, pottery from south of Santa Fe is rare. Instead, colonists are acquiring pottery from their Tewa neighbors to the north.

Fauna from Stratum 3.6 was examined in relation to data from other seventeenth-century contexts elsewhere in downtown Santa Fe and was found to be comparable (Akins, this report). Combined, this seventeenth-century data set shows a diverse array of species potentially being consumed, including buffalo from the eastern plains. While seventeenth-century settlers consumed sheep and goat, they appear to represent one of many proteins in the diet, whereas goat and sheep were overwhelmingly the primary protein source in the eighteenth century.

Analysis of flaked stone indicates a preference for chertic or quartzitic material (Moore, this report). Moore postulates that these materials were favored for their ability to maintain a sharp, resilient edge, ideal for use as a strike-a-light. Two strike-a-lights were encountered based on metal adhesions.

Ground stone was not common. The few artifacts encountered were pieces of unprepared cobble with striations only denoting light or moderate use. This wear level combined with the use of cobble raw material suggests that many of these tools were used quickly and then discarded (Wening, this report).

Last, the nine hand-wrought nails, piece of mica, and metallurgical slag were of limited interpretational value but could represent metallurgy and construction/renovation activities occurring nearby at the time of deposition. Perhaps the pit was initially used as a borrow pit for mining sands and clays.

Certainly, many of the questions regarding the plaza cannot be addressed by the current archaeological data set and are outside the realm of this small study. However, the documentation of the strata coupled with detailed analysis and interpretation of the artifacts, specifically from Stratum 3.6, contributes in meaningful ways to the understanding of our past. It underscores the need to both conserve and protect Santa Plaza as a valuable archaeological resource.

No further construction on Santa Fe Plaza is scheduled by the City of Santa Fe at this time. If future ground-disturbing activities are required and it is expected that these activities will impact subsurface deposits 60 cm (2 ft) bgs, OAS recommends that archaeological monitoring be performed in conjunction with data recovery, if and when unmixed culturally significant deposits are encountered.

References Cited

Abbink, Emily K., and John R. Stein
1977 An Historical Perspective on Adaptive Systems in the Middle Rio Grande. In *Archaeological Investigations in Cochiti Reservoir, New Mexico*, Vol. 1, *A Survey of Regional Variability*, edited by J. V. Biella and R. C. Chapman. Office of Contract Archeology, University of New Mexico, Albuquerque.

Ackerly, Neal W.
1996 *A Review of the Historic Significance of and Management Recommendations for Preserving New Mexico's Acequia Systems*. Dos Rios Consultants, Silver City, New Mexico.

Acklen, John C., John A. Evaskovich, and Christopher A. Turnbow
1994 *Results of Archaeological Investigations of Old Fort Marcy, Santa Fe County, New Mexico.* MAI Project 1141. Mariah Associates, Albuquerque.

Acklen, John C., Christopher A. Turnbow, and Dorothy Larson
1997 Conclusions and Recommendations. In *Ole Volume III: Analysis*, edited by John C. Acklen. TRC Mariah Associates and the Public Service Company of New Mexico, Albuquerque.

Adams, Jenny L.
1988 Use-Wear Analyses on Manos and Hide-Processing Stones. *Journal of Field Archaeology* 15(3):307–315.

1999 Refocusing the Role of Food-Grinding Tools as Correlates for Subsistence Strategies in the U.S. Southwest. *American Antiquity* 64(3):475–498.

2002 *Ground Stone Analysis: A Technological Approach.* University of Utah Press, Salt Lake City.

2010 Understanding Grinding Technology through Experimentation. In *Designing Experimental Research in Archaeology: Examining Technology through Production and Use*, edited by Jeffrey R. Ferguson. University Press of Colorado, Boulder.

Adams, Eleanor B., and Fray Angélico Chávez
1956 *The Missions of New Mexico, 1776: A Description by Fray Francisco Atanasio Domínguez with Other Contemporary Documents*. University of New Mexico Press, Albuquerque.

Adler, Michael A., and Herbert W. Dick
1999 *Picuris Pueblo through Time: Eight Centuries of Change at a Northern Rio Grande Pueblo.* William P. Clements Center for Southwest Studies, Southern Methodist University, Dallas.

Ahlstrom, Richard V.
1985 The Interpretations of Archaeological Tree-Ring Dates. Ph.D. dissertation, Department of Anthropology, University of Arizona, Tucson.

Akins, Nancy J.
2004 Fauna. In *Excavations at LA 80000: The Santa Fe Plaza Community Station, Santa Fe, New Mexico*, by Stephen C. Lentz, pp. 35–39. Archaeology Notes 243. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

2010 Faunal Remains from Historic Features. In *Settlers and Soldiers: The Historic Component at El Pueblo de Santa Fe (LA 1051)*, by Stephen C. Lentz and Matthew J. Barbour, pp. 235–250. Archaeology Notes 410. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

in prep. a
Subsistence and Cuisine at the Palace of the Governors. In *Archaeological Excavations for the New Mexico History Museum (LA 11322): 350 Years of Occupation and Changing Land Use behind the Palace of the Governors in Santa Fe, New Mexico.* Compiled by Stephen Post.

Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

in prep. b
Historic Site Animal Use. In *Land Use, Settlement, and Community in the Southern Tewa Basin*, Vol. 2, *The Euroamerican Sites and Site Components*, edited by James L. Moore. Archaeology Notes 404. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Allen, C. D.
2004 Ecological Patterns and Environmental Change in the Bandelier Landscape. In *Village Formation on the Pajarito Plateau, New Mexico*, edited by T. A. Kohler pp. 19–68. University of New Mexico Press, Albuquerque.

Allen, Joseph W.
1972 *The Tsogue Highway Salvage Excavations near Tesuque, New Mexico*. Laboratory of Anthropology Notes 73. Museum of New Mexico, Santa Fe.

Allen, Joseph W., and Charles H. McNutt
1955 A Pit House Site near Santa Ana Pueblo, New Mexico. *American Antiquity* 20(3):241–255.

Andrefsky, William, Jr.
1998 *Lithics: Macroscopic Approaches to Analysis*. Cambridge Manuals in Archaeology. Cambridge University Press, Cambridge.

2001 Emerging Directions in Debitage Analysis. In *Lithic Debitage: Context, Form, Meaning*, edited by W. Andrefsky Jr., pp. 2–14. University of Utah Press, Salt Lake City.

Anschuetz, Kurt F., John C. Acklen, and David V. Hill
1997 Prehistoric Overview. In *Ole Volume I: Context*, edited by John C. Acklen. TRC Mariah Associates, Public Service Company of New Mexico, Albuquerque.

Badner, Jessica
in prep.
Archaeological Excavations at the Santa Fe Railyard, Santa Fe, New Mexico. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Banks, Larry D.
1990 *From Mountain Peaks to Alligator Stomachs: A Review of Lithic Sources in the Trans-Mississippi South, the Southern Plains, and Adjacent Southwest.* Memoir 4 of the Oklahoma Anthropological Society. Oklahoma City.

Bandelier, Adolph
1893 *The Gilded Man (El Dorado) and Other Pictures of the Spanish Occupancy of America*. D. Appleton, New York.

Barbour, Matthew J.
2010a Archaeological Monitoring and Testing Plan for the Installation of Four Light Poles on the Santa Fe Plaza (LA 80000) in Downtown Santa Fe, New Mexico. On file, New Mexico Historic Preservation Division, Santa Fe.

2010b *Archaeological Monitoring of the Installation of Seven Light Posts on Santa Fe Plaza in Downtown Santa Fe, New Mexico*. Archaeology Notes 412. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

2011 *Urban Archaeology in the Capitol Complex Historic District, Santa Fe, New Mexico*. Archaeology Notes 403. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Bartlett, Katharine
1933 Pueblo Milling Stones of the Flagstaff Region and their Relation to Others in the Southwest. *Museum of Northern Arizona Bulletin* 3. Flagstaff.

Batkin, Jonathan
1987 *Pottery of the Pueblos of New Mexico, 1700 to 1900*. Colorado Springs Fine Arts Center, Colorado Springs.

Baxter, John O.
1987 *Las Carneradas: Sheep Trade in New Mexico, 1700–1860*. Published in cooperation with the Historical Society of New Mexico. Uni-

versity of New Mexico Press, Albuquerque.

1997 *Dividing New Mexico's Waters, 1700–1912*. University of New Mexico Press, Albuquerque.

Bell, William H., and Edward F. Castetter
1941 *The Utilization of Yucca, Sotol and Beargrass by the Aborigines in the American Southwest*. University of New Mexico Bulletin Ethnobiological Studies in the American Southwest 8. University of New Mexico Press, Albuquerque.

Bowden, J. J.
1969 Private Land Claims in the Southwest. Vol. 1. Master's thesis, Southern Methodist University, Dallas.

Bowen, Joanne V.
1995 Seventeenth Century Faunal Remains from Santa Fe's Downtown Historic District. In *No Scum, No Vermin: Seventeenth Century Faunal Remains from Santa Fe's Downtown Historic District*, by David H. Snow and Joanne Bowen. Report prepared for the Archaeological Review Committee, City of Santa Fe. On file, Office of Archaeological Studies Library, Santa Fe.

Boyer, Jeffrey, Charles Hannaford, Guadalupe Martinez, and Adisa Willmer
1994 *Historic Artifact Analysis Standardized Variable and Attribute Codes.* Archaeology Notes 24d. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Boyer, Jeffrey L., and Steven A. Lakatos
1997 Archaeological Clearance Letter for the Pojoaque South Project US 84/285, Santa Fe County, New Mexico. On file, Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Boyle, Susan C.
1997 *Los Capitalistas: Hispano Merchants and the Santa Fe Trade.* University of New Mexico Press, Albuquerque.

Brooks, James F.
2002 *Captives and Cousins: Slavery, Kinship, and Community in the Southwest Borderlands.* Published for the Omohundro Institute of Early American History and Culture, Williamsburg, Virginia. University of North Carolina Press, Chapel Hill and London.

Bustamante, Adrian H.
1989 Españoles, Castas, y Labradores. In *Santa Fe: History of An Ancient City*, edited by David Noble, pp. 65–77. School of American Research Press, Santa Fe.

Carlson, Alvar Ward
1969 New Mexico's Sheep Industry, 1850–1900: Its Role in the History of the Territory. *New Mexico Historical Review* 44(1):25–49.

Carroll, Charles H.
1984 Norton-Tesuque 115 kV Transmission Project Cultural Resources Technical Report. Ms. on file, Public Service Company of New Mexico, Albuquerque.

Castetter, Edward H., and Ruth M. Underhill
1935 *The Ethnobiology of the Papago Indians*. University of New Mexico Bulletin, Ethnobiological Studies in the American Southwest 2. University of New Mexico Press, Albuquerque.

Chapman, Kenneth M.
1970 *The Pottery of San Ildefonso Pueblo*. University of New Mexico Press, Albuquerque.

Chávez, Fray Angélico
1979 Genízaros. In *Handbook of North American Indians*, Vol. 9, edited by A. Ortiz, pp. 198–200. Smithsonian Institution, Washington, DC.

Cordell, Linda S.
1979 A Cultural Resources Overview of the Middle Rio Grande Valley, New Mexico. USDA Forest Service, Albuquerque.

1984 *Prehistory of the Southwest*. Academic Press, New York.

Cordero, Robin, and Glenda Deyloff
2002 Faunal Assemblage. In *Final Results of Ar-*

chaeological Investigations and Archival Study at the 60 East San Francisco Street Property Parking Lot, Santa Fe, New Mexico, by Glenda Deyloff, pp. 217–232. Southwest Archaeological Consultations 442c. Santa Fe.

Cotterell, Brian, and Johan Kaminga
1987 The Formation of Flakes. *American Antiquity* 52:675–708.

Crabtree, Don E.
1972 *An Invitation to Flintworking*. Occasional Papers of the Idaho State Museum No. 28. Pocatello.

Creamer, Winefred
1993 *The Architecture of Arroyo Hondo Pueblo*. Arroyo Hondo Archaeological Series, Vol. 7. School of American Research Press, Santa Fe.

Cross Cultural Research Systems
1992 *Santa Fe Historic Plaza Study II: Plaza Excavation Final Report, Fall 1990*. City of Santa Fe Historic Preservation Office, Santa Fe.

Deagan, Kathleen
1987 *Artifacts of the Spanish Colonies of Florida and the Caribbean, 1500–1800.* Vol. 1, *Ceramics, Glassware, and Beads*. Smithsonian Institution Press, Washington, DC, and London.

Dean, Robert K.
2010 King Maker in the Back Room: Editor Max Frost and Hardball Politics in the Late Territorial Period, 1876–1909. In *All Trails Lead to Santa Fe: An Anthology Commemorating the 400th Anniversary of the Founding of Santa Fe, New Mexico in 1610*, edited by the 400th Anniversary of Santa Fe Book Committee, pp. 317–338. Sunstone Press, Santa Fe.

Dello-Russo, Robert
2010 *Archaeological Testing at the Caja del Rio Paleoindian Site (LA 112527), Santa Fe County, New Mexico*. Archaeology Notes 401. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Deyloff, Glenda
1998 *Results of Archaeological Sewer Line Excavations Monitoring in the Santa Fe City Hall Parking Lot*. SW 421B. Southwest Archaeological Consultants, Santa Fe.

Dick, Herbert W.
1968 Six Historic Pottery Types from Spanish Sites in New Mexico. In *Collected Papers in Honor of Lyndon L. Hargrave*, edited by A. H. Schroeder, pp. 77–94. Papers of the Archaeological Society of New Mexico No. 1. Museum of New Mexico Press, Albuquerque.

Dickson, Bruce D.
1979 *Prehistoric Pueblo Settlement Patterns: The Arroyo Hondo Site Settlement Survey*. Arroyo Hondo Archaeological Series, Volume 2. School of American Research Press, Santa Fe.

Dozier, Edward P.
1970 *The Pueblo Indians of North America*. Holt, Rinehart and Winston, New York.

Drake, Lynne
1992 Archaeological Investigations of a Backhoe Trench on the West Side of City Hall, Downtown Santa Fe, New Mexico. On file, City of Santa Fe Planning Division. Drakos Archaeological Consulting, Santa Fe.

Eggan, Fred
1979 Pueblos: Introduction. In *Handbook of North American Indians*, Vol. 9, edited by A. Ortiz, pp. 224–235. Smithsonian Institution, Washington, DC.

Eiselt, B. Sunday
2006 The Emergence of Jicarilla Apache Economy during the 19th Century in Northern New Mexico. Ph.D. dissertation, Department of Anthropology, University of Michigan, Ann Arbor.

Eiselt, B. Sunday, and Richard I. Ford
2007 Sangre de Cristo Micaceous Clays: Geochemical Indices for Source and Raw Material Distribution, Past and Present. *Kiva* 73:219–236.

Elliott, Michael L.

1988 *The Archaeology of Santa Fe: A Background Report*. Jemez Mountain Research Center 87-113. Albuquerque, New Mexico.

Ellis, Bruce T.
1974 Sketch Map of "Old Foundations Uncovered in the Elks Parking Lot Trenching." Field notes, File 19, LA 4451. Archeological Records Management Section, Historic Preservation Division, Santa Fe.

Ellis, Florence Hawley
1975 Life in the Tesuque Valley and Elsewhere in the Santa Fe Area during the Pueblo II Stage of Development. *Awanyu* 3(2):27–49.

Euler, R. C., and H. F. Dobyns
1983 The Ethnoarchaeology of Pai Milling Stones. In *Collected Papers in Honor of Charlie Steen Jr.,* edited by N. L. Fox. *Papers of the Archaeological Society of New Mexico No. 8*. Albuquerque Archaeological Society Press, Albuquerque.

Evaskovich, John A., Richard W. Coleman, Richard A. Anduze, E. Tianna Crollett, Robert Dello-Russo, John C. Acklen, Katherine J. Roxlau, Richard W. Lang, Meade F. Kemrer, Dorothy L. Larson, Rachel Loehman, and Douglas G. Campbell
1997 Cañones Mesa Geoarchaeological Unit. In *OLE, Volume I: Context*, edited by John C. Acklen, pp. 199–462. Public Service Company of New Mexico, Albuquerque.

Fenneman, Nevin M.
1931 *Physiography of the Western United States*. McGraw-Hill, New York.

Fergusson, Harvey
1967 *Rio Grande*. William Morrow, New York.

Fierman, Floyd S.
1964 The Spiegelbergs of New Mexico: Merchants and Bankers, 1844–1893. *Southwestern Studies* 1:371–451. Texas Western College Press, El Paso.

Folks, James J.
1975 *Soil Survey of Santa Fe Area, New Mexico: Santa Fe County and Part of Rio Arriba County*. USDA Soil Conservation Service and Forest Service, USDI Bureau of Indian Affairs, and New Mexico Agricultural Experiment Station, Las Cruces.

Fontana, Bernard L., and Cameron Greenleaf
1962 Johnny Ward's Ranch: A Study in Historic Archaeology. *Kiva* 28(1–2):1–115.

Frank, Larry, and Francis H. Harlow
1990 *Historic Pottery of the Pueblo Indians 1600–1880*. Schiffer Publishing, West Chester, Pennsylvania.

Frank, Ross H.
1991 Changing Pueblo Indian Pottery Tradition: The Underside of Economic Development in Late Colonial New Mexico, 1750–1820. *Journal of the Southwest* 33: 282–321.

2000 *From Settler to Citizen: New Mexican Economic Development and the Creation of Vecino Society, 1750–1820*. University of California Press, Berkeley.

Franklin, Hayward
1997 Valencia Pueblo Ceramics. In *Excavations at Valencia Pueblo (LA 953) and a Nearby Hispanic Settlement (LA 67321), Valencia County, New Mexico*, edited by K. L. Brown and B. J. Vierra, pp. 125–257. Office of Contract Archeology Report No. 185-400F. Albuquerque.

Gabin, Vickie L., and Lee E. Lesperance
1977 *New Mexico Climatological Data: Precipitation, Temperature, Evaporation, and Wind, Monthly and Annual Means, 1850–1975*. W. K. Summers, Socorro.

Habicht-Mauche, Judith A.
1993 *The Pottery from Arroyo Hondo Pueblo, New Mexico: Tribalization and Trade in the Northern Rio Grande*. Arroyo Hondo Archaeological Series, Vol. 8. School of American Research Press, Santa Fe.

Hack, John T.
1942 *The Changing Environment of the Hopi Indians of Arizona.* Papers of the Peabody Mu-

seum of American Archaeology and Ethnology 35(1). Cambridge.

Hackett, Charles W., and C. C. Shelby
1942 *Revolt of the Pueblo Indians of New Mexico and Otermin's Attempted Reconquest, 1680–1682*. Vols. 8 and 9. Coronado Cuarto Centennial Publications: 1540–1940. University of New Mexico Press, Albuquerque.

Hall, G. Emlen
1987 The Pueblo Grant Labyrinth. In *Land, Water, and Culture: New Perspectives on Hispanic Land Grants*, edited by C. L. Briggs and J. R. Van Ness, pp. 67–138. University of New Mexico Press, Albuquerque.

Hammond, George P.
1927 Oñate. *New Mexico Historical Review* (April), p. 143.

Hammack, Nancy S., Alan Ferg, and Bruce Bradley
1983 *Excavations at Three Developmental Period Sites near Zia and Santa Ana Pueblos, New Mexico*. CASA Papers No. 2. Complete Archaeological Service Associates, Cortez, Colorado.

Hammond, George P., and Agapito Rey
1953 *Don Juan de Oñate: Colonizer of New Mexico, 1595–1628.* University of New Mexico Press, Albuquerque.

Hannaford, Charles A.
1997a Archaeological Monitoring of Building and Site Improvements at the United States Courthouse and the Federal Oval, Santa Fe, New Mexico. Archaeology Notes 218. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

1997b *Archaeological Monitoring at LA 902, the Fine Arts Building, Santa Fe, New Mexico*. Archaeology Notes 148. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

2007 *The First Judicial District Courthouse Complex: Archaeological Investigations at LA 156207 in Santa Fe, Santa Fe County, New Mexico*. Archaeology Notes 390. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Hannaford, Charles A., and Yvonne R. Oakes
1983 Historic Artifacts. In *The Ontiberos Site: A Hispanic Homestead near Roswell, New Mexico*, by Yvonne R. Oakes, pp. 70–82. Laboratory of Anthropology Notes 311. Museum of New Mexico, Santa Fe.

Harlow, Francis H.
1970 History of Painted Tewa Pottery. In *The Pottery of San Ildefonso Pueblo*, by Kenneth Chapman, pp. 37–51, University of New Mexico Press, Albuquerque.

1973 *Matte Paint Pottery of the Tewa, Keres, and Zuni Pueblos*. Museum of New Mexico, Santa Fe.

Hawley, Florence
1936 *Field Manual of Prehistoric Southwestern Pottery Types*. University of New Mexico Bulletin 291, Anthropological Series 1(4).

Hayes, Alden C., Jon N. Young, and A. Helene Warren
1981 *Excavation of Mound 7, Gran Quivira National Monument, New Mexico*. National Park Service Publications in Archaeology 16. US Department of the Interior, US Government Printing Office, Washington, DC.

Haynes, C. Vance
1980 The Clovis Culture. *Canadian Journal of Anthropology* 1(1): 115–121.

Hewett, Edgar Lee
1912 *First Annual Report of the Museum of New Mexico*. Santa Fe.

Hibben, Franklin C.
1975 *Kiva Art of the Anasazi at Pottery Mound*. KC Publications, Las Vegas, New Mexico.

Hordes, Stanley M.
1990 The History of the Santa Fe Plaza, 1610–1720. In *Santa Fe Historic Plaza Study I, with Translations from Spanish Colonial Documents,* edited by Linda Tigges, pp. 3–36. Santa Fe City Planning Department.

2010 The History of Santa Fe Plaza, 1610–1720. In *All Trails Lead to Santa Fe: An Anthology Commemorating the 400th Anniversary of the Founding of Santa Fe, New Mexico in 1610*, edited by the 400th Anniversary of Santa Fe Book Committee, pp. 129–146. Sunstone Press, Santa Fe.

Hull-Walski, Deborah A., and James E. Ayres
1989 *The Historical Archaeology of Dam Construction Camps in Central Arizona.* Vol. 3, *Laboratory Methods and Data Computerization*. Dames & Moore, Phoenix.

Irwin-Williams, Cynthia
1973 *The Oshara Tradition: Origins of Anasazi Culture.* Contributions in Anthropology 5(1). Eastern New Mexico University, Portales.

Ivey, James
2010 The Viceroy's Order Founding the Villa of Santa Fe: A Reconsideration, 1650–1610. In *All Trails Lead to Santa Fe, An Anthology Commemorating the 400th Anniversary of the Founding of Santa Fe, New Mexico in 1610* edited by the 400th Anniversary of Santa Fe Book Committee, pp. 97–108. Sunstone Press, Santa Fe.

Jenkins, Myra E., and Albert H. Schroeder
1974 *A Brief History of New Mexico*. University of New Mexico Press, Albuquerque.

Jernigan, E. Wesley
1978 *Jewelry of the Prehistoric Southwest.* School of American Research, Santa Fe; and University of New Mexico Press, Albuquerque.

Julian, George N.
1887 Land Stealing in New Mexico. *North American Review* 65:17–31.

Kamen, Henry
2003 *Empire: How Spain Became a World Power, 1492–1763.* Harper Collins Press, New York.

Kelley, N. Edmund
1980 *The Contemporary Ecology of Arroyo Hondo, New Mexico*. Arroyo Hondo Archaeological Series, Vol. 1. School of American Research Press, Santa Fe.

Kelly, Robert L.
1985 *Hunter-Gatherer Mobility and Sedentism: A Great Basin Study*. Ph.D. dissertation, Department of Anthropology, University of Michigan. University Microfilms, Ann Arbor.

1988 The Three Sides of a Biface. *American Antiquity* 53:717–734.

Kelly, Vincent C.
1979 Geomorphology of the Española Basin. In *New Mexico Geological Society Guidebook: Santa Fe County (30th Field Conference)*, pp. 281–288. University of New Mexico, Albuquerque.

Kessell, John L.
1989 *Kiva, Cross, and Crown: The Pecos Indians and New Mexico, 1540–1840*. National Park Service, US Department of the Interior, Washington, DC.

Kennedy, Michael
1998 *Archaeological Investigations of Five Sites in the Santa Fe National Cemetery, Santa Fe, New Mexico*. Rio Grande Consultants, Albuquerque.

Kidder, Alfred V.
1915 *Pottery of the Pajarito Plateau and Some Adjacent Regions in New Mexico*. Memoirs of the American Anthropological Association 2(6).

1924 *An Introduction to the Study of Southwestern Archaeology, with a Preliminary Account of the Excavations at Pecos*. Reprint, 1962, Yale University Press, New Haven.

Kidder, Alfred V., and Anna O. Sheppard
1936 The Pottery of Pecos. Vol. 2, *The Glaze Paint, Culinary, and Other Wares*. Papers of the Phillips Academy, Southwest Expedition No. 7. Yale University Press, New Haven.

Kohler. Timothy A.
1990 *Bandelier Archaeological Excavation Project: Summer 1989 Excavations at Burnt Mesa Pueblo*. Reports of Investigations 62. De-

partment of Anthropology, Washington State University, Pullman.

Koning, D. J., S. D. Connell, F. J. Pazzaglia, and W. C. McIntosh
2002 Redefinition of the Ancha Formation and Pliocene-Pleistocene Deposition in the Santa Fe Embayment, North-Central New Mexico. *New Mexico Geology* 24(3):75–87.

Ladd, Edmund J.
1979 Zuni Economy. In *Handbook of North American Indians*, Vol. 9, *Southwest*, edited by William C. Sturtevant. Smithsonian Institution, Washington, DC.

Lakatos, Steven A.
2006 Cultural Continuity in the Northern Rio Grande Valley of New Mexico, A.D. 600–1200. Master's thesis, Department of Anthropology, New Mexico Highlands University, Las Vegas.

2011 *Data Recovery Results from the First Judicial District Courthouse Complex, LA 156207, Santa Fe County, New Mexico*. Archaeology Notes 424. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Lakatos, Steven A., Stephen Post, Jessie Murrell
2001 *Data Recovery Results from Two Archaeological Sites along North Ridgetop Road, Santa Fe, New Mexico*. Archaeology Notes 290. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Lambert, Marjorie
1985 The Wells in the Palace of the Governors Patio and the Excavations and Repair of Well 1. In *Southwestern Cultural History: Collected Papers in Honor of Albert H. Schroeder*. Papers of the Archaeological Society of New Mexico 10. Ancient City Press, Santa Fe.

Lamar, Howard R.
1966 *The Far Southwest, 1846–1912: A Territorial History*. Yale University Press, New Haven.

Lang, Richard W.
1995 *Flint Procurement and Other Limited Activity Sites of the Upper Tesuque Valley, New Mexico: A Sampling from the Bishop's Lodge Locality*. Southwest Archaeological Consultants Report SW 284B. Santa Fe.

1997a *The Archaeological Landscape of Las Campanas: Archaic and Pueblo Use of the Piedmont Slopes Northwest of Santa Fe, Santa Fe County, New Mexico*. SW 317. Southwest Archaeological Consultants, Santa Fe.

1997b Ceramics from Archaeological Sites in the Vicinity of the Jemez Mountains: The Ole Corridor. In *OLE Volume II: Artifacts*, edited by John C. Acklen, pp. 231–276. TRC Mariah Associates, Albuquerque.

Lange, Charles H.
1968 *Cochiti Dam Archaeological Salvage Project*. Part 1, *Report on the 1963 Season*. Museum of New Mexico Research Records No. 6. Santa Fe.

Larson, Robert W.
1968 *New Mexico's Quest for Statehood: 1846–1912*. University of New Mexico, Albuquerque.

LeCompte, Janet
1989 When Santa Fe Was a Mexican Town. In *Santa Fe: History of An Ancient City*, edited by David Noble, pp. 79–95. School of American Research Press, Santa Fe.

Lentz, Stephen C.
1991 *Survey, Test Excavation Results, and Data Recovery Plan for Cultural Resources near San Juan Pueblo, Rio Arriba County, New Mexico*. Archaeology Notes 17. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

2004 *Excavations at LA 80000, the Santa Fe Plaza Community Stage Location, Santa Fe, New Mexico*. Archaeology Notes 343. Museum of New Mexico, Office of Archaeological Studies, Santa Fe.

2005 *El Pueblo de Santa Fe (LA 1051): Archaeological Testing of the Proposed Santa Fe Civic Center*. Archaeology Notes 355. Office of

Archaeological Studies, Museum of New Mexico, Santa Fe.

2011 *Ogapogeh, the White Shell Water Place: The Prehistoric Component at El Pueblo de Santa Fe (LA 1051).* Archaeology Notes 410. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Lentz, Stephen C., and Matthew J. Barbour
2008 Preliminary Report on Selected Pit Structure Proveniences at LA 1051, El Pueblo de Santa Fe. Preliminary Report No. 12. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Levine, Daisy F.
1990 *Archaeological Excavation in the Courtyard of the Palace of the Governors*. Laboratory of Anthropology Notes 513. Museum of New Mexico, Santa Fe.

Lewis, Candace K.
2004 Ceramic Artifact Analysis. In *Excavations at LA 80000, the Santa Fe Plaza Community Stage Location, Santa Fe, New Mexico,* by Stephen C. Lentz, pp. 47–56. Archaeology Notes 410. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Lewis, Nancy Owen
2010 The Cure at the End of the Trail: Seeking Health While Transforming a Town, 1880–1940. In *All Trails Lead to Santa Fe: An Anthology Commemorating the 400th Anniversary of the Founding of Santa Fe, New Mexico in 1610* edited by the 400th Anniversary of Santa Fe Book Committee, pp. 361–382. Sunstone Press, Santa Fe.

Lipe, William D.
1989 Social Scale of Mesa Verde Anasazi Kivas. In *The Architecture of Social Integration in Prehistoric Pueblos*, edited by W. D. Lipe and M. Hegmon, pp. 53–71. Occasional Papers, No. 1. Crow Canyon Archaeological Center, Cortez, Colorado.

Lucas, Mary Beth
1984 Norton-Tesuque 115 KV Transmission Project. Earth Resources Technical Report. On file, Public Service Company of New Mexico, Albuquerque.

Luedtke, Barbara E.
1992 *An Archaeologist's Guide to Chert and Flint*. Archaeological Research Tools 7. Institute of Archaeology, University of California, Los Angeles.

Lyman, R. Lee
1994 *Vertebrate Taphonomy*. Cambridge University Press, Cambridge.

Majewski, Teresita
2008 Notes on Historic Ceramics. Presented at the 2008 New Mexico Archaeological Council Historic Artifact Workshop, *Euroamerican, Hispanic, and Asian Ceramics and other Artifacts,* Albuquerque.

Martinez, Guadalupe A.
1994 *Results of the Monitoring of Two Construction Sites along Lincoln Avenue, Santa Fe, New Mexico.* Archaeology Notes 61. Office of Archaeological Studies, Museum of New Mexico.

Maxwell, Timothy D., and Kurt F. Anschuetz
1992 The Southwestern Ethnographic Record and Prehistoric Agricultural Diversity. In *Gardens in Prehistory: The Archaeology of Settlement Agriculture in Greater Mesoamerica*, edited by T. W. Killon, pp. 35–68. University of Alabama Press, Tuscaloosa.

Maxwell, Timothy D., and Stephen S. Post
1992 *An Archaeological and Historical Study of Old Pecos Trail*. Archaeology Notes 58. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

McKenna, Peter J., and Judith Miles
1990 Ceramic Manual for the Bandelier Archaeological Survey. On file, Bandelier National Park.

McNutt, Charles H.
1969 *Early Puebloan Occupations at Tesuque By-pass and in the Upper Rio Grande Valley*. Anthropological Papers No. 40. Museum of Anthropology, University of Michigan,

Ann Arbor.

Mera, H. P.
1932 *Wares Ancestral to Tewa Polychrome*. Laboratory of Anthropology Technical Series, Bulletin No. 4. Museum of New Mexico, Santa Fe.

1933 *A Proposed Revision of the Rio Grande Paint Sequence*. Laboratory of Anthropology Technical Series, Bulletin No. 5. Museum of New Mexico, Santa Fe.

1934 *A Survey of the Biscuit Ware Area in Northern New Mexico*. Technical Series Bulletin No. 8. Laboratory of Anthropology, Museum of New Mexico, Santa Fe.

1935 *Ceramic Clues to the Prehistory of North Central New Mexico*. Technical Series Bulletin No. 8. Laboratory of Anthropology, Museum of New Mexico, Santa Fe.

1939 *Style Trends of Pueblo Pottery in the Rio Grande and Little Colorado Cultural Areas from the Sixteenth to the Nineteenth Century*. Laboratory of Anthropology Memoirs No. 3. Museum of New Mexico, Santa Fe.

1940 *Population Changes in the Rio Grande Glaze Paint Area*. Technical Series Bulletin No. 9. Laboratory of Anthropology, Museum of New Mexico, Santa Fe.

Miller, John P.
1963 Cenozoic Deposits. In *Geology of Part of the Southern Sangre de Cristo Mountains, New Mexico*, by J. Miller, A. Montgomery, and P. Sutherland, pp. 50–53. Memoir 11. State Bureau of Mines and Minerals, Socorro.

Montgomery, Arthur
1963 Precambrian Rocks. In *Geology of Part of the Southern Sangre de Cristo Mountains, New Mexico*, by J. Miller, A. Montgomery, and P. Sutherland, pp. 6–21. Memoir 11. State Bureau of Mines and Minerals, Socorro.

Moore, James L.
1992 Spanish Colonial Stone Tool Use. In *Current Research on the Late Prehistory and Early History of New Mexico*, edited by B. Vierra, pp. 239–244. New Mexico Archaeological Council Special Publication 1. Albuquerque.

2001a Spanish Adaptations to the New Mexican Frontier: LA 65005. In *Prehistoric and Historic Occupation of Los Alamos and Guaje Canyons: Data Recovery at Three Sites near the Pueblo of San Ildefonso*, by J. Moore, pp. 161–203. Archaeology Notes 244. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

2001b Analysis of the Chipped Stone Artifact Assemblage. In *Valencia: A Spanish Colonial and Mexican Period Site along NM 47 in Valencia County, New Mexico*, by N. Akins, pp. 61–85. Archaeology Notes 267. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

2003a Analysis of the Chipped Stone Assemblages. In *Occupation of the Glorieta Valley in the Seventeenth and Nineteenth Centuries: Excavations at LA 76138, LA 76140, and LA 99029*, by J. Moore, pp. 127–161. Archaeology Notes 262. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

2003b Spanish Chipped Stone Artifacts. In *Adaptations On the Anasazi and Spanish Frontiers: Excavations at Five Sites near Abiquiú, Rio Arriba County, New Mexico*, by J. Moore, J. Boyer, and D. Levine, pp. 179–200. Archaeology Notes 187. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

2008 *Spanish Chipped Stone Technology*. Paper presented in the symposium *People, Land, and Empire: A Historical Archaeology Perspective on 400 Years of New Mexico's Past*. 41st Annual Conference on Historical and Underwater Archaeology, Society for Historical Archaeology, Albuquerque.

n.d. Patterns of Historic Spanish Chipped Stone Use and Manufacture. In *Land Use, Settlement, and Community in the Southern Tewa Basin*, Vol. 2, *The Euroamerican Sites and Site Components*, edited by J. Moore. Archaeology Notes 404. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Moore, James L., Jeffrey L. Boyer, and Daisy F. Levine
2003 *Adaptations on the Anasazi and Spanish Frontiers: Excavations at Five Sites near Abiquiú, Rio Arriba County, New Mexico*. Archaeology Notes 187. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Moorhead, Max L.
1974 The Presidio of Santa Fe. New Mexico. *Historical Review* 49(2):123–142. University of New Mexico Press, Albuquerque.

1975 *The Presidio: Bastion of the Spanish Borderlands*. University of Oklahoma Press, Norman.

Myers, Sandra L.
1979 The Ranching Frontier: Spanish Institutional Backgrounds of the Plains Cattle Industry. In *New Spain's Far Northern Frontier: Essays on Spain in the American West: 1540–1821*, edited by David J. Weber, pp. 79–94. University of New Mexico Press, Albuquerque.

Nelson, Lee H.
1968 *Nail Chronology as an Aid to Dating Old Buildings*. American Association for State and Local History Technical Leaflet 48. *History News* 24(11):1–12.

Nims, F. C.
1881 *Health, Wealth, and Pleasure in Colorado and New Mexico: A Reliable Treatise on the Famous Pleasure and Health Resorts, and the Rich Mining and Agricultural Regions of the Rocky Mountains*. Belford, Clarke, Chicago. Centennial edition, Museum of New Mexico Press, 1980.

Noble, David G.
2008 *Santa Fe: History of an Ancient City*. School of American Research Press, Santa Fe.

(OAS) Office of Archaeological Studies
1994a *Standardized Lithic Artifact Analysis: Attributes and Variable Code Lists*. Archaeology Notes 24b. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

1994b *Standardized Ground Stone Artifact Analysis: A Draft Manual for the Office of Archaeological Studies*. Archaeology Notes 24a. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Orcutt, Janet D.
1991 Environmental Variability and Settlement Changes on the Pajarito Plateau, New Mexico. *American Antiquity* 56(2):315–332.

Ortiz, Alfonso
1979 San Juan Pueblo. In *Handbook of the North American Indians*, Vol. 9, *Southwest*, edited by Alfonso Ortiz, pp. 278–295. Smithsonian Institution, Washington, DC.

Parsons, Jeffrey R., and Mary H. Parsons
1990 *Maguey Utilization in Highland Central Mexico: An Archaeological Ethnography*. Anthropological Papers No. 82. Museum of Anthropology, University of Michigan, Ann Arbor.

Payne, Melissa
1999 Valley of Faith: Historical Archaeology in the Upper Santa Fe River Basin. Ph.D. dissertation, Department of Anthropology, University of New Mexico, Albuquerque.

Pearce, Thomas M.
1965 *New Mexico Place Names: A Geographical Dictionary*. University of New Mexico Press, Albuquerque.

Peckham, Stewart L.
1954 A Pueblo I Site near San Felipe Pueblo, New Mexico. *New Mexico Highway Salvage Archaeology* 1(4):41–51.

1957 Three Pithouse Sites near Albuquerque, New Mexico. In *New Mexico Highway Salvage Archaeology* 3(12):39–70. Museum of New Mexico, Santa Fe.

1977 Field notes for trench monitoring, LA 4450 #33. LA 1051 site record. On file, Archaeological Records Management Section, Historic Preservation Division, Museum of New Mexico, Santa Fe.

1982 Nusbaum's Old Headquarters Excavations, 1916. *El Palacio* 88(2):41–42.

1984 The Anasazi Culture of the Rio Grande Rift. In *New Mexico Geological Society Guidebook: Rio Grande Rift, Northern New Mexico*, pp. 275–281. Socorro, New Mexico.

Pilz, Wayne B.
1984 Norton-Tesuque 115 kV Transmission Project Biotic Resources Technical Report. On file, Public Service Company of New Mexico, Albuquerque.

Porter, Valerie
1991 *Cattle: A Handbook to the Breeds of the World*. Helm, London.

Post, Stephen S.
1996 *Las Campanas de Santa Fe: Sunset Golf Course, and Estates IV, Estates V, and Estates VII Excavations.* Archaeology Notes 193. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

1999 *An Archaeological Investigation of the Former Sotero Romero Property (LA 110432) at the Cieneguita del Camino Real Subdivision in Santa Fe, New Mexico*. Archaeology Notes 254. Museum of New Mexico, Office of Archaeological Studies, Santa Fe.

2001 *The Archaic Sites Project: A Sample Archaeological Inventory of the Former Santa Fe Ranch Lease, Taos Field Office, Bureau of Land Management, Santa Fe County New Mexico*. Santa Fe Northwest Advisory Council Report No. 2. Submitted to Bureau of Land Management, Taos Field Office, Taos, New Mexico.

2002 *A Data Recovery Plan for Excavation at the New Mexico Museum of History Site: 700 Years of Human Occupation near the Palace of the Governors in Santa Fe, New Mexico*. Archaeology Notes 311. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

2008 Ancient Santa Fe: Ten Thousand Years of High Desert Living. In *Santa Fe: History of an Ancient City*, edited by David Grant Noble, pp. 1–14. School of Advanced Research Press, Santa Fe.

2010 *7,000 Years on the Piedmont: Fourteen Archaeological Sites along the Northwest Santa Fe Relief Route, Santa Fe County, New Mexico*. Archaeology Notes 357. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Post, Stephen S., and David H. Snow
1982 *Archaeological Investigations for the Gallery Addition to the Museum of Fine Arts*. Laboratory of Anthropology Notes 282. Museum of New Mexico, Santa Fe.

Post, Stephen S., Nancy Akins, Eric G. Ozolins, Vincent H. Stefan, and Joseph F. Powell
1998 *The 124 Kearney Road Burials (LA 120430): Report on Human Remains Recovered from a Water Meter Excavation near Downtown Santa Fe, New Mexico.* Archaeology Notes 248. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Pratt, Boyd C., and David H. Snow
1988 *The North Central Overview: Strategies for the Comprehensive Survey of the Architectural and Historic Archaeological Resources of North Central New Mexico*. Vol. 1, *Historic Overview of North Central New Mexico*. New Mexico State Historic Preservation Division, Santa Fe.

Preucel, Robert
2002. *Archaeologies of the Pueblo Revolt*: *Identity, Meaning and Renewal in the Pueblo World*. University of New Mexico Press, Albuquerque.

Reiter, Paul
1938 *The Jemez Pueblo of Unshagi New Mexico with Notes on the Earlier Excavations at Amoxiumqua and Gusewa.* Vols. 1 and 2. Monographs of the School of American Research No. 6. University of New Mexico and School of American Research, Santa Fe.

Reitz, Elizabeth J., and Elizabeth S. Wing
1999 *Zooarchaeology*. Cambridge Manuals in Archaeology. Cambridge University Press, Cambridge.

Reynolds, S. E.
1956 *Climatological Summary, New Mexico*. Technical Report 5. State Engineer's Office, Santa Fe.

Robertson, Gail, and Val Attenbrow
2008 Skin-Working at Emu Tracks 2, New South Wales, Australia: An Integrated Residue and Use-Wear Analysis of Backed Artefacts. *Lithic Technology* 33:31–49.

Schaafsma, Curtis F.
1982 A Window on Santa Fe's History. *El Palacio* 88(3):29–39.

Schaafsma, Polly
1992 *Rock Art in New Mexico*. Museum of New Mexico Press, Santa Fe.

Schaafsma, Polly, and Curtis F. Schaafsma
1974 Evidence of the Origins of the Pueblo Katchina Cult as Suggested by Southwestern Rock Art. *American Antiquity* 39(4):535–534.

Schmader, Matthew, F.
1994 *Archaic Occupations of the Santa Fe Area: Results of the Tierra Contenta Archaeological Project*. Final report submitted to the Archaeological Review Committee. Rio Grande Consultants, Albuquerque.

Scheick, Cherie L.
2003 *Final Results of Archaeological Investigations and Archival Study at the 125 Guadalupe Street Property, Santa Fe, New Mexico*. Southwest Archaeological Consultants, Santa Fe.

2005 *Coalition Period Remains under the West Alcove, U.S. Federal Courthouse, Santa Fe, New Mexico*. SW 477C. Southwest Archaeological Consultants, Santa Fe.

Scheick, Cherie L., and Lonyta Viklund
2003 Archaeological Research. In *Final Report: Archaeological Resources of "La Otra Banda del Río" City of Santa Fe Railroad Properties*, by Cherie L. Scheick, pp. 7–25. SW 458b. Southwest Archaeological Consultants, Santa Fe.

Schoenwetter, James, and Alfred E. Dittert
1968 An Ecological Interpretation of Anasazi Settlement Patterns. In *Anthropological Archaeology in the Americas*, edited by Betty J. Meggers, pp. 41–66. Anthropological Society of Washington, Washington, DC.

Schroeder, Albert H.
1979 Pueblos Abandoned in Historic Times. In *Handbook of North American Indians*, Vol. 9, *Southwest*, edited by A. Ortiz, pp. 236–254. Smithsonian Institution, Washington, DC.

Schroeder, Albert H., and Dan S. Matson
1965 *A Colony on the Move: Gaspar Castaño de Sosa's Journal, 1590–1591*. School of American Research Press, Santa Fe.

Scurlock, Dan
1988 The Protohistoric, Spanish Colonial, Mexican, and Early Territorial Periods. In *Trails, Rails, and Roads: The Central New Mexico East-West Transportation Corridor Regional Overview*, Vol. 1, *Historic Overview*, by B. C. Pratt, C. D. Biebel, and D. Scurlock, pp. 197–290. Historic Preservation Division, Santa Fe.

1998 A Poor Man's Cow: The Goat in New Mexico and the Southwest. *New Mexico Historical Review* 73(1):7–24.

Seifert, Donna J.
1979 *Archaeological Excavations at the Palace of the Governors, Santa Fe, New Mexico, 1974 and 1975*. Museum of New Mexico Laboratory of Anthropology Notes 420. Santa Fe.

Simmons, Marc
1979a Settlement Patterns and Village Plans in Colonial New Mexico. In *New Spain's Far Northern Frontier: Essays on Spain in the American West*, edited by D. J. Weber, pp. 97–116. University of New Mexico Press, Albuquerque.

1979b History of Pueblo-Spanish Relations to 1821. In *Handbook of North American Indians*, Vol. 9, *Southwest*, edited by A. Ortiz, pp. 178–193. Smithsonian Institution, Washington, DC.

1989 Santa Fe in the Days of the Trail. In *Santa Fe: History of An Ancient City,* edited by David Grant Noble, pp. 115–128. School of American Research Press, Santa Fe.

1990 *Spanish Government in New Mexico.* University of New Mexico, Albuquerque.

Skinner, S, Alan, C. Shaw, C. Carter, M. Cliff, and C. Heathington
1980 *Archaeological Investigations at Nambe Falls*. Archaeological Research Program, Research Report 121. Department of Anthropology, Southern Methodist University, Dallas.

Snow, Cordelia T.
1974 A Brief History of the Palace of the Governors and a Preliminary Report on the 1974 Excavations. *El Palacio* 80(3):1–22.

1990 A Hypothetical Configuration of the Early Santa Fe Plaza Based on the 1573 Ordenanzas or the Law of the Indies. In *Santa Fe Historic Plaza Study I, with Translations from Spanish Colonial Documents*, edited by Linda Tigges, pp. 55–74. Santa Fe Planning Department, Santa Fe.

1999 Archival Research. In *Preliminary Results of Archaeological Investigations and Archival Study at 60 East San Francisco Street, Santa Fe, New Mexico*, by Glenda Deyloff, pp. 14–35. Southwest Archaeological Consultants Research Series 442. Santa Fe.

Snow, Cordelia T., and David Kammer
1995 Not Occupied since the Peace: The 1995 Archaeological and Historical Investigations at Historic Fort Marcy, Santa Fe, New Mexico. On file, City of Santa Fe Planning Division.

Snow, David H.
1973 Some Economic Considerations of Historic Rio Grande Pueblo Pottery. In *Changing Ways of Southwestern Indians: A Historical Perspective*, edited by A. Schroeder, pp. 55–72. Rio Grande Press, Glorieta, New Mexico.

1982 The Rio Grande Glaze, Matte Paint, and Plainware Traditions. In *Southwestern Ceramics: A Comparative Review*, edited by A. H. Schroeder, pp. 235–278. *Arizona Archaeologist* 15.

1988 *The Santa Fe Acequia System*. Planning and Land Use Department, City of Santa Fe.

1999 The Pigs Running Loose in This Villa: Seventeenth Century Faunal Remains from Santa Fe's Historic Downtown District. In *Archaeology in Your Backyard*, pp. 45–52. Proceedings of a City of Santa Fe Symposium, Santa Fe.

Snow, David H., and Joanne V. Bowen
1995 No Scum, No Vermin: Seventeenth Century Faunal Remains from Santa Fe's Downtown Historic District. Report prepared for the Archaeological Review Committee, City of Santa Fe. On file, Office of Archaeological Studies Library, Santa Fe.

South, Stanley
1977 *Method and Theory in Historical Archaeology*. Academic Press, Orlando.

Spicer, Edward
1962 *Cycles of Conquest*. University of Arizona Press, Tucson.

Spiegel, Zane, and Brewster Baldwin
1963 *Geology and Water Resources of the Santa Fe Area.* US Geological Survey and Water Supply Paper 1525. Washington, DC.

Spude, Robert L.
2010 Progressive Santa Fe, 1880–1912. In *All Trails Lead to Santa Fe: An Anthology Commemorating the 400th Anniversary of the Founding of Santa Fe, New Mexico in 1610*, edited by the 400th Anniversary of Santa Fe Book Committee, pp. 339–360. Sunstone Press, Santa Fe.

Steen, Charlie R.
1977 *Pajarito Plateau Archaeological Survey and Excavations*. Report LASL-77-4. Los Alamos Scientific Laboratory, Los Alamos.

1982 *Pajarito Plateau Archaeological Survey and Excavations, II*. Report LA-8860-NERP. Los Alamos National Laboratory, Los Alamos.

Steen, Charlie R., and Frederick C. V. Worman
1978 *Excavations on Mesita de los Alamos*. Report LA-7043-MS. Los Alamos Scientific Laboratory, Los Alamos.

Stevenson, Matilda Coxe
1915 The Zuni Indians. *Annual Report of the Bureau of American Ethnology* 30:31–102.

Stiner, Mary C., Steven L. Kuhn, Stephen Weiner, and Ofer Baar-Yosef
1995 Differential Burning, Recrystallization, and Fragmentation of Archaeological Bone. *Journal of Archaeological Science* 22:223–237.

Stuart, David E., and Rory P. Gauthier
1981 *Prehistoric New Mexico: Background for Survey*. Historic Preservation Bureau, Santa Fe.

Stubbs, Stanley A., and Bruce T. Ellis
1955 *Archaeological Investigations at the Chapel of San Miguel and the Site of La Castrense, Santa Fe, New Mexico*. Monographs of the School of American Research 18. Santa Fe.

Stubbs, Stanley A.
1954 Summary Report on an Early Pueblo Site in the Tesuque Valley, New Mexico. *El Palacio* 61(2):43–45.

Stubbs, Stanley A., and W. S. Stallings Jr.
1953 *The Excavation of Pindi Pueblo New Mexico*. Monographs of the School of American Research and the Laboratory of Anthropology No. 18. Santa Fe.

Sze, Corinne P., and Beverly Spears
1988 *Santa Fe Historic Neighborhood Study*. City of Santa Fe.

TANM (Territorial Archive of New Mexico)
1848–1912 Microfilm papers, correspondence, and government transactions of New Mexico's Territorial period. New Mexico Records and Archive, Santa Fe.

Thoms, Alston V.
1977 A Preliminary Projectile Point Typology for the Southern Portion of the Northern Rio Grande Region. Master's thesis, Department of Anthropology, Texas Tech University, Lubbock.

Tigges, Linda
1990 *Santa Fe Historic Plaza Study I, with Translations from Spanish Colonial Documents.* Santa Fe City Planning Department, Santa Fe.

Toulouse, Betty
1977 *Pueblo Pottery of the New Mexico Indians: Ever Constant, Ever Changing*. Museum of New Mexico Press, Santa Fe.

Towne, Charles Wayland, and Edward Norris Wentworth
1945 *Shepherd's Empire*. University of Oklahoma Press, Norman.

Trigg, Heather B.
2003 The Ties That Bind: Economic and Social Interactions in Early-Colonial New Mexico, A.D. 1598–1680. *Historical Archaeology* 37(2):65–84.

Tuan, Yi-Fu, Cyril E. Everard, Jerod D. Widdison, and Iven Bennet
1973 *The Climate of New Mexico.* New Mexico State Planning Office, Santa Fe.

Turnbow, Christopher A.
1997 Projectile Points as Chronological Indicators. In *OLE Volume II: Artifacts*, edited by John C. Acklen, pp. 161–230. Report submitted to Public Service Company of New Mexico by TRC Mariah Associates, Albuquerque.

Twitchell, Ralph E.
1925 *The Story of New Mexico's Ancient Capital: Old Santa Fe*. Rio Grande Press, Chicago.

1963 *Leading Facts of New Mexican History*. Horn

& Wallace, Albuquerque.

Van Ness, John R.
1987 Hispanic Land Grants: Ecology and Subsistence in the Uplands of Northern New Mexico and Southern Colorado. In *Land, Water, and Culture: New Perspectives on Hispanic Land Grants*, edited by C. L. Briggs and J. R. Van Ness, pp. 141–216. University of New Mexico Press, Albuquerque.

Viklund, Lonyta
1999 A *Preliminary Report on Archival and Archaeological Investigations of the Lensic Property, Santa Fe, New Mexico*. Southwest Archaeological Consultants Research Series 440a. Santa Fe.

2001 *Final Results of Archaeological Investigations of the Lensic Property, Santa Fe, New Mexico*. Southwest Archaeological Consultants Research Series 440d. Southwest Archaeological Consultants, Santa Fe.

Warren, A. Helene
1974 The Ancient Mineral Industries of Cerro Pedernal, Rio Arriba County, New Mexico. In *Silver Anniversary Guidebook: Central-Northern New Mexico*, edited by C. Siemers, pp. 87–93. New Mexico Geological Society, Socorro.

1979a The Glaze Paint Wares of the Upper Middle Rio Grande. In *Archaeological Investigations in Cochiti Reservoir, New Mexico*, Vol. 1, *A Survey of Regional Variability*, edited by J. V. Biella and R. C. Chapman. Office of Contract Archeology, University of New Mexico, Albuquerque.

1979b Historic Pottery of the Cochiti Reservoir. In *Archaeological Investigations in the Cochiti Reservoir*, Vol. 4, edited by J. Biella and R. Chapman, pp. 235–245. Office of Contract Archeology, University of New Mexico, Albuquerque.

Weber, David J.
1992 *The Spanish Frontier in North America*. Yale University Press, New Haven.

Weber, Michael F.
1974 The Problems of Preservation. *El Palacio* 80 (Fall 1974):37–45.

Wendorf, Fred
1954 *Salvage Archaeology in the Chama Valley, New Mexico*. School of American Research Monograph No. 17. Santa Fe.

Wendorf, Fred, and Erik Reed
1955 An Alternative Reconstruction of Northern Rio Grande Prehistory. *El Palacio* 62:131–173.

Wenker, Chris T.
2005 *Santa Fe Railyard Archaeological Testing: Preliminary Report*. Archaeology Notes 352. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Wentworth, Edward Norris
1948 *America's Sheep Trails*. Iowa State College Press, Ames.

Wetherington, Ronald K.
1968 *Excavations at Pot Creek Pueblo*. Fort Burgwin Research Center Report No. 6. Taos.

Westphall, Victor
1965 *The Public Domain in New Mexico 1854–1891*. University of New Mexico Press, Albuquerque.

1983 *Mercedes Reales*. New Mexico Land Grant Series. University of New Mexico Press, Albuquerque.

Williams, Jerry L. (editor)
1986 *New Mexico in Maps*. 2nd ed. University of New Mexico Press, Albuquerque.

Wilson, Christopher
1981 The Santa Fe, New Mexico Plaza: An Architectural and Cultural History, 1610–1921. Master's thesis, University of New Mexico, Albuquerque.

1997 *The Myth of Santa Fe: Creating a Modern Regional Tradition*. University of New Mexico Press, Albuquerque.

Wilson, C. Dean

2003 A Reappraisal of the Nature and Significance of Spatial Distributions of Pottery from Sites in the Northern Southwest. In *Anasazi Archaeology at the Millennium: Proceedings of the Sixth Occasional Anasazi Symposium,* edited by Paul F. Reed, pp. 129–136. Center for Desert Archaeology, Tucson.

2007 Insights from Powhoge Polychrome at Archaeological Sites. In *Texas and Points West: Papers in Honor of John A. Hedrick and Carrol P. Hedrick*, edited by R. N. Wiseman, T. C. O'Laughlin, and C. T. Snow, pp. 175–185. Archaeological Society of New Mexico Papers 33. Albuquerque.

2011a Historic Indigenous Ceramic Types. In *Settlers and Soldiers: The Historic Component at El Pueblo de Santa Fe (LA 1051),* by Stephen C. Lentz and Matthew J. Barbour, pp. 223–237. Archaeology Notes 410. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

2011b Analysis of Pottery from Prehistoric Contexts. In *Ogapogeh, the White Shell Water Place: The Prehistoric Component at El Pueblo de Santa Fe (LA 1051),* by Stephen C. Lentz, pp. 187–246. Archaeology Notes 438. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Wilson, C. Dean, and Candace K. Lewis

2005 Ceramic Artifacts. In *El Pueblo de Santa Fe (LA 1051): Archaeological Testing of the Proposed Santa Fe Civic Center,* by Stephen C. Lentz, pp. 53–57. Archaeology Notes 355. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Wilson, Gordon P.

2007 *Guide to Ceramic Identification: Northern Rio Grande Valley and Galisteo Basin to A.D. 1700*. Technical Series Bulletin No. 12. Laboratory of Anthropology, Santa Fe.

Winship, George P.

1896 *The Coronado Expedition: 1540–1542.* Annual Report 14, Part 1. Bureau of American Ethnology, Washington, DC.

Wiseman, Regge N.

1988 *Pottery Production for the Spanish: A Preliminary Analysis of the Indian-Made Ceramics Recovered by the La Fonda Project, Santa Fe, New Mexico*. Laboratory of Anthropology Notes 499. Museum of New Mexico, Santa Fe.

1989 *The KP Site and Late Developmental Period Archaeology in the Santa Fe District*. Laboratory of Anthropology Notes 494. Museum of New Mexico, Santa Fe.

1992 Early Spanish Occupation of Santa Fe: Excavations at the La Fonda Parking Lot. In *Current Research on the Late Prehistory and Early History of New Mexico,* edited by Bradley J. Vierra, pp. 207–214. New Mexico Archaeological Council, Special Publication No. 1. University of New Mexico, Albuquerque.

Wozniak, Frank

1987 Irrigation in the Rio Grande Valley, New Mexico: A Study of the Development of Irrigation Before 1945. Prepared for the New Mexico Historic Preservation Division, Santa Fe, New Mexico.