Adaptations on the Anasazi and Spanish Frontier

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Excavations at Five Sites near Abiquiú, Rio Arriba County, New Mexico

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Excavations at Five Sites near Abiquiú, Rio Arriba County, New Mexico

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ADMINISTRATIVE SUMMARY

Between October 28 and November 4, 1987 and February 8 and June 10, 1988, the Research Section of the Laboratory of Anthropology (now the Office of Archaeological Studies), Museum of New Mexico, tested one site and conducted data recovery at four sites along U.S. 84 near Abiquiú, Rio Arriba County, New Mexico. This work was completed at the request of the New Mexico State Highway and Transportation Department. The sites were located on private land, state highway land, and land administered by the USDA Forest Service.

The purpose of testing was to assess the potential of part of the site of Santa Rosa de Lima de Abiquiú (LA 806) to yield information relevant to local prehistory and history. Santa Rosa de Lima de Abiquiú is listed on the National Register of Historic Places, but the part of the site investigated contained no subsurface cultural remains. Based on our findings, it was determined that no further investigations were needed in the section of the site within project boundaries.

Data recovery was aimed at obtaining information relevant to local prehistory and history from four sites. Two prehistoric sites, LA 6599 and LA 59659, were examined and were found to have agricultural features built during the Anasazi occupation of the Rio Chama Valley. Parts of two historic sites, La Puente (LA 54313) and the Trujillo House (LA 59658), were also investigated. The area examined at La Puente contained midden deposits and trash pits associated with a Spanish Colonial through American Territorial period occupation, and the excavated part of the Trujillo House contained an American Territorial period habitation structure and associated trash-filled borrow pit. These investigations have exhausted the potential of the parts of these sites within project limits to yield new information relevant to local prehistory and history.

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Only through the labors of many people was this project successfully completed. The authors would like to express their appreciation to those who participated—thank you, everyone, for working in the cold of winter and the heat of summer, and for suffering through the analysis of too many artifacts. Field assistants included Peter Bullock, Robert Emerson, Rhonda Main, Susan Moga, Ann Noble, Stephen Post, and Adisa Wilmer. Laborers included William Davis, Stephanie Daw, Byron Hamilton, Douglas Heffington, Kalay Melloy, and Pearl Sunrise. Joseph Lujan and Philip Martinez worked with us as laborers through an arrangement with Taos Pueblo that provided them with training in archaeological field methods and recording, which in turn will aid their pueblo in its preservation efforts. William Davis, Robert Emerson, and Katherine Fuller assisted the ceramic analysis, Robert Emerson and Adisa Wilmer helped analyze the Euroamerican artifacts, and Karen Wening analyzed the ground stone artifacts. Anthony Martinez produced statistics and analytic summaries. Maps and illustrations were produced by Rob Turner, Nancy Warren photographed the artifacts, and Pete Brown edited the manuscript.

Many volunteers assisted during field work and laboratory analysis, and we would like to single them out for special thanks. Scott Abbot, Emily Goldman, Robert Killins, and Sam Sweezy participated in excavations at the Trujillo House and La Puente, and Carol Potter helped on the ceramic analysis.

Mr. Benjamin Archuleta, a lifelong resident of the Moke section of Santo Tomas de Abiquiú, graciously consented to an interview while we were conducting our field work. His knowledge and perspective on local history were invaluable when we were sorting through the mire of information, and placing La Puente in its historical context. His willingness to share his knowledge, and his patience with Boyer's limited understanding of Spanish were much appreciated. Furthermore, he told very good stories.

Much of the specialized analysis was completed by consultants. Historic archival research was conducted by Charles M. Carrillo and Stanley Hordes. Glenna Dean and Mollie S. Toll, both of the Castetter Laboratory for Ethnobotanical Studies, completed pollen, phytolith, and macrobotanical studies. Bart Olinger of Los Alamos National Laboratories graciously donated his time and expertise for the study of ceramic clay sources. Jack B. Bertram analyzed faunal materials, and Robert H. Weber of the New Mexico Bureau of Mines and Mineral Resources examined slag samples from La Puente. Radiocarbon samples were processed by Beta Analytic, Inc.

Finally, the authors would like to express their appreciation to the New Mexico State Highway and Transportation Department for their funding and assistance. In particular, we would like to thank William Taylor and Steven Koczan of the Environmental Section.

—JLM, JLB, DFL

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PART 1

Introduction and Background Information

CHAPTER 1

PROJECT DESCRIPTION

JAMES L. MOORE AND JEFFREY L. BOYER

At the request of the New Mexico State Highway and Transportation Department, the Research Section of the Laboratory of Anthropology (now the Office of Archaeological Studies), Museum of New Mexico, investigated five sites along U.S. 84 near Abiquiú in Rio Arriba County, New Mexico (Fig. 1-1). Portions of three sites within the U.S. 84 right-of-way were excavated (LA 6599, LA 59658, and LA 59659); a fourth site (LA 54313) extended into a temporary construction permit area, and data recovery was conducted in that part of the site. Testing at Santa Rosa de Lima de Abiquiú (LA 806; AR-03-10-06-77) was limited to the portion of the site that extended into the U.S. 84 right-of-way, and was conducted between October 28 and November 4, 1987. Work on this phase was directed by James L. Moore and Timothy D. Maxwell. Santa Rosa de Lima was a Spanish Colonial through American Territorial period village, and is listed on the National Register of Historic Places. Testing was limited to a strip along the south edge of the U.S. 84 right-of-way, and demonstrated that no structures or features associated with the village existed within project limits in that area. The part of Santa Rosa de Lima investigated was on land administered by the USDA Forest Service, and work was conducted under a Special Use Permit from the Santa Fe National Forest (expired 12-31-88).

Data recovery was completed at two prehistoric sites and two historic settlements. These investigations were conducted between February 8 and June 10, 1988. James L. Moore directed excavations at the Trujillo House (LA 59658); Jeffrey L. Boyer was in charge of work at La Puente (LA 54313; AR-03-10-06-72); and Daisy F. Levine supervised at LA 6599 and LA 59659 (AR-03-10-06-76). Although two of these sites extended onto lands managed by the Santa Fe National Forest, data recovery was restricted to portions on private land. Laboratory analyses were directed by James L. Moore (lithic artifacts), Jeffrey L. Boyer (Euroamerican artifacts and adobe samples), and Daisy F. Levine (native ceramic artifacts). David A. Phillips was principal investigator for most of the project; Timothy D. Maxwell assumed these duties during the later phases. Part of the Trujillo House and LA 6599 were on lands administered by the State of New Mexico; the rest of the Trujillo House, La Puente, and LA 59659 were on private land.

The prehistoric sites (LA 6599 and LA 59659) contained agricultural features associated with the Anasazi occupation of the lower Rio Chama Valley. Prehistoric features at LA 6599 included a rock pile, a charcoal stain, and a fieldhouse; the last was outside project limits. LA 59659 contained ten rock piles, a farming grid, and two possible fieldhouses. Only the rock piles were within project limits. No other cultural features or subsurface deposits were found at either site. The charcoal stain at LA 6599 proved to be amorphous, and contained few artifacts. It appeared to be prehistoric, but little else concerning its nature could be determined. Farming features at both of the prehistoric sites consisted of rock piles resulting from field clearing before or during cultivation. A section of a historic road passes through LA 6599, connecting the Trujillo House with the old highway. By cutting through river terrace deposits, the road appears to have created most of the features defined during site survey (Hannaford and Maxwell 1987). No diagnostic materials were found in association with prehistoric features at LA 6599, but ceramics from LA 59659 suggested it was occupied during the Rio Grande Classic period (A.D. 1300-1600).

The two historic sites were La Puente (LA 54313) and the Trujillo House (LA 59658). Like Santa Rosa de Lima, La Puente was occupied during the Spanish Colonial period through the American Territorial period, and many consider it a forerunner of Santa Rosa de Lima. There is evidence of a square, plaza-like structure north of the highway at this site, but only midden deposits were found within project limits. The midden contained an extensive surface artifact scatter, two shallow stratified trash deposits, a blacksmith's dump, and several deep, trash-filled pits. The pits and the blacksmith's dump date from the Mexican and American Territorial periods, while the shallow stratified midden deposits appear to derive from the Spanish Colonial period.

The Trujillo House was an eight-room, C-shaped adobe structure occupied during the last half of the nineteenth century, and abandoned around 1900. Varying internal wall thicknesses and abutment patterns indicated several episodes of construction, suggesting that the house reached its final form by increments. A trash-filled borrow pit north of the structure yielded numerous arti-

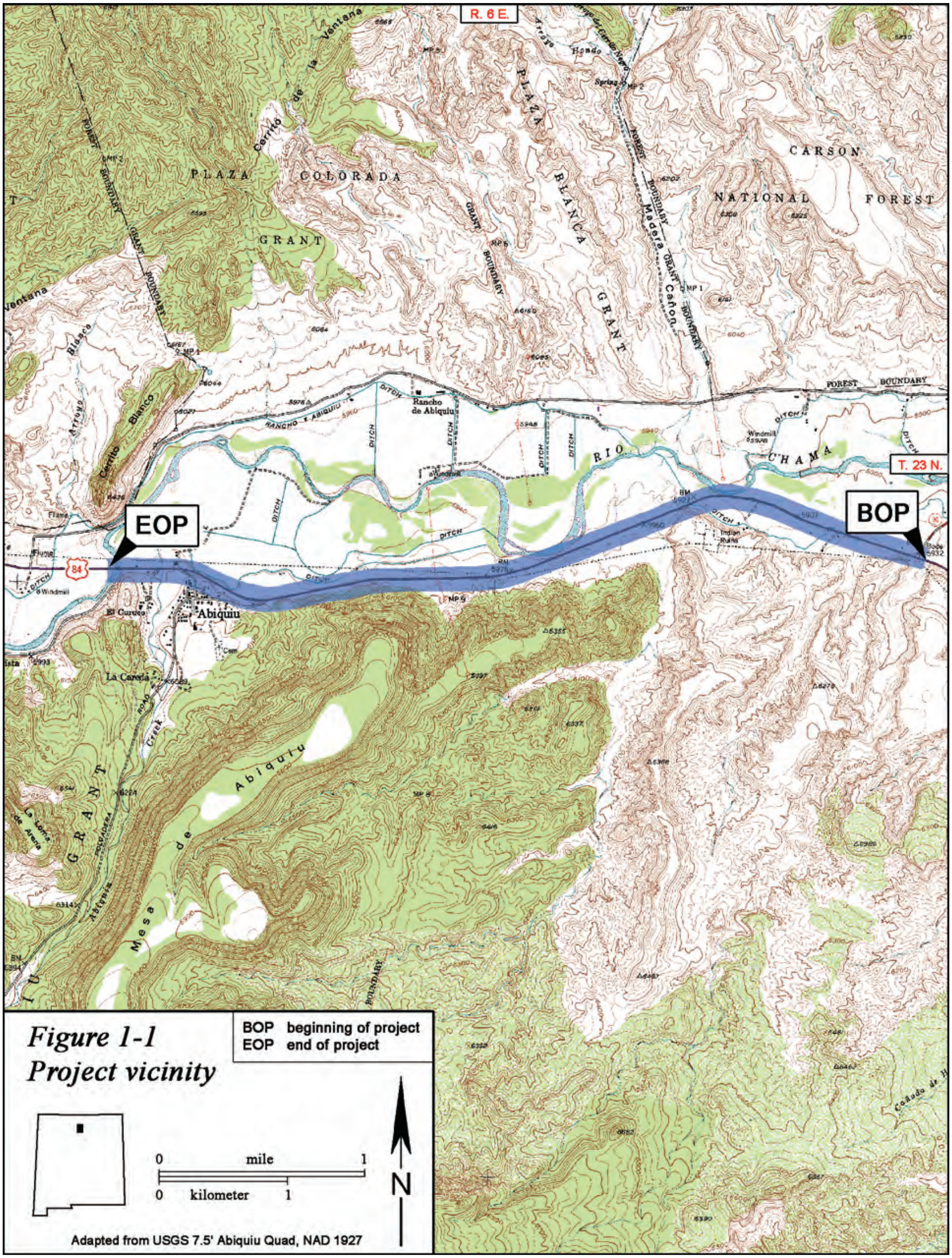

Figure 1-1
Project vicinity
BOP beginning of project
EOP end of project
0 mile 1
0 kilometer 1
N
Adapted from USGS 7.5' Abiquiu Quad, NAD 1927
EOP
BOP
R. 6 E.
T. 23 N.
Abiquiu
Rancho de Abiquiu
RIO CHAMA
PLAZA COLORADA GRANT
PLAZA BLANCA GRANT
CARSON NATIONAL FOREST
Mesa de Abiquiu
La Cereda
El Curuco

facts and subsistence-related materials. This pit seemed to have originally served as a borrow pit for materials used in house construction, and later as a trash pit.

Analysis of the prehistoric sites was aimed at defining their function and determining what part of the generalized Anasazi adaptive system they represented. This analysis was only partially successful because pollen and phytolith studies failed to confirm an agricultural function for the sites. By comparing them with similar sites from the region and the Southwest in general, however, an agricultural function seems likely. Thus, a model of the prehistoric farming system used in the Rio Chama Valley was developed, and the prehistoric sites were placed within its framework.

Analysis of the historic sites was aimed at defining aspects of life on the Spanish Colonial frontier. Examination of floral and faunal remains provided information on subsistence strategies. The analysis of locally manufactured ceramics focused on a controversy regarding Hispanic versus Indian pottery manufacture, and aided in the interpretation of ethnic relations as well as aspects of local economy and industry. An analysis of architectural materials at the Trujillo House provided information on the use of local materials for building, and clarified the construction sequence at that site. Analysis of Euroamerican artifacts focused on changing relations between the frontier and Spanish, Mexican, and American core areas. A detailed examination of the lithic artifact assemblage provided information concerning the little known Hispanic production of chipped stone tools.

The report is structured in several sections. A description of local environment, and field and analytic methods are included in an introductory section. The prehistoric sites and their artifacts are discussed in a section that also includes an overview of the prehistory of the Rio Chama Valley. A separate section contains discussions of the historic sites and their artifacts as well as historic overviews of the Rio Chama Valley in general and the village of Santa Rosa de Lima de Abiquiú in particular. Finally, project findings are discussed in a series of interpretive chapters.

Based on the testing program, it was determined that cultural features or subsurface remains did not occur in the portion of Santa Rosa de Lima de Abiquiú (LA 806) within project limits. The data recovery investigations at LA 6599, LA 59659, La Puente (LA 54313), and the Trujillo House (LA 59658) have exhausted the potential of the sections of those sites within project boundaries to yield new information on local prehistory and history. No further archaeological studies are needed within project boundaries.

CHAPTER 2

ENVIRONMENT OF THE PROJECT AREA

Daisy F. Levine and Anthony Martinez

Physiography and Geological Setting

The project area is in the lower Rio Chama Valley, which drains much of the Española Basin (Fenneman 1931). The Rio Chama is a perennial stream that has been dammed above the village of Abiquiú by the Army Corps of Engineers. Its headwaters are in the mountains north of Chama, and it flows into the Rio Grande approximately 40 km (25 miles) downstream from the project area (Anschuetz et al. 1985:3). The Española Basin extends from Abiquiú and Ojo Caliente on the west and northeast to Velarde and San Ildefonso on the east and south (Fiero 1978:4).

Alternating rims and plateaus bound the Española Basin. The Rio Grande enters the basin through a gorge on the north and exits through a gorge on the south (Kelley 1979). The Jemez Mountains form its west boundary, and on the northwest it is bounded by the north-to-northwest trending Brazos and Tusas Ranges. The eroded edge of the Taos Plateau forms the north boundary, the Sangre de Cristos are the east boundary, and the south edge is marked by the Cerrillos Hills and the north rim of the Galisteo River Valley. The La Bajada Fault Escarpment and the Cerros del Rio hills form the southwest boundary (Kelley 1979).

The portion of the Rio Chama Valley at and upstream of Abiquiú is noted for its eroded geologic features. Exposed formations include those from the Paleozoic through the Cenozoic eras, and are mostly composed of varicolored sandstones and shales that have eroded into spires and badlands (Schaafsma 1979:12). The Española Basin, which probably formed during a period of uplifting and folding in the Miocene and Pliocene epochs, filled with alluvial sediments of the Abiquiú and Santa Fe formations, which were deposited by streams flowing out of the surrounding mountains (Fiero 1978:4). The terraces on which the sites occur probably formed during the Pleistocene when the Rio Chama periodically stabilized and cut laterally rather than downward (Schaafsma 1977:10).

The Española Basin is one of a series of basins that formed along the Rio Grande rift during a period of downwarping and extensive faulting, which succeeded a period of regional uplift (Kelley 1979). At the time of basin subsidence, the Nacimiento, Jemez, and Brazos uplifts were present to the west and northwest, and, with the addition of the Sangre de Cristo Mountains, were the source of much of the sediment that filled the Española Basin (Kelley 1979:28). Sedimentation continued as the basin subsided, particularly as the Sangre de Cristos were tilted upward. The major period of subsidence and uplifting occurred after most of the Santa Fe sediments were deposited. Following this period, which has been called the Santa Fe disturbance (Kelley 1979:281), widespread tectonic stability set in. Erosion of upturned beds and elevated scarps was relatively rapid, and pedimentation spread widely through the basin.

A local geological formation of cultural significance is Cerro Pedernal, about 10 km (6 miles) northwest of the project area. This peak is a major source of a cryptocrystalline chert that is commonly referred to as Pedernal chert, which is characterized by a white to pearly gray to black color; a clear translucent variety with yellow specks also occurs. Banding in red, pink and yellow occurs near the top of the chert formation at Cerro Pedernal, and a band of black to gray material that can be mistaken for obsidian occurs near the base, and occasionally near the top (Bryan 1939:17). Occasional open cavities in the chert are often lined with small quartz crystals.

Rock formations around Cerro Pedernal consist of flatlying sedimentary and volcanic beds that range in age from Permian to recent. Cerro Pedernal itself is composed of Tertiary rocks resting on Cretaceous sandstone. Pedernal chert outcrops near the base of the Tertiary deposits at an elevation of 2,590 m (8,497 feet). Above the chert lie beds of tuff capped by a basalt flow (Bryan 1939:10,13). In addition to the source on Cerro Pedernal, this material occurs as cobbles in gravel deposits along the Rio Chama and Rio Grande, as well as in isolated outcrops near Abiquiú Dam.

Soils

Most soils in the project area are of the Green River-El Rancho-Werlow association, which occurs on the nearly level to gently sloping floodplains of the Rio Chama, and in a few small upland areas. These soils, which are forming in stratified alluvia of mixed origin, are mostly deep and moderately coarse to moderately fine textured (Maker et al. 1973:24). Soils of the Pojoaque-Rough Broken Land association are also found in the project area, and occur on rolling and hilly uplands dissected by intermittent gullies and arroyos. Steep slopes are common on the breaks and side slopes of ridges in the severely dissected areas. A few nearly level to gently sloping valley bottoms and floodplains adjacent to intermittent streams are also included in this association. Most of these soils are forming in unconsolidated old alluvium which is dominantly coarse to medium-textured and gravelly. They are usually calcareous and have sandy clay loam, sandy loam, or gravelly sandy loam surface layers. A thin mantle of scattered gravels and cobbles is common over much of the land surface (Maker et al. 1973:33).

Soils of the Rock Land-Rough Broken Land association are also found in the study area, and occur on rough and broken topography, very steep slopes, and rock outcrops. Included in these categories are escarpments, steep canyon walls, rocky ridge tops, rock slides, rock ledges, and steep breaks, all of which are dominated by rock outcrops and small areas of highly variable soils. The exposed bedrock consists of sandstone, shale, tuff, basalt, quartzite, and granite. The outcrops of tuff, sandstone, and basalt contain vertical or near vertical cliffs and escarpments forming canyon walls (Maker et al. 1973:24).

Climate

Several factors determine the range of temperature in an area. Latitude and altitude are the most influential, with altitude being the stronger determinant in New Mexico (Tuan et al. 1973:65). Cold air drainage is a common feature of deep New Mexico valleys. Cool down-valley winds at night reverse to warm up-valley winds during the day (Tuan et al. 1973:69). While narrow canyons and valleys create their own temperature regimes by channeling air flow in this way, temperatures on broad valley floors are influenced by local relief (Tuan et al. 1973:69). An examination of these patterns by Hallenbeck (1918:364-373) showed that temperature drops before sunrise are gradual or at least not extreme when winds are relatively stable throughout the night during spring and fall. However, on clear nights accompanied by gentle horizontal gradients, sudden dips in temperature are not uncommon, with resultant crop damage being possible (Tuan et al. 1973:70).

Although precipitation levels and temperature can fluctuate widely because of temperature inversions and humidity, contemporary and historic use of the Rio Chama floodplain attest to its suitability for agriculture (Anschuetz et al. 1985:3). The average daily summer temperature is 22.8 degrees C, and the average daily winter temperature is 1.7 degrees C. The mean yearly high is 35.6 degrees C, and the yearly low averages -16.7 degrees C. The frost-free period consists of 140 to 160 days between May and October, with most precipitation falling during the same months. Yearly precipitation ranges from 254 to 305 mm, 243 mmof which fall between May and October (Schaafsma 1977:13-14). However, much of this moisture is lost as run-off during heavy thunderstorms in which the ground quickly becomes saturated. Moisture is also lost through evapotranspiration; mean annual evapotranspiration loss at Abiquiú Dam is 897 mm, creating a potential annual moisture deficit of 654 mm (Gabin and Lesperance 1977:260).

Flora and Fauna

There are three habitat zones in the Lower Rio Chama Valley: the Upper Sonoran, Transition, and Canadian (Fiero 1978). The prehistoric occupation of the lower Rio Chama occurred mostly within the Upper Sonoran Zone, but resources of the others were accessible. Based on the botanical analysis of a thirteenth-century site situated 9.7 km (6 miles) southeast of the project area (LA 11830), there appears to be little difference between the late prehistoric and modern vegetation of the area. Floral remains from that site include piñon, juniper, cottonwood, willow, grasses, composites, sage, and prickly pear (Ford 1978). Ponderosa pine and mountain mahogany were probably also available from this zone during prehistoric times (Ford 1978:53).

The current study area is in the Upper Sonoran Zone, which extends from the valley floor at 1,700 m (5,577 feet) to about 2,130 m (6,988 feet) above sea level. Three river terraces and the lower part of the mountain foothills are in this zone. Modern plants characteristic of the valley bottom and lowest terrace include blue grama, sand dropseed, Indian ricegrass, galleta grass, snakeweed, cottonwood, and willow (Fiero 1978). The mountain foothills form an ecotone between the Upper Sonoran and Transition Zone (Fiero 1978), and offered additional resources to the prehistoric inhabitants. In addition to the grasses found at lower elevations, sagebrush, serviceberry, bitterbrush, mountain mahogany, and ponderosa pine are also found in this zone (Fiero 1978; Ford 1978). The Canadian Zone occurs above 2,600 m (8,530 feet) in the high mountains, and is characterized by steep, heavily forested terrain and wide, open meadows. Resources from this zone were apparently not exploited as heavily as were those from lower elevations (Fiero 1978; Ford 1978).

Fauna found along the river and in the foothills include kangaroo rat, pocket gopher, woodrat, prairie dog, white-footed mouse, jackrabbit, cottontail, fox, coyote, and bobcat (Fiero 1978). Common to higher elevations are mule deer, wolf, coyote, bobcat, mountain lion, squirrel, various species of mouse, chipmunk, prairie dog, woodrat, jackrabbit, cottontail, skunk, raccoon, black bear, and elk (Anschuetz et al. 1985; Fiero 1978). Several varieties of fish native to the Rio Chama, as well as transient populations of waterfowl and shorebirds, were also available to the prehistoric inhabitants.

CHAPTER 3

FIELD AND ANALYTIC METHODS

James L. Moore, Jeffrey L. Boyer, Daisy F. Levine and Mollie S. Toll

Field Methods

Though the same general excavation methods were used at each site, specific applications varied because of differences in the remains present, and because of the types of data expected to be recovered. General field methods are described first, followed by site-specific applications.

The first step in excavation was establishment of a main datum. All horizontal and vertical measurements were referenced to that point. Sites were mapped by transit and stadia rod or tape. The locations of all features, excavation units, grid lines, surface artifacts (when collected individually), and current topographic and cultural features were plotted. Sites were contour mapped to provide an accurate depiction of their structure in relation to the immediate physical environment.

Surface artifacts were collected in three ways: point provenience, variably sized grids, and as a general collection within disturbed areas. Features and structures outside project limits were described and mapped. Within project boundaries they were investigated to determine their nature, depth, and artifact content.

Horizontal excavation units were 1-by-1-m grids unless circumstances warranted otherwise. Exploratory grids were excavated in arbitrary 10-cm levels unless natural strata were encountered. After soil strata were defined, excavation continued in natural levels. Soil was screened through 1/4-inch mesh hardware cloth unless it was from nonculturally deposited strata. Artifacts recovered by screening were bagged, assigned a field specimen number, and transported to the laboratory for analysis. A grid unit form describing the matrix encountered and listing ending depths and field specimen numbers for each bag of artifacts was completed for all excavation units. Flotation samples were collected from cultural strata, and radiocarbon samples were obtained when possible. Pollen and phytolith samples were collected from farming features on prehistoric sites. Excavation ended when sterile deposits were encountered.

Excavated cultural features were photographed, and profiles showing their vertical structure were drawn. Excavation areas were backfilled when field investigations were completed. Cultural materials recovered during these investigations are curated at the Museum of New Mexico. Field and analysis records are on file at the Archeological Records Management Section of the Historic Preservation Division. Both of these facilities are in Santa Fe.

LA 806 – Santa Rosa de Lima de Abiquiú

Cultural remains within project limits at this site were tested to assess their potential to contribute information on local history, and to determine whether a data-recovery phase was warranted in that area. A datum was established in the central part of this area, and features and surface artifacts were marked. The resulting distribution of surface remains provided the basis for selection of some test pit locations. Surface artifacts within project limits were point provenienced and collected.

Test pits were excavated to examine potential features, and were placed in areas that contained clusters of surface artifacts that suggested the possible presence of buried remains. A few test pits were excavated between these areas to determine whether cultural remains were present elsewhere. Since no cultural features or deposits were found, no profiles were drawn and no features were mapped or photographed. When gravel deposits did not occur at the base of test pits, auger holes were used to determine whether cultural deposits were present at a deeper level.

LA 6599 and LA 59659

Because the same procedures were followed at both of these sites, they are discussed together. Datums were established in the west-central part of LA 6599, and in the northeast part of LA 59659. Surface artifacts within project limits were marked and collected by exact provenience. All features were mapped and described, and exploratory 1-by-1-m grids were excavated into features within project limits to determine their nature, depth, and content.

Plan views showing the distribution of construction elements were drawn before features were excavated. Profiles were drawn when cultural strata were found or the feature was of cultural origin. When sterile strata were encountered, auger tests were used to determine whether cultural deposits were present at a deeper level. Soil and pollen samples were collected around farming features at LA 59659, but none were taken from LA 6599.

LA 54313 – La Puente

A datum was placed at the east end of this site. Areas that were to be disturbed by archaeological excavation or which contained high surface artifact densities were collected in 4-by-4-m grids. The ground surface within the existing highway right-of-way was collected as a single unit because artifacts were demonstrably out of place. Exploratory 1-by-1-m grids were dug in areas within project limits that contained high surface artifact densities or possible features. To determine whether subsurface cultural materials were present in other areas, grids were excavated in several locations that lacked surface indications of features or cultural deposits. When buried cultural remains were found, exploratory grids were expanded into trenches to define their nature, size, and content.

Excavation generally proceeded in 1-by-1-m grids, but individual trash pits were excavated as single horizontal units. Exceptions to this occurred when pits overlapped, or when the exterior matrix was too soft to allow excavation of the entire feature at once. Standard procedures were followed in those cases. Excavation and surface collection were confined to project limits, but the surrounding area was examined to determine the extent of the site. Trenches containing cultural deposits were profiled, and excavated features were mapped and photographed.

LA 59658 – The Trujillo House

A datum was established at the east end of this site. The existing right-of-way was surface collected as a single unit because artifacts were demonstrably out of place. In parts of the construction zone outside the existing right-of-way, surface artifacts were collected in 1-by-1-m grids. Only two features were found within project limits: a borrow or trash pit and an eight-room house.

The site was divided into 1-by-1-m grids, which served as excavation units in trenches. An exploratory grid dug into the borrow or trash pit found substantial cultural deposits. It was expanded into a trench to define the limits of the pit and the nature of its fill. Excavation continued until sterile strata were encountered. Auger holes were bored into the bottom of the trench to verify that the base of cultural deposits had been reached.

Two exploratory grids were excavated into the low mound that represented the remains of the house, and both encountered adobe walls and floors. Wall tops were stripped to define the size of the structure and the locations of individual rooms. The presence of plaster and whitewash lines on interior wall surfaces aided this procedure. These grids were expanded into trenches that bisected Rooms 2 and 4. Trenches were placed through the approximate centers of other rooms, with the exception of Room 8. In that case, no evidence of the room was found until a dividing wall was encountered during excavation of Room 4. Since Room 8 was much smaller than the others, a single grid rather than a trench was used to define its stratigraphy.

When internal deposits were determined to be noncultural, rooms were divided into quadrants and the fill was removed without screening. However, any artifacts noted were collected and bagged. In the few cases where cultural deposits were found on floors or in features, excavation proceeded by quadrant or feature but the soil was screened, and all recovered artifacts were bagged for analysis.

Trenches were placed outside the structure on all four sides to define wall widths and determine whether footing trenches or foundations were present. As in other trenches, excavation was conducted by 10-cm level in 1-by-1-m grids. All soils were screened and all artifacts were collected and bagged.

Profiles of trenches and the sides of two quadrants were drawn for each room, providing north to south and east to west cross-sections. Plans of each room and feature were also drawn. Construction details were photographed, and a series of bipod photographs was taken to aid in mapping the structure, and to provide a record of its appearance.

Chipped Stone Artifact Analysis

Initially, the purpose of the chipped stone analysis was threefold: (1) to determine whether the artifacts were of Hispanic origin, (2) to define reduction strategy and technology, and (3) to determine in which activities they were used.

By examining the results of chipped stone analyses from similar sites and conducting experiments, several other objectives were generated, leading to analysis for evidence of bipolar reduction, reduction using metal tools, use as strike-a-light flints, and use as gunflints.

The chipped stone artifacts were studied under a binocular microscope to aid in determining material type and to examine platforms and wear patterns. The level of magnification varied between 15x and 80x. Utilized and modified edge angles were measured with a goniometer.

Other dimensions were measured with a sliding caliper. Analytic results were entered into a computerized data base and analyzed using the Statistical Package for the Social Sciences (SPSS).

Attributes analyzed on all chipped stone artifacts included material type, artifact type, texture, cortex, portion, alterations, and dimensions. Material types were coded by general categories such as chert or quartzite, and sources were noted where they could be determined. Artifact types were exclusive except in certain cases. When artifacts were used as strike-a-light flints and their original form could still be identified, both were coded. Thus, a flake used as a strike-a-light flint was coded as a strike-a-light/flake, and attributes for both artifact types were recorded. Artifacts combining more than one tool type, such as scraper/spokeshave, were also coded as such. Artifact type definitions are given in Table 3-1.

Texture was measured subjectively to aid in examining material flakability. Most materials were divided by grain size into fine, medium, and coarse categories. Such measures were applied within but not between material types. For example, chert was not compared with quartzite, and vice versa. Obsidian was classified as glassy by default, and this category was applied to no other material. Dorsal cortex on debitage was monitored by percent in ten-degree increments. The presence of cortex on cores and tools was noted, but was not quantified.

Artifacts were coded as whole or fragmentary. When fragmentary, the portion was recorded if it could be determined. Alterations were noted where visible, and included facial or edge retouch, utilization, and thermal treatment. The number of utilized and retouched edges was noted. Noncultural damage was recorded when present.

Dimensions were measured for each artifact. On angular debris and cores, length was defined as the artifact's largest measurement; width was perpendicular to the length and was the second largest measurement. Thickness was perpendicular to length and width, and was the smallest measurement. On flakes and formal tools, length was the distance between the platform (or proximal end) and termination (or distal end), width was the distance between the edges paralleling the length, and thickness was the distance between dorsal and ventral surfaces.

Two attributes were examined on flakes only: platform type and lipping. The former is an indicator of reduction technique and can aid in defining the stage during which the flake was produced. Platform modifications (including retouch and abrasion) were recorded, as were missing and collapsed platforms. Platform lipping generally indicates soft hammer reduction (Crabtree 1972), and was recorded to help define the tools used in chipped stone reduction.

Table 3-1. Lithic artifact type definitions.

Flake	Pieces of debitage displaying definable ventral and dorsal surfaces, and, if whole, striking platforms.
Angular debris	Pieces of debitage lacking definable dorsal and ventral surfaces; also called shatter.
Core	Pieces of parent material that lack bulbs of percussion, and exhibit surfaces from which at least two flakes have been removed.
Scraper	Unifacially retouched tools with steep working edges that are usually straight or convex in shape.
Spokeshave	Unifacially retouched tools with shallow to steeply angled concave working edges.
Chopper	Tools with one or more uni- or bifacially flaked edges, usually exhibiting heavy battering from use against an anvil.
Axe	Flaked and/or ground tools with sharpened wedge-shaped distal ends, and proximal ends that are notched or grooved for hafting.
Projectile point	Bifacially flaked tools with pointed distal ends, and proximal ends modified for hafting by notching and/or grinding.
Biface	Bifacially flaked tools lacking modifications for hafting on their proximal ends.
Gunflint	Tools used in gunlocks and made from snapped blades, or squared, pillow-shaped bifaces.
Strike-a-light flint	Tools used to produce sparks, exhibiting uni- or bidirectional utilization/retouch, abrasion, and occasional metal adhesions.

Several attributes were recorded when artifacts were utilized or retouched. They included whether the utilization or retouch was unidirectional (confined to one surface) or bidirectional (occurred on both surfaces), type of microflake scars, presence of abrasion, and edge angle. Several other attributes were recorded for strike-a-light flints, including edge shape, utilization or retouch type, and the presence of metal adhesions.

Manufacturing flakes were defined using a polythetic set of variables that was first presented by Acklen et al. (1983), and is shown in a slightly modified form in Table 3-2. If a whole flake fulfilled seven of ten conditions or a fragmentary flake fulfilled five of seven conditions, it was considered to have been produced during tool manufacture. Flakes that did not fulfill these conditions were classified as core flakes.

Table 3-2. Polythetic set used to define manufacturing flakes.

Whole Flakes

1. Platform:
   a. has more than one facet.
   b. is modified (retouched and abraded).

2. Platform is lipped.

3. Platform angle is less than 45 degrees.

4. Dorsal scar orientation is:
   a. parallel.
   b. multidirectional.
   c. opposing.

5. Dorsal topography is regular.

6. Edge outline is even, or flake has a waisted appearance.

7. Flake is less than 5 mm thick.

8. Flake thickness is relatively even from proximal to distal end.

9. Bulb of percussion is weak (diffuse).

10. There is pronounced ventral curvature.

Broken Flakes or Flakes with Collapsed Platforms

1. Dorsal scar 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 thickness is relatively even from proximal to distal end.

6. Bulb of percussion is weak.

7. There is pronounced ventral curvature.

Artifact is a biface flake when:
- If whole, it fulfills 7 of 10 attributes.
- If broken or platform is collapsed, it fulfills 5 of 7 attributes.

Ground Stone Artifact Analysis

Attributes recorded on ground stone artifacts included artifact type, material type and color, condition, shaping methods, number of ground surfaces, ground surface longitudinal and transverse contour shape, presence and orientation of striations, ground surface texture and refurbishing, dimensions, and evidence of burning. Attributes recorded for only manos included transverse cross-section shape, and number of hands used for manipulation.

Artifacts were assigned to types based on their shape and morphology, and were classified by traditional categories when possible. Materials were classified by general groups. Grain size was noted when considered relevant. Reuse and post-depositional alterations were recorded when present. Dimensions were measured with a sliding caliper, and artifacts were examined under a binocular microscope to aid in defining material type, and to examine wear patterns.

Native Ceramic Artifact Analysis

Rough Sort Analysis

The first phase of the ceramic analysis was a rough sorting by basic type. All sherds from La Puente (26,093 sherds) and the Trujillo House (5783 sherds) were examined. Sherds from the other sites (LA 806, LA 6599, and LA 59659) did not go through this preliminary step because the assemblages were small. Sherds were coded by general types, vessel form, and provenience. All rims and painted sherds were separated for inclusion in the subsequent detailed analysis. Rim sherds were included in that phase because certain types, such as Apache Micaceous, are difficult to identify except by rim shape. When examining redwares and blackwares it is often difficult to distinguish body sherds from a flange plate or bowl, but this identification is simplified when rim sherds are examined.

Sherds were recorded by bag rather than individually in the rough sort. The contents of a bag were first sorted by general ceramic types. Microscopic analysis was used to determine whether a sherd was only mica-slipped or if it had a micaceous paste. Temper was examined to separate Tewa redware from Casitas Red-on-brown sherds. Other attributes were also used to divide the redwares (see below). When the separation of all types was completed, each group was then divided by vessel form, and counted. Totals for each vessel form by ceramic type by provenience were then recorded on analysis forms.

Definitions of Ceramic Rough Sort Types

A wide variety of prehistoric Anasazi and historic Pueblo, Athabaskan, and Hispanic locally manufactured pottery types was identified during the rough sort analysis; they are described below.

Tewa Red (seventeenth century to present). Thick, well-polished red slip, vitric tuff with pumice and/or fine sand temper; may be part of an overall red-slipped vessel, the neck of a San Juan Red-on-tan jar, or the base of a polychrome vessel. These categories were combined for the rough sort.

Polished blackwares (seventeenth century to present). Black slip over either all or part of the vessel, with varying degrees of polish. No attempt was made to separate Tewa from Hispanic blackwares during the rough sort.

Micaceous slip only. A utility ware with a thin micaceous slip over a nonmicaceous paste.

Micaceous paste. A utility ware tempered with mica or micaceous schist, with or without a micaceous slip.

Indeterminate Buff. A catch-all category for polished unslipped body sherds, representing either the lower undecorated portion of polychrome, San Juan Red-on-tan, or Casitas Red-on-brown vessels.

Casitas Red-on-brown (pre-A.D. 1672 to ca. 1890). The diagnostic feature of this type is a red band on the upper portion of both the inside and outside of bowls, and the outside of jars. Some bowls and flange plates have smeared designs on vessel interiors in addition to the red band. These consist of solid scrolls, circles, and "bulls-eyes" (Dick 1968:80-81). The red band and design are believed to have been applied with a rag, unlike San Juan Red-on-tan, on which the band was applied by brush. The latter method produces a finer demarcation between the red and the buff (Charles Carrillo, personal communication, 1988). The background is a stone-smoothed buff color, usually not well polished. Temper is mostly fine sand, occasionally with a small amount of tuff mixed in. Casitas Red-on-brown has been dated by Dick (1968) as pre-A.D. 1672 to ca. 1890.

Historic decorated wares. All Tewa and non-Tewa historic polychromes were included in this category.

Biscuit A (A.D. 1375 to 1425). A prehistoric painted ware, with a stone-stroked white or gray slip on the interior and a rough exterior. Vessel forms are exclusively bowls. Neatly executed formal designs in carbon paint are found only on bowl interiors. Motifs are generally lines and geometrics (Harlow 1973).

Biscuit B (A.D. 1425 to 1475). Distinguished from Biscuit A by an exterior slip to which neat and well-organized designs were applied, often with elements similar to those within the bowls. Otherwise, Biscuit B is very similar to Biscuit A, the main difference being that jars were also made (Harlow 1973:22). Jars were low and globular with rounded bases.

Wiyo Black-on-white (A.D. 1300 to 1400). A predecessor to the Biscuitwares, with a tan, gray, or olive paste and slip. Designs are bold lines and geometrics, in carbon paint. The temper is usually vitric tuff (Warren 1979; Mera 1935).

Prehistoric indeterminate. A general category used when a sherd was too small or eroded to accurately specify a type.

Glazewares (A.D. 1300 to 1700). All sherds with glaze paint decoration were included in this category. Glazewares were produced in the Central Rio Grande region, and thus would have been imported to these sites.

Potsui'i Incised (A.D. 1450 to 1550). This type has fine incised line designs on smoothed tan surfaces. A mica slip is sometimes used. Temper is vitric tuff (Warren 1979:34).

Indeterminate. Sherds that were too small or eroded to be classified by any of the other categories were given this designation.

Detailed Analysis

The detailed analysis began with an examination of all rims and painted sherds separated out during the rough sort. A new set of analytic attributes was developed, including detailed provenience information. A description of attributes is presented in Table 3-3.

All rims and decorated wares separated during the rough sort were analyzed and then counted. A percentage of the total assemblage was then calculated. It was considered advantageous for analytical purposes to have at least a 20 percent sample of the entire assemblage. The undecorated sherd assemblage was then sampled until 20 percent of both assemblages had been examined in detail. Approximately 2000 more sherds were analyzed for La Puente, and 400 more for the Trujillo House. For La Puente, this additional sample was biased toward grids in Trash Areas 1 and 2, with sherds from each level or stratum excavated. The sherds from these grids were analyzed following the same format used for the rims and decorated sherds. For the Trujillo House, one grid from the midden was selected for detailed study. Because of the original separation of rims and decorated sherds, this additional sample consisted entirely of plainware and culinary ware body sherds. This created some difficulty in identifying Apache wares. Thus, if a sherd was not large enough for the characteristic striations to be apparent, it was coded in the mica paste category. After the additional sample was examined, the total number of analyzed sherds was 5479 from La Puente, and 1347 from the Trujillo House.

Following analysis, the data were entered into a dBase 3 file and analyzed using SPSS (Statistical Package for the Social Sciences). The rough sort and detailed analysis files were entered separately, for different types of data manipulation. Statistics were then run for specific attributes and cross-tabulation tables produced. In addition, a sample of each ceramic type was selected for X-ray fluorescence analysis to aid in defining differences between pottery of Tewa manufacture and presumed Hispanic-made wares.

Table 3-3. Attributes monitored during the detailed ceramic analysis.

Ceramic type	Sherds were classified by known types when possible.
Vessel form	Sherds were classified by the general shape of the vessel from which they came: jar, bowl, flange plate/bowl, handle, or indeterminate.
Rim form	Rim form was particularly useful in determining whether there were differences between rims of Tewa wares and Hispanic wares. Types included thickened/straight, everted, flange, inverted, scalloped/flange, flared, everted/scalloped, scalloped, scalloped/carinated, straight, flared/scalloped, carinated, and indeterminate.
Paste texture	Two categories of paste texture were recorded: hard-compact and soft-porous.
Paste color	The dominant paste color was recorded for each sherd. Colors included buff, black, pink, brown, red, half gray and half buff, orange, white, and gray.
Surface color	The dominant color of the surface of each sherd was recorded. Colors included cream, black, white, red, buff, brown, orange, and gray.
Slip	The presence, location, and extent of slip was recorded, and in some instances used to distinguish between Tewa and Hispanic manufacture. Choices included unknown, unslipped, slipped interior, slipped interior and exterior below rim, slipped interior and exterior, slipped exterior, slipped exterior and interior neck (jars), slipped exterior below rim only, slipped interior below rim and exterior below rim, and unknown.
Surface finish	Surface finish was informative mainly in helping to classify the micaceous wares, as striations and interior polishing were factors in separating specific types. Choices included unknown, unpolished interior and polished exterior, unpolished exterior and polished interior, striations on interior and exterior, polished on both sides, polished on both sides with a smudged interior, smoothed and unpolished, striations on the interior only, and striations on the exterior only.
Temper	Temper was critical in identifying Tewa versus Hispanic wares, and Apache versus non-Apache culinary wares. Sherds with all or a predominance of sand temper were presumed to be of Hispanic manufacture, while a preponderance of tuff or pumice indicated Tewa ceramics. In dealing with the culinary wares, monitoring mica schist and combinations thereof versus sand, or versus quartz and feldspar, was necessary to distinguish various micaceous wares, particularly when the rims were absent. Temper types recorded during this analysis included unknown, mica/sand, tuff, quartz/feldspar, sand, quartz, mica schist/quartz, mica, mica/sand, mica/tuff, crystal pumice, pumice/tuff, pumice/sand, tuff/sand/pumice, tuff/sand/mica, mica/pumice, mica schist, mica schist/feldspar/quartz, predominantly sand with some tuff, predominantly tuff with some sand, and other.
Design style	This category was useful in temporally separating the polychromes. Generally, geometric designs occurred later than flowers or feathers. Feathers without filled-in red tips indicated either a very early Powhoge or a transitional Ogapoge/Powhoge Polychrome. Design styles included red band around rim, parallel lines, curved lines, zig-zag lines, feathers, feathers (with red), geometrics, triangles, flowers, red band around rim/circles, red band around rim/scrolls, red band around rim/vertical bands, red band around rim/unknown interior design, scallops with dots, parallel lines/geometrics, lines with dots, dots, triangles/dots, and unknown.
Mid-body	This category was also used as a temporal indicator. A mid-body-only design band was characteristic of the early polychromes (Tewa and Pojoaque) from ca. A.D. 1650-1760. Single mid-body framing lines were associated with these types. Early Ogapoge Polychrome also had single framing lines. Double framing lines generally indicate post-1760. Choices included design only at mid-body (Tewa, Pojoaque), single mid-body framing lines, double mid-body framing lines, design only at mid-body with single framing lines, design only at mid-body with double framing lines, and not applicable.
Alterations	Any visible alterations to sherds were noted: including burned exterior, interior smudging, worked sherd, mend hole, air pockets (molded), and none present.
Thickness	Thickness in centimeters was recorded for each sherd.
Rim diameter	Estimated diameter was recorded in centimeters for each rim sherd.
Function	This category was included to correlate with the historic artifact analysis; choices included unknown, cooking, storage, and serving/food preparation.
Rim cross-section	This variable was essential in distinguishing Apache Micaceous from other culinary wares, and for monitoring stylistic differences within other ceramic types. Choices included square, round, rounded/tapered, and not applicable.

Definitions of Detailed Analysis Ceramic Types

Various ceramic types were recorded during the detailed analysis. Some types were also recorded during the rough sort, and their descriptions are included in that section. Polychrome descriptions are from Harlow (1973) and Frank and Harlow (1974).

Tewa Red (seventeenth century to present). See rough sort description.

Tewa blackware (seventeenth century to present). An inclusive term used to describe slipped and polished blackwares with vitric tuff or crystal pumice and/or fine sand temper. Other names previously used are Kapo Black and Santa Clara Black. The term *Tewa Polished Black* was suggested by Carlson (1965) because *Kapo Black* was originally used to designate vessels with a specific shape and of a very limited time period (Harlow 1973), and there is an abundance of polished blackwares that lack this shape. Blackwares were made by smudging red-slipped vessels. Vessel forms include jars, bowls, and flange plates, the latter often having a neatly scalloped rim.

Tewa other. This category includes sherds with Tewa-type temper that did not fit into more specific categories. It includes buff sherds that could represent the basal portions of either polychrome or San Juan Red-on-tan vessels, brown sherds that were misfired red or black wares, and gray sherds that were either misfired blackwares or the unslipped basal portions of blackware vessels. Also, if a sherd was so eroded that no slip remained but it had a buff paste and Tewa temper, it was included in this category.

Hispanic polished blackware (date unknown). A blackware distinguished from Tewa Black by a predominantly sand temper, sometimes with small amounts of tuff (discussed in more detail in Chapter 14). It is also characterized by a thinner black slip, which is often streaky. Usually the interior black slip on bowls continues over the rim, forming an exterior band 2 to 3 cm in width (Charles Carrillo, personal communication, 1988), whereas Tewa Black is more often completely slipped on both interior and exterior surfaces. Bowls and flange plates are common forms; jars are rare. Flange plates occasionally have scalloped rims, but the scalloping is much shallower and not as clearly defined as that on Tewa blackwares.

Casitas Red-on-brown (pre-A.D. 1672 to 1890). See Rough Sort description.

Casitas Red-on-brown Smudged (pre-A.D. 1672 to 1890). Same as Casitas Red-on-brown, but the interior has been smudged gray.

San Juan Red-on-tan (A.D. 1700 to present). Polished red slip on a stone-smoothed tan paste, with Tewa-type temper. San Juan Red-on-tan differs from Casitas Red-on-brown in temper and degree of polish. San Juan vessels have a heavier red slip, which generally does not continue over the exterior lip of a jar into the interior (which occurs on Casitas), and bowls have no interior decoration except for a red band under the rim.

Plain utility (A.D. 1700 to 1895). A coarse sand-tempered, unslipped and unpolished plainware, usually buff-colored; probably Carnue Plain (Dick 1968:84).

Tewa Polychrome (A.D. 1650 to 1730). This type is characterized by a red-slipped upper body, with the under body slipped about two-thirds of the way to the base. The bottom third of the base is polished but unslipped, and is therefore buff-colored, not red. A white slip was applied over the red slip in a band at the mid-body, and was decorated with neat, formal, open fine-lined designs in black carbon paint. Single horizontal framing lines outline the designs. Bowls are keeled, and jars tend to bulge outward at mid-body. Some soup plates, indicating Spanish influence, also occur.

Pojoaque Polychrome (A.D. 1720 to 1760). This is a transitional type between Tewa Polychrome and Powhoge Polychrome. It is similar to Tewa Polychrome in that the design occurs only in a band at the mid-body. It differs in that the design is bolder, with geometric figures containing large filled-in black areas. In addition, it has only a red basal band below the white slip; the upper body is slipped red as in Tewa Polychrome. Jar forms are slightly broader than those of Tewa Polychrome.

Ogapoge Polychrome (A.D. 1720 to 1760). The use of red slip is considerably reduced in Ogapoge Polychrome. The upper body of jars is white slipped, except for red slipped rims. On both bowls and jars the under body red slip is restricted to a narrow band just below the lowest framing line. Below the red band, the surface is polished but unslipped. Framing lines are generally single, becoming double in later examples which are transitional to Powhoge Polychrome. Design elements are less geometric, with feathers and flowers being more common. A significant change is the inclusion of red in designs, often filling in the tips of feathers. As red comprises only a small part of the design and is not always present in each sherd, it was often difficult to assign small sherds to Ogapoge Polychrome.

Powhoge Polychrome (A.D. 1760 to 1850). Powhoge Polychrome is the first type in the Tewa series on which the entire upper part of the body became a decorative area. It is white-slipped and contains bold, heavy geometric designs in black carbon paint. The use of flower and feather motifs occurs in only the earliest Powhoge vessels, and red is no longer used in the design. The only red occurs on the rim top and in a narrow band below the lowest framing lines. Double framing lines are used, rather than the single lines diagnostic of earlier styles. A simple geometric design panel was painted on the short neck, just below the rim. Jars are globular and bowls are depressed hemispherically. Vessels lack the sharp keel seen in previous types.

Powhoge Black-on-red (A.D. 1760 to 1850). Same forms and design styles as Powhoge Polychrome, except that the upper two-thirds of vessels are slipped red instead of white.

Unknown Black-on-red. Probably Powhoge Black-on-red, but not enough design elements are present to make an accurate determination.

Nambé Polychrome (A.D. 1760 to 1825). Design elements are similar to Powhoge Polychrome. The following characteristics distinguish the two types: (1) Nambé Polychrome has larger, although not necessarily more, mica flakes in the paste; (2) the slip on Nambé vessels is softer and erodes more easily, and the under body is not as well smoothed; (3) design execution is noticeably sloppier on Nambé vessels.

Unknown Tewa polychrome. Most of the painted wares fell into this category, because many sherds were too small to make accurate type assignments. These sherds had a buff paste, tuff or pumice temper, and at least a remnant of white slip. Portions of a design were often present, but were insufficient to distinguish a specific type.

Other polychromes. This category includes types that are not Tewa polychromes, such as those from the Puname and Keres districts. Distinctions were made between Zia and Santa Ana (Puname area) based on temper. Ceramic types from Zia have crushed basalt temper, while Santa Ana types are tempered with large waterworn sand grains. Both have a distinctive brick red or orange paste. The few Keres sherds were distinguished by an open, flowery design, and crushed rock and quartz temper.

Apache Micaceous (A.D. 1550 to 1900). This is a generalized category characterized by a laminated micaceous paste and flat square rims (Carrillo, personal communication, 1988). Prominent interior and exterior striations, produced by smoothing with a corn cob, are common. The two Apache wares found in the area, Ocate Micaceous and Cimarron Micaceous, are mainly distinguished by thickness. Ocate Micaceous ranges from 1.5 to 6.0 mm thick, with an average of 3 to 4 mm; Cimarron Micaceous ranges from 4 to 9 mm thick, with an average of 4 to 6 mm (Gunnerson 1969). Since there is an overlap in width between the two types, the decision was made to combine them under the general category of *Apache Micaceous*, with the expectation that they might later be statistically separated into two distinct groups. Ocate Micaceous has been tentatively dated to A.D. 1550 to 1750; Cimarron to A.D. 1750 to 1900 (Gunnerson 1969).

Chacon Micaceous (A.D. 1840 to 1870). An Apache ware named by Carrillo (1987), having a square rim, a micaceous slip with a non-micaceous clay body, and quartz and feldspar temper with a small amount of mica schist. Carrillo believes manufacture of this type indicates that the Jicarilla Apache lost their micaceous clay source in the middle to late nineteenth century to newcomers who purchased the land on which it was located.

Mica-slipped. This category included culinary wares that were not made from a micaceous clay, but had a mica slip and rounded rims. Vadito Micaceous (A.D. 1600 to early twentieth century) was manufactured at Picurís, and is a sand-tempered culinary ware with a prominent micaceous slip, consisting of a serecite mica-rich clay over a rough surface (Carrillo 1987). El Rito Micaceous (A.D. 1800 to 1895) was first described by Dick (1968). It is found in the El Rito-Abiquiú area and in the Picurís-Taos area. The slip is a white or gold serecite mica. Vessel interiors are usually smoothed and polished; bowl interiors are unslipped. These wares are similar, except that El Rito Micaceous is thinner than Vadito Micaceous. Carrillo (personal communication, 1988) suggests that El Rito Micaceous may be a Hispanic-made ware. Because of the difficulty in distinguishing El Rito Micaceous from Vadito Micaceous, a general category was used.

Mica paste. This category includes culinary wares with rounded rims made from micaceous clays or with micaceous temper, with or without a mica slip. Peñasco Micaceous (A.D. 1600 to present) is considered a Puebloan ware, and was described by Dick (1965) at Picurís. The clay contains biotite mica and grains of quartzitic sand. Vessels are usually unslipped, though a biotite micaceous slip does occur. Petaca Micaceous, first described by Dick (1968), dates from 1800 to 1895. It is similar to modern vessels produced at Picurís Pueblo, except that moderate amounts of angular quartz and feldspar temper are included in the Petaca ware. Oblique scoring on both interior and exterior surfaces of vessels resulted from wiping the surfaces to smooth them. Carrillo (personal communication, 1988) suggests that Petaca Micaceous may also be a Hispanic ware. Because Peñasco Micaceous and Petaca Micaceous are very similar and distinguished only by scoring, they were combined in this general category.

Prehistoric wares. Wiyo, Biscuit A, Biscuit B, Glazewares, and Potsui'i Incised have been described in the Rough Sort section.

Euroamerican Artifact Analysis

Descriptive Analyses

The Euroamerican artifacts from La Puente and the Trujillo House were analyzed using a descriptive format that focused on artifact function. The format was designed to monitor functional information, either regardless of material of manufacture (for instance, see Boyer 1987), or within material categories. The latter option was chosen for this analysis because this project's research questions called for studying the availability of various items on the Rio Chama frontier. Within this descriptive format, each artifact was inspected and four types of variables were recorded: function, chronology, manufacturing, and description.

Variables of function were concerned with the use of the artifact. This could be either the manufacturer's intended function, or the actual function if it differed from that intended by the manufacturer and was definable by the analyst. The function of each artifact, if determined, was recorded in a hierarchical framework based on categories first employed by Ward et al. (1977), and since used by Kelley and Boyer (1982), Seaman (1983), Oakes (1983a), Maxwell (1984), and others. Boyer (1987) expanded these categories into a more explicit framework that provided increased functional information. This framework includes ten functional categories: Subsistence/Production, Food, Indulgences, Domestic Equipment, Household Equipment, Construction/Maintenance, Personal Effects, Entertainment, Transportation, and Unidentifiable. Within each functional category, artifacts were assigned to "types" containing items whose specific functions might be different but are, in general, related. Finally, the specific function of each artifact, if known, was recorded as a function within a type within a category. For instance, within the category Food is a type of item called Canned Goods. Within Canned Goods are several functions such as Meat Can, Vegetable Can, and so on. Functional information on reuse and brand names was also recorded.

Chronological information was obtained from descriptive and manufacturing variables. This is particularly true for mass-produced items whose attributes changed in chronologically definable ways. Examples include the location of seams on bottles, the kinds of seams on cans, identifiable maker's marks on glass and ceramic vessels, glass color, and nail form. Because the dates are usually manufacturing dates, they may not reflect dates of availability. Time lag in either the introduction or disappearance of items at a site or in a region is difficult to define for individual artifacts, and is better studied by comparing assemblages with historic documents concerning site and regional history and artifact availability. When dates were obtained for an artifact, they were recorded as "post dates" (i.e., post-1750), "pre dates" (pre-1890), ranges of dates (1765 to 1832), exact dates (1923), questionable dates (1883? or 1880 to 1925?), and "circa dates" (ca. 1900).

Manufacturing variables described the material, manufacturer, and attributes that reflect the manufacturing process. These attributes were recorded for descriptive purposes, to provide chronological information, and to provide or verify functional information.

Variables of description provided information on the physical properties of an artifact, such as amount present, length, thickness, and signs of aging. Obviously, these attributes varied according to the material of the artifact (for example, glass bottles cannot be described by paste type, and ceramic bowls cannot have a can number), and the amount recovered (bottle finish type cannot be recorded from a body sherd). As much information as possible was recorded for each artifact to provide and verify functional and chronological conclusions.

Artifact Chronology

Because Euroamerican artifacts, particularly those that are mass-produced, often exhibit temporally sensitive physical or stylistic attributes, they may be used to help establish dates for sites, features, and components or occupations. Two techniques were employed to make use of chronological data available from the Euroamerican artifact assemblages. The first technique involved South's (1977) Mean Ceramic Date formula. South's formula was used to calculate mean dates for ceramic artifacts and other material groups, providing mean artifact dates for the Trujillo House and the features at La Puente. Using this information, occupation dates were postulated for the Trujillo House and the three components at La Puente.

The second technique involved constructing graphs showing ranges of years within which most of the datable artifacts could have been made. Except for a few artifacts with exact manufacturing dates, most of the dates obtained were actually ranges, expressed as pre dates, post dates, or date ranges. The artifacts associated with each date range could have been made during any year within the range. In order to estimate dates for an assemblage, the number of artifacts that could have been made during any five-year period within each date range was calculated. These numbers were converted into percentages of the total number of datable artifacts, reflecting the relative frequencies of datable artifacts for each five-year period. By graphing these percentages, it was possible to postulate a range of years within which the datable artifacts probably appeared at the site.

At the Abiquiú sites, this technique was used to examine different material groups, features, and components, as well as to estimate dates for each site as a whole. The result was a series of graphs that can be compared to each other, to the mean artifact dates, and to major historical events. Because the sites had lengthy occupations spanning several historical events that affected access to market goods, dates were not calculated in one-year periods. Relations between features and components, and between site assemblages and historical market changes can be investigated using five-year periods; it was felt that any further refining of dates would produce unnecessary noise.

Architectural Materials Analysis

Architectural material samples were collected at La Puente and the Trujillo House. They included adobe brick, adobe plaster, and gypsum plaster from the walls of the Trujillo House, pieces of adobe from midden deposits at La Puente, and pieces of gypsum from both sites. The gypsum pieces were separated into processed and unprocessed groups by provenience and weighed; no further analysis of these materials was attempted.

Using techniques developed at the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM) in Rome, the adobe brick and plaster samples were subjected to a series of tests to define the character of the adobe used at the sites, and its relation to natural on-site soil. Tests included analysis of particle size by sieving and sedimentation, Attenburg tests to define liquid and plastic limits of the materials, and analyses of soluble salts. Methods and standards for conducting these tests are detailed in Teutonico (1988). The tests were conducted at the Architectural Preservation Laboratory at the Laboratory of Anthropology, Museum of New Mexico. Standards for comparison of adobe are available in Clifton et al. (1978), Smith (1982), and Precision Engineering (1985).

Flotation and Macrobotanical Analysis

Soil samples collected during excavation were processed at the Laboratory of Anthropology by the simplified bucket version of flotation (see Bohrer and Adams 1977). Each sample was immersed in a bucket of water, and a 30- to 40-second interval allowed for settling out of heavy particles. The solution was then poured through a fine screen (about 0.35 mm mesh) lined with a square of chiffon fabric, catching organic materials floating or in suspension. The fabric was lifted out and laid flat on coarse mesh screen trays until the recovered material had dried. Each sample was sorted using a series of nested geological screens (4.0, 2.0, 1.0, 0.5 mm mesh), and then reviewed under a binocular microscope at 7× to 45×. As the "floated" samples were very large and seeds numerous, it was necessary to subsample some screen sizes in 18 of the samples, and calculate an estimated number of seeds for the entire sample. As the original soil volume was not recorded by lab workers in five La Puente samples and one Trujillo House sample, calculation of seed density (number of seeds of a given taxon per liter of soil) was not always possible. Note the following eccentricities of flotation data tables: With samples for which original soil volume is unknown, seed counts in tables are given as actual number of seeds recovered, followed by estimated number of seeds for the entire sample in bold type in parentheses: 2 (**6.2**); for samples of known volume, seed counts are given as actual number of seeds recovered, followed by an adjusted number of seeds per liter of soil, in italic type in parentheses (which takes into account both subsampling and sample size): 4 (*1.2*). Relevant tables have a footnote that explains this notation.

The total number of individual seeds (4083) and taxa (26) recovered from these sites was high: a good deal of this is known to be noise, which is extraneous to this project's aim of illuminating human plant utilization practices. The flotation data tables have been stratified in an attempt to sort out clear cultural information from possible economic plants and likely intrusives. What this crude stratification reveals immediately is the very small percentage of certain economics (all cultivars) and the large numbers of ambiguous or extraneous results. It should be noted that categorization of individual taxa or specimens as possibly economic or probably intrusive is conjectural, given the shallowness of deposits (within 10 cm of surface in most cases) and signs of roadside weed control by burning (charred seeds of Russian thistle, known to postdate all cultural activity at La Puente and the bulk of the Trujillo House occupation). Because of known disturbance and burning of these near-surface deposits, the best clues to affiliation of the plant specimens may be growth habits, or autecological characteristics, of the individual species. Ruderal species (annuals growing in disturbed conditions such as roadsides) are suspect, even when considering charred specimens of prime human collecting targets such as goosefoot and pigweed. Perennials with special habitat requirements (sedge, and possibly piñon and juniper) are likely present due to human intervention; prickly pear seeds, on the other hand, are a favorite food of small rodents (Martin et al. 1951), and showed all the signs of mouse disturbance (always unburned, frequently cracked open in characteristic feeding patterns).

From each flotation sample with sufficient charcoal, a sample of 20 pieces of charcoal was identified (10 from the 4-mm screen, and 10 from the 2-mm screen). Each piece was snapped to expose a fresh transverse section, and identified at 45×. Low-power, incident light identification of wood specimens does not often allow species-or even genus-level precision, but can provide reliable information useful in distinguishing broad patterns of utilization of a major resource class. Charcoal samples from La Puente, earmarked for radiocarbon dating, were identified using similar methods, but the largest pieces were selected with no attempt to produce an even representation of various size classes.

Macrobotanical corn remains consisted entirely of charred cob fragments, most abundant in the Trujillo House midden. Specimens possessing a full cob circumference were examined to determine number of kernel rows. Both circular and compressed cob cross-sections were common. Straight rows were by far the most common configuration, but spiral and irregular row dispositions were also observed. Cob diameter and cupule dimensions were measured according to description by Nickerson (1953), using dial calipers. All metric measurements on cobs were adjusted to reflect an estimated 21 percent shrinkage during carbonization (Cutler 1956). Since erosion of glumes (the papery structures surrounding individual kernels) can have a significant effect on cob diameter and cupule **width**, measurements of badly eroded cobs were tabulated separately from uneroded or only slightly eroded cobs. It is immediately apparent that, for any given provenience category, average dimensions for these two groups of cobs are significantly different.

Bone Artifact Analysis

The methods used to examine faunal remains from the Abiquiú sites are summarized from Bertram (1990). Bone was recovered from only two sites: La Puente and the Trujillo House. Analysis was conducted in two stages. A rough sort of all faunal materials provided general baseline information on the animals used, taphonomy, and consumption practices. A sample of bone was then analyzed in more detail to provide further information on butchering methods, species composition, age of animals at death, and the relative representation of parts.

A total of 18,043 bone elements was rough sorted: 11,205 from La Puente and 6838 from the Trujillo House. Several attributes were analyzed including probable species (or size range if indeterminate), butchering and processing techniques visible on specimens, evidence of thermal alteration, and general state of preservation. Several methodological problems were encountered during this study. For the most part they consisted of heavily reduced fragments that could not be assigned to specific genera. An example of this problem is pig bone, which, when heavily reduced, is not readily distinguishable from deer, sheep, cattle, horse, bear, and even human bone. In addition, only a few elements of sheep and goat bone are easily distinguished on casual inspection.

Thermal alteration was also difficult to identify objectively. Burning is generally easy to recognize, but mild roasting and boiling are more difficult to identify except where fecal bone and soil staining can be ruled out. Thus, only cases where thermal alteration was definite were so recorded during the rough sort. Taphonomic changes through weathering or the action of soil on bone are also difficult to identify in a cursory examination. When visible, weathering, root-etching, acid-etching, and gnawing were noted. Evidence of processing was noted but was not recorded for individual specimens at this level of analysis.

A 35 percent sample of the rough sorted bone from both sites was analyzed in detail. Bone from definite Colonial and Territorial period contexts at La Puente was selected for this level of analysis, and was dated based on associated artifacts. Samples were taken from strata within features where available, including Features 1, 5, and 8; the sample totalled 3816 fragments. Since Spanish Colonial deposits were relatively rare, all bone from those deposits was included in the detailed analysis. All bone from the interior of the structure at the Trujillo House, and from four 1-by-1-m grids in the midden which contained the full range of strata encountered, were selected for detailed analysis; the sample totalled 2147 elements. Thus, the sample was biased toward units that would provide the most information concerning the economic use of meat at these sites.

Sampled items were analyzed for taxa (to species where possible), skeletal element, portion and laterality of element, age, and sex or fusion state of each item. In addition to these attributes, the number of fragments that could be refitted to form a single element was noted. Alterations including cooking, gnawing, scatological modification, cutting or other reductive processing, and taphonomic character were recorded. The last included erosion, leaching, weathering, surface-exposure weathering, root-etching, and delamination. In addition, a new variable was recorded for these artifacts: total rib length for all groups of rib fragments within a bag. This allowed monitoring of the relative completeness of ribs to one another, their association with meat units in cooking and other processing, and their susceptibility to scavenger and post-depositional attrition (Binford and Bertram 1977).

PART 2

The Prehistoric Sites

CHAPTER 4

PREHISTORY OF THE RIO CHAMA VALLEY

JAMES L. MOORE

Though the archaeology of the Rio Chama Valley has been studied for nearly a century, many aspects of cultural development in the region are poorly understood. The general consensus is that it was used intermittently for hunting or chert mining around Cerro Pedernal before A.D. 1200. After A.D. 1200, and particularly after A.D. 1300, rapid population growth culminated in the large, multistoried pueblos of the Classic period. By the time Spanish colonists arrived at San Juan Pueblo in A.D. 1598, there were few permanent residents left in the Rio Chama region.

PALEOINDIAN

The earliest occupation of the Southwest was during the Paleoindian period, which contained three broad temporal subdivisions: Clovis (10,000 to 9000 B.C.); Folsom (9000 to 8300 B.C.); and Plano (8300 to 5500 B.C.) (Agogino 1968; Irwin-Williams 1965, 1973; Irwin-Williams and Haynes 1970; Neuman 1967). The last subsumes several traditions using distinct projectile point styles. In the past, Paleoindians have been classified as big-game hunters, but recent research has changed this. Evidence suggests that the Clovis people were generalized hunter-gatherers (Stuart and Gauthier 1981:31). Folsom and Plano groups are thought to have turned increasingly toward the specialized hunting of migratory game, particularly bison. This shift may have been caused by the extinction of megafauna and changes in vegetation patterns caused by late Pleistocene environmental shifts.

Though a few isolated projectile points have been found, no Paleoindian sites have been recorded in the Rio Grande Valley north of La Bajada Hill or in the Rio Chama Valley (Anschuetz et al. 1985; Stuart and Gauthier 1981).

ARCHAIC

By the end of the Paleoindian period a cultural tradition based on the broad-spectrum exploitation of floral and faunal resources developed: the Archaic. Renaud (1942a, 1942b, 1942c) provides the earliest discussion of Archaic sites in the upper Rio Grande, assigning them to his Rio Grande Culture. His projectile points (Renaud 1942a) resemble those of the Oshara sequence as defined by Irwin-Williams (1973) in north-central New Mexico, and derive from the same cultural tradition. Thus, more recent investigations in the Rio Chama Valley have assigned Archaic projectile points to the Oshara sequence (Anschuetz et al. 1985; Lang 1980; Schaafsma 1976; D. Snow 1983).

The Oshara tradition is divided into five phases: Jay (5500 to 4800 B.C.), Bajada (4800 to 3200 B.C.), San Jose (3200 to 1800 B.C.), Armijo (1800 to 800 B.C.), and En Medio (800 B.C. to A.D. 400). Jay and Bajada sites are mostly small, ephemeral base camps (J. Moore 1980; Vierra 1980). People were probably grouped into small, mobile nuclear or extended families during these phases. San Jose sites are larger and more common than those of earlier periods, which has been interpreted as evidence of population increase. Corn horticulture and a pattern of seasonal population aggregation and dispersion were introduced by the beginning of the Armijo phase (Irwin-Williams 1973). The En Medio phase represents a transition from nomadic hunting-gathering to a semisedentary lifestyle based on a combination of hunting-gathering and limited horticulture. A strongly seasonal pattern of population aggregation and dispersion developed during this phase.

Middle and Late Archaic sites are the most common types in the lower Rio Chama basin, but most of the Archaic sites that have been investigated in the region are in and around Abiquiú Reservoir. Schaafsma (1976, 1978) completed the first systematic research on the Archaic occupation of this area. Fifty-six Archaic sites were identified in his study, of which 13 were excavated. Most were simple lithic artifact scatters or isolated projectile points, but five were large base camps situated at the mouths of major drainages on the Rio Chama terrace. More recent work in this area has been completed by Bertram et al. (1989). Eighteen sites were investigated in their study, of which eight contained identifiable Archaic components. A Late Archaic occupation was suggested for four of these sites (LA 25330, LA 27042, LA 51700, and LA 51703), all of which appear to have been reused at later times (Bertram 1989; Schutt et al. 1989). Middle to Late Archaic occupations were noted at five sites (LA

25328, LA 25480, LA 27002, LA 27018, and LA 27020), and in some instances multiple occupations were suggested by the presence of diagnostic projectile points or obsidian hydration dates from varying time periods (Bertram 1989; Schutt et al. 1989).

Anschuetz et al. (1985) note interesting regional variations in the distribution of Archaic sites. Tools associated with intensive food processing are rare or absent at sites near Abiquiú, but are common at sites near the confluence of the Rio Chama and Rio Grande. They feel this demonstrates a differential pattern of seasonal use and exploitation from one end of the valley to the other.

In addition to hunting and gathering activities, the Rio Chama Valley also served as a source of Pedernal chert between at least the Paleoindian and Protohistoric periods (Warren 1974; Snow 1978). Though this material is abundant in Rio Chama and Rio Grande gravels, Pedernal chert was also quarried around Cerro Pedernal and Abiquiú Reservoir, and quarries in the former location were originally called the Los Encinos Culture (Bryan 1939).

Anasazi

Developmental Period (A.D. 600 to 1200)

There is little or no evidence of Anasazi occupation in the lower Rio Chama Valley during the Developmental period. A records search by Maxwell and Anschuetz (1987) located only nine Developmental period sites in the area. Wendorf and Reed (1955) note a scarcity of Developmental period sites in the northern Rio Grande area, which contrasts with the San Juan region where sites from that period are common. During the second half of the period there was an influx of Pueblo farmers into the Taos region. A similar movement into the Cimarron and Canadian drainages has been posited (Wendorf and Reed 1955; Thoms 1976). However, Glassow (1980) found a long sequence of cultural development in the Cimarron district, suggesting that migration was not responsible for that population. There was no corresponding movement into the Rio Chama Valley.

Mera (1935) posits the descent of Kwahe'e and Taos Black-on-white (ceramic types that are hallmarks of the late Developmental period) from Chacoan roots. Neither type is common in the Rio Chama Valley. Taos Black-on-white has not been found, and only one Kwahe'e Black-on-white sherd has been recovered (Peckham 1981). No other pottery predating Santa Fe Black-on-white, a common Coalition period type, has been found in the valley (Beal 1987). Other than the single Kwahe'e sherd (possibly an heirloom piece), the only evidence of Developmental period use of the lower Rio Chama Valley are early Anasazi projectile points, which occasionally occur as isolates or in lithic artifact scatters. Thus, a pre-A.D. 1200 Anasazi occupation of the lower Rio Chama Valley on a permanent basis is unlikely. Use of the area before A.D. 1200 was probably restricted to brief hunting episodes and quarrying. In this respect, early Anasazi use resembled that of the Archaic.

Coalition Period (A.D. 1200 to 1325)

The beginning of the Coalition period was marked by a number of major changes in the northern Rio Grande. They included a switch from mineral- to carbon-painted ceramics, construction of above-ground kivas that were often incorporated into roomblocks, the appearance of specialized rectangular rooms, and settlement of the Rio Chama Valley (Wendorf and Reed 1955).

Mera (1935) views Santa Fe Black-on-white, the most common early Coalition period decorated pottery type, as a carbon-painted cross between Kwahe'e Black-on-white and Gallina Black-on-white, and thus a Chaco/Gallina descendent. Wendorf (1954) attributes the switch to carbon-painted wares to influence from the upper San Juan region, and suggests it was caused by an influx of Mesa Verdeans. Lang (1982:161) feels that carbon paint was introduced to the Gallina area around A.D. 1100 via immigrants from the San Juan, where carbon paint had been used since the A.D. 700s. Abandonment of the San Juan region in the late 1200s contributed to the spread of Mesa Verde design styles and their incorporation into late Santa Fe Black-on-white (Lang 1982:178). Thus, Santa Fe Black-on-white may have been influenced by both the Chaco and Mesa Verde ceramic traditions.

The late Coalition period is demarcated by the appearance of Wiyo Black-on-white. As with Santa Fe Black-on-white, there is disagreement concerning its origin. While Mera (1935) feels that Wiyo descended from Santa Fe Black-on-white and was thus part of the Chaco ceramic sequence, Wendorf and Reed (1955) see a clear connection to the San Juan series. Lang (1982:180) considers the origins of Wiyo to be problematic; however, certain attributes suggest it evolved in the Pajarito area under strong Towa influence.

The few Coalition period pueblos found in the Rio Chama Valley are relatively small (20 to 50 rooms) C-shaped roomblocks closed on the fourth side by a palisade or line of stones (Cordell 1979a). Riana and Palisade Ruins were constructed and abandoned at or shortly after the end of this period (Hibben 1937; Peckham 1958, 1981). Both were occupied only briefly, and Riana was burned at the time of abandonment. Leafwater Pueblo (Kap) was also built during this period

(Luebben 1953). All three villages evidence planned construction as well as accretional growth, implying that they were initially built by relatively large groups of people and added to at later times (Beal 1987).

Several of the large Classic period villages may also have been founded during the Coalition period. Tsiping was built during the mid to late Coalition period, and was abandoned early in the Classic period (Beal 1987). Santa Fe and Wiyo Black-on-white ceramics were recovered during excavations at Te'ewi (Wendorf 1953a), beneath the Classic remains at Ponsipa'akeri (Bugé n.d.a), and at Hupobi and Sapawe (Beal 1987). Thus, at least five of the large Classic period villages were probably founded during the Coalition period. Like the smaller villages that were abandoned near the end of the Coalition period, those that continued to be occupied probably began as small preplanned pueblos, growing by accretion over time.

Coalition period demographic patterns mirror trends elsewhere in the northern Rio Grande. In general, this period saw substantial population growth accompanied by residential expansion into areas of greater latitude and elevation than had previously been settled (Anschuetz et al. 1985:8-9). Abandonment of earlier occupational zones may have occurred for a variety of reasons, including environmental change, erosion caused by the reduction of local vegetation or shifts in rainfall patterns, and conflict. Related factors that may have contributed to this shift include increased rainfall mitigating shorter growing seasons at higher elevations, new crops or agricultural techniques that allowed farming to be accomplished in more marginal areas, or pressure from competing groups forcing population readjustments.

Classic Period (A.D. 1325 to 1600)

Like the Coalition period, the beginning of the Classic period was marked by a number of major changes. While a black-on-white ceramic tradition continued in the Chama, Santa Fe, Taos, Jemez, and Pajarito areas, the rest of the northern Rio Grande began producing glazewares during this period (Wendorf and Reed 1955). Average village size increased, with larger pueblos containing up to 2000 rooms. Wiyo Black-on-white evolved into thick carbon-painted Biscuit wares in the Rio Chama Valley. An early variety (Biscuit A or Abiquiú Black-on-white) was produced from A.D. 1375 to 1450, and a late variety (Biscuit B or Bandelier Black-on-white) was manufactured between A.D. 1400 and 1550 (Breternitz 1966:69-70). Potsuwi'i Incised was made between A.D. 1425 and 1525. Its production probably reflects the dramatically increased level of exchange that developed between the eastern pueblos and the plains at this time (Breternitz 1966:89; Spielman 1983; Wendorf and Reed 1955). Sankawi Black-on-cream (sometimes called Biscuit C) was manufactured between A.D. 1500 and 1600, and was ancestral to the historic Tewa wares of the Rio Grande Valley (Breternitz 1966:94).

Two origins of the large Classic population have been suggested: migration from other regions, and the concentration of populations from many small pueblos into a few large villages. Ellis (1964) documented the latter process at Nambé. Early villages were located defensively, but after A.D. 1425 were situated in nondefensive locations. This suggests that defensibility came to be determined by population size rather than location, and afforded more flexibility in village placement. The absence of numerous early small pueblos in the Rio Chama Valley suggests that a similar process was not at work in that region.

At least 16 large villages were occupied in the lower Rio Chama Valley during the Classic period: 15 have Tewa names and are considered ancestral to existing villages. Leafwater (Kap) and Tsiping were abandoned early in the Classic period. Most of the rest were occupied until nearly A.D. 1540, though Mera (1934) suggests that the absence of Sankawi Black-on-cream and late glazewares at many of them indicates that they were abandoned by A.D. 1500. Only five villages (Sapawe, Peseduinge, Te'ewi, Ku, and Tsama) appear to have been occupied as late as A.D. 1598 to 1620 (Schroeder 1979; Schroeder and Matson 1965). Euroamerican materials including sheep and cattle bones and metal were recovered from Sapawe and Tsama, and may represent direct evidence of occupation into the Historic period (Ellis 1975).

The Rio Chama Valley was abandoned by the Anasazi as a residential area by A.D. 1620 at the latest. They moved into the Rio Grande Valley, either joining with or forming the existing Tewa villages. Residents of San Juan Pueblo consider Homayo, Howiri, and Pose'uingue to be ancestral villages (Bandelier 1892:50; Ortiz 1979). Sapawe is also claimed as ancestral by some Tewa (Bandelier 1892:53). Jeançon (1923:76) reported traditions at San Juan and Santa Clara Pueblos that mention migration from the Rio Chama Valley to their villages. By the time the Spanish began moving into the valley in the early 1700s, the only Indians present were nomadic raiders.

Discussion

Though a number of Coalition and Classic period villages have been investigated, little is actually known about the Anasazi occupation of the Rio Chama Valley. Yarrow (1879) provided the earliest descriptions of archaeological resources in the region. Bandelier (1890, 1892) described many of the large Classic period sites, linking them through legend and name to existing Tewa pueblos. Some of the earliest intensive investigations were conducted by Jeançon in the early twentieth century. His work included descriptions of Ku and Tsiping as well as the excavation of 60 rooms at Peseduinge and 123 rooms at Poshu'ouinge (Jeançon 1911, 1912, 1919, 1923). Greenlee (n.d.) described most of the major ruins and excavated 12 rooms in the east plaza of Tsama. Sapawe and Tsama were partly excavated by the University of New Mexico field school in the 1960s (Ellis 1975). Salvage excavations were conducted at Leafwater (Kap), Te'ewi, and Howiri (Fallon 1978; Fallon and Wening 1987; Luebben 1953; Wendorf 1953a). Several rooms have been excavated at Ponsipa'akeri (Bugé n.d.a, n.d.b). Tree-ring samples were collected during the 1950s, but were insufficient for dating specific villages (Smiley 1952; Smiley et al. 1953). Mera's (1934, 1935) seminal work on surface collections from most of the major villages provided ceramic sequences and dates for later researchers.

Though much work has been completed, there is still little agreement on many aspects of regional cultural development. Problems have also been encountered in the interpretation of agricultural features as residential sites. Though Bandelier (1890, 1892) described extensive agricultural features, later researchers like Greenlee (n.d.) defined similar features as "foundation type" villages. In this way, a number of farming complexes have entered the literature as Classic period villages.

Central to understanding the culture history of this region is determining why it suddenly became suitable for occupation at a relatively late date. Did environmental change make the region more amenable to farming, or did technological advances allow expansion into more marginal zones? Most important, what was the source of the new population? Could internal growth have been responsible, or does the new population reflect a migration from elsewhere? If the latter, where did they come from?

These questions relate directly to the two agricultural sites investigated during this project. Perhaps innovations like water and soil control devices were responsible for the sudden ability of the Anasazi to occupy and farm regions that previously had not been open to such use. Then again, perhaps they are evidence of the problems encountered by farmers moving into the region. Knowing where the people came from and why the region suddenly became amenable to farming are critical to understanding the function and significance of such sites. The question of population origin will be discussed in the rest of this chapter. Why the region suddenly became amenable to farming will be addressed in a later chapter.

Where Did They Come From?

Numerous theories concerning the origin of the Rio Chama Valley Anasazi have been proposed, citing evidence from folklore, linguistics, and archaeology. Some are convincing, others less so. Though it is still impossible to conclusively determine the source of the population that flooded into the valley in the fourteenth century, the various arguments can be examined and assessed.

Indigenous population growth. A few researchers, such as Bugé (1980), believe that indigenous growth led to the large Classic period population. Wendorf (1953b) felt that the large Classic period villages derived from the coalition of smaller pueblos in the valley. He suggested a long occupation of the northern Rio Grande by the Tewa, predating the intrusion of other populations into the area (Wendorf 1954; Wendorf and Reed 1955). Citing linguistic studies, Hale and Harris (1979) concluded that the Rio Grande Anasazi were ancestral to both Tiwa and Tewa. While these arguments do not prove that the population developed in situ, they do imply a local origin rather than one in the distant Chaco or San Juan regions.

Plains origin. Trager (1967) felt that the Tanoans were latecomers to the Southwest, representing a "puebloized" population. He suggested that the Keres were the original occupants of the Rio Grande, and were in place by A.D. 700. The Tanoans, along with their linguistic relatives, the Kiowa, moved into eastern Colorado and northeastern New Mexico around A.D. 750, with ancestors of the Towa moving directly into the Rio Grande area. By A.D. 900 to 1000 the Tiwa-Tewa had adopted a pre-Puebloan form of social organization and moved south, displacing the Keres. Though Ellis (1967) also suggests a sojourn on the Plains before the eastern Tewa moved into the Nambé area, she traces their origin back to the San Juan region.

Chacoan origin. Few scholars feel that the Tewa originated in the Chaco area, though some have proposed such an origin for the Towa (Reed 1949). Mera (1935) suggested a link between the Tanoans and Chaco Canyon, but notes that the information available at the time was too meager to allow any solid conclusions.

Upper San Juan origin. Most believe the Tewa originated in the upper San Juan region (Eggan 1950, 1979; Ellis 1967; Hawley 1950; Ortiz 1969; Riley 1952; Reed 1949; Sando 1976). Ford et al. (1972) provided three views of this process. Schroeder felt that the Tewa occupied the Piedra district until A.D. 1000, when they began moving south down the Rio Puerco and Rio Chama. Some of these people occupied small, multiroom pueblos in a triangular area between Cuba, Española, and Albuquerque, and made Kwahe'e Black-on-white pottery. The rest moved into the Galisteo Basin and along the east flank of the Sangre de Cristos. Around A.D. 1250 the Tewa east of the Sangre de Cristos moved into the Rio Chama Valley-Española area, and those in the Jemez-Salado drainage moved onto the Pajarito Plateau. Ford generally agrees with this scenario, except he thinks that the pueblos on the east side of the Sangre de Cristos moved into the Pecos area, and that movement onto the Pajarito Plateau came from displacement of the Tewa east of the Rio Grande rather than from those west of the Jemez. Peckham feels that the Rio Chama Valley was not occupied as early as Schroeder believes, and that Kwahe'e and Santa Fe Black-on-white ceramics were produced by the Tano between Santa Fe and the Galisteo Basin, where they were joined by immigrants from Mesa Verde in the thirteenth century. Peckham also supports a Rio Grande origin for the Tewa. All agree that the Keres originated in the Chaco-Mesa Verde regions, and that their movement into the Rio Grande area displaced the Tewa and Tiwa already living there.

Beal (1987) suggests two patterns of movement out of the San Juan region. Movement before A.D. 1250 was in small groups, but after that date larger groups seem to have been on the move. These large groups lacked the time and resources necessary to maintain their previous lifestyles, and may have relied on raiding as well as foraging for survival. This could have contributed to the defensive posture of the Gallina people in the A.D. 1300s, as evidenced by their construction of cliff houses and towers (Beal 1987).

Folklore is often cited as proof of Tewa movement out of the San Juan region. Sando (1976) indicates that the Tewa refer to mountains in central Colorado in their songs, and considers this to be evidence of their origin in southeast Colorado. Ortiz (1969) presents the San Juan Pueblo origin story, relating their southward movement in two groups under summer and winter chiefs from Sipofene under Sandy Place Lake. After twelve stops the two groups rejoined and built a village called Posi (Pose'uinge), which was abandoned after an epidemic. Six groups left Posi and built the current Tewa pueblos. Ellis (1967) discusses a Tiwa-Tewa shrine in the Great Sand Dunes of southwest Colorado, and suggests it was a substitute for a shrine located further to the west in their prehistoric homeland.

Discussion. Ideas concerning the origin of the protohistoric Rio Chama Valley Tewa are often contradictory and confusing. Even when scholars agree on their location before movement into the area occurred, they often disagree about timing and the route taken. The first three possibilities (origin on the Plains, in the Chaco region, and locally) are the least likely. Since Trager (1967) presented his argument, research in northeast New Mexico and southeast Colorado has demonstrated local pueblo and nonpueblo developmental sequences of considerable antiquity (Campbell 1976; Glassow 1980; Moore 1984; Winter 1988). Thus, those populations were already in place at the time Trager (1967) postulated proto-Tanoan movement into the region.

It is similarly unlikely that they originated in the Chaco area. Though this possibility was raised by Mera (1935), there are no supporting data. A local origin is also questionable and can be interpreted in two ways: long-term occupation of the Rio Chama Valley with a sudden population surge in the fourteenth century, or occupation of nearby parts of the upper Rio Grande with eventual expansion into the Rio Chama Valley. There is no evidence to support the first possibility. No pre-Coalition villages have been found in the Rio Chama Valley, and all indications point to a transitory use of the region for hunting and foraging before that phase. The second possibility can be linked to migration from the upper San Juan region.

Though conflict in the Gallina area is well documented (Mackey and Green 1979), it is likely that it was internal rather than a response to invaders. The possibility of conflict with intruding Tewas cannot be entirely ruled out, but it must be questioned until hard evidence of such an invasion is found. Similarly, use of the Rio Chama Valley as a route to the Rio Grande by Tewas abandoning the upper San Juan must also be viewed with suspicion. If inhabitants of that region moved into the valley from the north, why are their ceramics totally absent? As discussed earlier, the earliest pottery in the Rio Chama Valley was a single Kwahe'e Black-on-white sherd found at Palisade Ruin, and that could have been an heirloom piece. No San Juan series ceramics have, as yet, been recovered.

If direct movement of people from the San Juan to the Rio Chama Valley occurred, certain characteristics linking those areas would be expected since they would be moving into an empty region without an existing material culture tradition. Two examples of areas with such direct links are Headcut Reservoir on a tributary of the Rio Puerco of the east, and the Galisteo Basin. In the former area, several large pueblos containing late San Juan pottery occur on high mesas. Villages at lower elevations are smaller and contain local ceramics such as Socorro and Santa Fe Black-on-white. This pattern suggests an intrusion of San Juan peoples into an area already occupied by farmers using pottery from a different ceramic tradition. The similarity of Galisteo Black-on-white to Mesa Verde Black-on-white has led many to suggest a direct link between the two regions. In both cases there is a continuity of ceramic traditions, both with and without modification. This is not the case in the Rio Chama Valley. The earliest ceramics there were influenced by Chacoan, Gallina, and San Juan styles, but cannot be directly linked to any one region.

The lack of evidence of the presence of other than hunters and foragers in the Rio Chama Valley before A.D. 1200 suggests that long-term indigenous growth was not responsible for the large Classic period population. The absence of San Juan series ceramics could mean that population movement from that area only indirectly contributed to settlement of the valley. Continued movement into the Rio Grande Valley and adjacent regions probably displaced some of the people already living there, including the original inhabitants as well as earlier immigrants. Because of this pressure, the Tewa may have founded several small villages in the Rio Chama Valley during the Coalition period. Movement into the valley, supplemented by internal growth, probably continued, resulting in the large populous Classic period villages.

CHAPTER 5

LA 6599

DAISY F. LEVINE

INTRODUCTION

Some confusion has surrounded LA 6599. Originally recorded in 1962, it was described as a Pueblo IV site containing 32 surface structures and eight kiva depressions. During a more recent survey, Hannaford and Maxwell (1987) noted several cobble concentrations that could conceivably have been construed as structural remains, but no depressions were found. This site was originally either mislocated or poorly described, since LA 6599 does not fit its 1962 description.

LA 6599 was on a low terrace on the north side of U.S. 84 at an elevation of 1817 m (5961 feet), and was situated between the Rio Chama floodplain on the north and the base of Abiquiú Mesa to the south. The site contained seven cobble concentrations, one ash stain, and one fieldhouse (Fig. 5-1). The fieldhouse was the only feature located outside project limits. The site measured 80 by 76 m, and included a low-density artifact scatter containing nine lithic artifacts and two sherds. Seven of the lithic artifacts were obsidian, two were chert. Five of the obsidian flakes were found in a cluster west of Feature 5.

Most of the seven cobble concentrations probably resulted from mechanical disturbance, since an abandoned dirt road, a ditch or drainage, and a buried telephone cable cross the site. The exception was Feature 6, a possible farming grid. The abandoned dirt road seems to have been associated with the nearby Trujillo House (LA 59658), and was probably built during the American Territorial period. Four features were investigated, including two cobble piles, the ash stain, and a small farming grid.

FEATURE DESCRIPTIONS

Feature 1

Feature 1 was a low rubble mound representing the remains of a small fieldhouse. The mound measured 4 by 3 m, and was 15-20 cm high. There was a light scatter of rubble around the main concentration, resulting from collapse of the walls. The fieldhouse was constructed of unshaped basalt and quartzite river cobbles. No artifacts were found in association. Feature 1 was located outside project limits, and was not excavated.

Feature 2

Feature 2 was a cobble concentration measuring 1 by 2.5 m. No cultural materials were associated with this feature. It was situated between the existing right-of-way fence and a buried telephone cable, and was probably created when the buried cable trench was dug. Because of its noncultural nature, Feature 2 was not selected for investigation.

Feature 3

This feature consisted of a concentration of cobbles and gravel, probably representing the remains of a gravel bar that was cut by an intermittent drainage and an abandoned dirt road. The concentration measured 3 by 11 m. Two adjacent 1-by-1-m grids were used to investigate this feature, and were excavated to a depth of 20 cm. There was no apparent structure to the feature from surface indications; excavation confirmed this. Subsurface remains indicated a natural origin rather than any intentional construction of cobble alignments. One lithic artifact was found on the surface, and a fence staple was found in Level 2.

Feature 4

This feature was very similar to Feature 3. It was on the south bank of the abandoned dirt road, between the old road bed and U.S. 84. It consisted of a cobble and gravel concentration, measuring 1 by 3 m, that probably represented another gravel bar disturbed by the abandoned road cut. Feature 4 was not selected for excavation since it was directly opposite Feature 3 and appeared to be part of the same natural gravel bar.

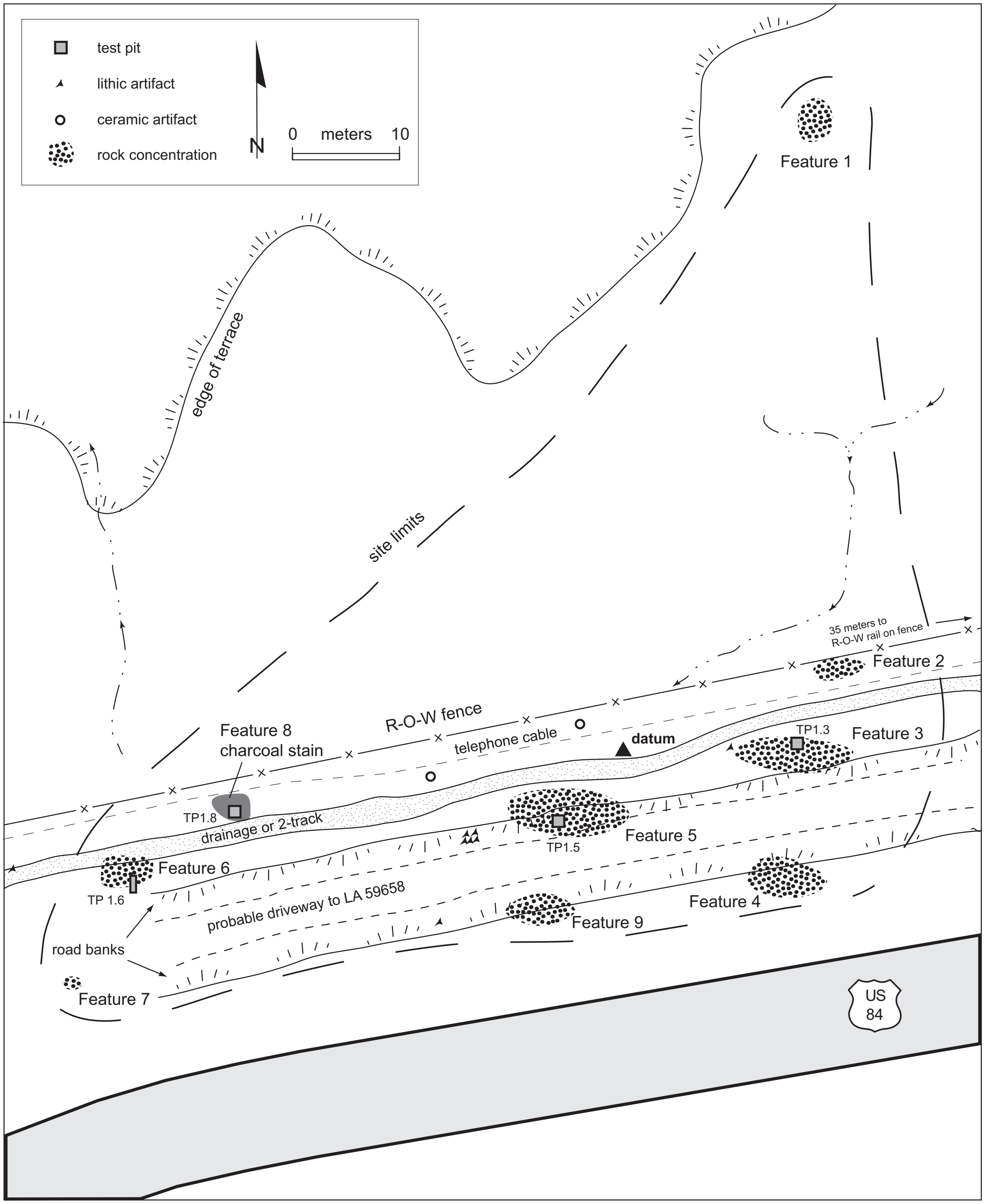

Figure 5-1. Plan of LA 6599.

Feature 5

This feature consisted of a cobble and gravel concentration on the north bank of the abandoned road cut, between the old road bed and the drainage. A 1-by-1-m grid, excavated to 20 cm below the surface, revealed sandy fill containing numerous small to medium gravels and some large cobbles. Again, this feature appeared to be part of a disturbed natural gravel bar. A cluster of five obsidian lithic artifacts was found 4 m west of Feature 5.

Feature 6

From the surface, Feature 6 appeared to be a small farming grid consisting of a 3-by-2 m rectangular concentration of medium-sized cobbles. There were no interspersed gravels, in contrast to the natural gravel bars. There was a possible corner in the northwest portion of the feature, and a straight cobble alignment formed the north edge. However, this alignment may have been created by a drainage that cuts across the north edge of the concentration.

A 0.5-by-2-m exploratory trench was placed perpendicular to the north alignment to determine whether there was a corresponding south alignment. Excavation to 20 cm below the surface revealed a few small- to medium-sized subsurface cobbles but no alignment. An old stream bed was encountered in the trench at 10 cm below the surface. Because of the location of this feature between an abandoned road cut and a drainage, the presence of a filled stream channel within the feature, and the close proximity of several natural gravel bars, it was assigned a questionable cultural origin.

Feature 7

Feature 7 was a triangular concentration of 10 medium- to large-sized basalt cobbles in a 1-by-1-m area. The cobbles occurred in a single surface layer, and were not piled. No surface or subsurface gravels were present. A 1-by-1-m grid, excavated to a depth of 15 cm, revealed loose alluvial sand fill, with no rocks. While this feature appeared to be of cultural origin, no specific function or date could be assigned.

Feature 8

Feature 8 was a 2-by-2-m dark stain adjacent to the telephone cable trench that paralleled the right-of-way fence. Excavation revealed an amorphous stain containing a 10-cm diameter semicircular ash deposit. The burned fill in Feature 8 varied between 8 and 16 cm thick. No charcoal was found in the feature. Some unburned cobbles and gravels occurred along its edge, suggesting disturbance by the buried telephone cable. Eight lithic artifacts were recovered from the ashy fill. The source of the stain is unknown, but it may have been a hearth dump associated with the fieldhouse or with other agricultural activities in the area.

Feature 9

Feature 9 was a cobble concentration that measured 3 by 4 m; it was on the north bank of the abandoned dirt road cut. Since it was similar to Features 3, 4, and 5, and probably also resulted from mechanical disturbance associated with the abandoned dirt road or buried telephone cable, it was not excavated. No cultural materials were associated with this feature.

Ceramic Artifacts

Two Tewa blackware sherds were recovered from the surface of this site; no pottery was found below the surface.

Chipped Stone Artifacts

JAMES L. MOORE

Because of small sample size, little can be said about the lithic artifacts from LA 6599. Seventeen chipped stone artifacts were recovered (Table 5-1). Slightly more than half are obsidian, and most of the rest are Pedernal chert; one artifact is an unidentified variety of chert. Though no cortex is present on the Pedernal chert artifacts, local procurement is presumed because of the close proximity of sources (outcrops and river gravels). Two obsidian artifacts have nonwaterworn cortex, suggesting they were obtained at the source rather than from river grav-

Table 5-1. Chipped stone artifact type by material type; LA 6599.

Material	Flakes	Bifaces	Row Total
Chert	1	-	1
Pedernal chert	7	-	7
Obsidian	8	1	9
Column total	16	1	17

Table 5-2. Chipped stone artifact material texture by material type; LA 6599.

Material	Glassy	Fine	Medium	Coarse
Chert	-	1	-	-
Pedernal chert	-	6	1	-
Obsidian	9	-	-	-
Column total	9	7	1	0
Column percent	52.9%	41.2%	5.9%	0.0%

Table 5-3. Flake platform type by material type; LA 6599.

Platform	Chert	Pedernal Chert	Obsidian
Single-faceted	-	4	-
Multifaceted	-	2	-
Multifaceted and abraded	-	-	1
Retouched and abraded	-	-	1
Abraded	-	1	-
Collapsed	1	-	4
Absent	-	-	2
Column total	1	7	8

els. Their physical appearance suggests they originated in the Jemez Mountains. An examination of material texture (Table 5-2) suggests that site residents selected the most suitable materials for flaking and tool production. Less than 10 percent of the assemblage consists of medium- or coarse-grained materials.

One flake appears to have been produced during primary core reduction; the rest probably originated during the secondary stage of core reduction. While no flakes appear to have been removed during tool manufacture, three have modified platforms (Table 5-3), suggesting they were removed from prepared cores or tools. The only tool in the assemblage is an obsidian biface fragment; none of the debitage showed the consistent edge damage that suggests use.

The lack of angular debris and cores in the part of the site investigated suggests that lithic reduction did not occur there. Either the flakes were produced elsewhere on the site and carried to the area examined, or they were reduced at other sites and transported to LA 6599 for use.

Pollen and Phytolith Analyses

Four pollen and phytolith samples taken in and between features were examined in an effort to identify the presence of domesticated plants at this site (Dean 1989a, 1989b), but no evidence of domestic pollen or plant phytoliths was recovered.

Discussion

The heavy disturbance of LA 6599 by an American Territorial period road cut, a buried telephone cable, and natural drainages made it difficult to interpret the activities that may have occurred at this site. The presence of a fieldhouse and possible farming grid, and proximity to the Rio Chama floodplain suggest an agricultural function. Though few diagnostic artifacts were found, a Classic period occupation is likely. The sparse scatter of artifacts suggests a short-term or seasonal occupation. The associated rock concentrations appear to have been created by various disturbances rather than prehistoric agricultural activities. This conclusion is supported by the fact that these features occur only along the abandoned dirt road and buried telephone cable, and are aligned with those disturbances.

In summary, the only features thought to be prehistoric are Feature 1, the fieldhouse, and Feature 6, the possible farming grid. Although Feature 1 could not be investigated, the presence of a possible hearth dump (Feature 8) supports the idea that this site contained a structure. Small agricultural sites are common throughout the northern Rio Grande. Previously tested sites include BAN-12, BAN-15, and BAN-22 (Acklen et al. 1984). These are all one- or two-room fieldhouses with associated artifact scatters, and are situated above drainages or arroyos. Though the presence of small structures is not always indicative of an agricultural site (Moore 1978), the location of LA 6599, the presence of a possible farming grid, and its proximity to other agricultural sites all suggest an agricultural function.

CHAPTER 6

LA 59659 (AR-03-10-06-76)

Daisy F. Levine

Introduction

This site was originally recorded as a sherd and lithic scatter with stone structures (Hannaford and Maxwell 1987:8). It was thought to be an Anasazi agricultural site dating to the Classic period (ca. A.D. 1350 to 1540). The site sits on a low terrace above the Rio Chama, and is on the south side of U.S. 84 at an elevation of 1818 m (5965 ft). The site measured 150 by 210 m. It contained 13 cobble concentrations that included five linear rock piles which varied from 1 to 3 m in diameter, and one farming grid (Fig. 6-1). The function of most of the cobble features is unknown. Some may represent fieldhouses, while others may be field boundary markers; some could have been created by an abandoned road cut which has disturbed part of the site. When the site was originally recorded, a few sparsely scattered artifacts were noted, including two Biscuitware bowl sherds, some Pedernal chert flakes, and a basalt multidirectional core.

Not long before the site was excavated, about half of it was disturbed by disking for field preparation. No surface artifacts were visible after this occurred, and some of the rock piles were scattered. Hannaford and Maxwell (1987) reported that some of the cobble concentrations had definite linear sides, but this was not confirmed by excavation. Six features were within project limits; three were selected for excavation.

Feature Descriptions

Feature 1

Feature 1 was a rubble mound (3 m in diameter, 30 to 40 cm high) that probably represents the remains of a fieldhouse. The rubble was very dense, and consisted of basalt and quartzite cobbles. A light cobble scatter was eroding downslope to the south. No corners were visible, but the feature had the appearance of having collapsed inward. Sufficient rubble was present to suggest cobble masonry walls, rather than jacal or adobe construction. Feature 1 was distinguished from Features 2 through 13 by its size, mound height, and by the fact that it did not align with other rock piles (see Feature 3 description). No artifacts were found near this feature. Since Feature 1 was outside project limits, no subsurface investigations were conducted.

Feature 2

Feature 2 was a very dense, circular cobble concentration (2 m in diameter, 20 cm high) with no evidence of wall alignments or corners. This feature could either be another fieldhouse, or a large rock pile (see Feature 3). It is also possible that this concentration was simply the result of prehistoric or historic rock quarrying for building material. It was outside project limits and was not excavated.

Features 3, 4, 5, 8, and 9

These five rock concentrations formed an alignment at the north edge of the site, and possibly represented field boundary markers (Fig. 6-1). They were 4 to 10 m apart, and ranged from 1 to 3 m in diameter. They were mostly surficial, with mound heights not exceeding 10 cm. Exploratory grids were excavated into Features 4 and 8 because they were the most substantial concentrations. These features were in an area disturbed by disking, and some of the rock piles were scattered. An agricultural function is suggested for these features (see below).

Feature 4 was one of the larger rock piles in the alignment. A 1-by-1-m grid was excavated along the north edge of this feature to examine it in profile and determine its depth. Approximately 25 to 30 medium to large cobbles were concentrated on the surface in a 3-m-diameter area. Excavation revealed 6 to 10 more rocks to a depth of 13 cm. There was no pattern to the arrangement of the cobbles; they appeared to have been piled randomly. No cultural deposits were encountered during excavation.

From the surface, Feature 8 was a dispersed scatter of quartzite and basalt cobbles. The feature was slightly mounded, but there was no real concentration of rocks. A 1-by-1-m grid revealed four distinct strata to a depth of 40 cm. Stratum 1 was a 20-cm-thick layer of light tan sand. Five Biscuitware sherds representing two vessels, and four lithic artifacts were recovered from this layer.

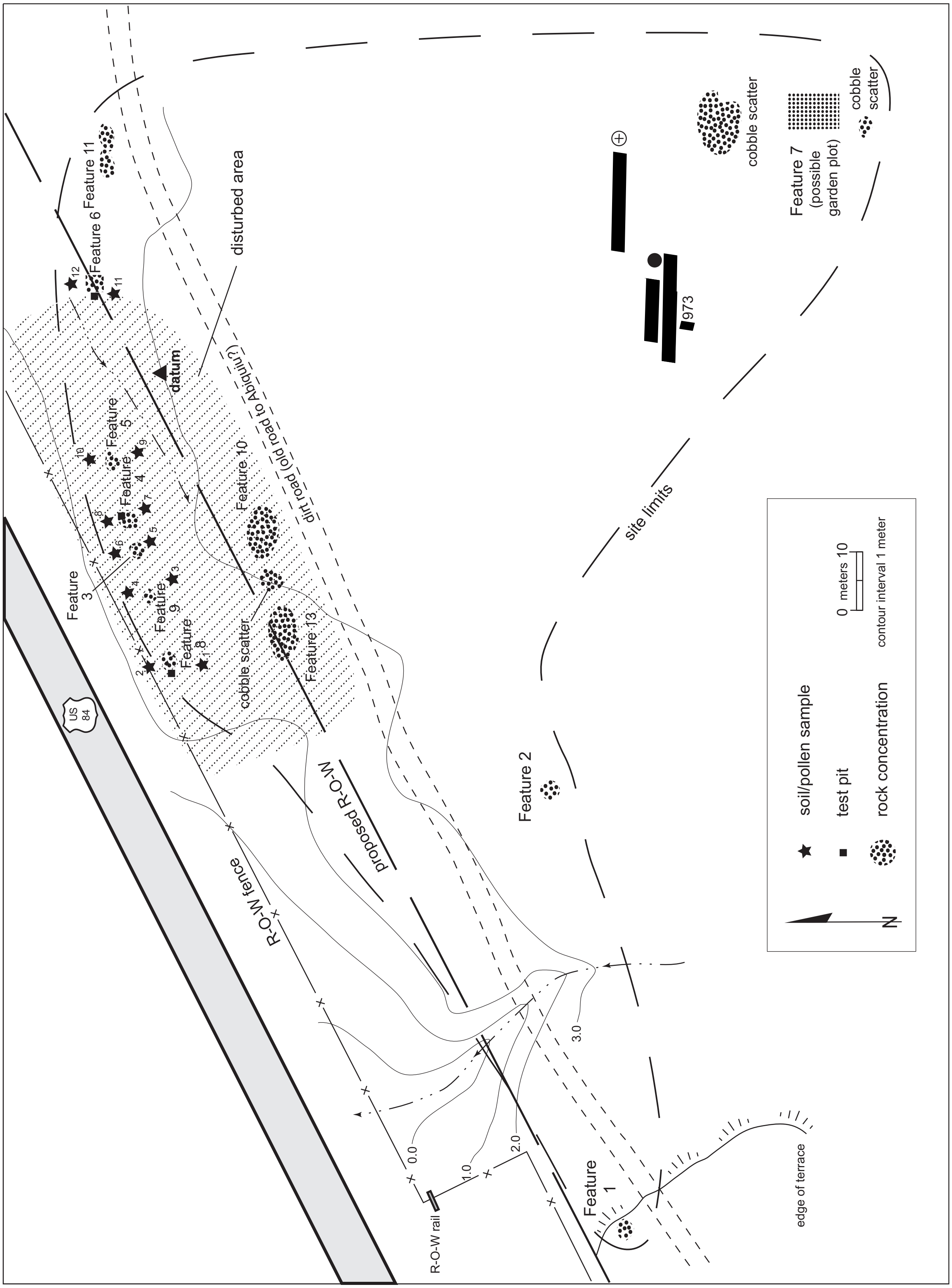

Figure 6-1. Plan of LA 59659.

Some flecks of charcoal and ephemeral soil staining were also present in an isolated area. In addition, a few small cobbles and medium-sized gravels were noted.

Stratum 2 was a 6-cm-thick layer of stream gravels, which contained no cultural materials. Stratum 3 was a 10-to-12-cm-thick red clay layer. Initially, this was thought to be a floor, but there was no definite evidence of a cultural origin. Stratum 3 overlaid a 10-to-16-cm-thick layer of compact sand mixed with caliche and gravels (Stratum 4). Augering below this stratum encountered a layer of stream gravels, which eventually became too thick for the auger to cut through.

It is possible that Feature 8 represented the remains of a fieldhouse, based on the presence of sherds, lithics, and charcoal flecks. However, the area was so badly disturbed by disking that it was impossible to determine this for certain. It is also possible that cultural materials were introduced into subsurface contexts by the disking, and that Feature 8 was simply a rock pile with an agricultural function similar to others in the area.

Feature 6

Feature 6 was a dense concentration of cobbles in a roughly rectangular area measuring 2 by 2 m. This feature was slightly mounded, standing about 20 cm high. Approximately 50 cobbles were present on the surface. This feature may represent another fieldhouse, though no corners or walls were evident. Excavation of a 1-by-1-m grid revealed that the feature was basically surficial, with the base of the cobble layer extending only 15 cm below the surface, and with no underlying rocks. No cultural materials were found in association with this feature.

Feature 7

Feature 7 was a 15-by-9-m cobble-mulched grid on a low terrace outside project limits. The river cobbles used to build this feature varied from small to large and were very dispersed, making it difficult to define the actual gridded area. The southeast corner was the only definite structural element visible, and no visible alignments were noted within the feature. The surface of the grid was sandy, with small gravels interspersed between cobbles. It had the same appearance and composition as some of the smaller grids recorded at LA 48679, about 5 km to the east (Anschuetz et al. 1985:74-75). There was a wide range of variability in the size and construction of those grids. An amorphous scatter of cobbles measuring 2 by 1.5 m was 5 m downslope and to the north of Feature 7. There was also a small (2 m diameter) cobble concentration 4 m southwest of Feature 7. These cobble concentrations were similar to the other agricultural features on the site, and may have been field markers. Feature 7 was not excavated because it was outside project limits.

Features 10 and 13

These were both dispersed, low-density cobble scatters adjacent to an abandoned dirt road that ran the length of the site. These cobble scatters were aligned from east to west, and almost blended into each other. Feature 10 measured 3 by 6 m, Feature 13 was 4 by 8 m. These concentrations were either created by construction of the abandoned dirt road, or were the remains of cultural features scattered by the road. Both were outside project limits and were not excavated.

Feature 11

Feature 11 was a dispersed scatter of cobbles that measured 16 by 7 m. It was at the east edge of the site outside project limits, and was not excavated.

Ceramic Artifacts

Only eight sherds were recovered from this site, all from Feature 8. The pottery represented two vessels, a Biscuit A bowl and a Biscuit B bowl. Seven sherds were from Stratum 1, and one was found in the auger test.

Chipped Stone Artifacts

JAMES L. MOORE

Because of small sample size, little can be said about the chipped stone artifacts from LA 59659. Four chipped stone artifacts were recovered: three were Pedernal chert, one was an unidentified variety of chert (Table 6-1). No cortex was present on the three pieces of debitage, but the core was partially covered by cortex. Because of the

Table 6-1. Chipped stone artifact type by material type; LA 59659.

Material	Flakes	Angular Debris	Cores	Row total
Chert	1	-	-	1
Pedernal chert	1	1	1	3

Table 6-2. Chipped stone artifact material texture by material type; LA 59659.

Material	Glassy	Fine	Medium	Coarse
Chert	-	-	1	-
Pedernal chert	-	3	-	-
Column total	0	3	1	0
Column percent	0.0%	75.0%	25.0%	0.0%

close proximity of outcrops and river gravel sources, the Pedernal chert was probably obtained locally. The origin of the other type of chert is unknown, though presumably it was also procured from local gravel deposits. Mostly fine-grained materials were selected for use at this site (Table 6-2), but the small sample size makes the validity of this observation questionable.

Both flakes originated during the secondary core-reduction stage, and both had collapsed platforms. No formal tools were recovered, and only one artifact was used as an informal tool: an edge of the Pedernal chert core was battered, suggesting it was used against a hard material or anvil.

Pollen and Phytolith Analyses

Fifteen pollen and phytolith samples taken in and between features were examined in an effort to identify the presence of domesticated plants at this site (Dean 1989a, 1989b), but no evidence of domestic pollen or plant phytoliths was recovered.

Discussion

The rock piles, fieldhouse(s), and farming grid suggest an agricultural function for LA 59659. A Classic period occupation is likely based on ceramic dates and its resemblance to other farming sites in the area. It is unfortunate that the site was disturbed by recent agricultural activities and that both possible fieldhouses were outside project limits and could not be examined in more detail. The handful of artifacts recorded during survey could not be relocated after the site was disked. However, the small number of artifacts that were originally recorded were consistent with Acklen et al.'s (1984:99) criteria for small nonresidential structural sites. They state that "fieldhouses are considered to be small, expedient structures evidencing few signs of prolonged occupation. Farmsteads are more substantial agriculturally oriented structures which do yield evidence of prolonged or multiple occupations."

While it may be argued that LA 59659 was a more substantial agricultural site because of the number of features located there, it did not have a midden, which would have indicated prolonged occupation. This site was probably only occupied during the summer growing season, and the paucity of artifacts suggests limited use.

LA 59659 was similar to several other agricultural complexes that have been examined. These include BAN-8, BAN-10, BAN-12, and LA 48679 (Acklen et al. 1984; Anschuetz et al. 1985; Moore and Harlan 1984). The first three sites are at the edge of La Bajada Mesa south of Santa Fe; LA 48679 is east of Abiquiú, near Medanales. BAN-8 had a particularly striking resemblance to LA 59659. That site contained a series of structures and rock concentrations, and a light scatter of surface artifacts (Acklen et al. 1984:36). Provenience 3 consisted of a 5-by-6-m rock structure, and an associated linear arrangement of seven rock piles averaging 30 cm high and 30 to 80 cm in diameter. Testing revealed coursed masonry walls in the structure, suggesting it was a fieldhouse. BAN-8 was thought to be an agricultural site: the presence of a fieldhouse suggested short-term occupation, and the associated rock piles may have been the result of field-clearing activities.

PART 3

The Historic Sites

CHAPTER 7

HISTORY OF THE RIO CHAMA VALLEY

JEFFREY L. BOYER

INTRODUCTION

Occupation and use of the Rio Chama Valley by mobile Native American groups during historic times is evident in Euroamerican documents, but few archaeological investigations of these remains have been undertaken. Consequently, we know little in historical or archaeological terms of the distribution of Navajo, Ute, and Apache sites in the Rio Chama Valley, either through time or across space. This situation is a prime factor in the controversy regarding Schaafsma's (1975, 1979, 1992) Piedra Lumbre phase sites. Schaafsma assigns these sites to sixteenth and seventeenth century Navajo sheepherders, whereas Carrillo (1992) feels they are the camps of Tewa or Hispanic herders. In turn, this controversy adds to the archaeological ambiguity of the historic Native American presence in this region. Because of this, the following discussion focuses on the Euroamerican history of the area, which is better documented archaeologically and in the historic literature. The reader is referred to Schaafsma (1975, 1979, 1992), Carrillo (1992), and Wozniak (1992) for discussions of Navajo use of the Rio Chama Valley; to Schroeder (1965) for a history of the southern Utes; and to Bender (1974) and Gunnerson (1974) for histories of the Jicarilla Apache.

While the history of the Rio Chama involves interaction between these groups and Euroamericans, their archaeological presence remains difficult to define. In this regard, the debate between Schaafsma and Carrillo is important because it has forced a re-examination of both the historical and archaeological records in an attempt to accurately define the Piedra Lumbre phase and to discern the presence of various Native American peoples in the region. Clearly, such a definition is critical if we are to examine the interethnic relationships that are an important part of Rio Chama history. This project, particularly through Levine's ceramic analysis, attempts to examine this issue from the perspective of two Hispanic sites, one a homestead and the other a village.

The story of the Euroamerican occupation of the Rio Chama Valley is a complex picture of the development of the Hispanic frontier, of changing relationships with core areas and native peoples, and of confrontation between frontiers. This overview presents a brief history of the Euroamerican use and occupation of the valley, and a discussion of the major structural and organizational features of the Rio Chama frontier. The reader is referred to Swadesh (1974) for a thematically focused anthropological history of the Rio Chama Valley, and to Kessell (1979) for a succinct bibliographic introduction to the area's history. Because the Euroamerican sites investigated during this project span the Spanish Colonial, Mexican, and American Territorial periods, but were apparently not occupied after ca. 1900, this discussion ends with the beginning of the Statehood period in 1912.

SPANISH EXPLORATORY PERIOD (1540 TO 1598)

In July of 1541, Don Tristán de Arellano, commander of Coronado's army, arrived at Tiguex with the portion of the expeditionary force that did not accompany Coronado to Quivira. Although it was summer, Arellano obviously planned to stay at Tiguex through the winter, because he dispatched Captain Francisco de Barrionuevo on an exploratory trip up the Rio Grande in search of other pueblos and provisions (Hammond and Rey 1940:244; Bolton 1949:209-210). Barrionuevo and his troops visited two "provinces" before reaching the northernmost point of their travels, the pueblo they called Braba or Valladolíd, later known as Taos. The first province was identified as "Hemes" or "Xemes" and contained seven pueblos. The second province was identified by Castañeda, Coronado's chronicler, as "Yuque-Yunque." Castañeda stated that the inhabitants of Yuque-Yunque "abandoned two very beautiful pueblos which were on opposite sides of the river, while the army was establishing camp, and went to the sierra where they had four very strong pueblos which could not be reached by the horses because of the craggy land" (Hammond and Rey 1940:284).

The Spaniards apparently followed the Indians on foot, since Castañeda also stated that the soldiers found in those pueblos "abundant provisions and beautiful glazed pottery of many decorations and shapes," as well as "many ollas filled with a select shiny metal with which the Indians glazed their pottery" (Hammond and Rey 1940:284). The "shiny metal" led Castañeda to speculate on the presence of silver mines in the region.

It is almost certain that the two pueblos located on opposite sides of the river were Yungue'ouinge and Okeh'ouinge. The former was later named for San Gabriel, and the latter for San Juan. Schroeder and Matson (1965:131) argue that the reference to "craggy land" rules out other villages visited by Barrionuevo along the Rio Grande, and indicates that at least four sixteenth century Tewa pueblos have yet to be positively identified. They favor Peseduinge, Te'ewi, Ku'ouinge, and Tsama'ouinge as the best qualifiers for the four strong pueblos, a contention based on ceramic cross-dating that suggests these sites were abandoned in the middle to late 1500s. If Schroeder and Matson are correct, Barrionuevo's visit to these villages represents the first entrance of non-Indians into the Rio Chama Valley. Castañeda does not mention how long Barrionuevo stayed at the temporarily abandoned pueblo of Yungue. The lack of a detailed description, such as that provided for Braba (Taos), may indicate that most of his time was actually spent en route to and from the four strong pueblos.

The second non-Indian visit to the Rio Chama Valley occurred fifty years later. On January 15, 1591, the small expedition led by Gaspar Castaño de Sosa, having left the pueblo of Picurís and returned to the Santa Cruz Valley by way of the pueblos of Pioge and San Juan (Okeh), went to "a pueblo which was on the other side of the deep river" (Schroeder and Matson 1965:129). Schroeder and Matson suggest this refers to the pueblo of Yungue, though Castaño de Sosa's chronicler does not provide a name for the village. The Castaño de Sosa party was there for two hours, after which they journeyed to another pueblo a league (4 to 4.8 km) from the first, where they spent the night. Based on the distances recorded, Schroeder and Matson (1965:133) suggest that the second pueblo was Te'ewi, since its distance from Yungue (8 km) is closer to a league than is the distance to the next closest pueblo, Santa Clara (about 13 km).

Castaño de Sosa's party visited San Juan only briefly on its way north, visited Yungue for two hours on its way south, and may have spent one night at Te'ewi. Spanish visits to the Rio Chama Valley in the sixteenth century probably made little impact, culturally or materially, on the valley's native inhabitants.

Spanish Colonization Period (1598 to 1680)

With the founding of the first Spanish community in New Mexico, the development of the Spanish frontier began. Interestingly, this event also marked the beginning, however tenuous, of movement of the frontier into the Rio Chama Valley. The pueblo of Yungue'ouinge was established in the latter half of the thirteenth century. Tradition at San Juan Pueblo indicates that the two moieties that comprise the village came to the area from different directions. The Summer People had previously lived at several sites in the Rio Chama Valley before settling near the confluence of the Rio Chama and the Rio Grande. The Winter People, on the other hand, moved from the north and east, settling at two villages upstream from Yungue, both of which were damaged by flooding. This may refer to Pioge and Sajiu (LA 144 and 547) (Schroeder and Matson 1965:121). Finally, they sought permission to settle on the opposite side of the Rio Grande from Yungue. In time, the two groups decided to become one village composed of two physically separate communities (Ellis 1987:15-16).

In the summer of 1598, Don Juan de Oñate led an army of soldier-colonists and their families into northern New Spain to colonize and secure the Spanish frontier. In July of that year, Oñate and an advance party arrived at a pueblo that he renamed San Juan de los Caballeros. It is commonly assumed that this pueblo was Okeh, the village now known as San Juan. However, Schroeder (1953:5) points out that the Spaniards identified the village as "Caypa," a word that strongly resembles Kapo, the Tewa name for Santa Clara Pueblo, located between modern San Juan and San Ildefonso Pueblos. He also notes that the pueblo now known as Santa Clara is not mentioned in two diaries of trips between San Ildefonso and San Juan pueblos. The implication, upon which Schroeder does not elaborate, is that Oñate first stopped at Santa Clara and later moved to San Juan and Yungue. This move is not mentioned in the historic documents, which is probably why Schroeder did not pursue the issue.

While waiting for the remaining colonists with their 83 ox-carts and wagons, and over 7000 head of livestock, Oñate first visited the neighboring pueblos to secure their compliance and co-operation, and then began construction of a ditch system for a city dedicated to San Francisco. When the main body of colonists arrived in August, a church was constructed. Because it was built in only two weeks, Ellis (1987:17) thinks it was a jacal building. Apparently, little additional work was done on the "city of our father San Francisco," the would-be residents having refused to contribute the necessary labor to build the city because life was too hard and many wanted to return to Mexico (Ellis 1987:19).

Based on dated letters from Oñate and others, Ellis (1987:18) contends that the Spanish headquarters were at Okeh (San Juan) from the summer of 1598 until February of 1599. Sometime between the spring of 1599 and March of 1601 the Spanish moved to Yungue. The pueblo was renamed San Gabriel and became the capital of the new province. In contrast, Jenkins (1987:63) observes that there is no mention in the documents of such a move. She contends that the Spanish had lived at San Gabriel since 1598, and cites a letter written at San Gabriel in March of 1601, in which Captain Luís de Velasco stated that the colonists had been there for three years. Ellis (1987:18) argues that this is an exception to the pattern in the dated letters, and that Velasco may have been referring to the San Juan-Yungue area rather than to a specific village.

In any case, the pueblo of Yungue'ouinge became the first capital of the new-born frontier. In 1610, Villagrá (cited by Ellis [1987]) described Yungue as having one rectangular plaza with an entrance at each corner, apparently a Spanish addition. The houses and terraces were high, perhaps multistoried. Ellis's excavations at the site revealed a series of unmodified rooms from the pueblo occupation, one block of modified rooms used by the Spanish as barracks and living quarters, a possible monastery-convent area, the first hornos in New Mexico, and the church of San Miguel. Artifacts recovered include a helmet that may already have been 100 years old when its bearer arrived at San Gabriel, links of chain mail, a religious medal, and Mexican and Indian pottery.

In 1609, Don Pedro de Peralta was appointed the new governor of the province and quickly made plans to move the capital to a more central location. He selected the site of Santa Fe. Simmons (1987:44) points out: "It has generally been assumed that San Gabriel was abandoned at that time. But reference to the place can be found in the documents as late as 1617. So it is apparent that the little community struggled on for a number of years before it finally withered away."

With the demise of San Gabriel there is no further mention in the documents of seventeenth century Hispanic settlement in the Rio Chama Valley. However, this does not necessarily mean that there were no settlements in the area. In 1714, Antonio de Salazar petitioned for the return of lands that had belonged to his grandfather, Alonso Martín Barba. These lands were west of the Rio Grande and extended for some miles along the southwest bank of the Rio Chama (Swadesh 1974:32). Since the request came only 20 years after De Vargas' Reconquest, it is likely that the Barba family had used those lands before the 1680 revolt. Whether this represents direct expansion of settlement from San Gabriel or later settlement is not clear.

No Euroamerican sites from the Colonization period are known from the Rio Chama Valley. Six sites from this period were discovered and three were excavated at Cochiti Reservoir (Snow 1971, 1973; Laumbach et al. 1977). Two of these sites, the Cochiti Springs Site (LA 34), and Las Majadas (LA 591), may have been permanently occupied homesteads. The former was a 12-to-18-room rectangular adobe structure built around a placita with adjoining corrals. The second was a five-room, L-shaped structure with an associated corral and three-room outbuilding. While most of the ceramics from these sites were puebloan, a few seventeenth century majolica sherds were found, along with other Euroamerican artifacts. Both sites were apparently abandoned before the 1680 revolt. The third site, LA 5013, was a small one-room stone structure identified as Hispanic because of a corner fireplace, and as seventeenth century because a Tewa Polychrome sherd was found.

Snow (1979:219) contends that the corrals and preponderance of domestic faunal remains indicate that, as early as the 1600s, the Hispanic colonists of the Cochiti area were beginning to specialize in pastoralism, primarily due to a paucity of available farm land. She also contends that these sites are representative of the expansion of the Spanish frontier: Cochiti Springs and Las Majadas as homestead/ranches, and the remaining sites as part of an as yet undefined structural feature of the frontier. However, their isolation within the already attenuated frontier and their consequent sociocultural simplicity relative to the neighboring pueblos may have resulted in the collapse and abandonment of the seventeenth century Hispanic frontier in the Cochiti area (Snow 1979:220), a situation that was mirrored regionally in 1680. Snow's observations may have significance for investigating the Rio Chama frontier, since the eighteenth and early nineteenth century Hispanic economy in that area was largely pastoral, much like the seventeenth century Hispanic economy of the Cochiti area. In particular, students of early Hispanic use of the Rio Chama Valley should pay attention to Snow's observations when considering Schaafsma's (1975, 1979, 1992) controversial Piedra Lumbre phase and the proposed seventeenth century presence of Navajo sheepherders in the upper Rio Chama. Although Schaafsma (1992) remains convinced that archaeological and historical evidence substantiates his claims of Navajo residence in the area, Carrillo (1992) and Wozniak (1992) are adamant in denying that the sites are Navajo. Carrillo (1992) suggests that they represent Tewa or Hispanic sheep camps from the seventeenth or eighteenth centuries.

Spanish Colonial Period (1692 to 1821)

At about the same time that Antonio de Salazar sought the return of his grandfather's lands, other settlers petitioned for land near old San Gabriel and along both banks of the Rio Chama. Though Swadesh (1974:32) does not specify their identities, the petitioners were apparently successful, since she observes that their grants were encroachments on the San Juan Pueblo grant. These settlers, assuming they were successful, most likely lived in scattered ranches. In his *declaración* from Nambé dated January 12, 1706, Fray Juan Álvarez reported no religious work in the Rio Chama Valley. The closest missions were at San Juan, Santa Clara, and San Ildefonso (Hackett 1937, III:372-378). In 1695, a community grant was established at La Cañada near the confluence of the Rio Chama and Rio Grande. The settlement was first called La Villa Nueva de los Españoles Mexicanos, but the name was later changed to La Villa Nueva de Santa Cruz de la Cañada, and finally shortened to Santa Cruz or La Cañada (Swadesh 1974:21). In 1706, the small church there was a *visita* of the mission at San Juan (Hackett 1937, III:372-378).

By the mid-1730s, settlement had moved up the valley and several of its tributaries, including the Rio del Ojo Caliente, the Rio del Oso, and the Rito Colorado. In 1734, Bartolomé Trujillo settled on the north bank of the Rio Chama west of the Rito Colorado. To his west lived Vicente Girón. On the south bank of the Rio Chama, beginning just west of the mouth of the Rito Colorado and proceeding upstream to the Arroyo de Abiquiú (Abiquiú Creek), eight grants were awarded. The grantees were Francisco Trujillo, Miguel Martín Serrano, Juan Trujillo, Miguel Montoya, Jose de la Serda (later changed to Serna), Josefa de Torres, Cristobal Tafoya, and Salvador de Torres. The following year, Gerónimo and Ignacio Martín Serrano were given a grant at the location of San José del Barranco about 3 km west of Abiquiú. The brothers were probably relatives of Miguel and all of them descendants of Pedro Martín Serrano de Salazar, an original settler of the Santa Cruz area who returned with De Vargas in 1692. Joining the Martín Serrano brothers were the families of Pascuál and Tomás (or Tomasa) Manzanares, and Juan de Gamboa (Swadesh 1974:33; Carrillo 1987).

Grantees on the Rito Colorado included Juan Esteban Garcia de Noriega, Antonio de Ulibarrí, José Antonio Torres, and Francisco Trujillo. The early grants on the Rito Colorado had a rather checkered history, and several single and multiple family dwellings from this period have been located (Quintana and Snow 1980). None have been excavated, but testing has been conducted at the Las Casitas site.

During the same years, the family of Rosalia Valdez and her sons Ygnacio and Juan Lorenzo established a settlement on the Rio del Oso. Apparently, this settlement was in the Vallecito at the heads of Abiquiú Creek and the Rio del Oso (Swadesh 1974:34, 49). The settlers were attacked by Indians in 1737 and subsequently moved to the Plaza Colorada grant in the Rio Chama Valley. This grant, along with Manuel Bustos' Plaza Blanca grant, were long, narrow strips of land situated across the Rio Chama from the abandoned pueblo of Abiquiú, and were immediately west of the lands of Vicente Girón.

In the same year that the Valdez family fled the Rio del Oso, the Abiquiú area residents received their first license for a chapel (*capilla*), which was dedicated to Santa Rosa de Lima (Salazar 1976:15). Construction of the chapel began on the grant of Miguel Martín Serrano (Swadesh 1974:37). The location of this first chapel and the plaza that was later built around it is controversial. Salazar (1976:15) maintains that the capilla remained incomplete in 1746. These issues are discussed in Carrillo's history of Santa Rosa de Lima and Boyer's history of La Puente in this volume.

The first detailed description of the population of the region was by Fray Miguel de Menchero, whose *declaración* is dated May 10, 1744. The Villa de Santa Cruz de la Cañada contained over 100 families occupied with raising wheat and sheep. In the Rio Chama Valley, the Rancho de Chama y Rio del Oso had either 11 (Jones 1979:123) or 17 (Hackett 1937, III:399) families who were ministered to by the friar at San Ildefonso. This friar also ministered to the "puesto de Santa Rosa Abiqui" (sic), occupied by 20 Spanish families. Swadesh (1974:34) contends that the families lived on scattered ranches, probably because of Menchero's use of the word "puesto," meaning place or post, rather than a word such as "plaza." This may indicate that the settlers of Santa Rosa were not aggregated into a single community.

During the 1730s and 1740s, residents of the Rio Chama were troubled by raiding Utes, Comanches, and Apaches. In 1747, the Viceroy of New Spain ordered Governor Joaquín Codallos y Rabal of New Mexico to join his soldiers with those from El Paso, Sonora, and Nueva Vizcaya in a punitive campaign against the Gila Apache (Jones 1966:118-119). However, the New Mexican contingent was unable to participate because of Indian problems of its own. In August of 1747, all settlements west of the Rio Grande were attacked by Comanches with Moache Ute allies. Twenty-three women and children were taken as captives (Swadesh 1974:35). In October of the same year, Governor Codallos y Rabal and 500 soldiers and citizens overtook the Comanches and some Utes a short distance from Abiquiú. Over 100 Indians were killed and 206 were captured, as were nearly 1000 horses (Bancroft 1962:249; Twitchell 1963, I:441-442). However, this did not calm the fears of the Spanish residents of the Rio Chama Valley, who petitioned in March of 1748 for permission to abandon their homes and move in with friends and relatives at Santa Cruz de la Cañada (see Pratt and Snow 1988:551-553; Carrillo, this volume). Permission was received in the summer and the settlers of Abiquiú, Ojo Caliente, and Pueblo Quemado moved to Santa Cruz.

Because the settlers were reluctant to reoccupy their homes when hostilities ended, the new governor, Tomás

Vélez Cachupín, ordered resettlement of the Rio Chama Valley in 1750. His decree included instructions regarding construction of a village around a plaza, in obedience to the "Royal Ordinances Concerning the Laying Out of New Towns" (Simmons 1969; Pratt and Snow 1988), which the settlers had previously ignored.

Resettlement was made under protest and duress in April of 1750 (Swadesh 1974:36-38). The main complaint came from the Valdez family, formerly of Rio del Oso and more recently of the Plaza Colorada grant. The Valdez family was dissatisfied with the way in which Governor Codallos y Rabal responded to the Comanche threat, with the lack of protection for the settlers, and with Miguel Martín Serrano. Nonetheless, Juan José Lobato, Alcalde Mayór of Santa Cruz, supervised the resettlement.

A census was taken in the same year (Olmstead 1981:30-31). The list of inhabitants of the "Puesto de Chama," a community in the lower valley apparently located near the modern village of Chamita, includes several of the original Abiquiú area settlers, notably Bartolomé Trujillo, Gerónimo and Ygnacio Martín, Tomás and Pascuál Manzanares, Salvador (de) Torres, and the infamous Juan Lorenzo Valdez. Also listed are several other, probably related, Martín and Salazar families, and several Mestas families, perhaps from the Mestas grant on the north side of Black Mesa (Mesa de la Canoa). At the end of the census for the Puesto de Chama, the document totals the inhabitants of both Santa Clara and Chama at 293. Earlier, the census lists 188 inhabitants at Santa Clara, leaving 105 people at the Puesto de Chama.

Two years later, Governor Cachupín commissioned a census of the settlements of "la gente de razón" ("people of reason"; i.e. Spaniards) (Jones 1979:124). This census lists 242 people in the Partido de Chama and 73 in the Partido de Abiquiú. If Cachupín's Partido de Chama is the same as the 1750 Puesto de Chama, the population in that area had dropped by 51 people in two years. Some may have moved up to the Abiquiú area, since only six families were there at the time of the 1750 resettlement.

Pratt and Snow (1988:568-575) have reconstructed the average family size of Spanish Colonial and Mexican Territorial period communities. The average from the Abiquiú area is 5.3 members per family. Using that figure, some 32 people may have resettled the community near the capilla of Santa Rosa de Lima in 1750. However, if we use the 1750 census, the average family in the Puesto de Chama contained 7.5 persons. This figure would raise the number of resettlers to 45. If this is correct, an additional 28 people moved into the Abiquiú area in two years, perhaps from downstream. It is interesting that not all of either the founding families or the resettler families are listed in the 1750 census. The Miguel Martín Serrano, Juan José de la Serda, Ignacio Valdez, and Manuel de la Rosa families are not included in this census, and were probably not living in the village at that time, but had their homes elsewhere in the valley.

In 1754, Governor Cachupín established genízaro land grants at Abiquiú and Ojo Caliente. With them came the Franciscan mission of Santo Tomás Apostól at Abiquiú. Since genízaros were Indians, albeit detribalized and at least nominally Hispanicized, these were corporate grants after the fashion of the traditional pueblo grants. The first 13 genízaro inhabitants of Abiquiú had probably been there for four years when the grant was established, because 13 genízaros were settled at the house of Miguel de Montoya, one of the area's founders whose grant was at Abiquiú pueblo and who did not return after 1747 (Twitchell 1914:162). Swadesh (1974:38) speculates that they may have been Hopis who were servants of Montoya in the 1740s. This may account for the tradition of referring to one section of Abiquiú as "Moke," a word that bears a striking resemblance to "Moqui," the Colonial Spanish name for the Hopi. Commonly, genízaros are considered to be detribalized Indians from any of the various "nomadic" tribes (Ute, Apache, Comanche, Navajo, etc.). However, Swadesh (1974:40) maintains that such was not the case at Abiquiú. Church records show that Pueblo Indians from Hopi, Zuñi, Isleta, Santa Clara, and other villages actually made up the majority of the genízaro population of Abiquiú.

By 1760, when Bishop Tamerón made his *visitación* to the New Mexican missions, the Spanish population of Abiquiú consisted of 104 families containing 617 persons (Adams 1954:64). This represents an increase in the Spanish population of 845 percent in only eight years. At the same time, the genízaro population increased by almost 1300 percent to 75 families containing 166 persons. However, by 1765 the Spanish ("and other classes") population had dropped to 76 families containing 482 persons, and the Indian population had dropped to 41 families containing 127 persons (Cutter 1975:349, 351). The census taker noted that these figures included families from "Santo Tomás y Santa Rosa de Abiquiú." This may be the first document that differentiates between the villages of Abiquiú (Santo Tomás) and Santa Rosa.

Fray Francisco Dominguez visited and described the missions of New Mexico in 1776. Regarding the "Pueblo and Mission of Santa Rosa de Abiquiú," Dominguez states: "This mission was recently founded by Don Tomás Vélez for Christian genízaro Indians. He had it named the pueblo and mission of Santo Tomás de Abiquiu, but the settlers use the name Santa Rosa, as the lost mission was called in the old days. Therefore, they celebrate the feast of this female saint [santa], and not of that masculine saint [santo], annually as the patron" (Adams and Chavez 1956:120; brackets ours).

Dominguez also described a small plaza east of Abiquiú. The plaza had a population of 49 families containing 254 persons, almost twice the size of Abiquiú, which had 136 persons in 46 families. Also east of Abiquiú was a "shrine of Santa Rosa de Lima belonging to the settlers where they buried their dead when there was no church in the pueblo" (Adams and Chavez 1956:126). The significance of Dominguez's observations is discussed in detail in later chapters.

That same year, Fray Dominguez joined with Fray Francisco Silvestre Vélez de Escalante for an expedition into what would become Utah, in search of an expedient overland route to California. Leaving Santa Fe on July 29, they arrived at "El Pueblo de Santa Rosa de Abiquiu" on the evening of the 30th, "where, due to various circumstances, we stayed over through the 31st" (Chavez and Warner 1976:4-5). Following a route perhaps first used 10 years earlier by Juan María de Rivera, the Dominguez-Escalante expedition traveled through southwestern Colorado into Utah, then turned south and east through northern Arizona and back to Santa Fe (Hill 1930:3-4). Though unsuccessful in establishing a route to the coast, the expedition opened what would eventually become known as the Old Spanish Trail, and made Abiquiú a frontier port for traders to the Utes (Hill 1930:5). Use of the Rio Chama as a transportation route between the Rio Grande and the Great Basin was apparently established by the Utes before the Spanish arrival (Schroeder 1965:54). During the first half of the 1700s, before the Comanche-Ute depredations of the 1740s and the subsequent years of resettlement, the Rio Chama was a route for trade with the Navajo (Schroeder 1953:5). After the Rivera expedition of 1765, much of the Hispanic trade originating in the Rio Chama was with the Ute (Hill 1930; Schroeder 1953, 1965; Swadesh 1974). Apparently, slaves were among the most lucrative items in the Ute trade (Malouf and Arline 1945). The Hispanic market for Indian slaves significantly affected Ute intratribal relationships as well as intertribal relations with neighboring Paiutes, Shoshones, and Navajos.

In 1789 or 1790, Governor Fernando de la Concha commissioned a census of the Abiquiú area (Olmstead 1981:111-124). The significance of this document lies in two areas. First, it identifies and enumerates the residents of the region. Second, it identifies by name the nine villages in the Abiquiú area at that time. Abiquiú (Pueblo de San Tomás) was but one of these villages, and not even the most populous; that honor belonged to San Miguel. Both Swadesh (1974:46) and Jones (1979:126) state that the census lists 160 genízaros in the area. However, Olmstead's (1981) translation identifies only "José, el Apache" at Abiquiú as a probable genízaro. A total of 262 families are listed in the census, containing 1124 persons. As discussed in later chapters, one of the most significant aspects of this census is that it identifies two plazas named in honor of Santa Rosa de Lima, only one of which is associated with the capilla of the same name.

The later years of the Spanish Colonial period were characterized by expansion of the frontier up the Rio Chama (Swadesh 1974). Initially, this took the form of land grants established further and further up the river. In 1766, Pedro and Juan Pablo Martín Serrano applied for the Piedra Lumbre and Polvadera tracts of the old José de Riaño grant (Swadesh 1974:47). Riaño, perhaps New Mexico's wealthiest land owner, had probably never actually occupied his large grant west of Abiquiú. The Martín Serrano brothers stated that they needed additional range land, apparently because of population growth that placed pressure on available farm and range land. This trend in population growth continued through the eighteenth and into the nineteenth centuries. In 1806, the San Joaquín del Rio Chama grant was established along the Rio Gallina and Rio Cebolla, some 24 to 32 km northwest of Abiquiú. A year later, the Vallecito de San Antonio grant was approved near the Rio del Oso settlement at the heads of Abiquiú Creek and the Rio del Oso. In 1814, petitioners began the process of securing what would become the enormous Tierra Amarilla grant. Their first request denied, they petitioned again in 1820 and 1824 before the grant was finally given in 1832. Nonetheless, the petitioners had apparently been using the area at least since they began their requests (Swadesh 1974:48-51).

As this process of frontier expansion began, the historical record has less and less to say about events in the lower Rio Chama Valley. Snow (1988:69) argues that this is in itself a significant issue, maintaining that the very "monotony" of the eighteenth and early nineteenth centuries was critical to the creation of the cultural milieu that is commonly recognized as Hispanic north-central New Mexico. At the same time, the process of population establishment and expansion seen in the Spanish Colonial period set a foundation for the major trends of the succeeding Mexican and American Territorial periods.

Mexican Period (1821 to 1846)

Two trends begun in the Spanish Colonial period resulted in the major characteristics of the Mexican period in the Rio Chama Valley. The first is continued Hispanic population expansion up the river by the process of obtaining land grants. While the Tierra Amarilla grant petitioners pursued its approval, a grant was given in

1823 to lands two leagues above the village of El Rito in an area known as Los Cañones de Riaño. The next year, the large Vallecitos de Lobato grant north of El Rito was approved, as was the Petaca grant north of Ojo Caliente. The latter was soon abandoned but was regranted in 1836 (Swadesh 1974:54). These grants show population movement north and east into the Tusas Mountains, which separate the Rio Chama and Taos-San Luís valleys. Because this is high country, agriculture was economically less important than sheep herding, an activity that continues to be economically important to the Tusas Mountain villagers. Pastoral goods, both on and off the hoof, were the Abiquiú area's most important contribution to the annual trading caravans to Mexico (Swadesh 1974:61), and sheep were frequently driven to California over the Old Spanish Trail.

With the establishment of plazas at Petaca and Servilleta after 1836, permanent settlement in the region appears to have been arrested along a line running northeast to southwest from the Petaca and Vallecitos area through El Rito to Abiquiú. Beyond this line, land use focused on seasonal pastoralism. In large measure, this was due to Indian hostility:

> While no permanent settlement could be established on the Tierra Amarilla Grant, as Lieutenant J. W. Abert noted in his 1846 reconnaissance report, Abert described the area as a prime stock range and mentioned that it was intersected by the trail between Santa Fe and Los Angeles. His statements tend to support local tradition; ie, that the Tierra Amarilla Grant was dotted with small summer sheep camps throughout the period of most hostility with the Utes. People say that the sheep were herded in small flocks and were scattered up the canyons when a Ute raid commenced, so that losses would be minimal. (Swadesh 1974:62)

Population expansion, then, was not always accompanied by residential relocation. In fact, it was often a seasonal phenomenon during the Mexican period. While it appears that most of the population was concentrated in the plaza-centered communities of the lower Rio Chama and its tributaries, it can be assumed that individual families were attempting to settle the open pastures of the upper river and adjacent highlands. The degree to which they were successful is unknown, though Abert's report suggests that there was no permanent settlement of the upper river during the Mexican period.

Easier acquisition of land grants from the Mexican government encouraged "the emergence of a group of wealthy men in the Abiquiú area who were seeking to monopolize land" (Swadesh 1974:54). They were met by "the resistance of the small land owners to such a force" (Swadesh 1974:54). The effects of growing economic and social stratification during the Mexican period were particularly evident to the region's genízaro population. The new government recognized genízaros and other Indians as citizens. For the former, this meant that grants which were originally held in common had to be partitioned among individuals. This process led to considerable dissent and a near revolt at Abiquiú in 1831 (Swadesh 1974:54-57), and was a major factor in the 1837 revolt that toppled the administration of Governor Perez. Both of these volatile situations focused on disputes between large and small land owners.

The second trend had to do with continued use of the Rio Chama Valley as a travel and trade route. While population expansion pointed north and east, this commercial trend pointed northwest. With Antonio Armijo's round-trip journey in 1829 to 1830, the Dominguez-Escalante/Old Spanish Trail to California was opened. Hafen and Hafen (1954:19) describe it as "the longest, crookedest, most arduous pack mule route in the history of America." Kessell (1979:267) notes that "Santa Fe may have been the New Mexico terminus, but Abiquiú was both jumping-off place and port of entry" for commercial endeavors in which sheep and sheep products were the primary commodities flowing west from Abiquiú in exchange for Californian horses and mules. The effect was to make Abiquiú a commercial center of sorts.

This situation was exacerbated by the activities of the "mountain men," trappers and traders who operated out of northern New Mexico: "By the late 1820s Abiquiú had become something of a little Taos. Here at a half dozen posts, traders and trappers rendezvoused and outfitted for ventures north and west. Many of the big names were in and out of Abiquiú. Cerán St. Vrain put Jacob P. Leese in charge of his store here, and Manuel Alvarez maintained local ties" (Kessell 1979:266-267).

While the Anglo trapper generally dealt in furs, Hispanic traders continued to focus on the Indian slave market begun in the late Spanish Colonial period (Hill 1930; Malouf and Arline 1945), though they also traded heavily in the furs and pelts that were most desired by the Americans (Hill 1930:19).

These trends should have had effects on settlement systems and material culture that are archaeologically visible. Residential settlement focused on plaza-centered communities in the lower Rio Chama Valley, continuing a trend begun during the late Spanish Colonial period. It is not surprising, then, that a Mexican period component could be defined at La Puente. In the highland areas north of Abiquiú and in the neighboring mountains, most sites from this period are likely to represent warm-season sheep camps. Whether these sites can be defined by period on the basis of their assemblages is yet to be determined. However, we might expect accurate definition of the period and ethnicity of occupation to be as difficult and controversial for these sites as it has been for the Piedra Lumbre phase. Students of these sites should also consider the possibility that they reflect territoriality in pastoral land use, since late American Territorial and early Statehood period sheep camps in the Tusas Mountains provide evidence of such land use patterning (Boyer 1987).

Artifact evidence for Abiquiú's position as a port of entry for trade and travel to the west and northwest has yet to be defined at sites in the region. However, we may expect that it is this aspect of Rio Chama history that permitted definition of La Puente's Mexican period component. Without a variety of items that could be dated to this short period (25 years), the Mexican period component might have been masked by the Spanish Colonial and American Territorial components. We may propose, then, that Abiquiú was a relatively wealthy community owing to the commerce in which it played a vital part. This included both trade goods of Euroamerican origin as well as native items acquired from nearby groups, primarily Utes. We may also expect that this wealth will be evident at other sites in the region. Swadesh (1974) argues strongly that the Ute trade, both legal and illegal, was a vital part of the Hispanic economy of the Rio Chama frontier, providing both subsistence goods and items such as the hides, furs, and slaves with which the Rio Chama Hispanics participated in the intraregional economy. This was particularly important for genízaros and Hispanics that were not of the landed gentry, for whom the gains provided by trade with the Ute helped to level the local and regional economic stratification that was largely based on land holdings (Swadesh 1974).

American Territorial Period (1846 to 1912)

Swadesh (1974:63) contends that the events characterizing the American Territorial period actually began in 1803, when Major Zebulon Pike's expedition entered the San Luís Valley. Pike and his men were arrested by Spanish officials and taken to Santa Fe for questioning. Along the way they passed through Ojo Caliente, San Juan Pueblo, Santa Cruz de la Cañada, and some of the Tewa Basin villages. Swadesh also argues that, following Pike's military incursion and the 1821 Mexican revolution, Santa Fe Trail merchants encouraged the United States to enter and take New Mexico from the Mexicans. Whether the American occupation of New Mexico in 1846 was actually the culmination of 25 to 50 years of planning and subterfuge remains for historians to decide. Its effects on the New Mexican population varied according to the strength of ties to Santa Fe:

> The Abiquiu area, whose only importance in commerce and military maneuvers lay in its access to Navajo and Ute country, did not become involved in either the conspiracy of the Santa Fe Trail merchants with the United State military or the efforts to throw off Yankee control. Following the conquest, however, an outward movement of population reduced the population of the Lower Chama Valley and altered its composition. Some people followed the gold rush to California or, later, to Colorado. Some returned to Old Mexico. The greatest number, however, moved northward into the Upper Chama Valley and the San Luis Valley, occupying grants made in previous years but not permanently settled due to Indian hostilities. (Swadesh 1974:64)

Thus, the trend of population expansion up the river begun in the Spanish Colonial period finally resulted in actual residential relocation in the American Territorial period, despite greatly increased hostility between settlers and Indians, particularly Utes, who were not consulted regarding Hispanic movement onto their lands:

> For three reasons the population was motivated to move northward, despite Indian opposition. They needed new irrigated lands, expanded ranges, and a better corner on the Ute trade. Another motive, never so stated, may have been escape from religious persecution, since a majority of the early settlers of the San Luis Valley were members of the Penitente Brotherhood. (Swadesh 1974:72)

Swadesh (1974:80-81) uses the large Tierra Amarilla grant as an example of northward expansion. Originally approved by the Mexican government in 1832, the grant saw only seasonal use and occasional attempts at residential occupation until the 1850s. Apparently beginning in the 1850s, allotments were made within the grant at the villages of Nutritas (later renamed Tierra Amarilla), La Puente (not the La Puente investigated by this project), Los Ojos de San José (later renamed Parkview), and Ensenada. Placita Blanca was settled in the 1870s near Los Ojos, and Chama was born in 1881 with the arrival of the Denver and Rio Grande Western Railroad (D & RGW). The limits of Hispanic population expansion, for so long held in check by the Utes, rapidly moved northward after the American occupation of New Mexico. By the end of the third quarter of the 1800s, Hispanic villages were established in the southwestern San Luís Valley and the San Juan River area. Both regions were largely occupied by emigrants from the Rio Chama Valley. Through time, the communities reverted from the plaza-centered villages of the late eighteenth and early nineteenth centuries to dispersed communities, often scattered along river floodplains (Swadesh 1974:137-138). This situation reflected both village population growth and decreased Indian hostilities, particularly after the 1850s.

Population expansion from the lower Rio Chama Valley, particularly from the Abiquiú area, reflects the fourth of Kessell's (1979) aspects of Abiquiú during the American Territorial period, that of the town as a "cradle of emigrants." The first aspect, according to Kessell, is that of Abiquiú as a military post. American troops first appeared in Abiquiú in 1846, boasting that they would protect the local residents from their Indian neighbors. Though some troops were apparently stationed there beginning in 1846, the army post at "Albiquin," as the first post commander misspelled it, actually opened in 1849 with 78 volunteers in Company A of the Santa Fe Guard (Kessell 1979:269). The volunteers pulled out in the summer and fall of that year, and were apparently replaced by regular army troops who stayed until about 1855. An actual post was probably never built; there was no hospital and the soldiers rented their quarters in Abiquiú. As is discussed in a later chapter, both the Trujillo House and La Puente yielded artifacts apparently related to the presence of American troops at Abiquiú in the 1840s and 1850s. Interestingly, the 1840s and 1850s were a time of increased Indian hostilities in the region, and it was not until the army post was closed and replaced by an Indian agency that local relations with the Utes and Apaches were calmed.

A garrison of soldiers was stationed at Camp Plummer in the wide Tierra Amarilla valley of the upper Rio Chama Valley in 1866 (Swadesh 1974:82). Like the earlier post at Abiquiú, Camp Plummer was established to control Indian hostilities near the Tierra Amarilla communities such as Los Ojos and La Puente. The camp, whose name was soon changed to Fort Lowell, was abandoned in 1869. Its presence in the upper Rio Chama Valley during the 1860s reflects residential relocation to the upper valley and the establishment of the several small communities in the area.

The second aspect discussed by Kessell is that of Abiquiú as an Indian agency. Because the army presence was initially focused on controlling the Indians, the village began serving as an "agency" in 1849, the year that James Calhoun, New Mexico's first Indian affairs superintendent, signed a treaty with the Ute at Abiquiú. Although the army post at Abiquiú was soon closed, the Indian agency remained until 1872. The agent was in charge of several bands of Utes (mostly Capote), and Jicarilla Apaches living west of the Rio Grande, and frequently interacted with Navajos. In 1872, the agency was moved to the abandoned buildings of Fort Lowell, where it remained until 1881, four years after the southern Ute agency was established at Ignacio and one year after the Jicarilla Apache reservation was established near Dulce (Swadesh 1974:65, 82, 98; Kessell 1979:272).

From Kessell's perspective, the third aspect of nineteenth century Abiquiú was its position as a mercantile, ranching, and mining center. In 1861, the Abiquiú, Pagosa, and Baker City Road Company was chartered to operate a toll road connecting Abiquiú to the booming mining areas in the San Juan Mountains. The road led northwest from Abiquiú up the Rio Chama, over the mountains to Pagosa Springs, and then west to Baker City near Durango (Swadesh 1974:82; Kessell 1979:273). It was mostly used by miners working the San Juans. The Hispanic settlers of the upper Rio Chama viewed the toll road as an opportunity for profit: "The many stores established along the road leave no room for doubt that it brought employment and profit to the settlers" (Swadesh 1974:82). In 1876, a road was built west from Abiquiú to Cañon Largo and the farming country along the tributaries of the upper San Juan River. This greatly encouraged Hispanic relocation to the northeastern margins of the San Juan Basin. The road was also used by miners for access to the San Juan mining district. In Abiquiú, local businessmen "had for some time been advertising the availability of boarding accommodations, provisions, and saddle and pack animals for people who wanted to make an early spring start to the mining country" (Swadesh 1974:82).

In 1881, Thomas Catron, who had managed to secure title to the Tierra Amarilla grant (Swadesh 1974:80-88), conveyed a right-of-way through the northern part of the grant to the D & RGW. Chama was established as a depot town. The east-to-west rail line connected the mining and lumbering industries of the San Juan Mountains with the outside world. A year later, Catron gave the D & RGW a right-of-way from Chama to Tierra Amarilla, opening the grant to large-scale lumber operations (Swadesh 1974:86-87). Since this line largely eclipsed the toll road from Abiquiú, one of its effects was to cut historic ties between the upper and lower Rio Chama Valley. Thus, in 1884, when lumbering was an economic mainstay of the upper Rio Chama Valley, a regional business directory listed Abiquiú's main products as wool, pelts, and hides. Eight of twelve business listings in 1884 were cattle or sheep ranchers. The lower Rio Chama Valley was still largely tied to its time-honored pastoral economy. The town had three general stores, a justice-of-the-peace, a church, and a district school, all serving a population of 300. Thirteen years later, another regional business directory listed agriculture, fruit, and mining as Abiquiú's "principal resources." Lumbering was still not included. By this time, the town had only one general store (Kessell 1979:273-274).

Some mining had occurred in the Abiquiú area since at least the mid-1700s, principally for copper (Swadesh 1974:38-39; Kessell 1979:274-275). American troops visited mines near Abiquiú in the late 1850s. While camped at Abiquiú in July of 1859, Captain J. N. Macomb and several soldiers accompanied Albert Pfeiffer, the Abiquiú Indian agent, in an inspection of copper mines about 14.5 km north of Abiquiú. In "an eroded valley," they...

> ...found an entrance, five to six feet in dimensions, which led to a series of galleries, having a combined length of perhaps a hundred yards. The work exhibits considerable skill in the use of tools and a familiarity with the business of mining. The roof is carefully braced where weak, and old galleries are closed by well-laid walls of masonry. From the style in which the excavation is done, and from the perfect preservation of the woodwork, I attribute this and other similar mines in this region to the early Spanish explorers. (Macomb 1876:68-69)

Macomb (1876:68-69) describes in detail the regional geology and the location and description of the copper deposits that were mined. There were civil court cases over mines into the 1890s; still, the actual output of the copper mines is unknown. Based on Macomb's observations, we might suppose that a considerable amount of copper ore was removed. It is interesting, in this light, that mining was considered a "principal resource" of the region in the 1897 business directory. Whether this includes the copper mines or the remaining hard-rock mines in the San Juan and Tusas Mountains is unclear.

We see, then, that population expansion to the north was continuous since the late Spanish Colonial period in the Rio Chama Valley. During the Spanish Colonial and Mexican periods, residential expansion was largely checked by Indians who were willing to trade with the Hispanic settlers, but who would not allow them to establish communities in the upper Rio Chama Valley. However, this did not stop seasonal use of the upper Rio Chama Valley and adjacent mountains for herding. While American troops and Indian Agents were not always able to control the Indians, a major effect of their presence was to encourage residential relocation into the upper Rio Chama Valley, eastward into the San Luís Valley, and westward into the San Juan Basin. Thus, while most upper Rio Chama and adjacent highland sites from the Mexican period should be herding camps, sites from the American Territorial period should include villages, isolated homesteads, commercial establishments along the toll road, lumber mills and camps, and seasonal herding camps.

Use of the Rio Chama Valley as a highway connecting the Rio Grande Valley with the mountainous areas of northern New Mexico and southern Colorado may be expected to produce a broad spectrum of Euroamerican goods at American Territorial period sites. Analysis of artifacts from these sites may provide information on access to goods, economic scaling, and perhaps ethnic patterns of procurement and use. At the same time, American Territorial period sites may help illuminate patterns of continuity and change in interaction with neighboring native groups, and the effects of access to Euroamerican goods on those economic interactions.

While the population was expanding in the upper Rio Chama Valley, the lower valley appears to have remained fairly stable. Swadesh (1974) argues that expansion caused population decreases and changes in community structure in the lower valley, but does not provide specific details. We have seen that the lower valley continued a long-term agrarian economic focus that included pastoralism and agriculture. It may prove interesting to compare contemporaneous sites from the upper and lower Rio Chama Valley, looking for similarities and differences in access, selection, use, and discard of native and Euroamerican goods, as well as in architecture and site structure.

CHAPTER 8

A HISTORY OF SANTA ROSA DE LIMA DE ABIQUIÚ

CHARLES M. CARRILLO

The Hispanic village of Santa Rosa de Lima de Abiquiú has a history that extends from the early 1700s to the present. It is one of many settlements in the Rio Chama Valley that have contributed to a cultural continuum that is represented today by the settlement of Santo Tomas Apostol de Abiquiú.

Numerous episodes of settlement are documented for the early Spanish settlement of the Abiquiú area. Starting on August 23, 1734, ten settlers petitioned the governor and Captain General of the Kingdom of New Mexico, Don Gervasio Crusat y Gongora, for grants of land on both sides of the Rio Chama stretching from the Arroyo de Abiquiú to a point about 4.8 km to the east. These settlers sought land on which to support their growing families, and included Bartolomé Trujillo, Salvador (de) Torres, Miguel Martín Serrano, Xptobal (Cristobal) Tafoia (Tafoya), Francisco Trujillo, Juan de la Serna, Juan Trujillo, Miguel Montoya, Josepha de Torres, and Bizente (Bicente) Giron (SANM I 1734). The governor granted the requested lands and allocated set amounts for each family. The orders to settle also stipulated that the petitioners were to inhabit and farm their grants within a year's time. Failure to do so would cause the grants to revert to the crown. Governor Crusat y Gongora assigned his Lieutenant Governor, Don Juan Paez Hurtado, to place the settlers in possession of their new lands and designate the boundaries of each holding. On August 31, 1734, Lieutenant Governor Paez Hurtado made the settlement.

Six months later, on March 2, 1735, five petitioners, including Gerónimo Martín, Ignacio Martín, Juan de Gamboa, Pascuál de Manzanares, and Tomás de Manzanares along with their families, requested a large grant to the west of those made the previous year (SANM I 1735). These petitioners cited the same reasons for requesting grants as did the previous settlers: "We find that we are homeless and without lands on which we can live and cultivate in order to meet our obligations being compelled to live in borrowed lands by which we meet with great inconveniences each year" (SANM I n.d.a).

Acting in the absence of the governor, Lieutenant Governor Paez Hurtado examined and approved the request. Diego de Torres, Alcalde Mayor of the Abiquiú region, was made responsible for placing the settlers, and made the settlement on March 9, 1735. The grant boundaries extended from the west edge of the lands of Miguel Montoya to the hills on the west perimeter of the valley, and included land on both sides of the Rio Chama. While the first series of grants belonged to individual families, the five families named in the 1735 grant owned their lands communally. Communal grants were usually allocated to sedentary Indians and were not often given to Spanish settlers, who generally received their lands on an individual basis.

The early settlers of the area faced many problems, the worst of which were perhaps those caused by nomadic Indians living to the north and west of Abiquiú. Utes and Comanches frequently raided the Abiquiú settlements to obtain livestock and capture women and children for ransom or slavery. Miguel Martín Serrano lamented: "I have lost my meager fortune in said place for in the first place they carried off fifty head of livestock, and since then they have taken six and four at a time.... During your Excellency's term they carried off my entire herd of horses and I and my sons went forth with some of the residents and took it away from them" (SANM I n.d.a).

However, the theft of livestock was not the worst loss experienced by the settlers, for some lost their lives defending their holdings. In 1745, a son of Miguel Montoya was killed by raiders, causing the family to abandon their grant and flee to settlements farther south.

Only a few records of the Abiquiú settlements between the 1730s and the late 1740s have survived. The first license for the chapel at Santa Rosa was apparently issued by the Bishop of Durango and Visitor General Don Martin de Elisacochea in 1737. The chapel's patron saint was listed as Santa Rosa de Lima. Salazar (1976) maintains that the structure was still unfinished in 1746. Another document from the period that mentions Abiquiú is the 1744 report of Fray Miguel de Mencharo, who noted that 20 Spanish settlers were scattered across the Abiquiú area (Hackett 1937; SANM I 1744).

EVACUATION OF THE ABIQUIÚ SETTLEMENT

Indian depredations reached a peak of ferocity when all of the settlements west of the Rio Grande were raided in August of 1747. Comanches struck Abiquiú on the morning of August 12, 1747, apparently abducting 23 women and children (Hackett 1937; SANM II n.d.b). It was also reported that an old woman and girl were killed for "having defended themselves." The Comanche and a few Moache Ute allies who raided the village failed to achieve total surprise, because scouts and settlers had warned Governor Codallas y Rabal of the impending attack, having found evidence of several large bands of Indians in the area. The Governor's failure to take forceful steps to stave off the attack brought sharp criticism from several residents:

> That whereas we have suffered and are suffering gravest exhortations and vexations because of the great omission of the General Don Joachin Codallos y Rabal who having been advised by the Comanche enemy of the invasion with which the said Governor was threatened and was sufficiently notorious and public, there following this reports of diverse kinds to the effect that the Comanche enemy intended to advance upon the settlement of Ojo Caliente or upon that of Abiquiú and after this the many trails that they were seen and of which information was given to the said general many times and repeatedly and well known your Excellency must have heard of them. (SANM I n.d.c)

Despite the warning, Governor Codallos y Rabal furnished only a minimal guard, providing six to eight Indian auxiliaries and four or five residents to guard the settlement from surprise attack (SANM I n.d.c). Although he received bitter criticism for his apparent lack of concern for the Abiquiú settlements, Governor Codallos y Rabal was hard-pressed by the need to defend all of the settlements west of the Rio Grande against attack, and sent as many troops as he had available.

Four days after the attack the governor organized a pursuit, but the raiders were too swift and escaped. All that the troops following their trail found were four bodies, of three women and a newborn child. The Utes were initially blamed for the attack, and troops from Santa Fe conducted a reprisal expedition against them. Only several years later did the government learn that the Comanches were really responsible.

The most significant consequence of the Indian raids during the late summer of 1747 was the abandonment of the Abiquiú area. On March 28, 1748, the residents of Abiquiú and Ojo Caliente petitioned the lieutenant of Santa Cruz, Juan de Abeyta, for permission to temporarily abandon their grants and go to live with relatives in places of greater safety:

> Whereas the inhabitants of the places of Ojo Caliente, Santa Rosa de Abiquiú and Pueblo Quemado have come before me stating that in said places they find themselves in imminent danger of losing their lives and the lives of their families and little property, because the said inhabitants are few and are unarmed for their protection against the invasions, deaths and robberies of Abiquiú; and as they are almost within view of the pagan Indian enemies, Yutas, Aguaguanos, Comanches, and other who appear in said places daily, there is no other remedy except for the petitioners to move to more inhabited places in which the greater number of petitioners have houses and lands where they can live for the present, until the said enemies can become pacified. (SANM I 1747)

Not having authority to allow the settlers to abandon their grants, Juan de Abeyta referred the petition to Governor Codallos y Rabal. The governor approved the request without penalizing the petitioners or revoking their grants. However, it was understood that this was to be a temporary measure (SANM I 1747). The governor eventually made abandonment of the area mandatory, and even coerced recalcitrant settlers by threatening a 500-peso fine for noncompliance (SANM I n.d.c). Records indicate that the displaced settlers went to live with relatives in Santa Cruz and San Juan.

Resettlement of 1750

Two years after abandonment of the Abiquiú area, the new governor ordered the settlers to return to their grants:

> I direct that the Alcalde Mayor of the Villa de Santa Cruz de la Cañada, Don Juan Joseph Lovato, shall summon the residents and families who belong there and who are the owners of ranches at Abiquiú and shall notify them that they shall with all their property go and occupy their houses and lands in order to plant the same in the next coming spring and they shall be protected by the arms of this Royal Garrison so far as may be possible without neglecting other obligations of equal importance caused by the many enemies who invade and infest this province. (SANM I n.d.c)

The governor threatened severe sanctions against those who refused to reoccupy their lands: their grants would be revoked, and their lands would revert to the crown. The forfeited grants would then be offered "to such families as may desire to resettle them in the name of the King" (SANM I n.d.c).

To insure against future abandonment because of Indian raids, Governor Velez Cachupín prescribed several security measures to render attacks against the settlers unsuccessful. The building of isolated houses was forbidden, and settlers were instructed to construct and occupy plazas with the houses joined together in a square. Furthermore, the decree stated that all exits were to be barred with strong gates. The settlers were ordered to "procure arms and not go out of their houses to their labors without them" (SANM I n.d.c). Farmers were to travel to and from their fields in groups, and work each field cooperatively.

In accordance with his superior's decree, Alcalde Mayor Lovato met with several of the Abiquiú settlers at San Juan Pueblo on March 6, 1750. There he read the governor's decree, instructing them to resettle the Abiquiú area immediately. Most of the settlers agreed to participate in the resettlement, rather than risk the loss of their grants. The settlers agreeing to resettle included Juan Joseph de la Serna, Miguel Martín Serrano, Manuel de la Rosa, Ignacio Valdez, Juan Valdez, and Gerónimo Martín. Three settlers (Juan Trujillo, Ignacio Martín, and Pablo Trujillo) refused to return to their grants until the land was at peace, and relinquished title with little argument. Some settlers like Bartolome Trujillo refused to return, but also declined to voluntarily relinquish their grants (SANM I n.d.c). The settlers who were unwilling to resettle lost their grants, which in turn became available to anyone willing to accept the risk of occupying them.

Members of the Valdez family who were faced with the possibility of losing their lands petitioned the Governor to delay the resettlement until the area was completely pacified and secure from the raids of hostile nomadic Indians. They argued that since only six families were willing to return, the resettlement should be delayed until more settlers agreed to go back. They quite reasonably felt that six families could not fend for themselves in this remote area (SANM I n.d.c). They also insisted that resettlement be made on the north side of the river near their lands rather than on the south side at the chapel built by Miguel Martín Serrano and dedicated to Santa Rosa de Lima, apparently the chapel that was first issued a license in 1737 (SANM I n.d.c). They argued: "The side upon which we are is better suited for the chapel and town lots" (SANM I n.d.c). It was their contention that it would be difficult to build a plaza enclosing the chapel on Serrano's land because it was located at the foot of a hill, which would impede construction (SANM I n.d.c).

The petition was denied and Governor Cachupín, acting upon the advise of Alcalde Mayor Lovato, ordered that the settlement proceed as planned. The loyalty of the Valdez family was questioned by the governor, who threatened them with the loss of their property as well as a heavy fine if they did not return with the other families (SANM I n.d.c).

Juan Joseph Lovato was placed in charge of the resettlement expedition on April 6, 1750. An escort of troops from the Royal Garrison was sent along to ensure that the settlers arrived safely at Abiquiú. Six families of Spanish colonists were resettled on the south side of the river, along with thirteen genízaros. The genízaros were not settled with the others but were placed in the abandoned house of Miguel Montoya, whose family had fled in 1745 (SANM I n.d.c). After the Alcalde surveyed the area he stated: "I made the resettlement at the place where the chapel is situated, and this being the center, I made the measurement and designated the plaza in a square, which consisted of 135 varas on each side" (SANM I n.d.c).

The plaza of Santa Rosa de Lima, which measured about 126 m square, is considered by many to have been at the ruins of a chapel which is now known locally as La Capilla de Santa Rosa. However, there is some controversy about the precise location of the resettlement. Some evidence suggests that Lovato made the resettlement on the lands of Miguel Martin Serrano where the first chapel had existed, but other information indicates a site about 1.6 km west of Serrano's grant at La Capilla. Although Lovato stated that the resettlement was established at a chapel, presumably the one built by Martín Serrano, that structure was supposed to have been built against a hillside, which would make construction of a plaza with the chapel in its center difficult if not impossible. This is one of the complaints contained in the Valdez petition. Swadesh (1974:38) contends that:

> This settlement on the lands of Miguel Martin is the location known in later times as La Puente, three miles east of Abiquiú on the south bank of the Chama. This first chapel, dedicated to Saint Rose of Lima, was destroyed a short time later in another Indian raid which once more displaced the settlements on the Chama. Another chapel of Saint Rose of Lima was built some years later on the south bank, about a mile upstream from the one at La Puente.

Swadesh's contention that the resettlement of 1750 was at La Puente provides a backdrop for the controversy. However, she does not provide documentation for her statement that the chapel was relocated again "a short time later." Salazar's (1976) historical overview of Santa Rosa contains no reference to a relocation of the chapel. His careful examination of the records is in direct contrast to Swadesh's (1974) contention of the later building of a second chapel dedicated to Santa Rosa. Further confusing the matter, and lending credence to Swadesh's contention, is the 1789 census which lists a village named La Plaza de Santa Rosa, and another called La Plaza de la Capilla. Work by Carrillo (1978) suggests that the existing ruins of Santa Rosa de Lima conform to the layout ordered by Lovato in 1750. Final disposition of this controversy awaits further archival work and careful consideration of the archaeological record.

Four years after the resettlement, Governor Cachupín established a genízaro grant at Abiquiú, naming the settlement Santo Tomas Apostol de Abiquiú. The hilltop chosen for this settlement is the site of the present-day village of Abiquiú. The genízaro grant was bounded on the east by the Spanish grants at Santa Rosa. A church for the genízaro community was begun in 1755; after its completion the Santa Rosa de Lima chapel served as an *ayuda* or auxiliary chapel of Santo Tomas.

In 1760 Bishop Pedro Tamaron y Romeral of Durango journeyed to New Mexico for an official visitation. Records indicate that he unsuccessfully attempted to inspect the Abiquiú settlements "because of the height of the river and the poor condition of the canoe" (Salazar 1976:17). However, he did record that the community of genízaros at Santo Tomas numbered 166 individuals in 57 families, and that there were 104 Spanish families totaling 617 individuals. It is likely that the Spanish families were those at Santa Rosa, indicating a jump from six families to 104 families in the ten years since the village was resettled in 1750. Quite a population explosion! The Bishop also relicensed the chapel during his visit (Salazar 1976).

Abandonment of the region and the settlement of Santa Rosa de Lima was again becoming a problem by 1770. On November 2, 1770, Governor Pedro Fermin de Mindinueta decreed that the settlers put an end to the gradual abandonment of the region, and requested a speedy return of those who had left their lands and homes. He instructed the Alcalde Mayor of Santa Cruz to notify the Abiquiú settlers to reoccupy their grants, stating: "Thereby all those who have abandoned the places and intend to abandon it are worthy of being considered and they merit being treated with great severity, dispossessing them of their houses and lands, giving them to those who may possess them with honor" (SANM I 1770).

Although Governor Cachupín had ordered the settlers to build a fortified plaza in 1750, and Alcalde Mayor Lovato had even marked off such a plaza, the settlers apparently returned to their isolated homes, ignoring the official decree. The dispersal of households made mutual protection impossible, and rendered useless the efforts of the squadron of royal troops stationed at the hilltop plaza of Santo Tomas Apostol de Abiquiú. In 1770 Governor Mindinueta ordered the settlers to build new homes and live in small plazas under the command of members of the urban militia, or in the plaza of Santo Tomas: "They shall inhabit them again, building homes in plazas or streets close to that of the Sergeant of Militia, Francisco Valdez, or that of the Ensign Ygnacio Gallego, or to that of Ygnacio Valdez, Senior, or to that of the Lieutenant, Juan Pablo Martin, or with the same Pueblo of Santo Tomas de Abiquiú." (SANM I 1770)

While many apparently followed the governor's instructions, others remained obstinate and continued to live in isolated ranch houses. No documents from this period describe the Santa Rosa community, though the Dominguez relation of 1776 does mention the chapel. Oral history relates that two *torreones* (watch towers) existed at Santa Rosa, suggesting an attempt to fortify or defend the plaza. Archaeological work by Carrillo in 1980 indicated that Santa Rosa contained a minimum of eight *placitas* and a *plaza mayor* (central plaza) forming what appear to be the remains of a fortified plaza.

Perhaps the most noted visit to the Abiquiú area came as part of the Fray Francisco Atanasio Dominguez visitation of 1776. It is the only remaining description of the Abiquiú settlements from the 1700s, making it a document extremely important to the history of the region. Dominguez wrote (brackets ours):

> This mission [Santo Tomas] has charge of the administration of some settlers, part of whom live in farms scattered to the west and north, part live to the east in a small plaza. In this direction there is a shrine of Santa Rosa de Lima belonging to the settlers, where they buried their dead when there was no church in the pueblo.... It is almost like the one I described at Rio Arriba near San Juan. Its furnishings consist of a paper print of the said lady and nothing else. The settlers built it and provided the set of vestments, which is mother-of-pearl satin, but is so old that even to look at it is indecorous.... I say the same thing about the lands of this settlement as about those of the pueblo, and like them is watered by the same Chama River since they begin where the other leaves off. Indeed, they do yield more and better crops than the others because the settlers work at it. Some are masters, others servants, others serve in both capacities as I have said in the other settlement. (Adams and Chavez 1956:120)

While Dominguez's description seems to indicate that the village of Santa Rosa was already in decline, other documents support the notion that it was still a viable community. In 1807 Fray Theodore Alcina reported on the burial status and furnishings of Santa Rosa, and found that they had changed little since the Dominguez visit 31 years earlier (Document on file at the Archives of the Archdiocese of Santa Fe [AASF]). A decade later, Vicar General Juan Bautista Ladron de Guevara visited New Mexico. In 1818 he reported that nearly all the furnishings of the Santa Rosa chapel belonged to the mission church of Santo Tomas, and that the chapel was about 20 varas long. His measurements approximate the dimensions of the ruins at La Capilla de Santa Rosa de Lima de Abiquiú (Kubler 1940). At some time during this period the community cast a bell for the chapel of Santa Rosa de Lima. On August 22, 1822, Fray Mariano Sanchez Vergara wrote: "...and having received from his hand and under the formal inventory of the parish church with all its furnishings, noting only the lack of six large medals of metal, six small ones and one relinquary of the same which were used in the casting of the bell which is now in the chapel of Santa Rosa." (AASF)

Casting a bell for a chapel does not seem like the type of activity a dying community would undertake.

Four years after the Vergara report, Vicar General Agustín Fernandez San Vicente noted that there was a bell in the chapel tower at Santa Rosa, and three doors with keys. He relicensed the chapel and recommended: "...to the priest and devout parishioners of Santa Rosa, patroness of the chapel, that they take great pains, more and more each day, in paying homage and respect to the religious cults, and not to permit the temple, which was the first one built in Abiquiú, to fall into ruins." (AASF)

The 1826 account by Vicar General Fernandez San Vicente is the last surviving document that describes Santa Rosa. It is not until the turn of the century when archaeologists and architectural historians turned their attention to the crumbling ruins of Santa Rosa de Lima that more information became available.

Table 8-1 illustrates census data for Santa Rosa and was compiled from various sources. Many do not list the number of individuals residing there; rather, they enumerate only the number of families. The population of Santo Tomas is not included except for a listing from an anonymous statistical report from 1765.

Table 8-1. Colonial population data for Santa Rosa de Lima de Abiquiú.

Year	Families	Individuals	Source
1734	10	-	SANM 1734
1744	20	-	Hackett 1937
1748	-	-	[1]
1750	6	-	SANM n.d.c[2]
1752	7	-	Salazar 1976
1754	-	-	[3]
1760	104	617	Adams 1954[4]
1765	41	127	Cutter 1975[5]
1765	76	482	[6]
1776	49	254	Adams and Chavez 1956
1787	19	80	Salazar 1976[7]
1790	19	84	Olmstead 1981[8]
1790	11	39	Olmstead 1981[9]

[1]Settlement abandoned.

[2]Settlement reoccupied.

[3]Santo Tomas de Abiquiú founded.

[4]Spanish families only.

[5]Listing for Santo Tomas y Santa Rosa de Abiquiú.

[6]Listing for Santo Tomas y Santa Rosa de Abiquiú: families of Spaniards and other classes.

[7]Listing as Plaza de Santa Rosa.

[8]Listing as Plaza de Santa Rosa Capilla. Appears to enumerate the same families listed in 1790 as residing in Plaza de Santa Rosa.

[9]Listing as Plaza de Santa Rosa de Lima. The location of this plaza is unknown; it cannot be mistaken for several other plazas in the area which are also listed.

Causes of Abandonment

Photographs of Santa Rosa indicate that the plaza was already abandoned by about 1915, and oral tradition suggests that the chapel served as an ayuda until the turn of the century. Geomorphological data indicate that the Rio Chama has meandered 300 to 450 m southward since the mid-1800s. The erosion of valuable farm land along the river and the exodus of growing families to other grants and settlements in the upper Rio Chama, El Rito, and San Luis Valleys eventually caused the Santa Rosa community to decline. Intermarriage between Spanish and genízaro families between 1754 and the American occupation in 1846 resulted in movement of much of the population to the larger and more defensible village of Santo Tomas Apostol de Abiquiú.

Archaeological Assessment of LA 806

The archaeological site of Santa Rosa de Lima de Abiquiú consists of the remains of a simple adobe chapel and low mounds representing at least 12 roomblocks, comprising a minimum of eight placitas or *plazuelas* and a plaza major. The contiguous roomblocks and chapel form a hollow square or plaza mayor. Traces of an old trail leading up to the eastern edge of the plaza suggest that an entrance originally existed in that area. A *campo santo*, or walled cemetery, was laid out east of the chapel and is where the early inhabitants buried their dead. Archaeological work by Carrillo in 1979 indicated that both the interior of the chapel and the walled campo santo are filled with burials. Two prominent trash mounds are visible outside the contiguous roomblocks, one at the far east edge of the site and another along the river bank at the northeast edge of the village. Smaller trash mounds occur on the west side of the plaza. The

Rio Chama has destroyed much of the site, as documented by aerial photos taken by Lindbergh in 1932 (Salazar 1976) and Hibben in the 1930s (Hibben 1937). The river has eroded much of a northern roomblock that is clearly shown in the two photos. Lindbergh's photo also shows a meandering road that passes south of the chapel. Traces of this road are still visible today. In addition to the wide unpaved road, there are also indications of an acequia and an older road.

Most of the roomblocks are easily defined and are represented by stone foundations topped by adobe walls, or as stone alignments which may have been foundations for adobe or jacal walls. Specialized features like hornos, corrals, and corner fireplaces can be recognized by their distinctive shapes. Vertical erosion cuts along the north bank of the river show that cultural materials are buried 1 to 2 m below the surface. Mapping has demonstrated that many of the adobes were larger than the standard used today, and measured about 25 by 75 cm. Gypsum or kaolin clay washes were used to finish many of the interior room walls as well as the walls of the chapel. No Spanish remains have been documented south of the chapel, though cultural materials are scattered throughout that area.

Conclusions

Since the middle of the eighteenth century, when the Abiquiú area was resettled by Spanish settlers and genízaros, the area has been continually occupied. As the nomadic Indian menace lessened, the more heavily populated settlements were better able to defend themselves. The population grew and land became more and more scarce due to subdivision and shifts in the river's course. With new and remote areas pacified, people began an exodus from the area that continued until World War II. Santa Rosa, when viewed as a Spanish Colonial frontier settlement, underwent a long and arduous process of settlement and development. The establishment of the genízaro community of Santo Tomas Apostol brought stability to the upper Rio Chama Valley. The area finally began to prosper, and served as a base for an expansion into newly pacified regions that continued into the twentieth century.

In reviewing the history of Santa Rosa from 1737 to the present, the most salient feature is the dispute concerning the location of the first chapel. Swadesh (1974) places the first chapel at a location now known as La Puente and contends that the chapel at Santa Rosa de Lima is a later structure. However, Salazar (1978) maintains that La Capilla is the site of the chapel started in 1737. He illustrates an aerial view of the site on which he has outlined a rectangular plaza, with the chapel centered in its middle. Many historians have interpreted the Lovato mandate of 1750 to say that having found an existing chapel, he created a quadrangular plaza with the chapel in its center. Examination of the resettlement papers and a map of the community suggest that Lovato did indeed lay out a quadrangular plaza; however, he most likely situated the chapel along one side of the plaza, and paced 135 varas from that side to form a four-cornered plaza. The 1750 document states: "hize el repueble en la ubicacion donde zita la capilla y quedando en el zentro hize medir y senales la plaza cuadrangular gue consta..." The word "cuadrangular" can either mean quadrangular or four-cornered. The plaza was therefore laid out to the north, west, and east of the chapel and not to the south as so many historians and archaeologists have believed. It is this author's opinion that Salazar is correct, except for the plan of the plaza. When compared to Hispanic plazas constructed in the middle to late 1700s, like the Plaza de Cerro in Chimayo, the village of Santo Tomas Apostol, and San Miguel del Vado, it seems reasonable that the chapel at Santa Rosa de Lima was located on one side of the main plaza.

This new line of thought helps resolve the problem of a lack of structural remains on the south side of the chapel. The few cultural remains found there are work areas and corrals; no roomblocks have ever been recorded in that area. For the past 60 years, all roads have passed just south of the chapel. The fortified appearance of the existing ruins may be related to the Mindinueta decree of 1770, since the records indicate that even after 20 years of reoccupation the settlers had still not fortified their village into a defensible community (SANM I 1770). Thus, it is unlikely that structural remains occur south of the existing highway.

CHAPTER 9

SANTA ROSA DE LIMA DE ABIQUIÚ (LA 806; AR-03-10-06-77)

James L. Moore

Introduction

Santa Rosa de Lima de Abiquiú (LA 806) was an eighteenth to early twentieth century village situated on a terrace on the [redacted] Rio Chama. The site is on [redacted] and covers 3.6 ha (Carrillo 1978). Only a part of this area (measuring 150 m by 30 m; 0.45 ha) running along the south edge of the village was investigated in detail (Fig. 9-1). This area was tested to assess its potential to yield information important to local history.

Ten possible features and a surface artifact scatter were found. Five possible features outside project limits were mapped but were not tested. The five remaining features were inside project limits and were tested to determine their nature and depth. Contemporary documents indicate that the village was built as a plaza with a church in its center. However, investigations by Carrillo (1978, this volume) suggest that the documents are incorrect and the church was actually at the southeast edge of the plaza rather than in its center. Testing was expected to help resolve this question. If the documented layout was correct, house remains should occur in the investigated area.

Features Outside Project Limits

Feature 4

Feature 4 was a 2-by-2-m L-shaped cobble alignment located near a gully. No associated artifacts were found. Because it was similar to tested features, it was concluded to be a natural outcrop rather than a cultural feature.

Feature 5

Feature 5 was a 1-m-long cobble alignment to the northeast of Feature 4 on the terrace top. No artifacts were found in association; it was probably a natural cobble outcrop rather than a cultural feature.

Feature 7

Feature 7 was a 1.5-m-diameter cobble pile, probably representing the remains of a prehistoric fieldhouse or field marker similar to those found at LA 59659. No datable artifacts were found in association with this feature.

Feature 8

Feature 8 was an eroded hearth next to Feature 7, and is probably associated with it. The hearth measures about 1 m in diameter by 30 to 40 cm deep, and contains a considerable amount of fire-cracked rock.

Feature 10

Feature 10 was a scatter of fire-cracked rock and a few lithic artifacts measuring 5 by 2.5 m in an eroded area at the edge of a gully. No datable artifacts were found, but the feature is thought to be prehistoric.

Discussion of Features Outside Project Limits

Both prehistoric and natural features were found outside project limits. Features 7 and 8 may be related to prehistoric farming, and are similar to remains found at LA 6599 and LA 59659. Feature 10 is probably prehistoric, but lacking diagnostic artifacts, no accurate date could be assigned. The presence of fire-cracked rock and lack of pottery suggest an Archaic affiliation, but this possibility is otherwise unsubstantiated. Features 4 and 5 are cobble alignments that at first seemed to be of cultural origin. However, when similar features within project limits

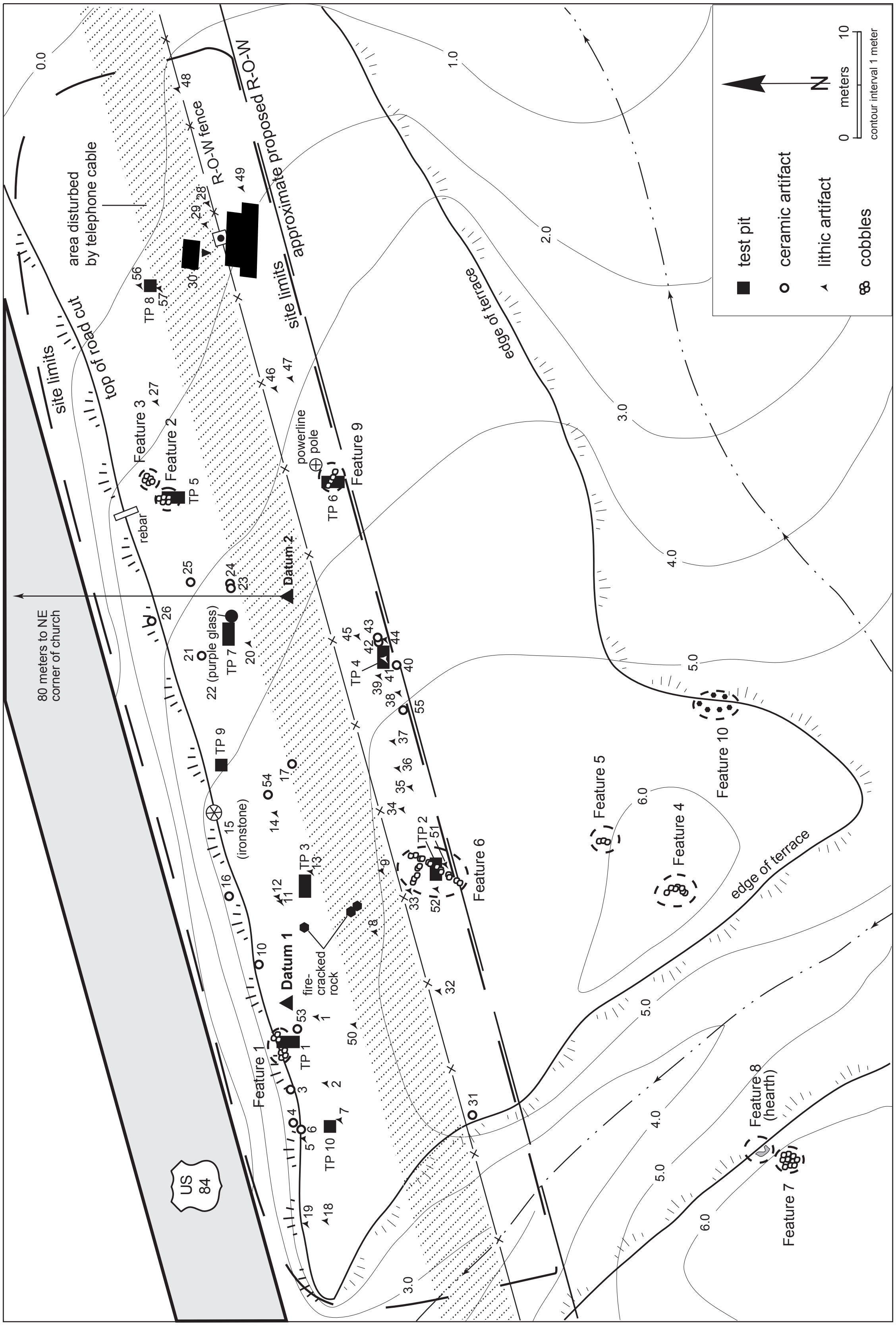

Figure 9-1. Plan of area tested at Santa Rosa de Lima de Abiquiú.

were tested, they were determined to be natural. Thus, Features 4 and 5 were concluded to be of a similar nature.

Features and Test Pits Within Project Limits

Five possible features were tested within project limits. In addition, five test pits were excavated in artifact clusters and between the possible features to determine whether subsurface cultural deposits were present. The area examined within project limits was moderately eroded, and was partly disturbed by a buried telephone cable that paralleled the fence at the edge of the existing right-of-way.

Feature 1

Feature 1 was a pair of subsurface cobble clusters exposed at the edge of the roadcut, and was thought to be the remains of a house foundation. A 2.5-by-1-m test pit (Test Pit 1) was excavated into this feature. The northern 1-by-1 m grid was excavated to a depth of 50 cm, and the southern 1.5-by-1-m grid to 16 cm. Two strata were defined. Stratum 1 was a 24-cm-thick layer of light yellow-brown sand containing some gravels and a few flecks of caliche. Under this was Stratum 2, a layer of sterile unsorted brown sand and gravel which continued below the base of the test pit. Only a few artifacts were recovered, all coming from the upper 5 cm of fill. The cobble clusters displayed no subsurface patterning, and excavation demonstrated that they were not the remains of foundations. Thus, it was concluded that Feature 1 represented natural cobble concentrations.

Features 2 and 3

Features 2 and 3 were cobble clusters similar to those examined in Feature 1. Each was 50 cm in diameter, and they were spaced 1.5 m apart. A 2-by-1-m test pit (Test Pit 5) was excavated into Feature 2. The northern grid was excavated to a depth of 25 cm, and the southern grid to 17 cm. Two strata were defined. Stratum 1 was a 15-to-20-cm-thick layer of brown sand containing some gravel. Under this was Stratum 2, a layer of gravel and cobbles mixed with tan sand which continued below the base of the test pit. Only one artifact was recovered, from the upper 7 cm. Once the soil was stripped away from Feature 2, the cobble cluster was found to be nonpatterned and larger than originally estimated. It was concluded to be the surface expression of a natural collection of cobbles and gravel. Feature 3 was determined to be part of the same noncultural formation.

Feature 6

Feature 6 contained two perpendicular cobble alignments, one measuring 6.5 m and the other 2.5 m. The alignments were thought to be the remains of a house foundation. A 2-by-1-m test pit (Test Pit 2) was excavated to examine this possibility. The eastern grid was dug to a depth of 26 cm, and the western to 10 cm. Three strata were defined. Stratum 1 was an 8-to-10-cm-thick layer of brown sand mixed with gravel and a few cobbles. Under this was Stratum 2, a 20-to-22-cm-thick unit of fine brown sand mixed with gravel and cobbles. Stratum 3 was lowermost, and was a layer of brown river sand containing pockets of gravel.

When Stratum 1 was stripped away, cobbles were found to be distributed across the test pit. The apparent linear pattern of the surface cobbles was undoubtedly caused by erosion. Feature 6 was concluded to be the surface expression of a natural concentration of stream-deposited cobbles and gravel. Subsurface deposits were sterile except for a single artifact recovered from the upper 5 to 10 cm of fill.

Feature 9

Feature 9 was a 2-m-long alignment of basalt boulders. Its location next to a transmission line structure and a buried telephone cable suggested it was of recent origin. A 2-by-1-m test pit (Test Pit 6) was excavated to make this determination. The northern grid was dug to a depth of 22 cm, and the southern to 10 cm. Two strata were defined. Stratum 1 was a 17-cm-thick layer of brown sand containing some gravel. Stratum 2 was a layer of loose light brown sand that extended below the base of the trench. An auger test in the floor of the pit showed that Stratum 2 was thicker than 40 cm. No cultural materials were found below the surface. The boulders comprising the feature were surficial, and there were no underlying structural components. Feature 9 was determined to be of natural origin, and was probably created by the disturbances discussed earlier.

Test Pit 3

Test Pit 3 was a 2-by-1-m trench excavated into a low mound in the west-central part of the construction zone, which was thought to be the remains of an adobe structure. The western grid was excavated to a depth of 38 cm, and the eastern to 33 cm. Three strata were defined. Stratum 1 was an 8-to-10-cm-thick layer of very gravelly fine brown sand. Under this was Stratum 2, a 12-to-

24-cm-thick fine brown sand unit containing some gravel. Stratum 3 was lowermost, and was found only in the easternmost part of the trench. This unit was a layer of unsorted gravel and cobbles containing some tan sand, and probably represents an old stream bed. An auger test encountered an additional 90 cm of fine sand underlying the rest of the test pit, ending at an impenetrable layer of gravel. The few artifacts found came from the upper 5 to 10 cm of fill. The mound was concluded to be a natural feature.

Test Pit 4

Test Pit 4 was a 2-by-1-m trench placed in the south-central part of the construction zone to investigate an artifact concentration and determine whether subsurface deposits were present. The western grid was excavated to a depth of 32 cm, and the eastern to 22 cm. Two strata were defined. Stratum 1 was a 5-cm-thick layer of light yellow brown sand containing some gravel. Under this was Stratum 2, a brown sand unit containing some gravel. The base of Stratum 2 was not encountered in the test pit. The only artifact found was from the upper 5 cm of fill. The artifact concentration was concluded to be essentially surficial, and no evidence of substantial subsurface deposits was found.

Test Pit 7

Test Pit 7 was a 2-by-1-m trench placed in the northeast part of the construction zone to investigate a light concentration of surface artifacts. The western grid was excavated to a depth of 19 cm, and the eastern to 18 cm. The only stratum defined was a layer of brown sand containing some gravel. A few artifacts were found in the upper 10 cm of fill. The artifact concentration was concluded to be mostly surficial, and no evidence of substantial subsurface deposits was found.

Test Pit 8

Test Pit 8 was a 1-by-1-m trench placed in the east-central part of the construction zone to investigate a light concentration of surface artifacts, and was excavated to a depth of 26 cm. The only stratum defined was a layer of brown sand containing some gravel. The only artifact found was from the upper 10 of fill. The artifact concentration was determined to be primarily surficial, and no evidence of substantial subsurface deposition was found.

Test Pit 9

Test pit 9 was a 1-by-1-m trench placed near the edge of the existing road in the north-central part of the construction zone to determine whether subsurface cultural deposits were present, and was excavated to a depth of 34 cm. The only stratum defined was a layer of brown sand containing some gravel, which became increasingly common with depth. No cultural materials were recovered, and it was concluded that subsurface cultural deposits did not occur in that area.

Test Pit 10

Test Pit 10 was a 1-by-1-m trench placed in the northwest part of the construction zone to investigate a light scatter of surface artifacts, and was excavated to a depth of 18 cm. The only stratum defined was a layer of brown sand containing some gravel. An auger test showed that this unit was thicker than 76 cm. No artifacts were found, and it was concluded that no subsurface cultural deposits occurred in this area.

Discussion of Features and Test Pits within Project Limits

Five possible features were examined within project limits, and five test pits were excavated to investigate surface artifact concentrations, a possible adobe structure, and areas devoid of surface artifacts. All of the possible features were concluded to be of natural origin. No substantial subsurface cultural deposits were found, either in or between artifact clusters. No evidence was found to suggest that the plaza of Santa Rosa de Lima extended south of the existing road. Carrillo's (1978, this volume) conclusions concerning the incorrect nature of the documented description of the village appear to be verified.

Ceramic Artifacts

DAISY F. LEVINE

Ceramic artifacts are summarized here and discussed in greater detail in Chapter 14 (Native Ceramic Analysis and Interpretation). Twenty-five sherds were recovered from the tested area at LA 806. The assemblage consisted mostly of Tewa wares, but a few Hispanic wares were also found. Most of the sherds were recovered from the surface. The remainder came from Test Pits 1, 3, 7, and 8, all in the first level of excavation. Table 9-1 presents ceramic types by vessel form.

Table 9-1. Ceramic type by vessel form from area tested at Santa Rosa de Lima (frequencies and table percentages).

Ceramic Type	Jar	Bowl	Indeterminate	Row total Percent of total
Tewa Red	4 16.0%	0 0.0%	2 8.0%	6 24.0%
Tewa Black	5 20.0%	0 0.0%	1 4.0%	6 24.0%
Tewa Gray	4 16.0%	1 4.0%	2 8.0%	7 28.0%
Tewa Polychrome	1 4.0%	0 0.0%	0 0.0%	1 4.0%
Ogapoge Polychrome	2 8.0%	0 0.0%	0 0.0%	2 8.0%
Unidentified whiteware	0 0.0%	1 4.0%	0 0.0%	1 4.0%
Biscuit A	0 0.0%	1 4.0%	0 0.0%	1 4.0%
Glazeware	1 4.0%	0 0.0%	0 0.0%	1 4.0%
Column total Percent of total	17 68.0%	3 12.0%	5 20.0%	25 100.0%

Table 9-2. Ceramic type by vessel form from part of a midden at Santa Rosa de Lima that was sampled in the field (frequencies and table percentages).

Ceramic Type	Jar	Bowl	Indeterminate	Row totals Percent of total
Sample Area 1				
Tewa Red	2 14.3%	1 7.1%	1 7.1%	4 28.6%
Tewa Black	3 21.4%	1 7.1%	0 0.0%	4 28.6%
Tewa Gray	1 7.1%	0 0.0%	0 0.0%	1 7.1%
Unidentified Black-on-white	1 7.1%	0 0.0%	0 0.0%	1 7.1%
Peñasco Micaceous	2 14.3%	0 0.0%	1 7.1%	3 21.4%
Vadito Micaceous	1 7.1%	0 0.0%	0 0.0%	1 7.1%
Column total Percent of total	10 71.4%	2 14.3%	2 14.3%	14 100.0%
Sample Area 2				
Tewa Red	3 20.0%	2 13.3%	1 6.7%	6 40.0%
Biscuit A	1 6.7%	0 0.0%	0 0.0%	1 6.7%
Indeterminate	3 20.0%	0 0.0%	0 0.0%	3 20.0%
Peñasco Micaceous	2 13.3%	0 0.0%	1 6.7%	3 20.0%
Vadito Micaceous	1 6.7%	0 0.0%	1 6.7%	2 13.3%
Column total Percent of total	10 66.7%	2 13.3%	3 20.0%	15 100.0%

Two 1-by-2-m sample units were placed in a midden outside project limits on the north side of the existing highway. These artifacts were analyzed in the field and were left in place. Fourteen sherds in Sample Area 1, and 15 sherds in Sample Area 2 were recorded. The assemblage consisted of historic Tewa and Tiwa wares, and prehistoric types. Table 9-2 presents ceramic types by vessel form.

Chipped Stone Artifacts

Chipped stone artifacts are summarized here and discussed in detail in Chapter 16 (Spanish Chipped Stone Artifacts). Forty-three chipped stone artifacts were recovered, most of which were Pedernal chert (Table 9-3). The obsidian artifacts lacked cortex, but their physical appearance suggested an origin in the Jemez Mountains. Cortex on other materials was waterworn, suggesting they were obtained from local gravel deposits. Predominantly fine-grained materials were selected for reduction and use (Table 9-4).

Conclusions

Surface and subsurface investigations in the portion of Santa Rosa de Lima de Abiquiú (LA 806) within project limits suggest that no historic structural remains or substantial subsurface cultural deposits occur in that area. This is consistent with Carrillo's (1978, this volume)

Table 9-3. Chipped stone artifact type by material type; Santa Rosa de Lima.

Material	Flake	Angular Debris	Core	Strike-a-Light Flint	Row Total
Chert	2	0	0	0	2
Pedernal chert	23	6	1	2	32
Quartzite	4	0	0	0	4
Obsidian	4	0	0	0	4
Basalt	1	0	0	0	1
Column total	34	6	1	2	43

Table 9-4. Chipped stone artifact material texture by material type; Santa Rosa de Lima.

Material	Glassy	Fine	Medium	Coarse
Chert	0	2	0	0
Pedernal chert	0	32	0	0
Quartzite	0	0	4	0
Basalt	0	1	0	0
Obsidian	4	0	0	0
Column total	4	35	4	0
Percent of total	9.3%	81.4%	9.3%	0.0%

conclusions concerning the accuracy of documentary accounts of village layout. No historic features were found on the south side of the existing highway. However, a few probable prehistoric features were located in that area. Feature 10, a scatter of fire-cracked rock and lithic artifacts, was tentatively assigned an Archaic date. Features 7 and 8 appear to be related to one another, and are similar to features found at LA 6599 and LA 59658. Thus, they are probably evidence of use of the area by Anasazi farmers.

The few subsurface artifacts recovered during testing were from the upper 5 to 10 cm of fill, and probably originated on the surface and were moved downward by natural processes. No evidence of stratified trash deposits was found within project limits. Surface artifacts were related to the historic occupation of Santa Rosa de Lima, and were part of the light scatter of cultural materials that surrounds the village. No structural remains, stratified cultural deposits, or patterned surface artifact scatters were found during testing in this part of the site.

CHAPTER 10

LA PUENTE (LA 54313; AR-03-10-06-72)

JEFFREY L. BOYER

INTRODUCTION

LA 54313 was a large site along [redacted] within the community of La Puente ("the bridge") (Fig. 10-1). The site consisted of an extensive surface artifact scatter measuring about 350 by 250 m on the first bench above the Rio Chama floodplain. It was bounded on the north and west by the edge of the bench and on the east by a large unnamed arroyo. U.S. 84 runs from east to west through the site some 80 m from its southern boundary.

Only one major cultural feature, the midden area, could be defined within site boundaries. An undisturbed part of the midden extended into a temporary construction easement along the south side of the project area. This was the only part of the site investigated during this project. No intact cultural deposits were found within the existing right-of-way.

HISTORY OF LA PUENTE

The first mention of a site, prehistoric or historic, in association with the village of La Puente comes from Hewett (1906:34-36). In his discussion of the biscuitware pueblo of Poshu'ouinge, he describes the pueblo as located on a "conical hill about 150 feet high overlooking the Rio Chama at a point known as 'La Puenta,' about three miles below Abiquiu."

Although Poshu'ouinge was described previously by Yarrow (1875, 1879) and Bandelier (1892), its location relative to the local Hispanic community was not

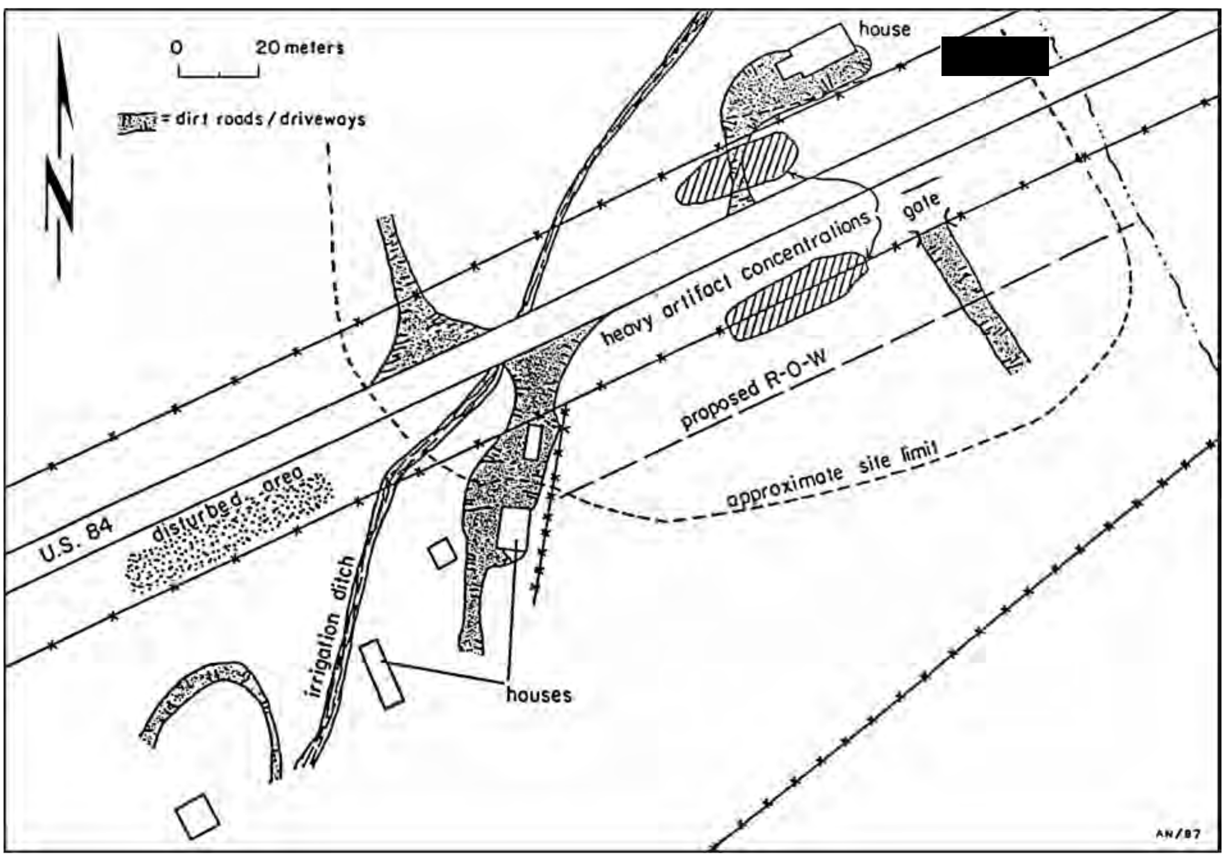

Figure 10-1. Plan of La Puente.

noted. The next mention of a site at La Puente is by Twitchell (1914:233), who located "the pueblo of Abiquiu...at a place known as La Puente on a mesa on the south bank of the Chama, three miles southeast of Abiquiu." He clearly misidentified the site and was actually referring to Poshu'ouinge.

In 1916, Harrington described a "pueblo ruin" just west of the village of Mariana, a short-lived name for La Puente. According to Harrington (1916:132), a group of Mormon families settled at La Puente around 1910. Since he could find no information on the name Mariana, he assumed it came with the Mormons. Actually, the community had acquired this name at least as early as 1891 when Asabel Fuller became the first postmaster of Mariana. The post office closed the following year, only to reopen in 1901 and close again in 1906 (Dike 1958-1959). The name Mariana, whose origin remains unclear, was dropped by those few who actually used it and the community again became La Puente.

Concerning the "pueblo ruin" at Mariana, Harrington stated that the site was just west of the village between the wagon road to Abiquiú and the Rio Chama and that "the writer used every endeavor at San Juan to obtain the Indian name of this ruin, but without success. A low mound could be seen in this field where the ruin lies" (Harrington 1916:132). In the report of his survey of the Rio Chama Valley, Hibben (1937:11) provides the following description of Harrington's ruin at Mariana/La Puente: "A ruined town immediately beside the highway some five miles below Abiquiu is also a late Tewa Polychrome site. It retains its earlier Biscuit form of one large hollow square, with evidence of another. No Spanish record of this site is known."

By 1987, Harrington's ruin had acquired another name when Beal (1987:63) discussed the "Mariana ruin" in his overview of the large pueblo sites of the Rio Chama and its tributaries. Beal was not able to relocate the site, however, and could offer no information on its nature or condition.

The description of the Mariana/La Puente site has changed considerably through time. Harrington (1916) first described the site as a "low mound" in a field just west of Mariana, about which his San Juan informants could reveal nothing. Twenty years later, Hibben's (1937) description turned the site into a Tewa Polychrome pueblo with at least one large plaza, possibly representing an earlier Biscuit component. This description should give pause for reflection, since most of the Biscuit and later pueblos in the region are well known to the modern Tewa Indians. Finally, by 1987 Beal was unable to relocate the site at all. In the course of 70 years the site at La Puente appeared as a low mound, became a late Tewa pueblo with a possible Biscuit component, and disappeared. However, its disappearance was not complete, for it gained a historic component as the controversial possible forerunner of Santa Rosa de Lima in Swadesh's seminal work on the Rio Chama Valley (Swadesh 1974:35-36). Clearly, accurate identification of LA 54313 is an important issue.

To address this issue, it is necessary to begin with Hibben's description of the site in 1937, in which he stated that it consisted of a large plaza with evidence of another. Figure 10-2 is a 1935 aerial photograph of the site area. The photograph shows a large feature, roughly square in shape, immediately north of the part of the site investigated by this project. This feature is distinguished from the surrounding area by varying vegetative patterns. When viewed in stereo, the square appears as a low mound. The wagon road to Abiquiú is south of the mound. That Beal could not relocate the site is not surprising, since a 1963 aerial photograph of the same area (Fig. 10-3) shows that the highway, which is some distance north of the old wagon road, runs along the southern edge of the square, perhaps near what was once the southern roomblock of a plaza. Further, the area north of the highway has been bladed and built upon by homeowners since the 1940s. Inspection of fields and yards on the north side of the highway revealed an extensive artifact scatter containing polished red and black sherds. A single low mound running east to west was found in a field just north of the highway.

Combining Hibben's description with the 1935 aerial photograph and information from historical records may help identify this site. LA 54313 was apparently a sizeable village built in a plaza form. Surface ceramics indicate a historic occupation, and the fact that Harrington's Tewa informants could not identify it as a Tewa site suggests it was a Hispanic site. Three possible identities have been suggested for this site by historians studying the history of the lower Rio Chama Valley: San Miguel de la Puente, Plaza de Guadalupe, and Santa Rosa de Lima.

San Miguel de la Puente

Gilberto Cordova, a native of Abiquiú whose doctoral work focused on educational and assimilative processes at genízaro villages and especially at Abiquiú, made the following statement: "Bartolome Trujillo was another early Hispanic settler. By 1734, he was living near the junction of the Chama and the Rito Colorado. To his west and on the south bank of the Chama, Vicente Jiron had acquired a grant at San Miguel de la Puente. This settlement was just below the ancient pueblo of Poshu" (Cordova 1979:75).

Cordova does not provide a reference for this information, though he cites Swadesh (1974) as the basis for his discussion of early Spanish settlement. However,

Figure 10-2. 1935 aerial photo of La Puente showing location of plaza mound.

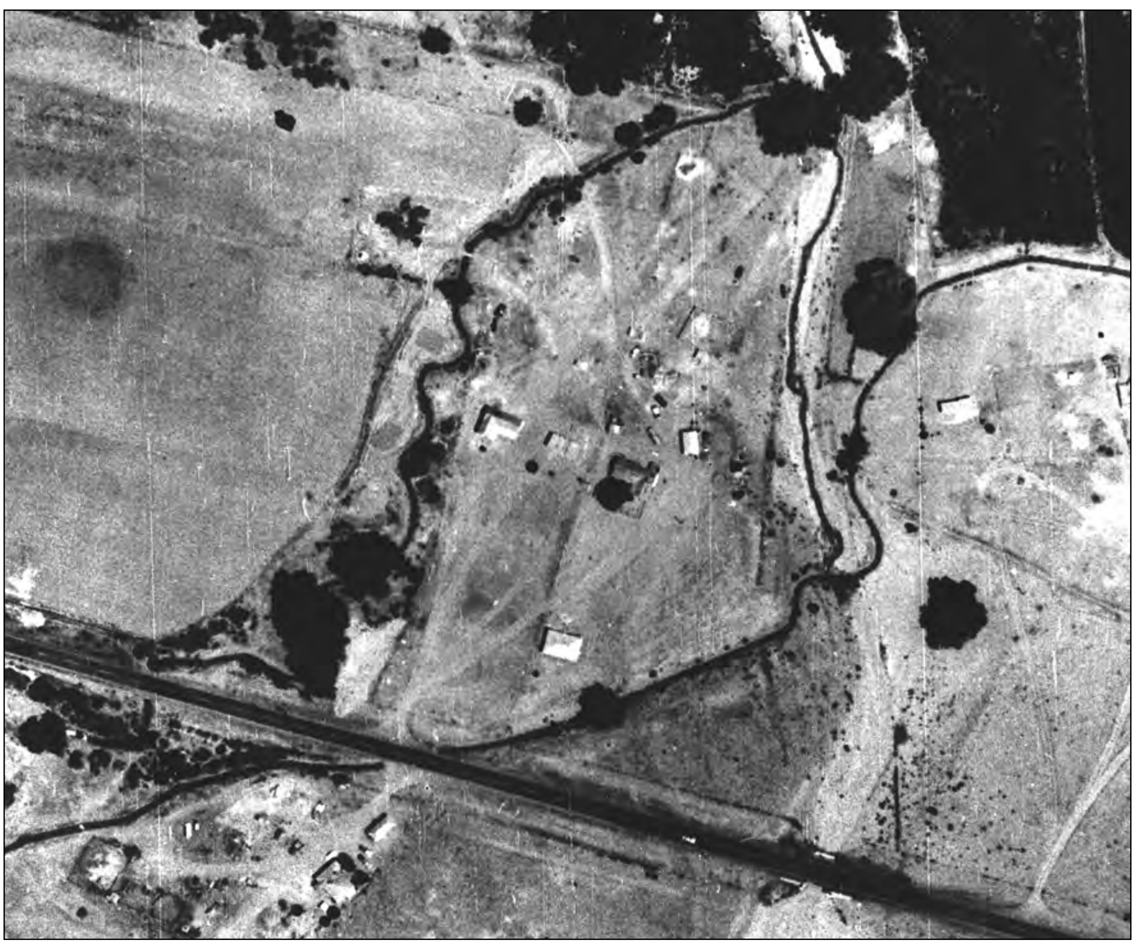

Figure 10-3. 1963 aerial photo of La Puente showing location of modern highway and houses in mound area.

Swadesh never mentions a village known as San Miguel de la Puente. She does discuss the Plaza de San Miguel, which she maintains was near the modern village of Cañones (Swadesh 1974:44, 47, 145). This is probably because Cañones recognizes San Miguel as its patron saint, a fact that apparently has some historical depth (Kutsche and Van Ness 1981). The 1790 census of the Abiquiú area lists 51 families at the Plaza de San Miguel, making it the second largest village in the region (Olmstead 1981). Interestingly, the 1790 census lists only two men in the entire region with the surname Girón (or "Jirón"). Both resided at the Plaza de San Miguel. Since there seems to be no historical documentation for a village of San Miguel de la Puente and the Plaza de San Miguel was probably near present-day Cañones, it seems clear that LA 54313 was not the Plaza de San Miguel, and the location of Cordova's "San Miguel de la Puente" remains unknown.

Plaza de Guadalupe

In a historical overview of LA 54313, Hordes (n.d.a) states that the village at La Puente may have been the original location of the Capilla de Santa Rosa de Lima. In this, he apparently follows Swadesh (1974), whose research is discussed below. However, he argues that in the 1790 census of the Abiquiú area (Olmstead 1981), the village had been renamed Plaza de Guadalupe. The source of this assertion is unclear, but seems to lie in the genealogical record of the family in whose hands the excavated part of the site rests, in nineteenth and twentieth century land claims documents, and in family and community traditions.

Hordes' research (n.d.a:6), however, demonstrates only that the land has been in the hands of the family of the present owner since 1933. In that year, Elvira Martínez received a quit claim deed for the land from trustees of the estate of W. S. Jackson, a Colorado resident who had acquired the Juan José Lobato grant shortly after 1900. Martínez was the aunt of the present land owner. She was also the step-granddaughter of Juan Rumaldo Cisneros, a farmer listed as a resident of the Lobato grant in 1901. Hordes' implication is that Cisneros occupied the land at La Puente, though he presents no definitive evidence to support this. It may be a reasonable conclusion, however, because it was the presence of many farms within the grant, including Cisneros', that led to quit claim deeding of numerous small parcels to the descendants of the farmers, which included Elvira Martínez.

Using church and census records, Hordes was able to establish that Juan Cisneros was the great-grandson of Antonio José Molla and Nicolasa Armijo (Hordes n.d.a:3). In 1790, Molla and his family were residents of Plaza de Guadalupe. It is apparently this information in combination with late nineteenth and early twentieth century land transactions that led Hordes to conclude that the site at La Puente was once called Plaza de Guadalupe. However, the same records show that Molla's descendants lived in or married spouses from several villages in the region, including Rio de Chama, El Rito, Plaza San Rafael, and Buckman (Hordes n.d.a:3). This indicates considerable movement among the region's Hispanic residents. Consequently, assuming that Molla's family lived at La Puente for 200 years is probably untenable. Like the Plaza de San Miguel, the location of the Plaza de Guadalupe is unknown, and Hordes' information alone does not demonstrate that La Puente was once called Plaza de Guadalupe.

Santa Rosa de Lima

LA 54313 has gained its greatest notoriety as the possible original location of the Plaza de Santa Rosa de Lima, an idea suggested by Swadesh (1974:37-38):

> Resettlement along the Chama was made on April 16, 1750 under the supervision of Alcalde Mayor Lobato. This settlement on the lands of Miguel Martin is the location known in later times as La Puente, three miles east of Abiquiu on the south bank of the Chama. Another chapel of Saint Rose of Lima was built some years later on the south bank of the Chama, about a mile upstream from the one at La Puente. Its crumbling remains are still visible from Highway 84. For awhile, the title of Santa Rosa was applied to both locations.

The opposing viewpoint regarding the location of Santa Rosa de Lima is best expressed by Salazar (1976), who maintains that the present location of the abandoned plaza and *capilla* (chapel) of Santa Rosa de Lima (LA 806) is its original and only location. Further, Salazar (1976:18) contends that population expansion in the early 1800s led to the establishment of numerous small villages in the region, including La Puente.

The earliest reference to the community of Santa Rosa appears to be Fray Menchero's declaration of 1744, in which he notes that the friar living at San Ildefonso ministered to a place called "Santa Rosa Abiqui" (sic), which contained 20 Spanish families (Hackett 1937:399). Fray Menchero used the term *puesto*, meaning a place, a location, or a small community, to refer to Santa Rosa. This may indicate that the community was not yet organized into a formal plaza (see Jones 1979:123; Adams and Chavez 1956:121n).

The name Santa Rosa de Lima refers to a capilla built in honor of the saint by Miguel Martín Serrano, who received a grant on the south side of the Rio Chama west of the Rito Colorado in 1734 (Swadesh 1974:33). Salazar (1976:15) notes that the first license for the chapel was issued in 1737, but the chapel remained unfinished in 1746. In March of 1748, following a severe attack by Comanches in 1747, the residents of "Santa Rosa de Abiquiu" joined those of Ojo Caliente and Pueblo Quemado in petitioning for and receiving permission to temporarily abandon their homes (Pratt and Snow 1988:Appendix III). In 1750, under protest but also under duress, the refugees were ordered by Governor Cachupín to resettle "at the place where the chapel is situated" in a plaza laid out around or including the chapel (Swadesh 1974:37). However, in November of 1770, 20 years after the ordered resettlement, Governor Mindinueta observed that this order "was obeyed by word of mouth but not by actually complying with it. Instead, those who resettled there at that time remained in their old houses, and those who thereafter settled in said place made theirs with greater irregularity, and their possession thereof was so retarded that it facilitated the enterprises of the enemies and made the defense impossible" (Pratt and Snow 1988:Appendix IV).

Mindinueta then ordered the Alcalde Mayór of Santa Cruz de la Cañada to notify the residents of the Rio Chama Valley who had again abandoned their homes or were considering doing so, "that they shall inhabit them again, building their houses in *plazas* or streets" close to the homes of local militia officers or in the pueblo of Santo Tomás de Abiquiú (Pratt and Snow 1988:Appendix IV). Clearly, the plaza of Santa Rosa de Lima does not date from 1750, but was built some time after 1770.

Perhaps the most convincing evidence supporting Swadesh's claim comes from Fray Dominguez's record of his visitation in 1776 (Adams and Chavez 1956) and from the 1790 census (Olmstead 1981). Fray Dominguez began his description of the "pueblo and mission of Santa Rosa de Abiquiu" by stating that it had actually been named for Santo Tomás, but that the residents insisted on using the name of Santa Rosa (Adams and Chavez 1956:120; see also Ahlborn 1968:127). Clearly, the capilla of Santa Rosa de Lima was a community focal point in the Abiquiú area, probably because it predated establishment of the genízaro pueblo of Abiquiú and the mission of Santo Tomás by almost 20 years. Dominguez states that the mission also ministered to settlers who lived in a small plaza to the east. This was evidently the community that resulted from Governor Mindinueta's stern decree, and was therefore built between 1770 and 1776.

Dominguez goes on to state: "In this direction [east], there is a shrine to St. Rose of Lima belonging to the settlers. It is almost like the one I described at Rio Arriba near San Juan" (Adams and Chavez 1956:126; brackets ours). It is interesting that Dominguez would use the phrase "in this direction" rather than "in this plaza" if the capilla was in the plaza of the settlers administered by the mission at Abiquiú. Clearly, the plaza and the capilla were both east of Abiquiú. Whether they were at the same place is not as clear, but seems doubtful.

A second point is Dominguez's description of the capilla as resembling the one he had described at Rio Arriba. At that time, Rio Arriba was a community of scattered farms and ranches on the east side of the Rio Grande between the modern villages of Alcalde and Velarde. In that community, Don Sebastian Martín had built a small capilla dedicated to Nuestra Señora de Soledád (Adams and Chavez 1956:90). Thus, Dominguez directly compares the capilla of Santa Rosa with that of Nuestra Señora, which was not in a plaza, but in a scattered community of farms and ranches. This may suggest that the capilla of Santa Rosa was not in a plaza but in a dispersed community near the plaza, and that the plaza established between 1770 and 1776 was not built around a capilla as indicated by the 1750 decree. As we have seen, this decree was certainly not followed to the letter.

Finally, there are two interesting entries in the 1790 census of the Abiquiú area (Olmstead 1981). The fourth plaza listed in the census, which contained 19 families with a total of 84 persons, is the "Plaza de Santa Rosa Capia" (capilla). The eighth plaza, containing 37 persons in 11 families, is the "Plaza de Santa Rosa de Lima." Apparently, in 1790 two plazas in the area used the name of Santa Rosa, but only one included a reference to the capilla. Assuming that it was the plaza now known as Santa Rosa de Lima which contains the remains of a capilla, the location of the other Santa Rosa is unknown.

Swadesh contends that the other Santa Rosa was at La Puente. If she is correct, the original plaza of Santa Rosa de Lima was built between 1770 and 1776 at La Puente, the ruins of which were mistaken by Hibben for a late Tewa pueblo. Swadesh's (1974:38) contention that the capilla in this plaza was destroyed shortly after its construction is based on a 1750 date for the plaza. In fact, this plaza probably did not have a capilla. Instead, the capilla was west of the plaza on the lands of Miguel Martín Serrano, who, like his relative Sebastián Martín, erected a capilla on his own land well before a plaza was established in the area. Sometime between 1776 and 1790, a second plaza was built that incorporated the capilla into its southern roomblock. This explains a discrepancy, observed by Salazar (1976) and Carrillo (1978), between the 1750 decree and the actual construction of the plaza. In the decree, the capilla was to have been built in the center of the plaza. Salazar contends that the discrepancy was only apparent and resulted either from a mistranslation of the decree or from the actual construction of the plaza. In fact, as we have seen, the 1750 decree was ignored and the plaza at the capilla was not built until the 1770s or 1780s. By that time, the 1750 decree was moot and the capilla was simply incorporated into the plaza roomblocks. By 1790, the plaza at the capilla had eclipsed the older plaza in population and, perhaps, importance. Unfortunately, nineteenth century documents seem to refer only to the plaza at the capilla and we know nothing of the subsequent history and abandonment of the older plaza at La Puente.

Summary

The exact identity of LA 54313 remains unclear. While historical documents appear to support Swadesh's contention that La Puente was once a village named for Santa Rosa de Lima, community tradition maintains that the ruined plaza with the standing capilla (the current Santa Rosa de Lima) was the original Santa Rosa. In June of 1988, Mr. Benjamin Archuleta, a life-long resident of Moke (a section of Abiquiú), was interviewed. Although he was at that time 96 years old, his memories were quite vivid. During the interview, it became clear that when Santa Rosa and La Puente were discussed, he did not distinguish between the two villages. When asked about his memories of La Puente, Mr. Archuleta talked of Santa Rosa de Lima and we were unable to structure questions that would encourage a distinction. For instance, when asked if he knew of a plaza at La Puente, Mr. Archuleta said he couldn't remember where the village was, and talked about going to the fiesta at Santa Rosa. However, Mr. Archuleta maintained that when he was a child the plaza at Santa Rosa de Lima (the location of the capilla) was essentially abandoned, and the capilla used as a corral. If the plaza was abandoned the local farming community had already become scattered along the valley, much as it is today. It is, therefore, interesting that he should conceive of the scattered community in terms of an abandoned plaza, and use the names La Puente and Santa Rosa interchangeably. Obviously, this does not resolve the question of the identity of LA 54313, but it does point to a close association between La Puente and the village of Santa Rosa.

Taken together, evidence from historical descriptions and documents suggest that Swadesh's identification of LA 54313 as the original plaza of Santa Rosa de Lima is correct. Other possible identities for the site can be discounted as lacking historical basis, and traditional reconstructions of the history of Santa Rosa de Lima do not take into account the plaza's probable construction dates or the results of the 1790 census. While these factors do not definitively identify LA 54313 as the first Santa Rosa, other explanations are less satisfactory.

Features Outside Project Limits

Reconnaissance of the area north of U.S. 84 revealed that the artifact scatter extended about 250 m in that direction. This area has been disturbed by construction of houses, driveways, yards, and garden plots; only modern cultural features were defined. However, as discussed above, aerial photography from 1935 corroborates a description of the site from the same period, showing a large hollow square mound in the area now occupied by houses. Figure 10-2 shows the mound in 1935. The mound was well north of the road at that date. The modern highway and houses that currently obscure the mound are shown in Fig. 10-3, a 1963 aerial photograph of the area. Although the square mound is no longer definable on the ground, a single low linear mound is visible in a field immediately north of U.S. 84. Artifacts observed in this area included polished red and black sherds, debitage, and broken glass. Residents of one house showed us a small polished stone axe found near the north end of the site. Artifact density is highest in areas that are used less often, particularly in a field along the north and west sides of the site, and along the west bank of a large arroyo that bounds the site on the east.

Features Within Project Limits

Excavations at La Puente were limited to a strip of land 15 m wide by 114 m long along the south side of the existing U.S. 84 right-of-way (Fig. 10-4). This area contained several low mounds, a large ash stain, and an artifact scatter. The low mounds were initially thought to represent adobe structural remains. However, excavation revealed that they were the remnants of stabilized sand dunes and alluvial gravel deposits, and that the cultural deposits represented a midden area that probably lay near the south edge of the village. Within the midden, three areas of trash deposits were defined on the basis of surface artifact density and vegetative patterns. These areas were designated Trash Areas 1, 2, and 3. The features found in each trash area are described below.

Trash Area 1

Trash Area 1 was at the west end of the project area and consisted of a broad but relatively shallow stratified

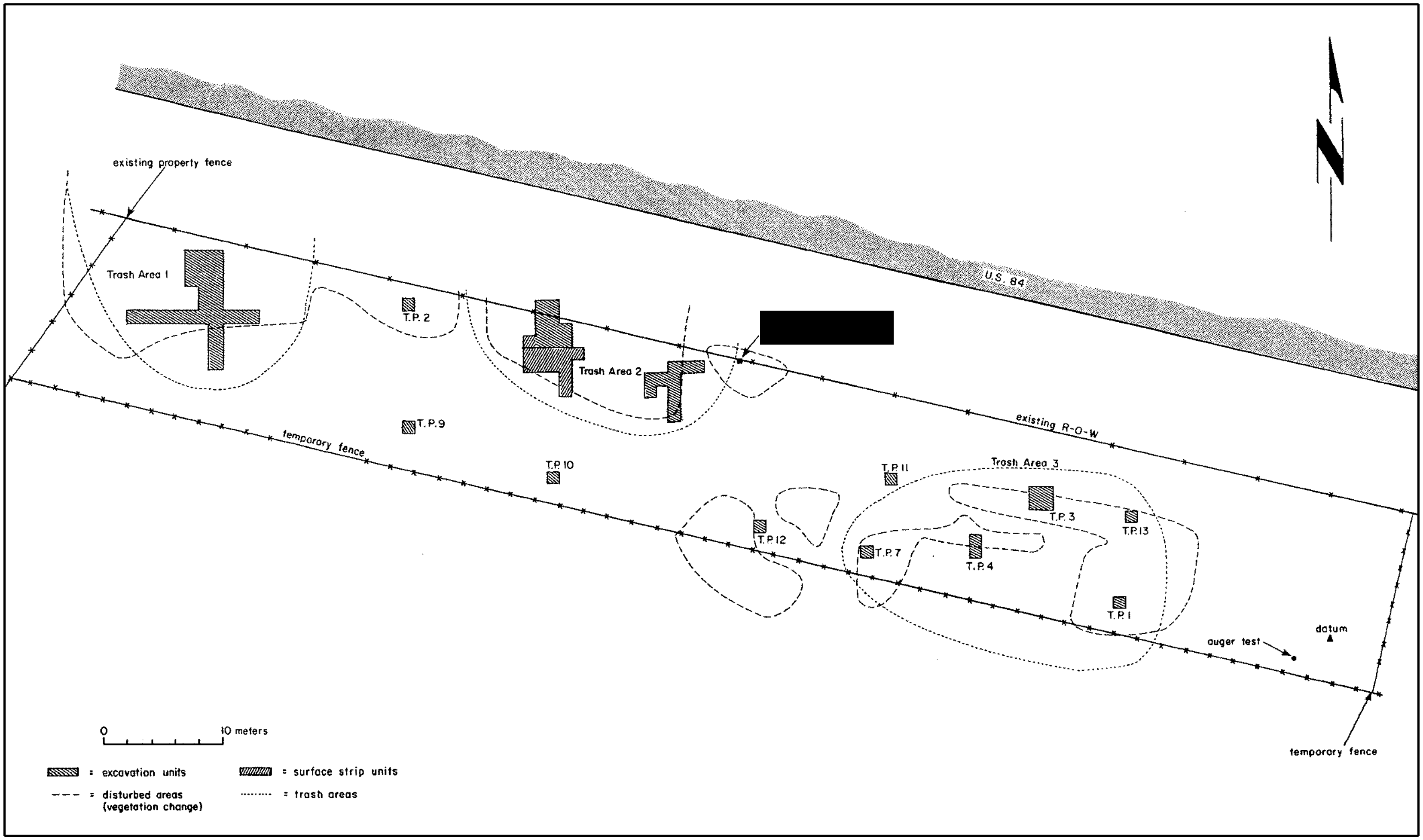

Figure 10-4. Plan of excavated area at La Puente.

deposit and four trash-filled pits (Fig. 10-5). The pits contrasted with the adjacent shallow deposit in that they were not distinctly stratified, though some lensing was visible. Trash Area 1 measured 20 m along its east to west axis by 15 m along its north to south axis.

Feature 2. Feature 2 was a large deep pit that cut through the north end of Feature 9, the shallow stratified deposit (Fig. 10-5). The pit measured about 2 m in diameter by 1.2 m deep, was roughly oval in horizontal section, and irregularly shaped in vertical section.

Although lensing was evident within the feature, its fill was defined as a single stratum. This stratum consisted of lenses of artifact-bearing and culturally sterile sandy, clayey loam. The upper 30 cm of fill contained numerous artifacts as well as large and small cobbles. With increasing depth, however, artifact density decreased and the fill became harder and contained more clay.

The size and depth of this feature and the clay content of the lower two-thirds of its fill suggest that the pit may have been an adobe mixing or borrow pit that was subsequently filled with trash.

Feature 3. Feature 3 was a large deep pit north of Feature 2 (Fig. 10-5). This pit, which was not completely excavated, was probably roughly oval in horizontal section and irregularly shaped in vertical section. It was 2 m deep and 2.5 m in diameter.

Six major strata were defined in this feature (Fig. 10-6). Stratum 1 (4 to 8 cm thick) was a layer of loose sand topsoil. Under this was Stratum 9, a 10-to-32-cm thick layer of gray-brown, sandy soil with lenses of charcoal and pebbles. Both of these strata extended across the feature. Beneath Stratum 9 on the east side of the pit was a small section of Stratum 10, which contained waterlain sand with some charcoal and pebbles. Beneath Stratum 9 in the center of the pit was Stratum 11, a basin-shaped lens 1.75 m wide and 4 to 25 cm thick. This stratum contained sandy soil with organic material, charcoal, artifacts, and pebbles. Stratum 17 was on the east and west sides of Stratum 11 and was also overlain by Stratum 9. This stratum was a sandy deposit containing building debris including plaster and burned adobe as well as artifacts. Beneath Strata 11 and 17 was Stratum 12, a thin lens of sandy mottled clay 1.4 m wide and 8 cm thick.

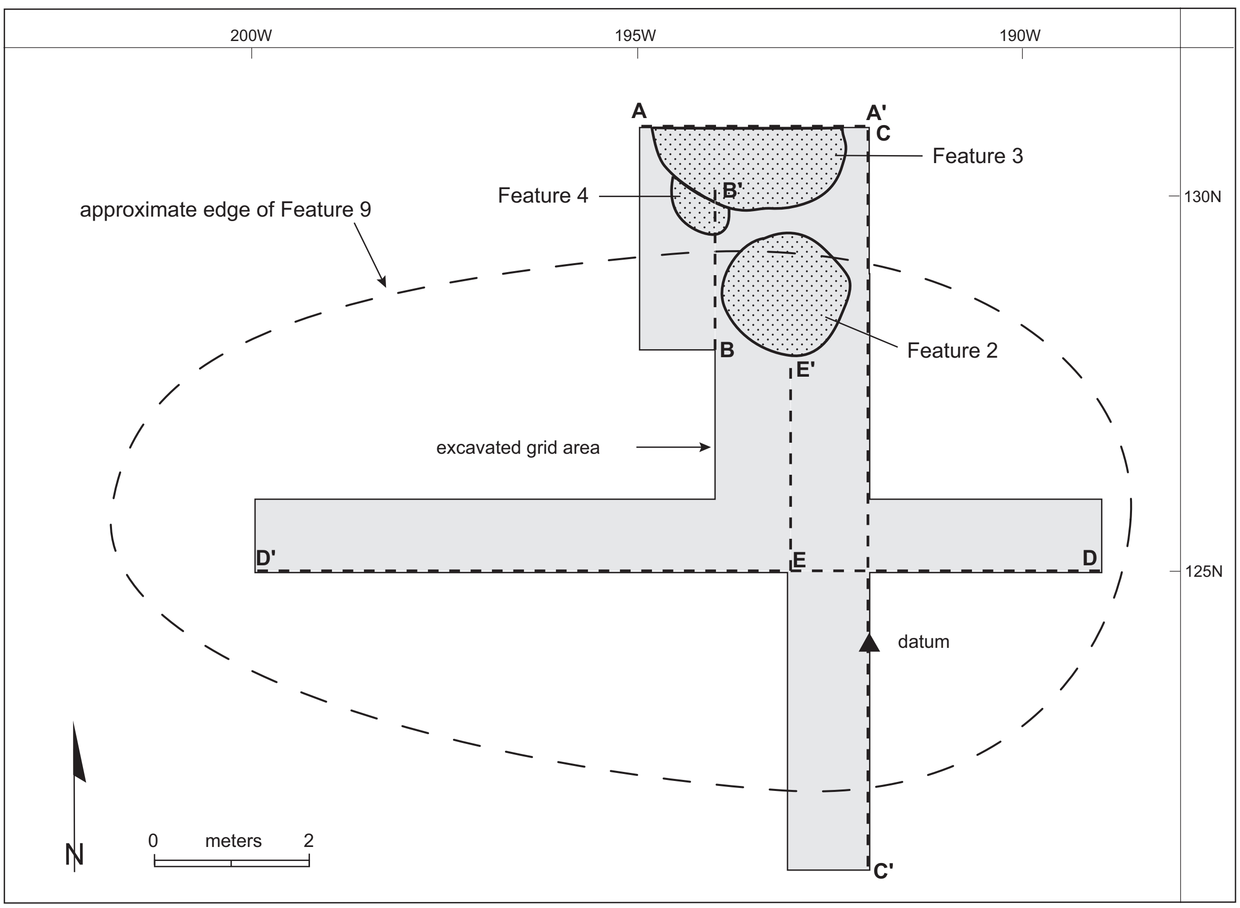

Figure 10-5. Plan of Trash Area 1 at La Puente.

Beneath Strata 12 and 17 was Stratum 13, a thick deposit that comprised the lower 1.3 m of fill. It consisted of pebbly sand containing small amounts of charcoal but few artifacts.

Feature 3 appeared to have been excavated to its complete depth and then partly filled with Stratum 13, which was probably of alluvial and eolian origin and contained few artifacts. Some 25 cm of Stratum 13 may have been removed from the central pit, as remnants of it appeared on the sides of Stratum 17. Stratum 12 was deposited on top of Stratum 13 in the center of the pit, and was subsequently covered by Stratum 17. Part of Stratum 17 was then removed to the top of Stratum 12, which had a higher clay content and was harder than the surrounding matrix. This area was filled with Stratum 11. After Stratum 11 was deposited, Stratum 10 accumulated on the east side of the feature, forming a shallow basin. The basin was filled with Stratum 9, which was then covered by loose sand (Stratum 1).

The function of Feature 3 is unknown. However, given its depth and diameter, the pit may have been an adobe mixing or borrow pit that was first filled by natural processes and then with cultural deposits.

Feature 4. Feature 4 was a small, shallow pit northwest of Feature 2 (Fig. 10-5). It was truncated on the north by Feature 3, and its upper strata may have been replaced by Feature 7. This pit was probably circular to oval in horizontal section, and was a dish-shaped basin in vertical section. It measured 1 m in diameter and was 20 cm deep.

Feature 4 was excavated into sterile sand, and contained Stratum 16, which consisted of very sandy soil with numerous pebbles and a few artifacts. There was some evidence of rodent disturbance. The original nature and function of Feature 4 remain unknown. Whether any strata were present above Stratum 16 is unknown since Feature 4 was covered by Feature 7 (Fig. 10-7).

Feature 7. Feature 7 was a large shallow pit excavated into sterile sand and possibly the upper parts of Feature 4 (Fig. 10-7). This pit was apparently truncated on the north by Feature 3, and may have been truncated on the south by Feature 2 (Fig. 10-5). It appeared to have been between 23 and 30 cm deep. The horizontal dimensions could not be established, but it was at least 1.5 m in diameter.

Two strata were defined in Feature 7. Stratum 14 was a 14-cm-thick unit of sandy soil that contained a large amount of construction debris including burned and unburned adobe and plaster as well as charcoal and artifacts. Beneath this was Stratum 15, a 12-to-16-cm-thick

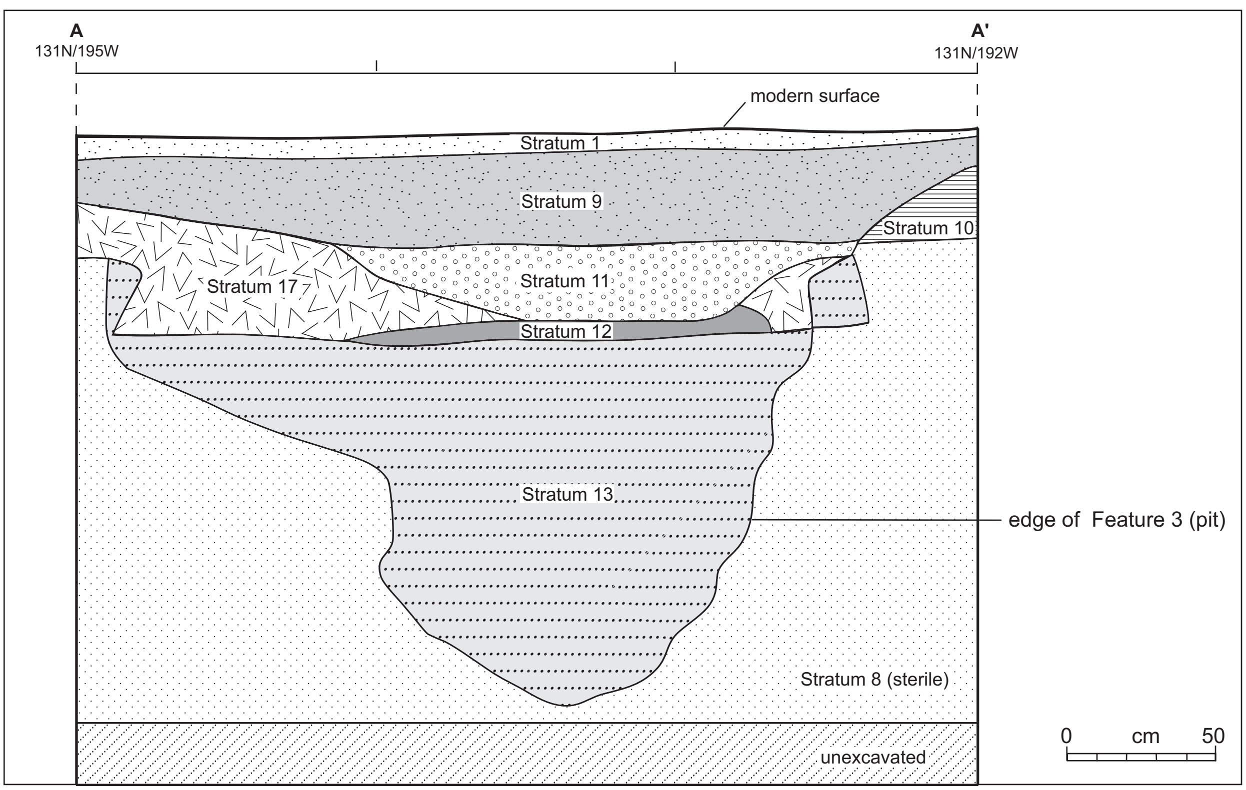

Figure 10-6. Profile of Feature 3 at La Puente.

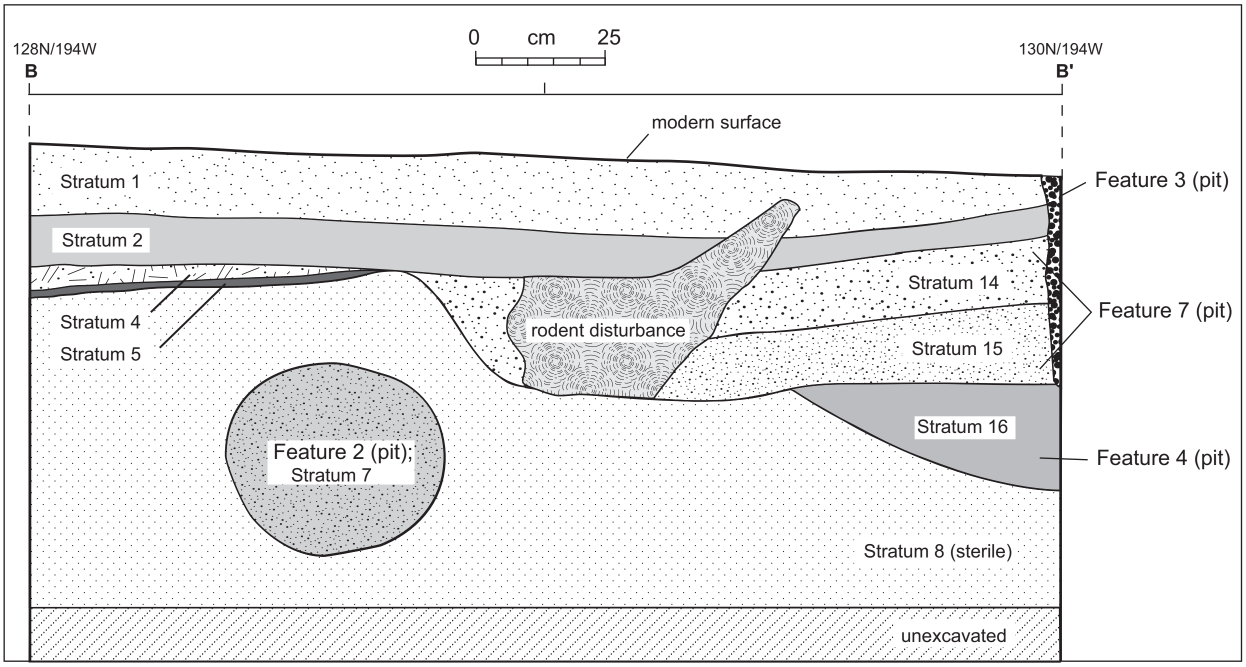

Figure 10-7. Profile of Features 4 and 7 at La Puente.

layer of sand containing fewer artifacts, less adobe, and less charcoal. Stratum 14 was overlain by Stratum 2, a broad, thin (2 to 10 cm) layer of artifacts, charcoal, and rubble extending north from Feature 9. Stratum 2 was in turn covered by Stratum 1. Strata 1 and 2 covered Feature 7 and were not part of it. Like Feature 4, the original function of Feature 7 remains unknown. It contained shallow deposits with poorly defined stratigraphy, and was disturbed by the excavation of Features 2 and 3.

Feature 9. Feature 9 was a broad, shallow, stratified deposit covering an area measuring 15 m by 7 to 8 m (Fig. 10-5). The deposit was up to 75 cm thick, though excavation usually stopped between 50 and 60 cm below the surface where the presence of artifacts diminished dramatically. Feature 9 was cut by Feature 2, and the north edge of Feature 9 appears to have overlapped Feature 7, although that relationship was not clear during excavation.

The stratigraphy of Feature 9 was complex, consisting of six distinct strata, two of which had internal substrata. Stratum 1 was loose eolian sand containing five substrata. The uppermost, Substratum 1a, was a lens of sand 4.75 m wide by at least 10 m long. It was about 10 cm thick in the center of the excavated area, increasing to 18 to 20 cm at the west side of the feature (Fig. 10-8). Substratum 1b was a 5-to-15-cm-thick layer of fine to coarse sand that contained more ash and charcoal than 1a. This layer was generally under 1a, but on the north and south sides of the feature, 1a was truncated by 1b, which rose to the surface from beneath 1a to become the topsoil (Fig. 10-9). Substratum 1c was very sandy and contained numerous gravels and occasional charcoal lenses. It formed the surface layer on the east side of the feature, covering Substratum 1a (Fig. 10-8). Substratum 1d was a small lens of sandy soil containing charcoal and ash mixed with fine sands and pea gravel. It was 80 cm long, 2 to 10 cm thick, and occurred near the west side of the feature (Fig. 10-8). Substratum 1e also occurred only on the west side of Feature 9, covering Strata 1a, 2, and 4. It was 7 to 10 cm thick and at least 1.85 m long. Its very sandy soil contained mixed lenses of charcoal, coarse sand, and pea gravel.

Stratum 2 was less sandy than Stratum 1 and contained considerably more ash, charcoal, and artifacts. Lenses and pockets of possibly burned sand were also present. Figures 10-8 through 10-10 show that Stratum 2 thinned near the east and west sides of Feature 9 and varied between 10 and 25 cm in thickness.

Stratum 3 was a 4-to-16-cm-thick layer of alluvial gravels that separated Strata 2 and 4 and was observed only in the west part of the trash area (Fig. 10-10). Elsewhere, Stratum 2 was immediately above Stratum 4. Stratum 4 was a relatively thick sandy layer under and clearly distinct from Stratum 2. It contained four substrata. Substratum 4 was a layer of fine to coarse sands containing gravel, charcoal, and artifacts, but no ash. Fig. 10-9 shows that this unit was about 5 m long and 10 to 25 cm thick, pinching out near the north and south sides of the feature. However, Fig. 10-8 indicates that it consistently occurred under Strata 1 and 2 across the east-

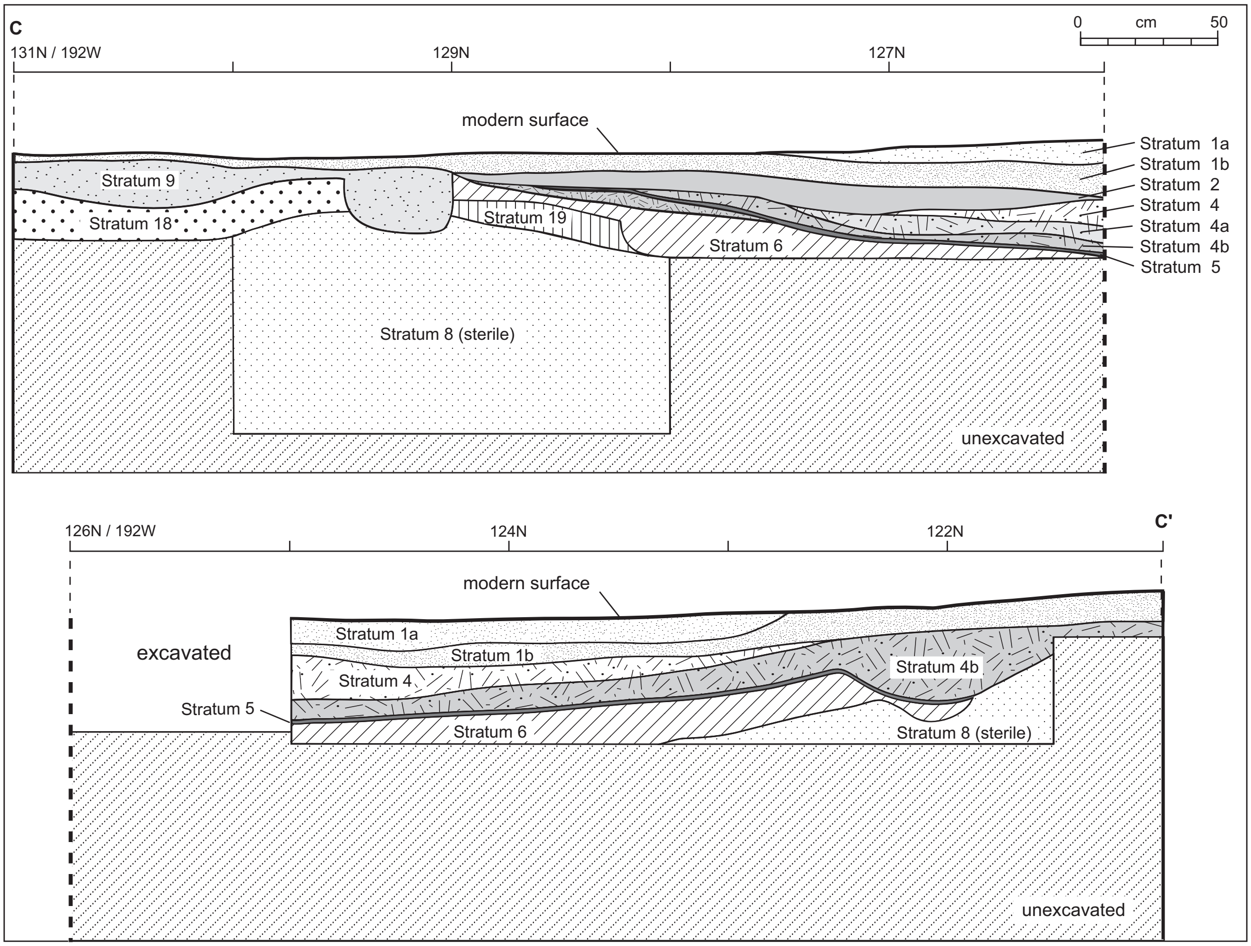

Figure 10-8. Profile of east wall of Feature 9, grids 122N/192W to 131N/192W at La Puente.

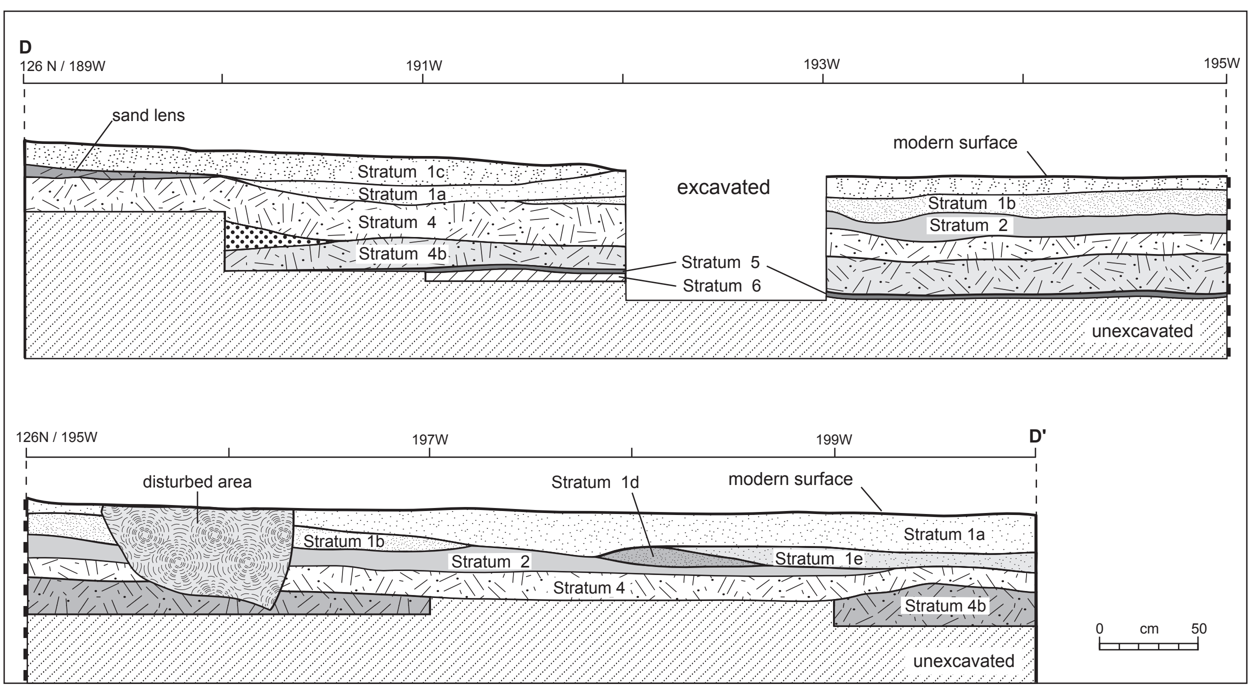

Figure 10-9. Profile of south wall of Feature 9, grids 126N/189W to 126N/199W at La Puente.

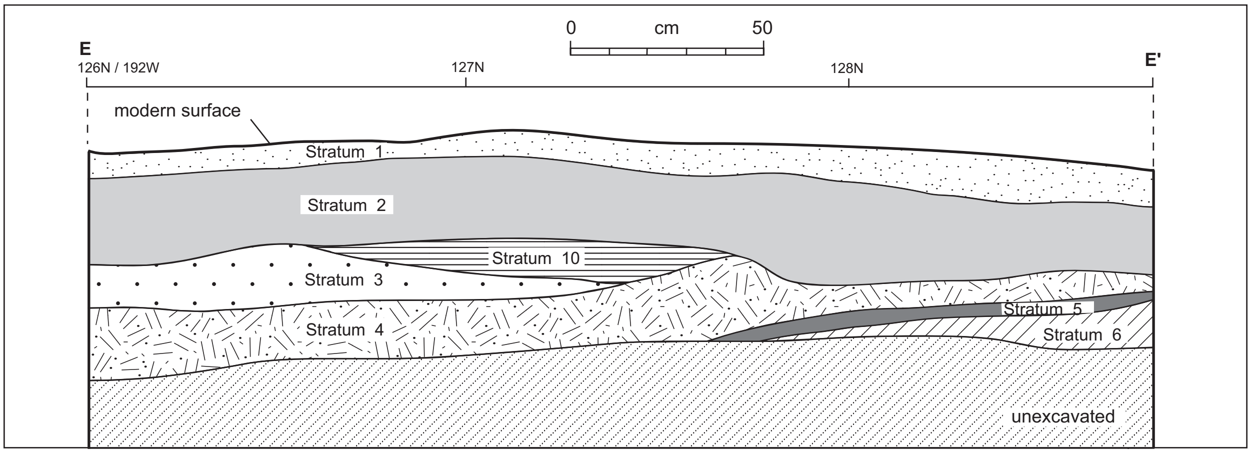

Figure 10-10. Short profile of west wall of Feature 9, grids 126N/192W to 128N/192W at La Puente.

west axis of the feature, and the east and west edges of the unit were not found. Substratum 4a was a lens of coarse sand and small gravel within and at the bottom of Substratum 4. It was defined only in the northeast quadrant of the feature (Fig. 10-9). Substratum 4b consistently underlay Stratum 4, and was composed of fine to coarse sand containing gravel, charcoal, and both lenses and pockets of clay. It was 5 to 15 cm thick, except along the south side of the feature, where it deepened to 35 cm in a small pit (Fig. 10-9). Substratum 4c occurred only along the east side of the feature; it was a thin lens of sand and pea gravel between Substratum 1c and Substratum 4 (Fig. 10-8).

Stratum 5 was a thin layer of compact clay 2 to 5 cm thick. It was consistently found beneath Substratum 4b (Figs. 10-8 through 10-10), and separated Strata 4b and 6. Stratum 6 was identical to Substratum 4b, and would not have been separately designated were it not for Stratum 5. The very fine, culturally sterile sand beneath the features in Trash Area 1 was designated Stratum 8. In Feature 9, it was present beneath Stratum 6. Stratum 10 was a small lens of sand containing charcoal. It occurred only in the west part of the area under Stratum 2, and filled a shallow pit near the north ends of Strata 3 and 4 (Fig. 10-10).

Trash Area 2

Trash Area 2 was in the west-central part of the project area along the existing right-of-way fence (Fig. 10-1). It was 25 m long by at least 12 m wide and contained a surface artifact scatter and five features: three trash-filled pits, a dumping area from a blacksmith's shop, and a buried trash deposit.

Feature 1. Feature 1 was a shallow trash-filled pit on the east side of Trash Area 2 (Fig. 10-11). It was excavated into Feature 6, and its deposits covered that pit. Later, Feature 5 was excavated through Feature 1 into Feature 6. Feature 1 was not completely excavated during this project, and was investigated by four grids (Figs. 10-11 and 10-12). Its complete size was unknown; it was at least 3 m wide, 4 m long, and 75 cm deep.

Two strata were defined in Feature 1. Stratum 1 was a sandy soil containing two substrata. Both were composed of fine sand containing small gravels, charcoal, ash, and artifacts. Substratum 1a was loamy topsoil. Substratum 1 contained more charcoal than Substratum 1a, and ash occurred in lenses. As discussed below, Substratum 1a also filled Feature 5. Substratum 1 may represent a topsoil horizon associated with Feature 1. It was covered by Substratum 1a when Feature 5 was

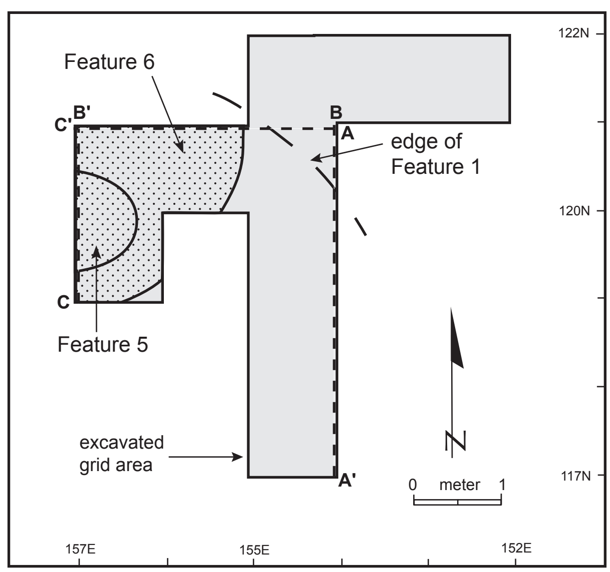

Figure 10-11. Plan of Trash Area 2 at La Puente.

filled. The distinction between the two was not defined until Feature 5 was discovered.

Stratum 2 had three substrata. Substratum 2 was a very loose, dark, ashy fill containing charcoal, numerous artifacts, and a large amount of bone. This was the primary artifact-bearing stratum in Feature 1, and it ranged between 5 and 40 cm thick (Figs. 10-12 and 10-13).

Substratum 2a consisted of mixed artifact-bearing soil and waterlain deposits. This substratum contained a great deal of charcoal and ash as well as artifacts and bone in lenses of fine to coarse sand. Laminated sand and clay layers separated the artifact-bearing lenses. This unit was under Substratum 2 on the south side of the feature (Fig. 10-12). Substratum 2b was a layer of hard clayey sand containing charcoal and some ash. It was consistently under Substrata 2 and 2a and was initially thought to be the lowest unit in Feature 1. However, its association with Features 5 and 6 suggests that it was

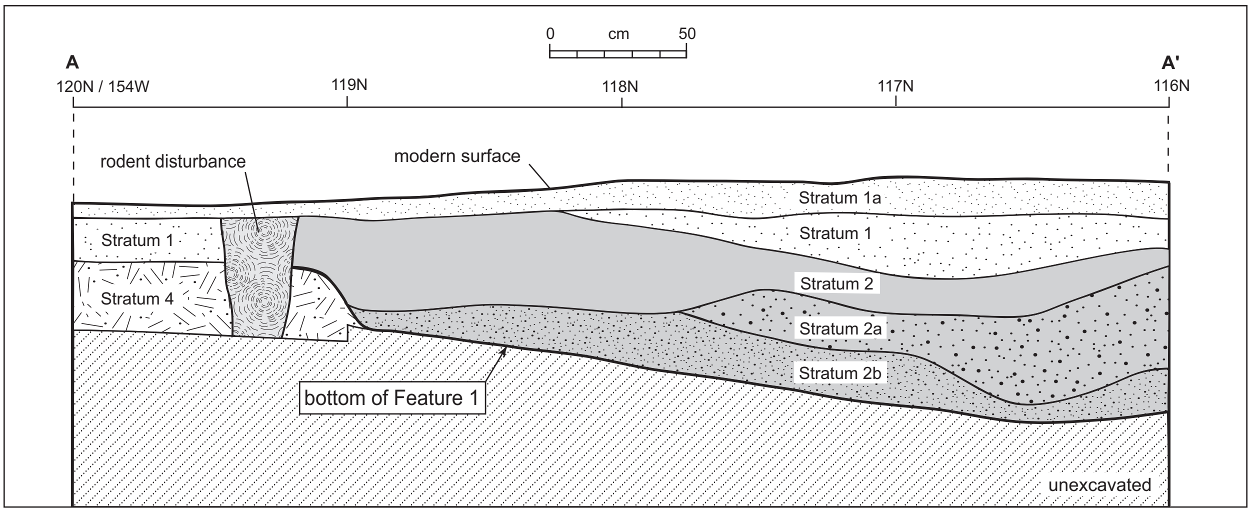

Figure 10-12. Profile of Feature 1 at La Puente.

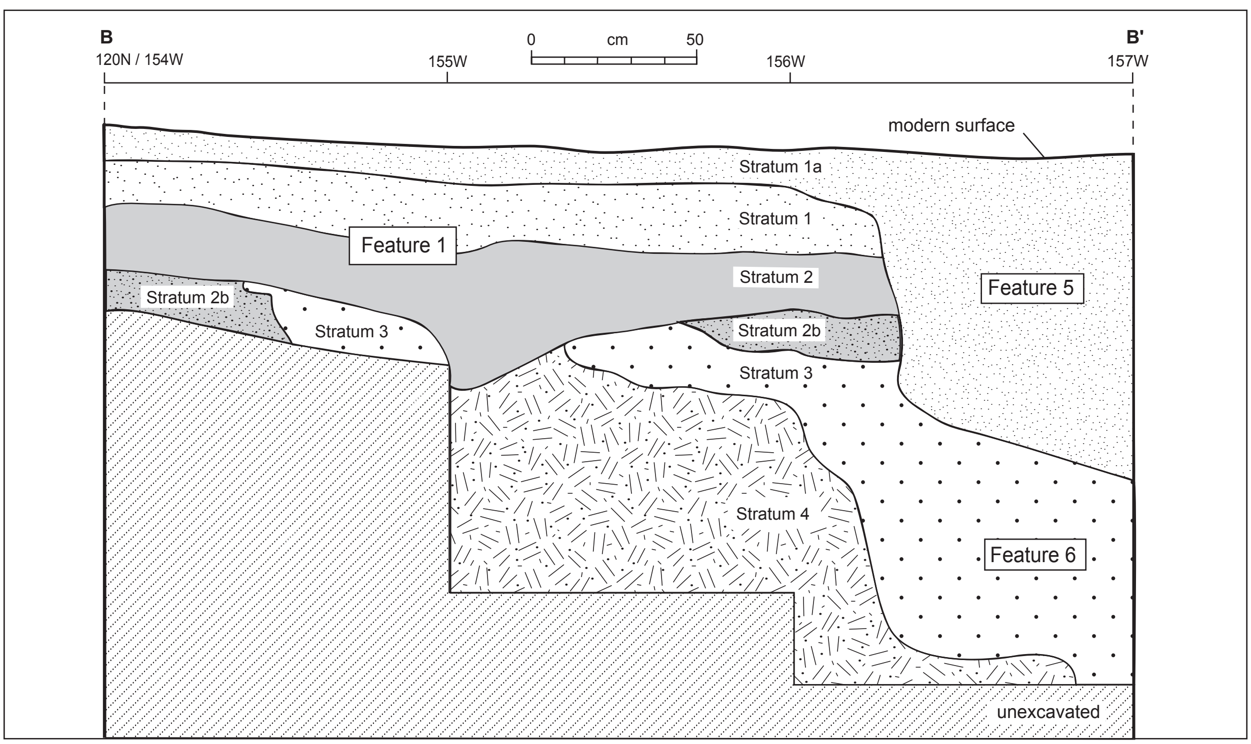

Figure 10-13. Profile of Features 1, 5, and 6 at La Puente.

deposited before Feature 6 was excavated. In Figs. 10-13 and 10-14, Substratum 2b is cut by Stratum 3, representing Feature 6 pit fill. In Fig. 10-13, it also occurs between Features 1 and 6. It is possible that this small unit was misidentified as Substratum 2a; otherwise, this situation cannot be explained. With this exception, Substratum 2b was an artifact-bearing horizon lying above Stratum 4, which was sterile sand.

Feature 5. Feature 5 was a trash-filled pit within Feature 6. About half of the pit was excavated, revealing that it was roughly circular, about 1.2 m in diameter and 1 m deep.

Feature 5 was filled with a single stratum identical in composition to Substratum 1a. Although minor lensing occurred, this unit appeared to be a single layer of loamy sand containing clay, adobe, charcoal, some ash, artifacts, and bone. As seen in Figs. 10-13 and 10-14, this stratum also comprised the surface layer in this part of Trash Area 2. It was apparently deposited on top of Feature 1 when Feature 5 was filled.

Feature 6. Feature 6 was a large trash-filled pit under the west side of Feature 1. The pit was excavated to a depth of 1.5 m below the modern ground surface. However, as discussed above, it is likely that Substratum 2b was deposited before Feature 6 was dug. Since both Substratum 2b and Feature 6 were covered by Feature 1, it can be speculated that the top of Substratum 2b was the ground surface when Feature 6 was dug. If so, Feature 6 was only about 1 m deep. Based on the size of the excavated part of the feature, it was at least 6 m in diameter. However, the deepest part was perhaps 2 m in diameter and 65 to 75 cm deep. Above that point, the pit walls flared out, making the surface diameter much larger. This is seen most clearly in Fig. 10-13.

Like Feature 5, Feature 6 was filled with a single stratum. Stratum 3 was a loose sand containing pockets

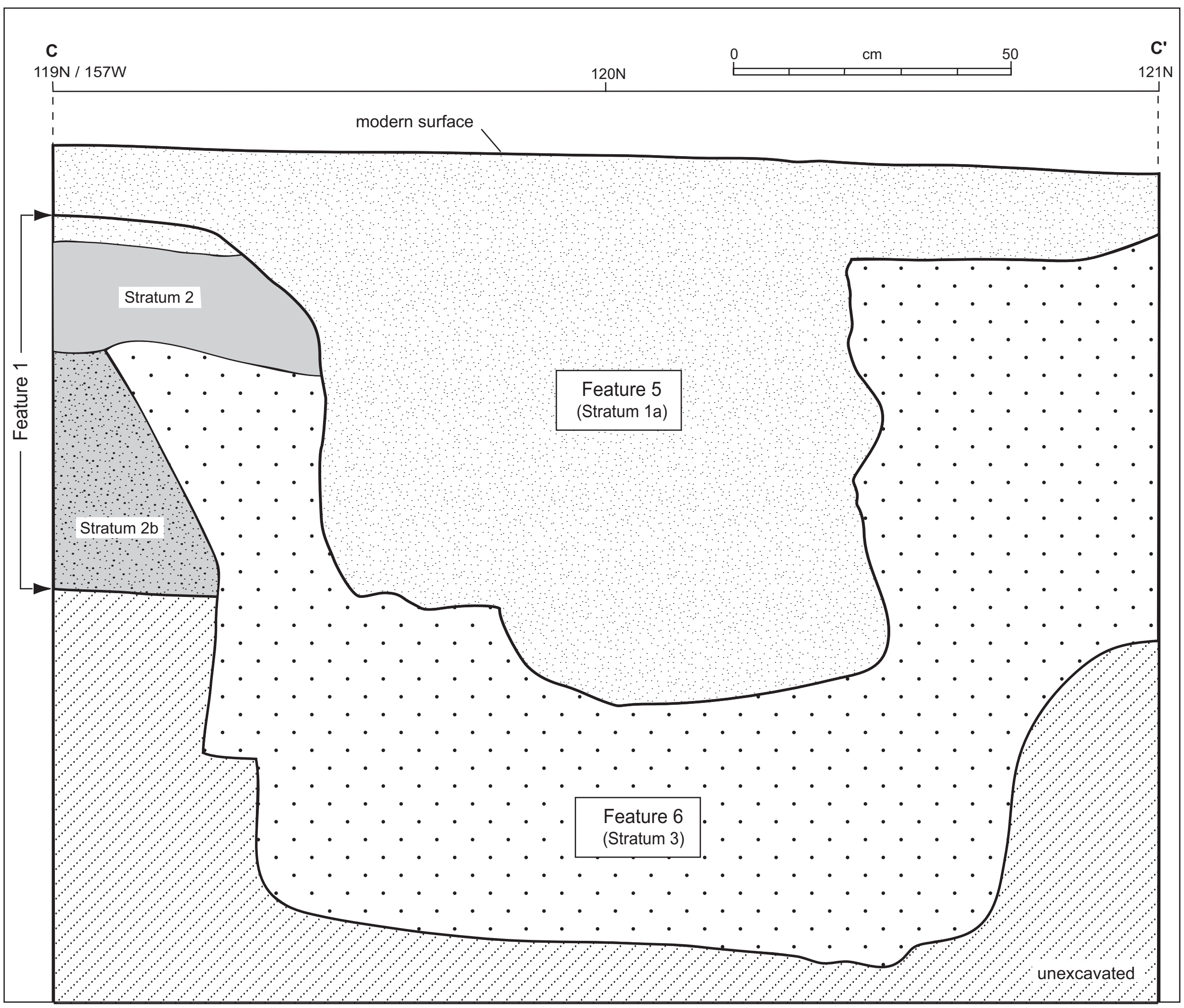

Figure 10-14. Profile of Features 1, 5, and 6 at La Puente.

and lenses of clay. It was considerably looser and sandier than Substrata 2b or 1a. It also contained numerous wood slivers and small sticks, as well as two small juniper logs that protruded into the bottom of Feature 5.

Feature 8. Feature 8 probably represented debris from a blacksmith's dump. It consisted of an oval area of black ashy soil that contained a great deal of charcoal, small bits of iron, and pieces of iron slag. Euroamerican and locally manufactured sherds were also present, as were a number of bone fragments. Since these items would not be expected debris in a blacksmith's shop, their presence suggests that Feature 8 consisted of redeposited materials. The dump measured 4.25 by 2.75 m, and was 10 to 12 cm deep in the center, tapering to 3 to 5 cm along the south and west sides.

In this part of Trash Area 2, this unit was designated Stratum 1 (Fig. 10-15). Excavation beneath Feature 8 revealed other artifact-bearing strata. Stratum 2 in Figs. 10-15 and 10-16 corresponds to substratum 1a, the topsoil and pit fill in Features 1 and 5 (Figs. 10-13 and 10-14). Stratum 3 corresponds to substratum 2b, the horizon through which Feature 6 was excavated. Stratum 4 was the same culturally sterile sand.

Feature 10. Feature 10 was a shallow pit containing artifact-bearing deposits under and north of Feature 8. Its outline was amorphous and difficult to define, but it may have been roughly oval, 3.5 to 3.75 m long, at least 2 m wide, and 3 to 20 cm deep. It was a lens of very ashy sand containing charcoal and artifacts found between Strata 3 and 4 (Fig. 10-16).

Trash Area 3

Trash Area 3 was a large surface artifact scatter near the east side of the project area (Fig. 10-1); it measured 34 m long by 18 m wide. Five 1-by-1-m grids were excavated in this area, revealing three strata that seemed to extend across the trash area. Stratum 1 was a layer of fine loamy sand, usually 5 cm or less in thickness. It contained bits of charcoal and, in some areas, numerous artifacts. Beneath this unit was Stratum 2, a 20-to-25-cm-thick

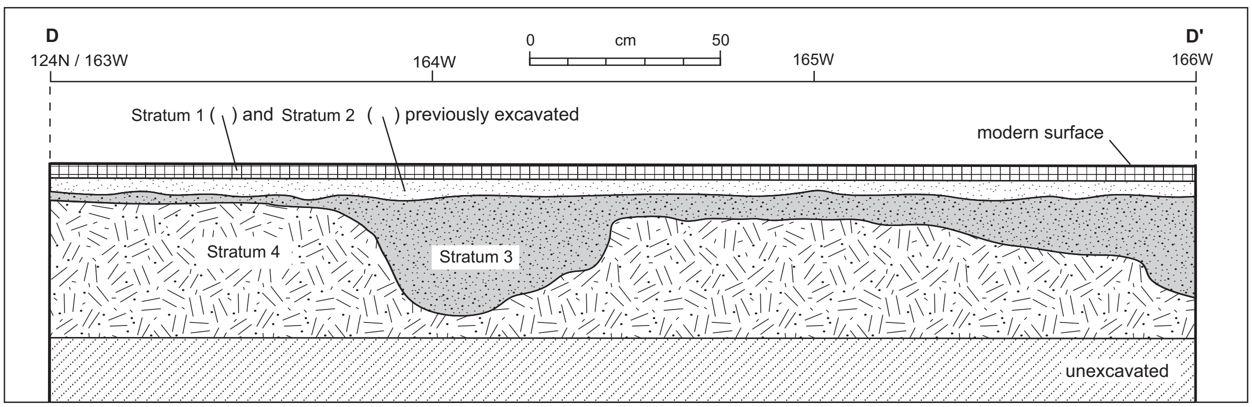

Figure 10-15. Profile of Feature 8 at La Puente.

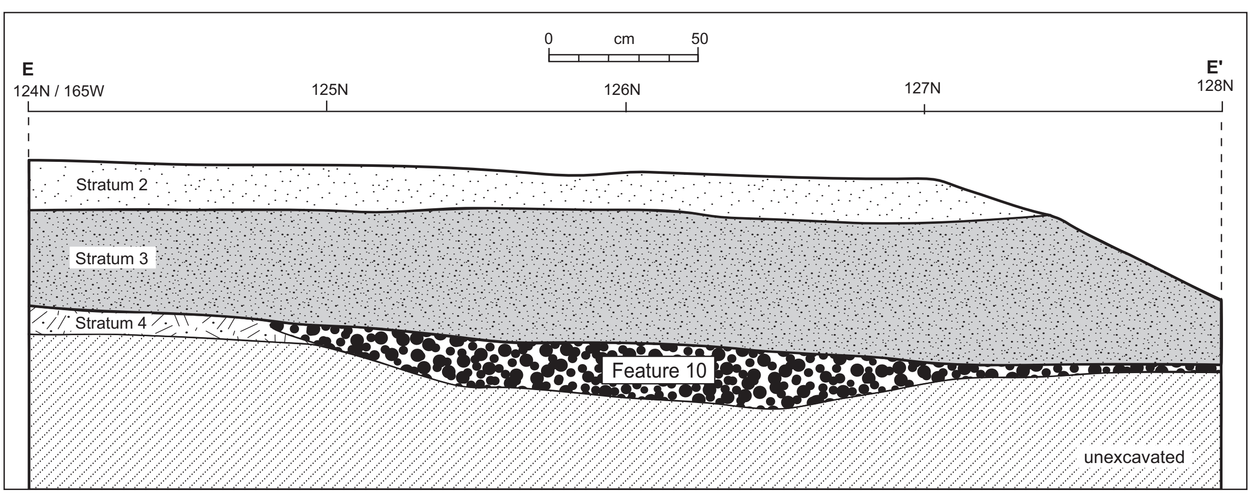

Figure 10-16. Profile of Feature 10 at La Puente.

layer of reddish-brown clayey sand. This layer also contained charcoal and, in some areas, numerous artifacts. However, the artifact count was normally less than in Stratum 1 and often dropped with increasing depth. Stratum 3 was the same sterile sand identified in Trash Area 1 as Stratum 8, and in Trash Area 2 as Stratum 4. No features were defined in Trash Area 3, and surface collection and limited excavation provided an adequate sample of surface and subsurface artifacts from this area.

Dating the Site

Historical Dates

Although historical information suggests a construction date for La Puente in the early 1770s, it is not possible to calculate a median historic date based on documented construction and abandonment dates because the latter are not available.

Chronometric Dates

Nineteen radiocarbon samples representing the eight features and selected stratigraphic columns were submitted for dating. The results are summarized in Table 10-1, and demonstrate that the site contains eighteenth and nineteenth century components.

Two dates suggest an old-wood problem: one at 1550 ± 70 and the other at 1590 ± 60. These samples have calibrated dates of 1450 and 1490, respectively. Five dates are modern: 1890 ± 60, 1910 ± 60, 1920 ± 70, and two at 1949 ± 70. Each of the modern samples has a calibrated date of 1955. The twelve remaining dates fall between 1670 and 1850, with five in the 1700s. The mean date of these samples is 1755.8. Figure 10-17 shows the percentage of samples that could date to each five-year period between 1600 and 1950, after deleting the two old-wood and five modern dates. The highest percentage of samples could date between 1700 and 1820, with small peaks between 1700 and 1740, 1775 and 1780, and 1800 and 1820. The midpoint of the 1700 to 1820 range is 1760, 4.2 years after the mean radiocarbon date. Less than 42 percent of the samples could date before 1700 or after 1820. Because it is known that the plaza was not built before 1700, the pre-1700 dates may represent old wood. In fact, the five samples dating between 1670 and 1750 all have calibrated dates in the 1640s and 1650s. They are included in Fig. 10-17 because their date ranges extend to the mid-1700s, when the region was first occupied by Spanish settlers. If they are deleted, however, the highest proportion of samples (about 86 percent) could date between 1775 and 1820.

Table 10-1. Radiocarbon dates by feature for La Puente.

Feature	Provenience	Sample No.	Adjusted Date (A.D.)*	Range (A.D.)*	Calibrated Date(s) (A.D.)*
Trash Area 1					
2	Level 4	Beta-28651	1850±50	1800-1900	1711, 1716, 1885, 1913, 1955
	Level 6	Beta-27631	1760±60	1700-1820	1668, 1751, 1758, 1777, 1796, 1947
3	Level 4	Beta-27632	1800±60	1740-1860	1681, 1735, 1806, 1936, 1955
	Level 6	Beta-28650	1680±60	1620-1740	1645
7	Level 3	Beta-27633	1710±70	1640-1780	1653
9	Level 2	Beta-27634	1750±70	1680-1820	1665, 1784, 1788, 1949, 1952
	Level 2	Beta-28653	1810±70	1740-1880	1685, 1730, 1808, 1931, 1955
	Level 2	Beta-27637	1920±70	1850-present	1955
	Level 3	Beta-27638	1670±70	1600-1740	1642
	Level 3	Beta-27635	1949±90	1859-present	1955
	Level 4	Beta-27639	1720±90	1630-1810	1656
	Level 4-5	Beta-27636	1949±70	1879-present	1955
Trash Area 2					
1	Level 2	Beta-27642	1690±50	1640-1740	1648
	Level 2	Beta-28955	1910±60	1850-1970	1955
5	Stratum 1 (feature fill)	Beta-27643	1890±60	1830-1950	1955
6	Level 4	Beta-28654	1840±70	1770-1910	1706, 1719, 1814, 1829, 1879, 1917, 1955
	Level 6	Beta-27644	1590±60	1530-1650	1490
8	Level 1	Beta-27640	1550±70	1480-1620	1450
10	Level 6	Beta-27641	1790±90	1700-1880	1678, 1739, 1804, 1938, 1955

*One-sigma dates.

Clearly, the radiocarbon dates show the presence of a Spanish Colonial period component at LA 54313, and the best dates agree with historical data that suggest initial occupation in the 1770s. Figure 10-17 also shows that the next large decrease in radiocarbon dates after 1820 is at 1880. This may suggest abandonment or disuse of this area in the last quarter of the nineteenth century.

Datable Artifacts

Native ceramics. Ceramic analysis for LA 54313 focused on 2332 native (locally produced) sherds. Figure 10-18 shows the percentage of sherds that could date to each five-year period between 1600 and 1950. Over 92 percent of the sherds could date between 1740 and 1820, while 96 percent could date between 1760 and 1820. The mean ceramic date is 1790.9, 0.9 years later than the midpoint of the 1760 to 1820 range. The minimum date range within which all sherds could date is 1760 to 1840, with a midpoint of 1800, 9.1 years after the mean ceramic date. However, this range is influenced by the presence of 15 Chacon micaceous sherds dating from 1840 to 1870. These sherds make up only 0.6 percent of the analyzed assemblage, but the minimum date range does not take into account their frequency relative to those of the more numerous types. If they are deleted, the minimum date range is actually the year 1760, and the mean ceramic date is 1790.5. In either case, the native ceramic assemblage substantially supports the radiocarbon samples in showing a Spanish Colonial occupation dating to the last quarter of the 1700s and the first quarter of the 1800s. There is a significant decrease in the number of datable sherds at 1890. The only pottery dating after that year are types still available today, including San Juan Red-on-tan and Tewa red and black sherds. Like the radiocarbon samples, the native sherds suggest abandonment or disuse of the midden area in the late 1800s.

Euroamerican artifacts. A later chapter presents a detailed discussion of site and feature dating using the Euroamerican artifacts, which are only summarized here. The data show that Features 9 in Trash Area 1, 10 in Trash Area 2, and perhaps 4 and 7 in Trash Area 1 date to the late Spanish Colonial period. Features 6 and 8 in Trash Area 2, the shallow deposit comprising Trash Area 3, and most of the scattered deposits between the trash

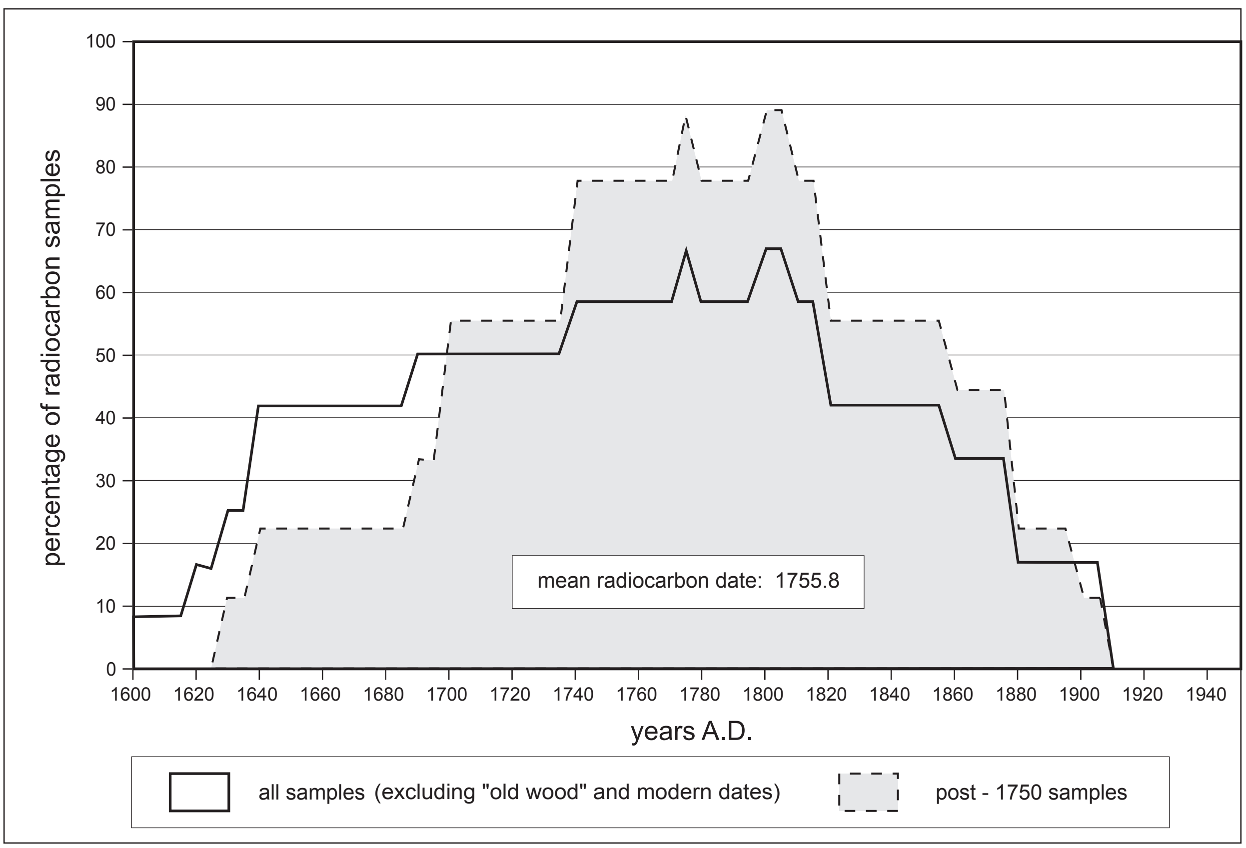

Figure 10-17. Percent of radiocarbon samples that could date to each 5-year period, A.D. 1600 to 1950, after deleting old wood and modern dates from La Puente.

areas date to the Mexican Territorial period. Finally, Features 2 and 3 in Trash Area 1, and Features 5 and 6 in Trash Area 2 date to the last half of the nineteenth century during the American Territorial period.

Summary

Radiocarbon dates from LA 54313 agree substantially with historic information that suggests the site was first occupied in the 1770s. The highest percentage of samples could date between 1775 and 1820. This correlates closely with historic information, particularly since over half of the dates represent either old wood or modern samples. The decrease in sample dates after 1880 suggests abandonment or disuse of the midden area at that time. These data are supported by the native sherds, the highest percentage of which could date between 1760 and 1820. The percentage of native sherds drops at 1890, perhaps supporting late nineteenth century abandonment or disuse. The Euroamerican artifacts also demonstrate the presence of a Spanish Colonial component dating to the late 1700s. They point to an important Mexican Territorial period component, since the highest percentage of artifacts could date between 1820 and 1850. Finally, they show an American Territorial period component with features dating up to about 1900. Chronometric and artifact dates are consistent in showing that the site was first occupied in the last quarter of the 1700s and largely abandoned late in the 1800s.

Euroamerican Artifacts

A summary of the Euroamerican artifacts is presented here, and a more detailed analysis is presented in a later chapter. Excavations at La Puente yielded 1128 Euroamerican artifacts from the ten features and three time periods. Through time, there is an increase in both the diversity of Euroamerican items and in the frequency of functionally unidentifiable artifacts. In the ceramic assemblages, there is a general decrease in the frequency of coarse earthenwares and an increase in fine earthenwares through time. This is expectable given changing market orientation from south toward Mexico to east toward the United States. At the same time, undecorated vessels dominate decorated vessels and, among the decorated vessels, most are hand-painted. While this is expectable before the advent of transfer printing, it continued as a pattern into the late nineteenth century.

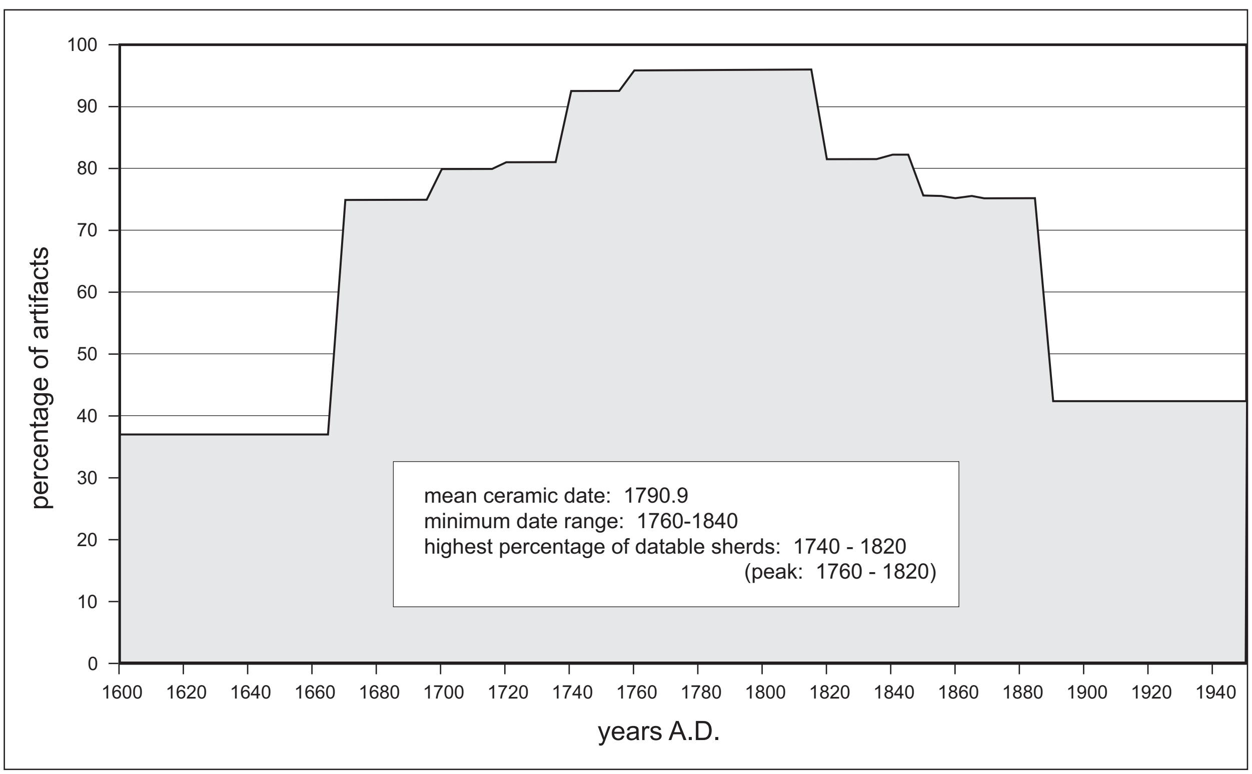

Figure 10-18. Percent of datable native sherds from La Puente that could date to each 5-year period, A.D. 1600 to 1950.

Ceramic Artifacts

DAISY F. LEVINE

A summary of the ceramic assemblage is presented here, and a more detailed analysis is presented in Chapter 14 (Native Ceramic Analysis and Interpretation). The assemblage contains Tewa, Hispanic, Tiwa, and Apache sherds, and a handful of sherds from the Puname, Keres, and Acoma districts. A few prehistoric sherds were also found, probably from the nearby site of Poshu'ouinge.

Of the 26,093 sherds collected from the site, 5481 were analyzed during the detailed analysis. Table 10-2 presents ceramic types and frequencies by vessel form. Tewa series polychrome jars were most frequent, followed by Casitas Red-on-brown bowls. Omitting unknowns and prehistoric types, 46 percent of the assemblage consisted of Tewa wares, 29 percent were Hispanic wares, 18 percent were indeterminate micaceous wares (mica paste and mica slipped, which could be either Pueblo or Hispanic), 6 percent were Apache, and 1 percent were imported Historic polychromes. The overall ceramic assemblage represents a Spanish Colonial to early American Territorial period occupation. The earliest historic ware is Ogapoge Polychrome, dating from 1720 to 1760.

Chipped Stone Artifacts

JAMES L. MOORE

A summary of the chipped stone assemblage is presented here, and a more detailed analysis is presented in Chapter 16 (Spanish Chipped Stone Artifacts). Of the 686 chipped stone artifacts recovered, the majority were Pedernal chert (Table 10-3). Other cherts, quartzite, and obsidian were also relatively common. Cortex on obsidian artifacts was waterworn, suggesting it came from stream deposits rather than sources in the Jemez Mountains. Cortex on other materials was also waterworn, suggesting that they too came from local gravel deposits. Predominantly fine-grained materials were selected for reduction (Table 10-4). Though fine-grained materials comprised 84.5 percent of the assemblage, 94.9 percent of the tools were made from this textural category, suggesting that the most suitable materials were selected for tool manufacture and use.

Ground Stone Artifacts

KAREN WENING

Forty-five ground stone artifacts were recovered from La Puente (Table 10-5). This assemblage included 27 handstones, one metate fragment, eight comal fragments, three stone disks, two stone beads, one shaft smoother, and three indeterminate fragments. Handstones are divided into five groups including polishers, one-hand manos, slab manos, reworked fragments, and indeterminate fragments.

Polishers are cobbles with smooth cortical surfaces; use on these artifacts occurs as a glassy polish displaying numerous striations. Nearly all polishers exhibit a heavily used primary surface opposite a little used or unused secondary surface. Both uni- and bidirectional, and multidirectional striations occur on use surfaces. Typically, polishers were unmodified oblong cobbles with biconvex or planoconvex transverse cross-sections. They were obviously selected for specialized use because of their small size and nonabrasive surfaces. Wear and morphology suggest they were used on smooth malleable surfaces rather than metates.

One-hand manos are separated from polishers because they are made of slightly more abrasive materials and do not exhibit glossy striated use surfaces. They are typically small round cobbles with flat very fine-grained use surfaces. Like polishers, they are unmodified with smooth cortical surfaces.

Slab manos are the rectangular form commonly associated with Anasazi sites dating to the Coalition and Classic periods. Four use stages are often hypothesized for this type of mano, with a rectangular cross-section representing the new or early use stage, followed by truncated wedge, wedge, and triangular cross-sections. Rectangular, truncated wedge, and triangular cross-sections are each represented by one example. The fourth slab mano is an exfoliated fragment with an indeterminate cross-section. Coarse-grained materials were used for this class of tool, contrasting with the minimally abrasive materials used for polishers and one-hand manos. Although only one complete slab mano was recovered, these artifacts are generally larger than the other varieties of handstones.

One mano fragment and one metate fragment were reshaped around their broken edges by chipping or grinding, and were reused as manos or polishers. The reworked metate fragment had two opposing use surfaces, one the concave surface of the original tool, and the other a flat, nearly polished use surface with occasional pecking that did not result from surface refurbishing. The reworked mano was planoconvex in cross-section. It was a medial fragment chipped to shape along both broken edges, and exhibited two opposing use surfaces. There were two manos too fragmentary for more specific classification; each exhibited a single flat use surface.

One slab metate fragment was found. It had a concave use surface that extended to the edge of the tool. Only one edge was unbroken, and was shaped by chipping and

Table 10-2. Ceramic type and frequency by vessel form; La Puente (frequencies and row percentages).

Ceramic type	Jar	Bowl	Flange Plate	Indeter-minate	Row total Percent of total
Tewa Red	37 49.3%	25 33.3%	2 2.7%	11 14.7%	75 1.4%
Tewa Black	339 42.1%	270 33.5%	104 12.9%	93 11.5%	806 14.7%
Tewa, other	135 47.5%	71 25.0%	10 3.5%	68 23.9%	284 5.2%
San Juan Red-on-tan	39 32.8%	65 54.6%	13 10.9%	2 1.7%	119 2.2%
Ogapoge Polychrome	15 78.9%	2 10.5%	0 0.0%	2 10.5%	19 0.3%
Powhoge Polychrome	67 70.5%	22 23.2%	3 3.2%	3 3.2%	95 1.7%
Powhoge Black-on-red	0 0.0%	1 100.0%	0 0.0%	0 0.0%	1 0.02%
Nambe Polychrome	1 50.0%	1 50.0%	0 0.0%	0 0.0%	2 0.04%
Unknown Black-on-red	2 22.2%	6 66.7%	0 0.0%	1 11.1%	9 0.2%
Non-Tewa polychromes	29 46.8%	22 35.5%	1 1.6%	10 16.1%	62 1.1%
Unknown Tewa polychrome	643 65.5%	195 19.9%	10 1.0%	134 13.6%	982 17.9%
Hispanic Black	152 24.1%	295 46.8%	122 19.3%	62 9.8%	631 11.5%
Casitas Red-on-brown	95 11.3%	565 66.9%	83 9.8%	101 12.0%	844 15.4%
Casitas Red-on-brown, smudged	0 0.0%	32 91.4%	1 2.9%	2 5.7%	35 0.6%
Mica slipped	246 69.9%	15 4.3%	2 0.6%	89 25.3%	352 6.4%
Mica paste	275 46.1%	18 3.0%	0 0.0%	304 50.9%	597 10.9%
Apache Micaceous	254 91.4%	8 2.9%	0 0.0%	16 5.8%	278 5.1%
Chacon Micaceous	14 77.8%	0 0.0%	0 0.0%	4 22.2%	18 0.3%
Plain utility	58 71.6%	5 6.2%	4 4.9%	14 17.3%	81 1.5%
Biscuit A	0 0.0%	16 88.9%	0 0.0%	2 11.1%	18 0.3%
Biscuit B	13 43.3%	15 50.0%	0 0.0%	2 6.7%	30 0.5%
Wiyo Black-on-white	0 0.0%	2 100.0%	0 0.0%	0 0.0%	2 0.04%
Potsui'i Incised	1 33.3%	2 66.7%	0 0.0%	0 0.0%	3 0.1%
Corrugated	1 100.0%	0 0.0%	0 0.0%	0 0.0%	1 0.02%
Glazeware	1 33.3%	2 66.7%	0 0.0%	0 0.0%	3 0.1%
Unknown	38 28.4%	28 20.9%	3 2.2%	65 48.5%	134 2.4%
Column total Percent of total	2455 44.8%	1683 30.7%	358 6.5%	985 18.0%	5481 100.0%

Table 10-3. Chipped stone artifact type by material type; La Puente.

Reduction Debris	Flakes	Angular Debris	Cores	Row Total
Chert	39	13	1	53
Pedernal chert	263	121	18	402
Silicified wood	6	0	0	6
Quartz	3	1	0	4
Quartzite	35	8	2	45
Quartzitic sandstone	1	1	0	2
Basalt	1	0	0	1
Obsidian	18	8	0	26
Rhyolite	5	1	0	6
Igneous undifferentiated	4	0	0	4
Column total	375	153	21	549
Tools	Strike-a-Light Flint	Gunflint	Scraper	Axe
Chert	4	1	0	0
Pedernal chert	115	2	1	0
Silicified wood	1	0	0	0
Basalt	0	0	0	1
Obsidian	0	0	2	0
Column total	120	3	3	1
	Scraper/Spokeshave	Biface	Unidentified	Projectile Point
Pedernal chert	2	1	2	0
Silicified wood	1	0	0	0
Quartzite	0	0	1	0
Obsidian	0	0	0	3
Column total	3	1	3	3

Table 10-4. Chipped stone artifact material type by texture; La Puente.

Material	Glassy	Fine	Medium	Coarse	Row Total
Chert	0	39	15	4	58
Pedernal chert	0	512	10	3	525
Silicified wood	0	8	0	0	8
Quartzite	0	9	27	10	46
Quartzitic sandstone	0	1	1	0	2
Quartz	0	4	0	0	4
Basalt	0	2	0	0	2
Rhyolite	0	3	3	0	6
Obsidian	31	0	0	0	31
Igneous undifferentiated	0	2	0	2	4
Column total	31	580	56	19	686
Percent of total	4.5%	84.5%	8.2%	2.8%	100.0%

Table 10-5. Ground stone artifact type by material type; La Puente.

Tool Type	Basalt	Quartzitic Sandstone	Sandstone	Igneous Undifferentiated	Pumice	Claystone	Row Total
Polishers	9	1	0	0	0	0	10
One-hand manos	0	0	1	8	0	0	9
Slab manos	1	0	3	0	0	0	4
Reworked manos	1	0	1	0	0	0	2
Mano fragments	0	0	2	0	0	0	2
Slab metates	1	0	0	0	0	0	1
Comals	0	0	8	0	0	0	8
Stone disks	0	0	3	0	0	0	3
Disks/beads	0	0	0	0	1	1	2
Shaft smoother	0	0	1	0	0	0	1
Indeterminate groundstone	1	0	2	0	0	0	3
Column total	13	1	21	8	1	1	45

grinding. Eight comals were also found; all were fragmentary and many were exfoliated beyond reconstruction. The comals were thin tabular sandstone slabs that were chipped to shape, and exhibited one or two burned surfaces. All of the comal fragments were made from fine-grained red sandstone, the color of which presumably resulted from oxidation caused by use over a fire.

Three sandstone disks of varying diameter were chipped to shape around their entire perimeters, and some were lightly ground on one or both flat surfaces. A circular pumice disk was shaped by grinding and had a hole drilled through it from both surfaces, giving the hole an hourglass-like cross-section. A red claystone bead was square with a thick tabular cross-section. The drilled surface was ground smooth, but other surfaces were left unmodified. The drilled hole was wider at the surface of the artifact than on the interior, and spiral striations were visible within it.

A fragmentary sandstone shaft smoother had two parallel grooves on one surface and a single groove on the opposite surface. The single groove was nearly opposite one of the parallel grooves, and the artifact was quite thin where the grooves were worn. The sandstone from which the shaft smoother was made is slightly coarser-grained and more abrasive than that used for other ground stone artifacts. Three ground stone artifacts exhibit flat (2) and convex (1) surfaces, but were too fragmentary for further classification.

Discussion

The most striking aspect of the assemblage was the overwhelming dominance of smooth or polished use-surfaces. Handstones were characteristically small unmodified cobble or tabular fragments whose cortical surfaces were frequently worn to a glossy, often striated texture. One-hand forms dominated two-hand varieties. These types of surfaces are usually produced by seed processing. Small, smooth-surfaced stones were used to hull fragile seeds with soft interiors on base stones or in baskets. A sharp functional contrast is illustrated by comparison with the larger, more abrasive slab manos commonly associated with corn processing. The near absence of base stones precludes further functional definition of the ground stone, but two functionally distinct mano classes can be clearly defined.

Faunal Remains

Table 10-6 lists the faunal assemblage from LA 54313 by feature. Bones from seven separate species, two genera, and 15 other more general classes of animals were identified. In addition, eggshell fragments were recovered from four features. Because Euroamerican artifact analyses allow each feature to be dated to one of the three temporal components represented at the site, the data in Table 10-6 can be compressed into faunal assemblages for each component. This information is listed in Table 10-7, which shows that the Spanish Colonial and American Territorial period assemblages are most diverse, with 19 and 21 species or other classification represented, respectively. The Mexican Territorial period component contains only eight species or other classes. This may be because the Mexican Territorial assemblage came from a single feature (Feature 8), while the other assemblages were derived from two Spanish Colonial and four American Territorial period features.

Table 10-6. Faunal remains by feature; La Puente (frequencies, row and column percentages).

Species or Classification	Feature No. 1	2	3	5	8	9	10	Total Row Percent Column Percent
Bos taurus	21	3	23	14	5	203	178	447
	4.7%	0.7%	5.1%	3.1%	1.1%	45.4%	39.8%	100.0%
	1.8%	0.2%	1.5%	1.2%	0.8%	5.1%	19.2%	4.2%
Equus sp.	0	0	1	2	0	0	0	3
	0.0%	0.0%	33.3%	66.7%	0.0%	0.0%	0.0%	100.0%
	0.0%	0.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.03%
Sus scrofa	0	3	4	8	0	1	2	18
	0.0%	16.7%	22.2%	44.4%	0.0%	5.6%	11.1%	100.0%
	0.0%	0.2%	0.3%	0.7%	0.0%	0.03%	0.2%	0.2%
Ovicaprid	336	173	370	375	128	542	334	2258
	14.9%	7.7%	16.4%	16.6%	5.7%	24.0%	14.8%	100.0%
	29.5%	12.8%	23.5%	31.9%	20.7%	13.6%	36.0%	21.0%
Ovis aries	20	3	3	11	0	5	8	50
	40.0%	6.0%	6.0%	22.0%	0.0%	10.0%	16.0%	100.0%
	1.8%	0.2%	0.2%	0.9%	0.0%	0.1%	0.9%	0.5%
Capra hircus	0	0	0	3	0	0	0	3
	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	100.0%
	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.03%
Canis sp.	0	22	2	0	1	2	18	45
	0.0%	48.9%	4.4%	0.0%	2.2%	4.4%	40.0%	100.0%
	0.0%	1.6%	0.1%	0.0%	0.2%	0.1%	1.9%	0.4%
Cervid	4	0	0	0	0	1	0	5
	80.0%	0.0%	0.0%	0.0%	0.0%	20.0%	0.0%	100.0%
	0.4%	0.0%	0.0%	0.0%	0.0%	0.03%	0.0%	0.05%
Odocoileus hemionus	0	0	0	4	0	21	0	25
	0.0%	0.0%	0.0%	16.0%	0.0%	84.0%	0.0%	100.0%
	0.0%	0.0%	0.0%	0.3%	0.0%	0.5%	0.0%	0.2%
Ursus americanus	0	0	0	0	0	1	0	1
	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%
	0.0%	0.0%	0.0%	0.0%	0.0%	0.03%	0.0%	0.01%
Large mammal	11	49	23	211	19	238	70	621
	1.8%	7.9%	3.7%	34.0%	3.1%	38.3%	11.3%	100.0%
	1.0%	3.6%	1.5%	18.0%	3.1%	6.0%	7.6%	5.8%
Medium or large mammal	383	157	61	535	450	148	314	2048
	18.7%	7.7%	3.0%	26.1%	22.0%	7.2%	15.3%	100.0%
	33.7%	11.6%	3.9%	45.6%	72.8%	3.7%	33.9%	19.0%
Small or medium mammal	0	0	1	0	0	3	0	4
	0.0%	0.0%	25.0%	0.0%	0.0%	75.0%	0.0%	100.0%
	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%	0.04%
Small mammal	0	3	4	0	0	7	0	14
	0.0%	21.4%	28.6%	0.0%	0.0%	50.0%	0.0%	100.0%
	0.0%	0.2%	0.3%	0.0%	0.0%	0.2%	0.0%	0.1%
Lagomorph	0	0	1	0	0	4	0	5
	0.0%	0.0%	20.0%	0.0%	0.0%	80.0%	0.0%	100.0%
	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%	0.05%
Lagomorph or small mammal	0	1	0	0	0	0	0	1
	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.01%
Gallus gallus	1	1	0	1	0	6	2	11
	9.1%	9.1%	0.0%	9.1%	0.0%	54.5%	18.2%	100.0%
	0.1%	0.1%	0.0%	0.1%	0.0%	0.2%	0.2%	0.1%
Large bird	0	1	0	1	0	8	1	11
	0.0%	9.1%	0.0%	9.1%	0.0%	72.7%	9.1%	100.0%
	0.0%	0.1%	0.0%	0.1%	0.0%	0.2%	0.1%	0.1%
Medium bird	3	6	1	0	1	43	0	54
	5.6%	11.1%	1.9%	0.0%	1.9%	79.6%	0.0%	100.0%
	0.3%	0.4%	0.1%	0.0%	0.2%	1.1%	0.0%	0.5%
Small bird	0	0	4	0	13	2	0	19
	0.0%	0.0%	21.1%	0.0%	68.4%	10.5%	0.0%	100.0%
	0.0%	0.0%	0.3%	0.0%	2.1%	0.1%	0.0%	0.2%
Lagomorph or bird	0	0	0	0	1	0	0	1
	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%
	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.01%
Rodent	0	0	0	0	0	5	0	5
	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%
	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.05%
Toad	0	9	0	0	0	0	0	9
	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	0.0%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Unknown	359	922	1074	9	0	2735	0	5099
	7.0%	18.1%	21.1%	0.2%	0.0%	53.6%	0.0%	100.0%
	31.5%	68.1%	68.3%	0.8%	0.0%	68.8%	0.0%	47.4%
Eggshell	present	present	present	absent	absent	present	absent	4 of 7
Total	1138	1353	1572	1174	618	3975	927	10757
Row percent	10.6%	12.6%	14.6%	10.9%	5.7%	37.0%	8.6%	100.0%
Column percent	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 10-7. Faunal remains by temporal component; La Puente (frequencies, row and column percentages).

	Temporal Component			
Species or Classification	Spanish Colonial	Mexican Territorial	American Territorial	Total Row Percent Column Percent
Bos taurus	381	5	61	447
	85.2%	1.1%	13.6%	100.0%
	7.8%	0.8%	1.2%	4.2%
Equus sp.	0	0	3	3
	0.0%	0.0%	100.0%	100.0%
	0.0%	0.0%	0.1%	0.03%
Sus scrofa	3	0	15	18
	16.7%	0.0%	83.3%	100.0%
	0.1%	0.0%	0.3%	0.2%
Ovicaprid	876	128	1254	2258
	38.8%	5.7%	55.5%	100.0%
	17.8%	20.7%	24.0%	21.0%
Ovis aries	13	0	37	50
	26.0%	0.0%	74.0%	100.0%
	0.3%	0.0%	0.7%	0.5%
Capra hircus	0	0	3	3
	0.0%	0.0%	100.0%	100.0%
	0.0%	0.0%	0.1%	0.03%
Canis sp.	20	1	24	45
	44.4%	2.2%	53.3%	100.0%
	0.4%	0.2%	0.5%	0.4%
Cervid	1	0	4	5
	20.0%	0.0%	80.0%	100.0%
	0.0%	0.0%	0.1%	0.05%
Odocoileus hemionus	21	0	4	25
	84.0%	0.0%	16.0%	100.0%
	0.4%	0.0%	0.1%	0.2%
Ursus americanus	1	0	0	1
	100.0%	0.0%	0.0%	100.0%
	0.0%	0.0%	0.0%	0.01%
Large mammal	308	19	294	621
	49.6%	3.1%	47.3%	100.0%
	6.3%	3.1%	5.6%	5.8%
Medium or large mammal	462	450	1136	2048
	22.6%	22.0%	55.5%	100.0%
	9.4%	72.8%	21.7%	19.0%
Small or medium mammal	3	0	1	4
	75.0%	0.0%	25.0%	100.0%
	0.1%	0.0%	0.0%	0.04%
Small mammal	7	0	7	14
	50.0%	0.0%	50.0%	100.0%
	0.1%	0.0%	0.1%	0.1%
Lagomorph	4	0	1	5
	80.0%	0.0%	20.0%	100.0%
	0.1%	0.0%	0.0%	0.05%
Lagomorph or small mammal	0	0	1	1
	0.0%	0.0%	100.0%	100.0%
	0.0%	0.0%	0.0%	0.01%
Gallus gallus	8	0	3	11
	72.7%	0.0%	27.3%	100.0%
	0.2%	0.0%	0.1%	0.1%
Large bird	9	0	2	11
	81.8%	0.0%	18.2%	100.0%
	0.2%	0.0%	0.0%	0.1%
Medium bird	43	1	10	54
	79.6%	1.9%	18.5%	100.0%
	0.9%	0.2%	0.2%	0.5%
Small bird	2	13	4	19
	10.5%	68.4%	21.1%	100.0%
	0.0%	2.1%	0.1%	0.2%
Lagomorph or bird	0	1	0	1
	0.0%	100.0%	0.0%	100.0%
	0.0%	0.2%	0.0%	0.01%
Rodent	5	0	0	5
	100.0%	0.0%	0.0%	100.0%
	0.1%	0.0%	0.0%	0.05%
Toad	0	0	9	9
	0.0%	0.0%	100.0%	100.0%
	0.0%	0.0%	0.2%	0.1%
Unknown	2744	0	2355	5099
	53.8%	0.0%	46.2%	100.0%
	55.9%	0.0%	45.0%	47.4%
Eggshell	present	absent	present	2 of 3
Total	4911	618	5228	10757
Row percent	45.7%	5.7%	48.6%	100.0%
Column percent	100.0%	100.0%	100.0%	100.0%

Of the 24 species or other classes represented in the assemblage, five made up almost 98 percent of the total (Table 10-7). Each of the other 19 classes comprised less than one percent; together they made up only 2.3 percent of the assemblage. The five most common classes were *Bos taurus* (cow), ovicaprid (sheep or goat), large mammal, medium or large mammal, and unidentifiable (unknown). The greatest variation between temporal components was in the frequencies of medium or large mammal and unknown bones. In fact, the Mexican Territorial assemblage, which contained the highest percentage of medium or large mammal bones, had the lowest percentage of unknown bones, while the earlier and later assemblages exhibited the opposite pattern. To check this, percentages of medium or large mammal and unknown bones were combined to see if variation between temporal assemblages was reduced. These results are shown in Table 10-8, which shows that variation between the assemblages was reduced to a level comparable to that seen in the percentages of *Bos*, ovicaprid, and large mammal bones. Based on this information, we suggest that most unknown bones are from medium or large mammals.

One factor that may have contributed to this situation is the condition of the bones. Table 10-9 shows percentages of burned or weathered bone from each feature and temporal component. The percentage of burned bone in the Mexican Territorial assemblage is very low, though the only feature from this period appeared to be a blacksmith's dump. This lends credence to the suspicion that the feature consisted of redeposited materials. The percentage of burned bone from the Spanish Colonial assemblage was 2.5 times higher than that from the Mexican Territorial assemblage; the American Territorial assemblage was 4.4 times higher. Still, these figures are rather low and it seems doubtful that 5.9 and 10.2 percent burned bone would produce 55.8 and 45.1 percent unidentifiable bone in the Spanish Colonial and American Territorial assemblages, respectively.

Table 10-9 shows that the Mexican Territorial period assemblage had the highest percentage of severely weathered bone, higher than any other feature or component. If the percentages of moderately weathered bone are added to these figures, the Mexican Territorial assemblage no longer contains the highest percentage of weathered and burned bone, but is still equal to or higher than those of the other features and components. Therefore, the relatively high frequencies of unknown bone fragments from the Spanish Colonial and American Territorial assemblages are probably not due to burning or weathering, but to some other process such as butchering practices. The frequent occurrence of moderate to severe weathering in the Mexican assemblage was probably related to the essentially surficial nature of Feature 8.

Taken together, these data show that the highest frequencies of faunal remains from each assemblage are medium or large mammals and ovicaprids. The paucity of identifiable wild mammal remains in the assemblages suggests that most of the medium or large mammals were domestic. Since the next largest group of remains are from ovicaprids, it can be supposed that most of the medium or large mammals were also ovicaprids. This is expectable given the historic dependence of the region's Hispanic inhabitants on sheep and goat pastoralism. These two classes comprise 83.1, 93.5, and 90.7 percent of the Spanish Colonial, Mexican Territorial, and American Territorial faunal assemblages, respectively. *Bos taurus* and other large mammal remains comprise much smaller portions of each temporal assemblage, followed by the many other species and classes that were only minimally represented. There is little variation between assemblages in terms of the relative frequencies of remains from the other species and classes represented. This is not to say, however, that variation is not present. Viewed from the perspective of the different classes of fauna, several patterns are evident that relate to variation through time in the relative frequencies of specific faunal classes. Species and other classes that were most common in the Spanish Colonial period include *Bos taurus* (cow), *Odocoileus hemionus* (deer), *Ursus americanus* (bear), small or medium mammal, lagomorph (rabbits, hares), *Gallus gallus* (chicken), large bird, medium bird, and rodent. Three of these—deer, bear, and lagomorphs—are wild mammals. Two others—cow and chicken—are domestic. The other classes could either be wild or domestic, but could not be more accurately identified. Rodents may be intrusive. Interestingly, deer remains largely consist of antler parts (Bertram 1990:9).

Only one class is common in the Mexican Territorial assemblage: small birds. The most common classes in the American Territorial assemblage are *Sus scrofa* (pig), ovicaprid (sheep or goat), *Ovis aries* (sheep), *Capra hircus* (goat), *Canis* sp. (dog), cervid (deer, elk), medium or large mammal, lagomorph or small mammal, and toad. The last is undoubtedly intrusive. As has been seen, the medium or large mammals are probably mostly ovicaprids. Six of the nine classes are domesticates, while cervids and lagomorph or small mammals are wild animals.

Through time, more domesticated animals are represented in the faunal assemblage, while wild animal remains are largely found in the earliest component. However, this is somewhat misleading, since the most common wild species represented in those deposits was deer, and most of the deer remains consisted of antler fragments, which do not represent edible parts. Thus, even with a higher percentage of wild animal remains in Spanish Colonial deposits, it is unlikely that the consumption of nondomesticates was significant in any period. Interestingly, the two domesticates that dominate the Spanish Colonial assemblage, cow and chicken, decrease dramatically through time. Three trends are evident. Over 85 percent of *Bos taurus* remains are from Spanish Colonial features. This proportion drops to 1.1 percent in the Mexican Territorial features, and climbs to 13.6 percent in the American Territorial features. If these figures are representative of actual consumption patterns, they suggest that *Bos* was most commonly used during the earliest period and became increasingly less common through time.

The second trend relates to medium or large mammal bones. The Spanish Colonial and Mexican Territorial assemblages each contained about 22 percent of this category of bones, while almost 56 percent of the American Territorial assemblage consisted of this category. Medium or large mammal bones, unlike the other dominant classes, do not decrease in frequency in the Mexican Territorial assemblage.

The third trend involves ovicaprid, large mammal, and unknown bones, all of which follow remarkably similar trajectories through time, with high frequencies in the Spanish Colonial and American Territorial assemblages, and very low frequencies in the Mexican Territorial assemblage. In particular, the large mammal and unknown trajectories are virtually identical, differing from each other by no more than 4 percentage points. These data could suggest that most of the unknown bones are from large mammals. This is an interesting conclusion considering that we have already suggested that most unknown bones are from medium or large mammals. Above, we also suggest that most of the combined medium or large mammal and unknown bones are from ovicaprids. Table 10-10 shows little similarity between the two classes, except that the American Territorial component contains the same percent of each. Rather, the table indicates a relationship between large mammal, unknown, and ovicaprid bones.

What seems most clear is that *Bos taurus* is distinct from other large mammal remains recovered from La Puente. There appear to be relationships between ovi-

Table 10-8. Percentage of dominant faunal classes by temporal component; La Puente (medium or large mammal and unknown categories combined).

	Temporal Component			
Species or Classification	Spanish Colonial	Mexican Territorial	American Territorial	Total
Bos taurus	7.7	0.8	1.2	4.2
Ovicaprid	17.9	20.7	23.9	21.0
Large mammal	6.3	3.1	5.6	5.8
Medium or large mammal + unknown	65.2	72.8	66.8	66.4
Total	97.1	97.4	97.5	97.4

Table 10-9. Burned, severely weathered, and moderately or severely weathered bone by component; La Puente.

Temporal Components and Features	Burned Bone	Severely Weathered Bone	Moderately or Severely Weathered Bone
Spanish Colonial			
Feature 9	5.7	52.0	84.5
Feature 10	6.9	25.0	72.7
Total	5.9	46.9	82.2
Mexican Territorial			
Feature 8	2.3	67.6	76.9
American Territorial			
Feature 1	14.1	21.8	78.5
Feature 2	14.0	33.9	70.0
Feature 3	7.1	62.5	81.0
Feature 5	6.3	22.1	71.1
Total	10.2	37.2	75.4

Values are percent of faunal assemblage from each feature and each component (total of features).

Table 10-10. Percentage of dominant faunal assemblages by temporal component; La Puente.

Species or Classification	Temporal Component: Spanish Colonial	Mexican Territorial	American Territorial	Total
Bos taurus	85.2	1.1	13.6	100.0
Ovicaprid	38.8	5.7	55.5	100.0
Large mammal	49.6	3.1	47.3	100.0
Medium/large mammal	22.6	22.0	55.5	100.0
Unknown	53.8	0.0	46.2	100.0

caprid, large mammal, medium or large mammal, and unknown bones. However, the nature of these relationships differs depending on whether one examines temporal component assemblages or individual faunal classes. It is unlikely that burning or weathering produced the high frequencies of unidentifiable bones in the Spanish Colonial and American Territorial assemblages. Bertram (1990:10) observed that:

> Emphasis in cutting seemed to be almost entirely directed toward axe or cleaver use to produce stew-sized chunks (roughly 2 to 4 cm on a side) and toward axe and knife use to produce rib pieces no more than about 10 cm in length...The chopping reduction pattern was observable on all skeletal elements which associate closely with muscle mass. Elements associated primarily with marrow or fat deposits (skull, mandible, portions of the vertebrae and innominates, and distal appendage parts) were also systematically chopped up or smashed (usually with an axe or cleaver) to about the same size as were meat parts, implying again the intention of stew or fat production by rendering...Saw-cut meat was almost or totally absent from these collections.

Given the redundancy of butchering data (Bertram 1990:10), it is likely that processing by axe cutting and smashing caused the high frequencies of unidentifiable bone fragments. This may explain why both large and medium or large mammals appear to have contributed to the unidentifiable portions of the assemblage. It does not explain why the Mexican Territorial assemblage contained unidentifiable bones. The economic instability of the Mexican Territorial period may have resulted in more conservative processing and consumption practices (Mick-O'Hara, personal communication, 1993).

CHAPTER 11

TRUJILLO HOUSE (LA 59658)

JAMES L. MOORE

INTRODUCTION

The Trujillo House (LA 59658) was a nineteenth century residential site situated north of the existing highway right-of-way, and partially within project limits. The site as a whole measured 116 by 91 m, and contained seven features including the Trujillo House, a trash pit, an acequia, three other structures, and a scatter of cobbles (Fig. 11-1). Only two features, the Trujillo House and the trash pit, were within project limits and were excavated (Fig. 11-2). Other features were mapped and described, but were not excavated.

HISTORICAL BACKGROUND

Hordes (n.d.b) has chronicled the history of the Trujillo House through analysis of historic documents and maps housed in a variety of archives. This discussion is summarized entirely from his research findings. Hordes (n.d.b:2-3) indicates that the land on which the Trujillo House is located was originally granted to the family of Joseph de Uribarri, which was among the genízaro settlers of Santo Tomas de Abiquiú in 1754. The land appears to have remained in the Uribarri family's possession until 1872, when it was finally sold.

Tracing the Uribarri family, Hordes (n.d.b:3-4) found that Gregorio Uribarri, listed as Joseph Uribarri's son in the 1750 census, was living with his family at the Plaza de San Miguel 40 years later. Among his children was a daughter, Maria Josepha, who later married Juan Trujillo. Their marriage produced a daughter, Theodora, who married Gregorio Jaramillo in 1825 and had a daughter, Juana Maria Jaramillo, the following year. Juana Maria eventually married Esteban Trujillo, and their marriage produced several children, including Anastacio, who was born in 1838. Among the children of Anastacio and his wife was Esteban Trujillo, possibly Juan Esteban Trujillo, who was born in 1862.

In 1872, Juan Esteban Trujillo (probably the Esteban Trujillo who married Juana Maria Jaramillo and was grandfather to the Juan Esteban Trujillo born in 1862) sold the land containing the Trujillo House to Jesus Maria Garcia for $12.50 (Hordes n.d.b:4). Garcia and his wife subsequently sold the parcel to Reyes Gonzales in 1884. However, the house and land were still occupied by the Trujillo family. Hordes (n.d.b:4) explains this as follows:

> Although it is clear that the property had come into the possession of Garcia, and later Gonzales, cartographic evidence suggests that Trujillo still resided on the land at least until April of 1894. A sketch map of the area cites the "house and lands of Juan Trujillo" at the extreme northeast corner of the Abiquiu grant, placing Trujillo's residence almost precisely on the site of LA 59658. An interview with an elderly resident in Abiquiu substantiated the presence of Trujillo on the land years after the formal alienation, indicating that in the late nineteenth century, many residents were forced to sell their lands in order to pay financial obligations, but were still allowed to live on the property by the new owners.

The parcel was retained by the Gonzales family until it was sold in the early 1970s.

Though no date for construction of the house could be found, some tentative dates for site occupancy can be suggested that are testable with archaeological data. Esteban (or Juan Esteban) Trujillo was married to Juana Maria Jaramillo by at least 1838, suggesting initiation of house construction around or after that date. The house was probably present by at least 1872, because it was in that year that Juan Esteban sold the parcel to the Garcia family, and it is unlikely that the new owners would have permitted them to build a new residence after that date, even though they were allowed to live there for some time after the sale. Documents indicate that the house was still occupied in 1894, suggesting that it was not abandoned until around the turn of the century. Thus, it would appear that the house was built as early as 1840, was present by 1872 at the latest, and was abandoned after 1894.

DESCRIPTIONS OF FEATURES OUTSIDE PROJECT LIMITS

Structure 2

This feature was a 7.25-by-7.5-m area of melted adobe that seemed to represent the remains of a square structure

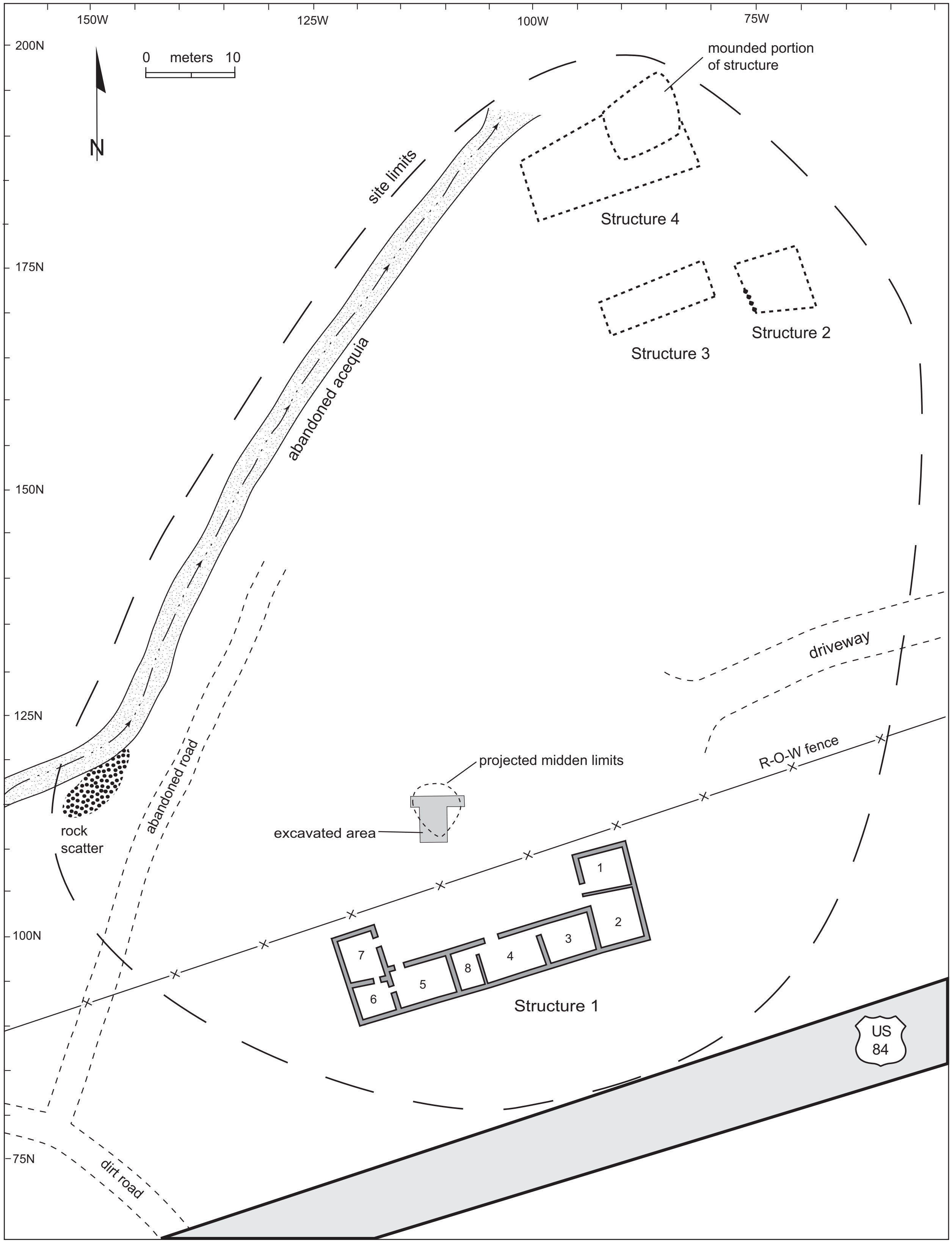

Figure 11-1. Plan of the entire site area at the Trujillo House.

(Fig. 11-1). The presence of a short cobble alignment along the west edge of the adobe melt area suggested that the walls were built on a cobble foundation.

Structure 3

This feature was similar to Structure 2, and was a rectangular area of melted adobe measuring 12.5 by 4.0 m that seemed to represent the remains of a rectangular structure (Fig. 11-1). No evidence of a foundation was noted.

Structure 4

This feature was a 19.5-by-11.0-m area of melted adobe that also seemed to represent the remains of a structure (Fig. 11-1). It was rectangular, with a mounded area in the northeast corner that suggested the presence of a second story in that part of the building. A scatter of cobbles around this structure suggests that they were used in its walls or as foundations.

Acequia

An abandoned acequia ran along the break between a low terrace and the floodplain at the north edge of the site (Fig. 11-1). Approximately 3 m wide, the acequia was excavated at the edge of the terrace, with spoil piled on the downslope side to form a low berm. It was probably built during the Hispanic occupation of the region, though it may be part of a possible prehistoric ditch that locals told Jeançon (1923:2) about.

Rock Scatter

A scatter of basalt cobbles measuring 10.0 by 3.5 m was northeast of Structure 1 next to the acequia (Fig.

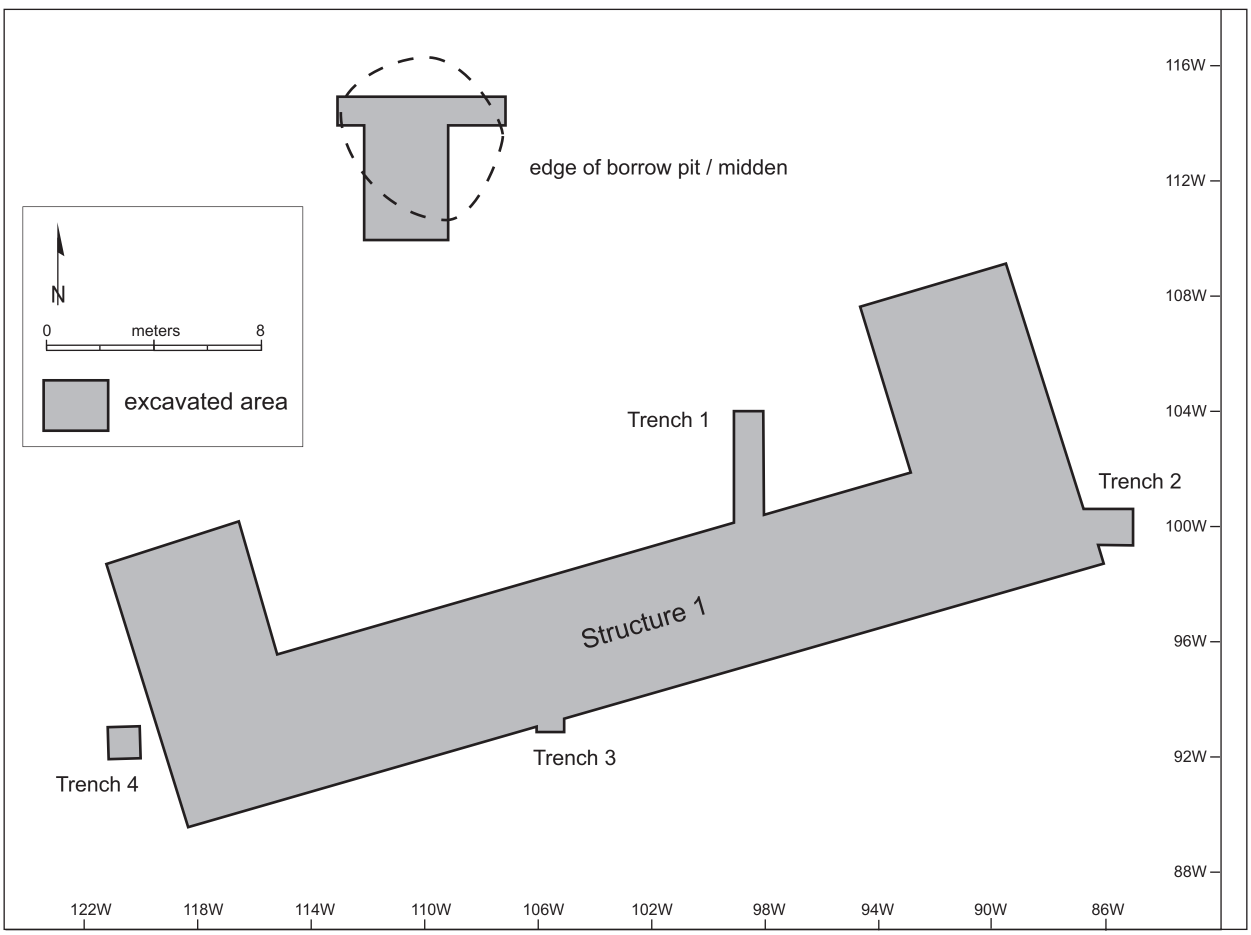

Figure 11-2. Excavated areas at the Trujillo House.

11-1). While this feature may represent the remains of a structure, it is more likely a natural feature of the landscape, or spoil from acequia construction or cleaning.

Discussion of Features Outside Project Limits

Structures 2 through 4 formed a small compound of questionable association with the excavated features. Though that part of the site lacked datable surface artifacts, it appeared to be earlier than the excavated area. Where numerous glass and Euroamerican ceramics occurred on the surface of the Trujillo House and the trash pit, similar materials were rare or absent around Structures 2 through 4. The only datable artifacts in that area were historic blackwares and redwares. Since those pottery types were made from the Spanish Colonial through American Territorial periods, they could not be used to date the features. The lack of Euroamerican ceramic and glass artifacts was potentially important, and suggests that Structures 2 through 4 may represent an earlier occupation of this area.

The Trujillo House (Structure 1)

The Trujillo House was an eight-room adobe structure measuring 34.5 by 10.5 m, and was oriented to the north-northeast. It consisted of a linear east-west alignment of six rooms, with single rooms adjoining the north side at either end of the roomblock, giving the structure a C-shaped configuration (Fig. 11-3). When first recorded (Hannaford and Maxwell 1987:12), the structure was visible as a low mound supporting a growth of tall grass that distinguished it from the surrounding terrain (Fig. 11-4a). This suggested that only the lower part of the house remained. During excavation it was discovered that the remaining walls were less than 0.5 m tall, and in places were totally missing (Fig. 11-4b). This was explained by informants, who related that the house was leveled by heavy equipment in the 1940s.

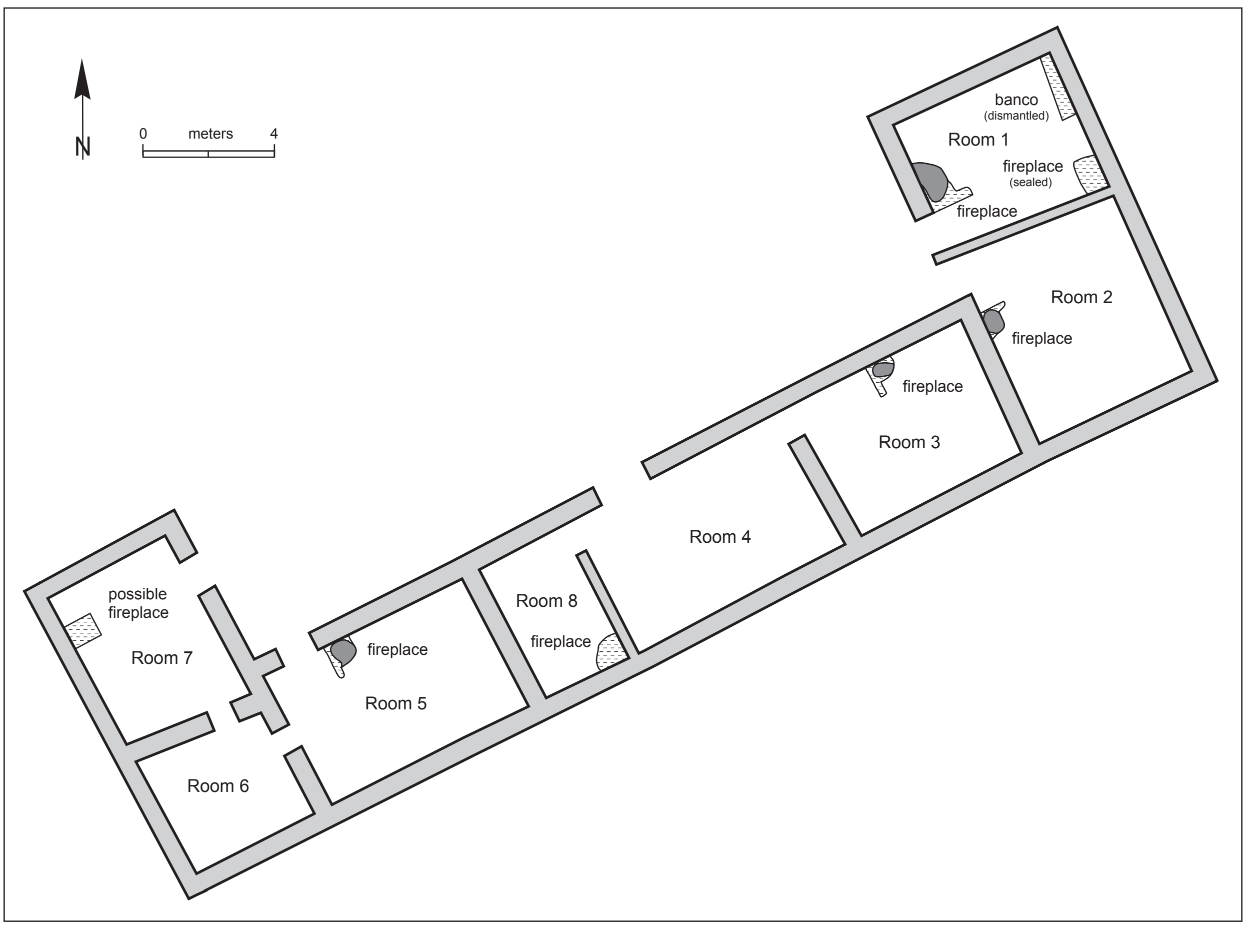

Figure 11-3. Plan of Structure 1 at the Trujillo House.

Figure 11-4a. Structure 1 before excavation.

Figure 11-4b. Structure 1 after excavation, showing the low walls and C-shaped room block.

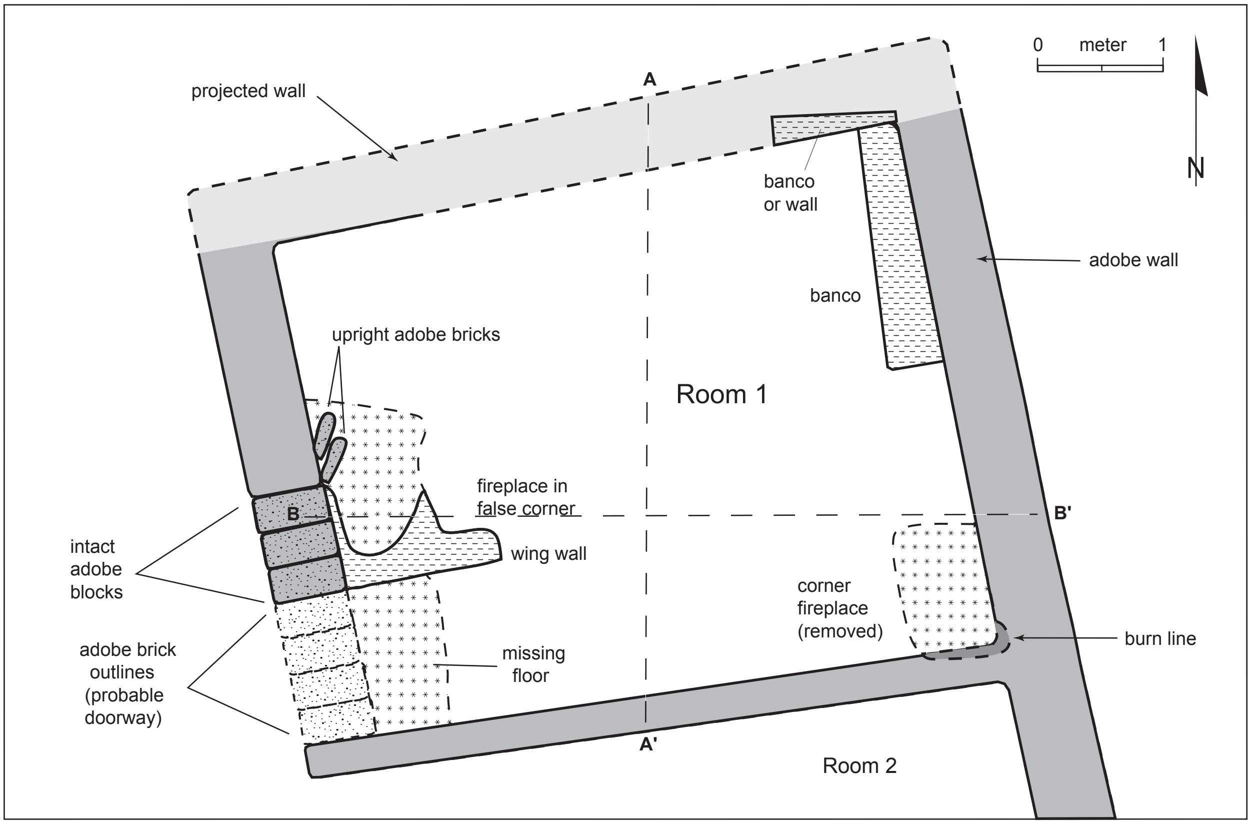

Figure 11-5. Plan of Room 1, Structure 1 at the Trujillo House.

Room 1

Room 1 was in the northeast corner of the structure, and measured 4.9 by 4.3 m (Fig. 11-5). A 1-m-wide trench was excavated by grid from north to south through the east half of the room, and the remaining fill was removed in quadrants. The south, east, and west walls were easily defined, but the only evidence of the north wall was the edge of the floor and a pile of adobe bricks that may once have been part of the wall. Demolition of the house in the 1940s and excavation of a telephone cable trench along the north side of the house have obscured the original position of this wall.

Stratigraphy. Four strata were defined (Fig. 11-6). Stratum 1 was a 5-cm-thick layer of pale brown loamy sand, heavily matted by grass roots. This was underlain by Stratum 2, a layer of pale brown melted adobe ranging from 5 to 10 cm thick at the walls to 25 cm thick near the center of the room. It contained lenses of organic material, adobe brick fragments, gravel, and colluvial sand and clay, suggesting deposition over a long period of time. Stratum 3 was a 5-to-10-cm-thick layer of yellow organic material, probably manure. Beneath Stratum 3 and directly above the floor was Stratum 4, a 1-to-2-cm-thick layer of whitewashed adobe plaster fallen from nearby walls. Stratum 4 was patchy and was only found next to the walls. The presence of wall plaster above the floor and beneath a layer of manure suggested that the room was used for shelter by livestock after the house was abandoned.

Features. Four features were defined: two fireplaces, a banco, and a probable doorway. One of the fireplaces was set into the southeast corner, but was removed during a remodeling episode. All that remained of it was a vertical burn line within the wall, and a 1.5 by 0.65 m zone in front of the burn line where the adobe floor was missing, presumably representing the area from which the hearth was removed. A new corner was formed by sealing the remains of the fireplace with two upright adobe bricks. A small ledge, 11 cm higher than the floor, beneath the bricks was all that remained of the hearth.

The second fireplace was against the west wall next to the probable door, and consisted of a wingwall placed perpendicular to the wall, forming a false corner into which the fireplace was set (Fig. 11-7). This type of fireplace is called a *padrecito*. Only the lower part of this hearth remained; the rest was removed when the house

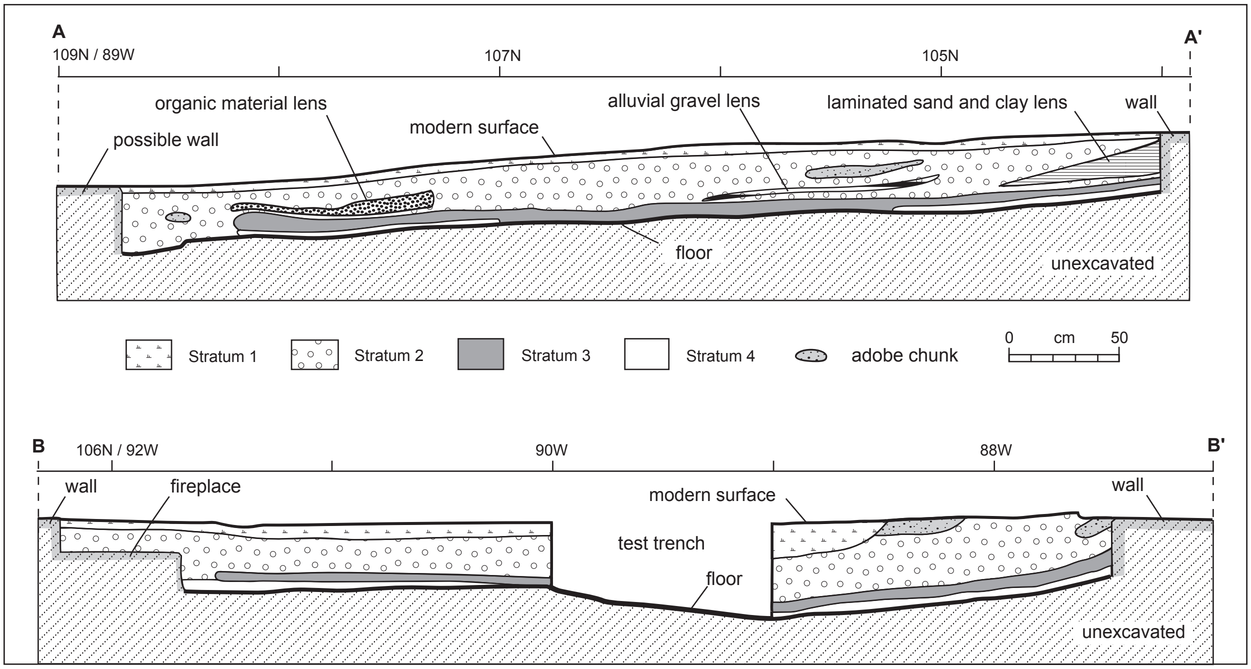

Figure 11-6. Profiles of Room 1, Structure 1 at the Trujillo House.

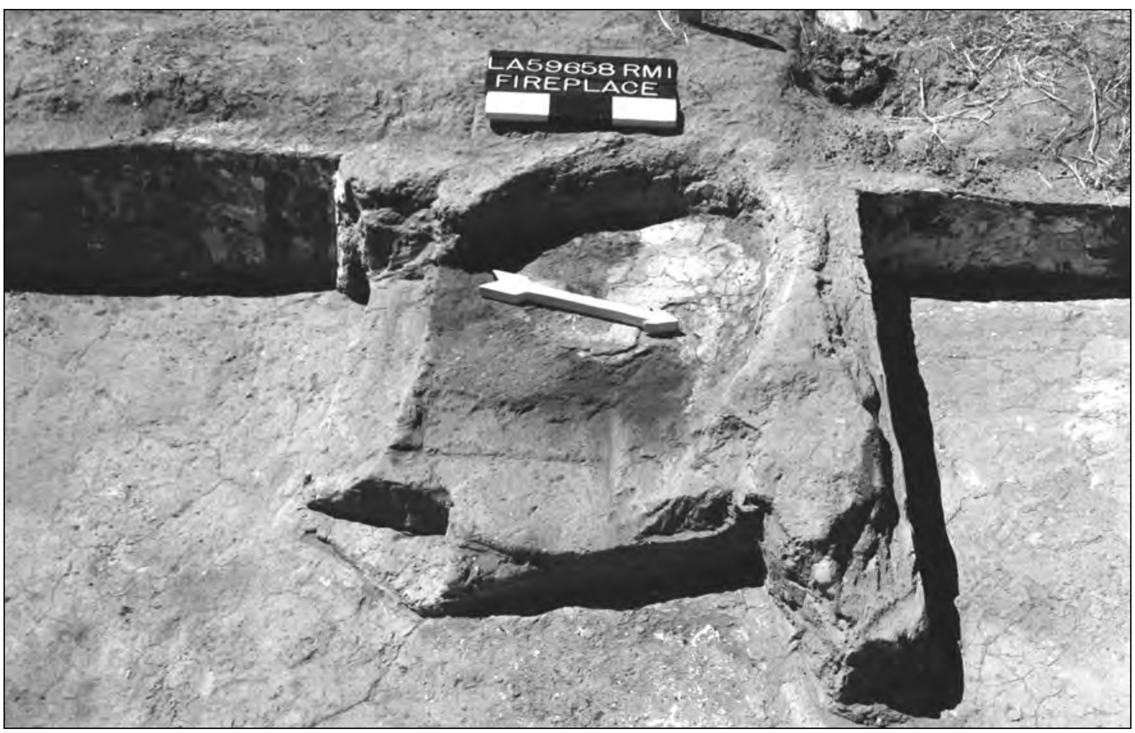

Figure 11-7. Padrecito fireplace in Room 1.

Figure 11-8. Outline of banco in Room 1.

was leveled. Two adobes found standing against the wall in this area may have been part of the fireplace hood.

A probable doorway (1.25 m wide) was between the south wall and the padrecito's wingwall. Part of the floor was missing in this area, and the outlines of several adobe bricks were visible in the sill. It is likely that this door was cut through the wall during a remodeling episode.

The outline of a 1.9 m long by 0.4 m wide banco was found in the northeast corner of the room, running along the east wall and perhaps along the north wall as well (Fig. 11-8). The floor in front of the banco was discolored, probably from having ash and charcoal ground into it. Within the outline of the banco, the floor was the natural color of the local adobe and had an uneven surface. The puddled adobe of the floor did not extend into this area, suggesting that the banco was an original feature of the room. Because of the deteriorated condition of the north wall, it was impossible to determine whether the banco was L-shaped, or whether a possible extension of this feature was actually part of the north wall. The banco seems to have been dismantled during a remodeling episode.

Walls. Parts of only three walls remained; the north wall and north sections of the east and west walls were missing. Extant walls averaged 24 cm high, and had two widths. The east and west walls were built of bricks laid side to side, and were 55 to 60 cm wide. The south wall, which separated Room 1 from Room 2, was between 31 and 43 cm wide, and was constructed of bricks laid end to end. The remaining plaster was 1 to 2 cm thick and contained several layers of whitewashed clay. The number of plastering episodes could not be determined.

Floor. The floor was puddled adobe, and lay above sterile sand. Because it was so near the surface, much of the floor was deteriorated and difficult to define. At least two plastering episodes were visible, but the floor was thin, ranging between 1 and 2 cm thick.

Room 2

Room 2, which measured 5 by 6 m, was in the southeast corner of the structure (Fig. 11-9). A 1-m-wide trench was excavated by grid from east to west through the room's approximate center, and the remaining fill was removed in quadrants.

Stratigraphy. Three strata were defined (Fig. 11-10). Stratum 1 was a 5-to-15-cm-thick layer of loose to medium compacted brown sandy soil containing a few gravels and artifacts. Under this was Stratum 2, a 15-to-25-cm-thick layer that was very similar in color and texture to Stratum 1, but contained a higher frequency of adobe chunks and charcoal. A lens of yellow-brown sand and clay occurred along the east wall within Stratum 2, apparently representing a layer of melted adobe. A thin

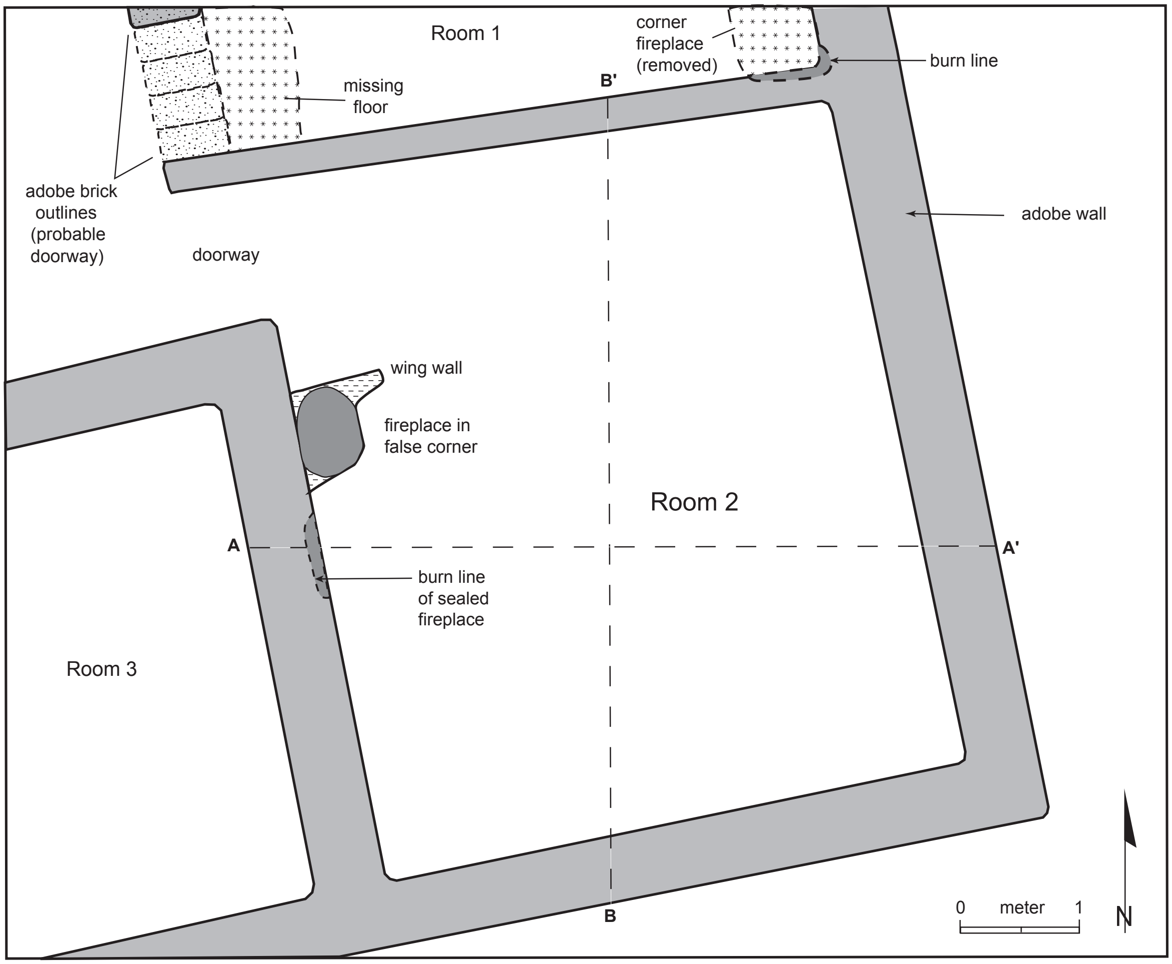

Figure 11-9. Plan of Room 2, Structure 1 at the Trujillo House.

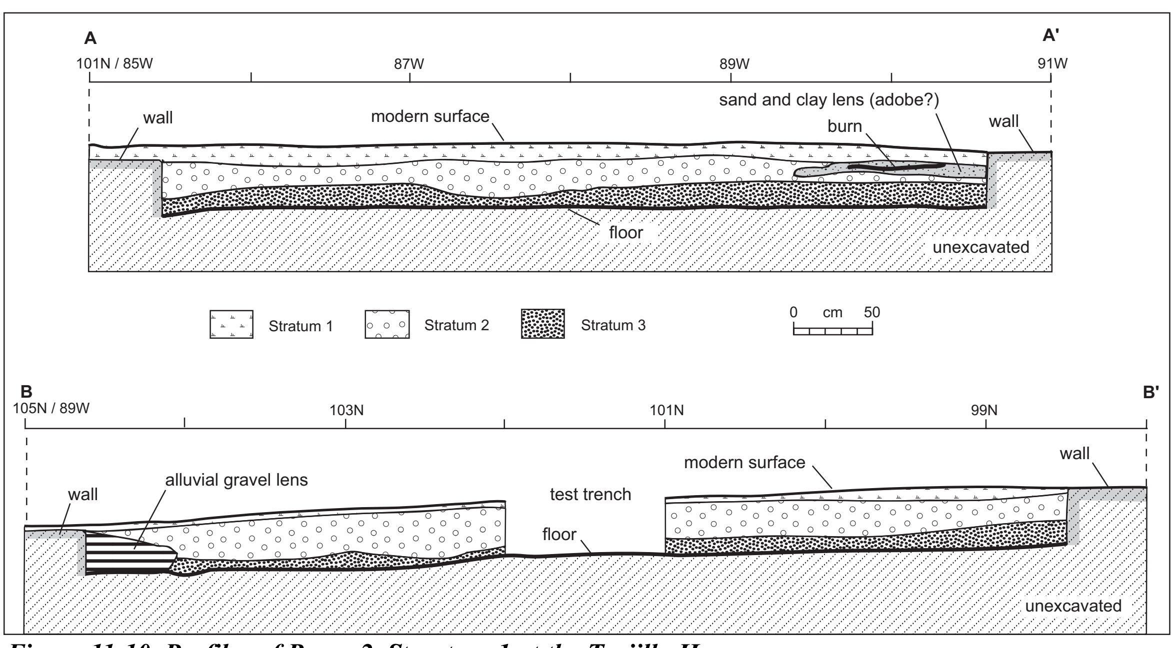

Figure 11-10. Profiles of Room 2, Structure 1 at the Trujillo House.

horizontal burn line within this lens suggested the presence of a postoccupational hearth. The lowermost unit was Stratum 3, which articulated with the floor and was 5 to 20 cm thick. This unit was a layer of yellow-brown colluvial sand containing adobe chunks, gravel, fragments of organic material (wood, bark, and manure), charcoal, ash, and artifacts. Chunks of whitewashed adobe plaster were commonly encountered near the walls.

Features. Three features were found in Room 2: a doorway and two fireplaces. The doorway was in the north part of the west wall and connected with the outside of the house; other than a width of 1.17 m, details of this feature's construction were obscured when the house was leveled. Both fireplaces were set against the west wall. One was placed in its approximate center, but was dismantled during a remodeling episode. All that remained at the time of excavation was a shallow, 33-cm-long niche cut 15 cm into the wall. The back edge of the hearth was 15 cm higher than the floor, and remaining interior surfaces were burned. This feature was sealed by cutting a 5.5-cm-wide trench into the floor along the wall and placing three upright adobe bricks into it. Gaps in the new wall segment were filled with mortar, and it was plastered over to form a smooth surface.

The second fireplace was a padrecito just north of the first, and was probably built to replace it. A wingwall of upright bricks was built perpendicular to the west wall, creating a false corner. Bricks were laid flat against the floor in the false corner to form a rectangular hearth, and upright bricks were used to build the oval superstructure of the hood. At least three plastering episodes were visible in the 5 cm of plaster that covered the interior of this feature, each consisting of a burned layer of adobe. Exterior surfaces were plastered and whitewashed. Only the lower part of this feature remained; the upper part was removed when the structure was leveled.

Walls. Walls averaged 21 cm high, and were of two widths. The north wall was also the south wall of Room 1, and was thinner than the others as discussed earlier. The remaining walls were 55 to 60 cm wide, and were built of bricks laid side to side. Interior wall surfaces were plastered, with thicknesses ranging between 1.5 and 3.0 cm. Up to five plaster layers were defined, each consisting of a thin coating of whitewashed clay.

Floor. The floor was puddled adobe and lay above sterile sand. Three to five plastering episodes were defined, and the composite floor was 1.5 to 2.5 cm thick. Artifacts were embedded in the floor surface, especially in the north half of the room, and included charcoal, ash, bone, and eggshell. The floor around the unsealed fireplace was stained black and gray from the ash and charcoal that was ground into it.

Room 3

Room 3 was in the east-central part of the structure, and measured 4.4 by 5.6 m (Fig. 11-11). A 1-m-wide trench was excavated by grid from north to south through the room's approximate center; the remaining fill was removed in quadrants.

Stratigraphy. Two strata were defined (Fig. 11-12). Stratum 1 was a 10-to-35-cm-thick layer of brown sandy loam that contained numerous gravels and was heavily matted by grass roots. This was underlain by Stratum 2, a 10-to-22-cm-thick layer of brown melted adobe. Stratum 2 lay above the floor in much of the room, but in places they were separated by a thin (2 to 4 cm) layer of plaster fallen from nearby walls. A 10-cm-thick lens of light brown alluvial sand separated Stratum 1 from Stratum 2 in the southeast quadrant of the room.

Features. A doorway and a fireplace were the only features found in this room. The doorway was at the north end of the west wall; it was 0.97 m wide and opened into Room 4. There was no plaster on the end of the west wall, suggesting that the doorway was framed by boards. The plaster on the north wall was unbroken from Room 3 to Room 4, but the presence of a plaster line on the floor in the doorway that paralleled the wall and was 7 cm away from it suggested that the opening was framed by boards on that side as well. The floor in the center of the doorway was worn and deteriorated, probably because of use.

The fireplace (Fig. 11-13) was a padrecito. A 1.10 m long by 0.17 m wide wingwall of upright bricks was built perpendicular to the north wall and parallel to the doorway to create a false corner. Bricks used in the wingwall were 25 cm wide and 7 cm thick, and it was plastered with a 5 cm thick layer of whitewashed clay. The bricks were laid flat in the corner to form the floor of hearth, which was 8 cm higher than the floor of the room. A 1-to-14-cm-high oval adobe collar ringed the hearth, and was all that remained of the hood.

Walls. Walls averaged 32 cm high by 55 to 60 cm wide, and were built of bricks laid side to side. All four walls were plastered, but the thickness and number of layers varied. There were two plaster layers on the north, east, and west walls. The outer layer on the north wall was 0.5 cm thick, and the inner layer was 1.5 to 3.5 cm thick; only the outer layer was whitewashed. Plaster on the east and west walls followed a similar pattern, with 1.5-to-2-cm-thick unwhitewashed inner layers, and 0.5-cm-thick whitewashed outer layers. Plaster on the south wall was 4.5 cm thick and had four distinct layers. The two outer layers were 0.5 cm thick, and were whitewashed. The third layer was 1.5 cm thick, and the inner layer was 2 cm thick; neither of these layers were white-

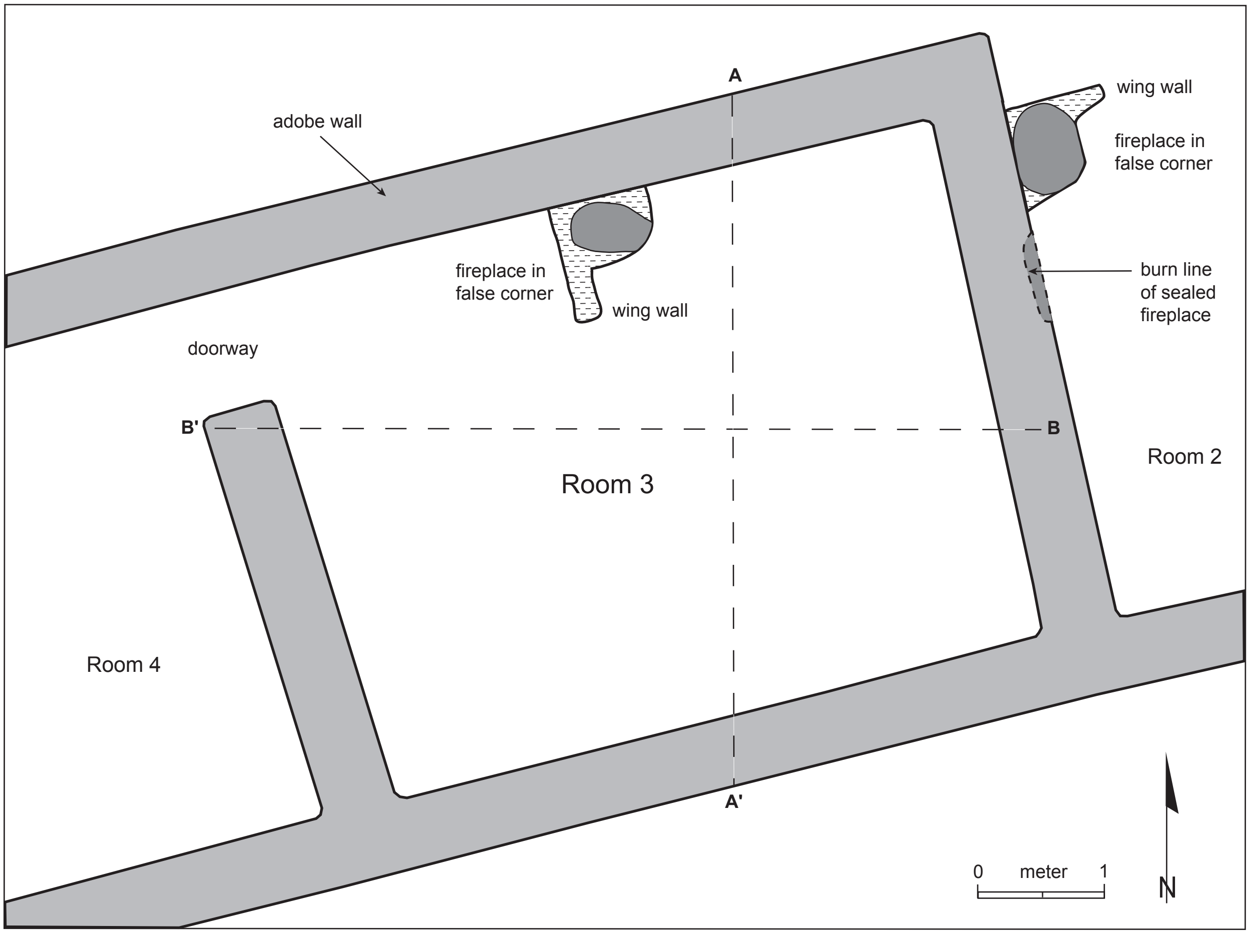

Figure 11-11. Plan of Room 3, Structure 1 at the Trujillo House.

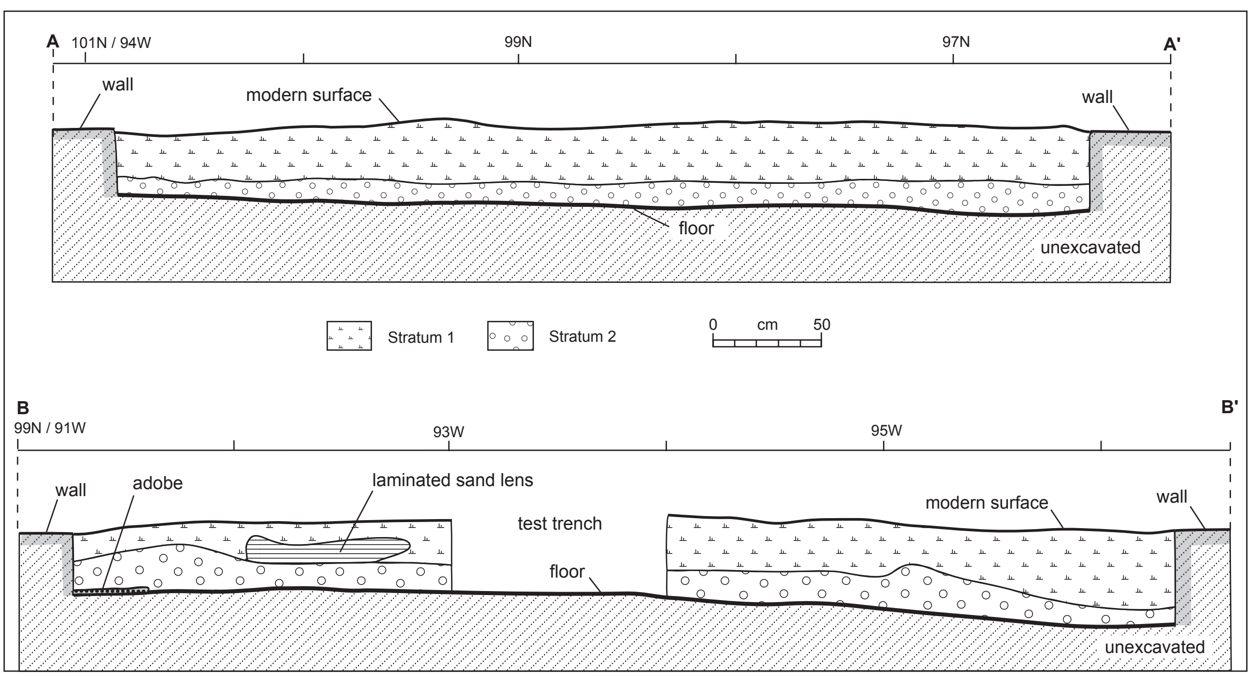

Figure 11-12. Profiles of Room 3, Structure 1 at the Trujillo House.

Figure 11-13. Padrecito fireplace in Room 3, Structure 1 at the Trujillo House.

washed. Inner plaster layers were uneven because they were applied to rough wall surfaces.

Floor. The floor was puddled adobe, and lay above sterile sand. At least two plastering episodes were visible, and included a 2.5-cm-thick upper layer, and a lower layer that ranged up to 6 cm thick because it was poured onto an uneven sand surface. The floor around the fireplace was stained gray from ash and charcoal that was ground into it. Numerous window glass fragments on the floor at the south end of the trench suggested that there was a window in that section of wall.

Room 4

Room 4 was in the central part of the structure, and measured 7.0 by 4.4 m (Fig. 11-14). A 1-m-wide trench was excavated by grid through the east half of the room; the remaining fill was removed by quadrants. Since this trench was the first to be excavated at the site and was begun before rooms were defined, it was positioned off-center. Thus, only three quadrants were excavated as units, the northeast quadrant was part of the trench.

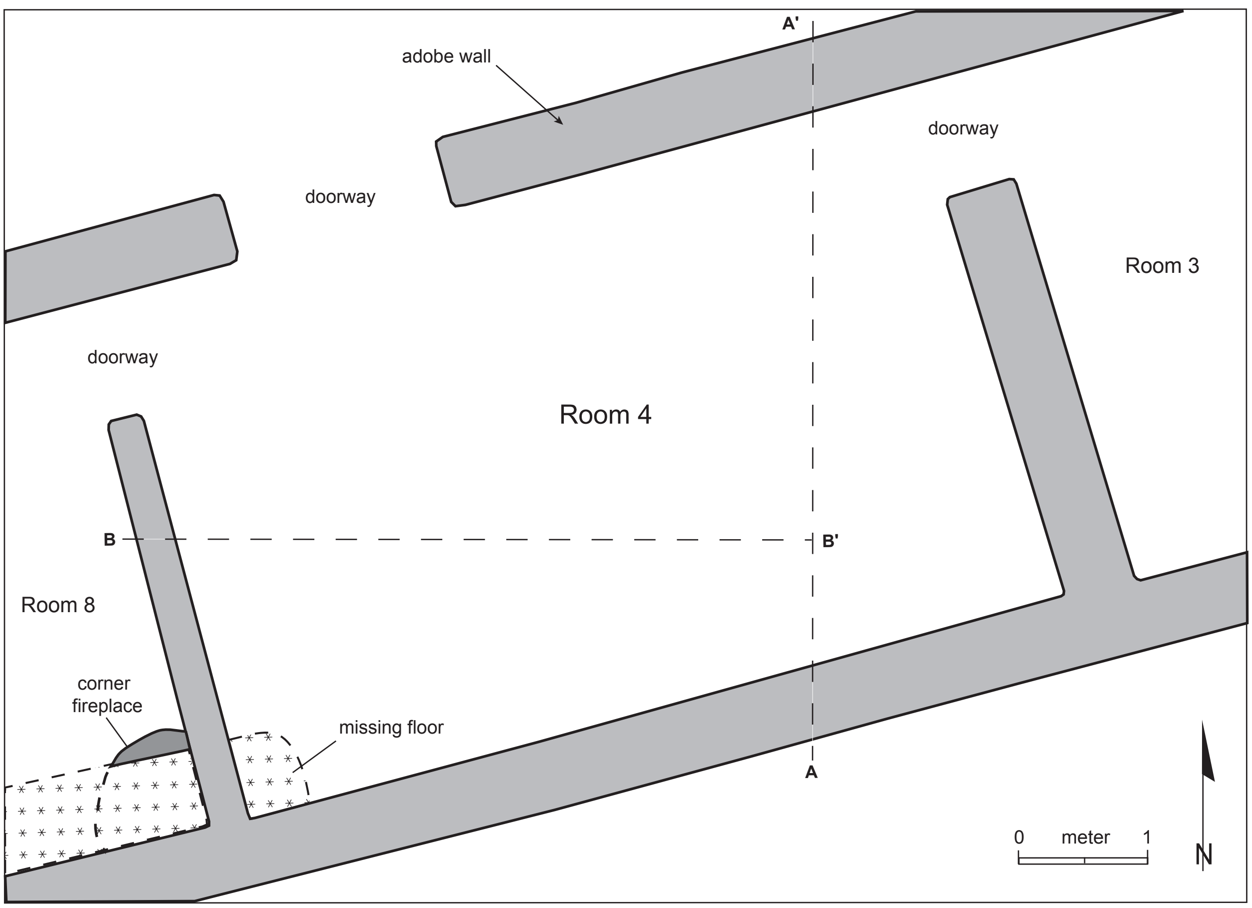

Figure 11-14. Plan of Room 4, Structure 1 at the Trujillo House.

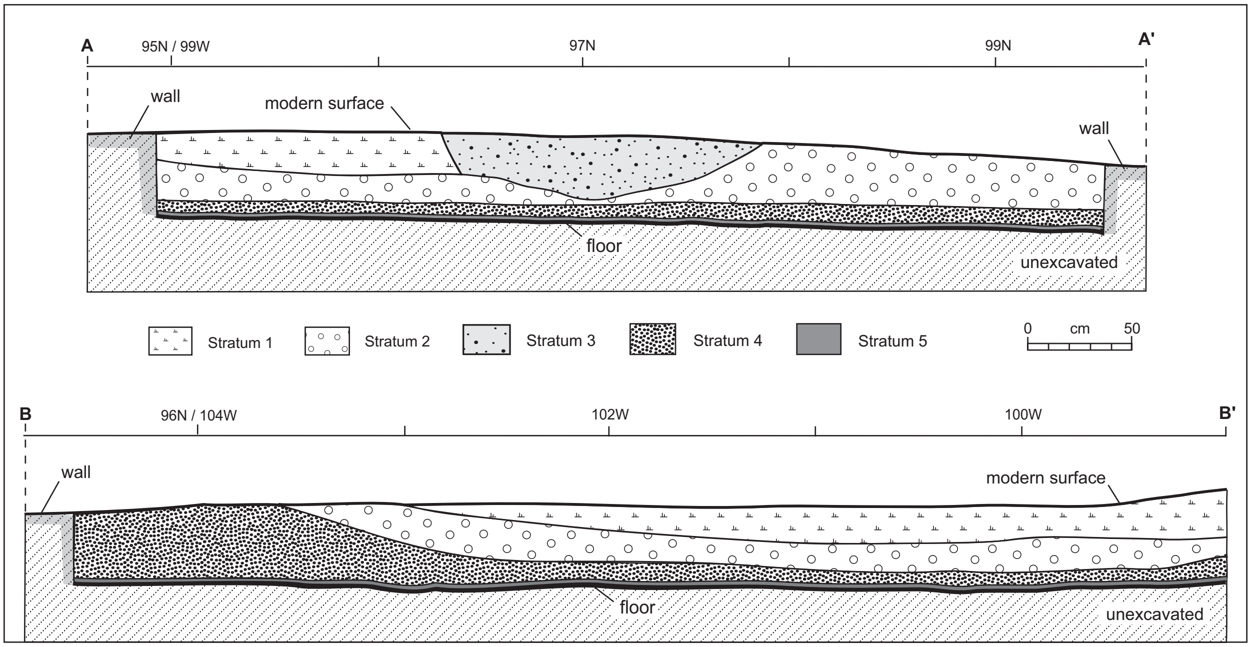

Figure 11-15. Profiles of Room 4, Structure 1 at the Trujillo House.

Stratigraphy. Five strata were defined (Fig. 11-15). Stratum 1 was uppermost across much of the room, and was a 5-to-20-cm-thick layer of pale brown melted adobe that was heavily matted by grass roots. This was underlain by Stratum 2, a 10-to-25-cm-thick mixture of light yellow-brown melted adobe and sandy colluvium containing numerous gravels. Stratum 2 was uppermost in the north part of the room where Stratum 1 was absent. Stratum 3 cut into Strata 1 and 2, and was a 30-cm-thick layer of fine to coarse pale brown alluvial sand. Stratum 4 was a 5-to-35-cm-thick layer of light yellow-brown rubble containing chunks of adobe, fragments of wood and charcoal, ponderosa pine bark, and artifacts. This unit was uppermost in the west part of the room, and was beneath Strata 1 through 3 elsewhere. Lowest in the sequence was Stratum 5, which lay directly above the floor, and was a 2-to-3-cm-thick mixture of light yellow-brown eolian sand and melted adobe.

Features. Three features were found in Room 4, all doorways. The eastern doorway was described in the discussion of Room 3. A doorway in the north wall opened onto the outside of the house, and was 1.7 m wide. No details of construction were evident, but the lack of bricks in this section of wall and the continuation of the floor into that gap indicated that an opening was present. The third doorway was at the north end of the west wall and opened into Room 8. Again, no details of construction were visible other than a width of 1.0 m.

Walls. Walls averaged 32 cm high and 55 to 60 cm wide, except for the west wall, which was 31 cm wide. The west wall was constructed of bricks laid end to end; the others were built of bricks laid side to side. All four walls were plastered, but the thickness and number of layers varied. Four layers were found on the north and east walls. On the north wall, the three outer layers were whitewashed, and were 0.25 to 0.5 cm thick. The inner layer was 1 to 2 cm thick and was not whitewashed. Only the two outer layers on the east wall were whitewashed; each was 0.2 cm thick. The third layer was 2 cm thick, and the innermost layer averaged 0.5 cm thick. Three plaster layers were found on the south wall. The outer layer was whitewashed, and was 0.5 cm thick. The middle layer was 0.25 cm thick, and was gray, perhaps because it was painted a different color or clay from a different source was used. The inner layer was not whitewashed, and ranged up to 2 cm thick. Inner plaster layers varied in thickness because they were applied to unprepared wall surfaces. Remaining walls were generally in good condition, except in the southwest corner where a 50-cm-long segment was destroyed by an animal burrow.

Floor. The floor was puddled adobe, and lay above sterile sand. At least three plastering episodes were defined. The upper layer was 1 cm thick and the middle layer was 1.25 cm thick; the lower layer averaged 4.75 cm thick, and was variable because it was applied to an uneven sand surface.

Room 5

Room 5 was in the west-central part of the structure, and measured 6.8 by 4.4 m (Fig. 11-16). A 1-m-wide trench was excavated by grid through the approximate center of the room; the remaining fill was removed by quadrants.

Stratigraphy. Four strata were defined (Fig. 11-17). Stratum 1 was a thin (5 to 10 cm) layer of light brown sandy loam that was heavily matted by grass roots. This was underlain by Stratum 2, a 10-to-35-cm-thick mixture of brown melted adobe and sandy colluvium. Stratum 3 was a 5-to-25-cm-thick layer of alluvial brown sand and gravels. This unit did not occur consistently throughout the room, and represented deposits in shallow gullies incised into Stratum 2. Stratum 3 underlay Stratum 1 where this unit occurred. Stratum 4 was directly above the floor, and was a 5-to-15-cm-thick layer of dark brown organic matter, probably a combination of deteriorated roof materials and manure.

Features. Three features were found in Room 5: two doorways and a fireplace. One doorway was in the north wall near the northwest corner of the room, and opened onto the outside of the house. Other than a width of 1.1 m, no details of construction were discernable. The second doorway was in the west wall, and connected Rooms 5 and 6. At 75 cm wide, this was the narrowest door in the house. The floor in Room 5 was 10 cm lower than the floor in Room 6, and two to three adobe bricks were placed flat against the floor in the doorway as a step (Fig 11-18). No other details of construction were discernable.

The fireplace (Fig. 11-19) was a padrecito. A 1.03-m-long by 0.21-m-wide wingwall of upright adobe bricks was built perpendicular to the north wall of the room next to the doorway to create a false corner. Its surface was coated with a 2-to-3-cm-thick layer of whitewashed plaster. Bricks were laid flat against the floor in the false corner to form a rectangular hearth that was 7 cm higher than the floor. An oval adobe collar ringed the hearth, and was all that remained of the hood.

Walls. Walls averaged 31 cm high and 55 to 60 cm wide, and were built of bricks laid side to side. All four walls were plastered, but the thickness and number of layers varied. Two layers were defined on the south, east, and west walls, but only one layer was applied to the north wall. Where two layers occurred, the outer was 1 to 1.5 cm thick, and the inner was 0.25 to 2+ cm thick. Both plaster layers were whitewashed on the south and east

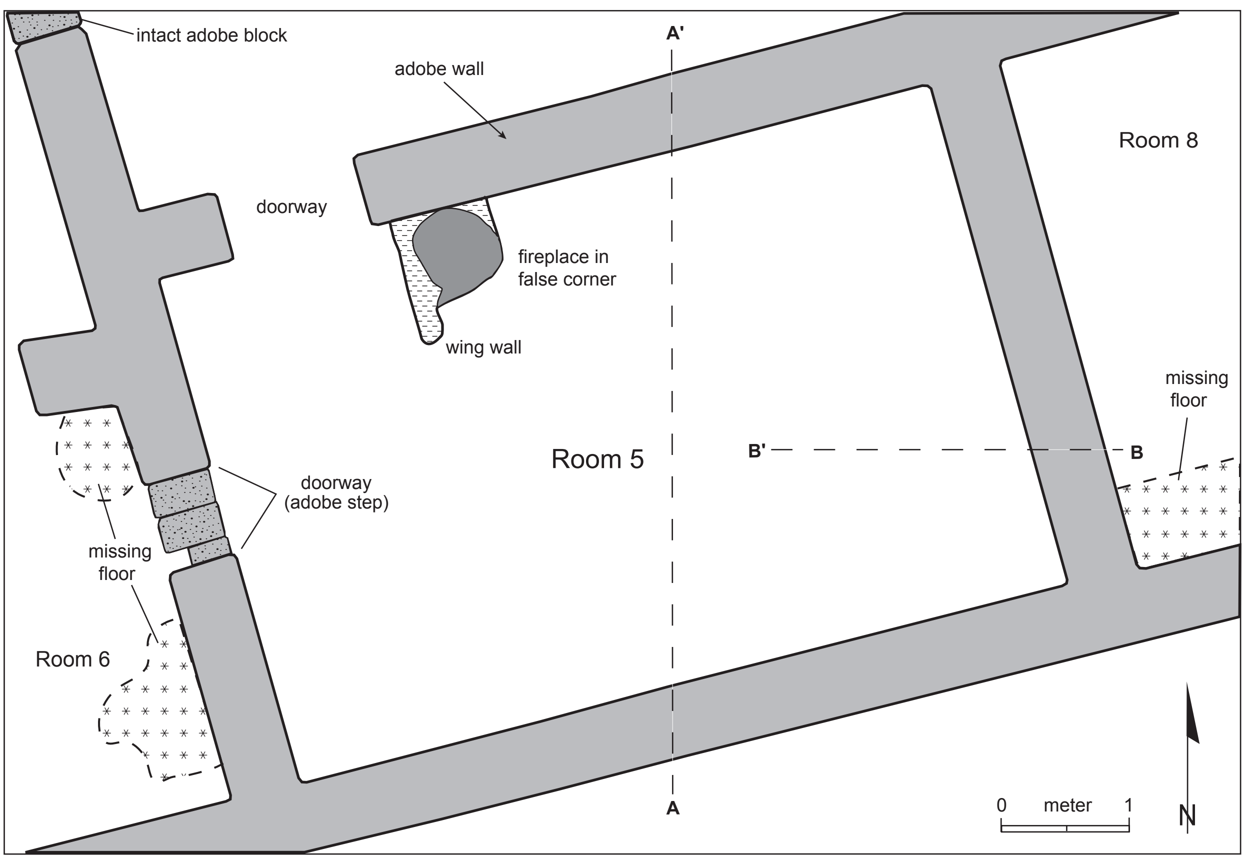

Figure 11-16. Plan of Room 5, Structure 1 at the Trujillo House.

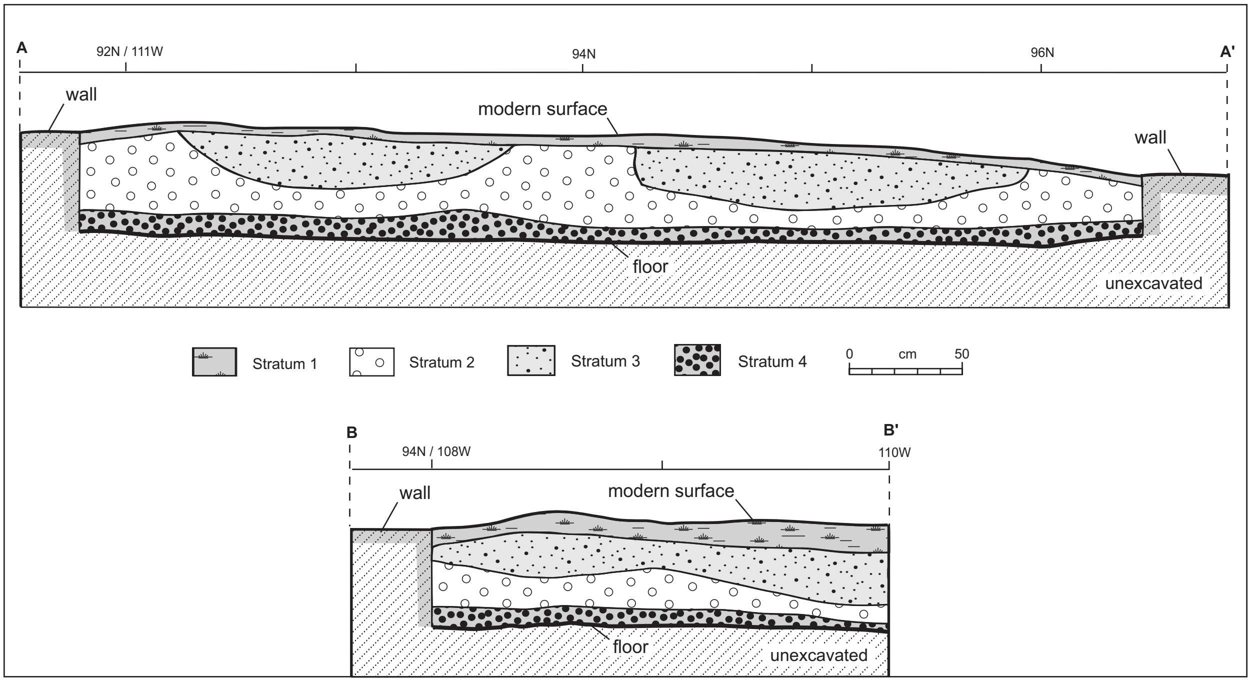

Figure 11-17. Profiles of Room 5, Structure 1 at the Trujillo House.

Figure 11-18. Step in west doorway of Room 5, Structure 1 at the Trujillo House.

walls, but only the outer layer was whitewashed on the west wall. The single layer of plaster on the north wall was 1 cm thick, and was faced by a 0.5 cm thick layer of whitewash. Interior plaster layers were uneven in thickness because they were applied to unprepared wall surfaces.

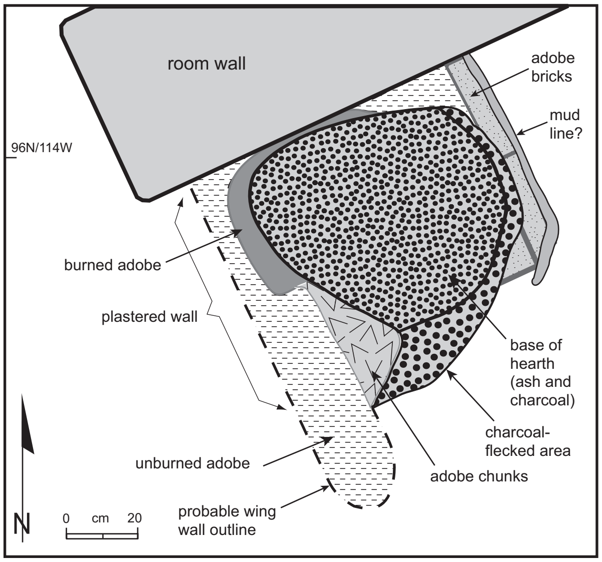

Figure 11-19. Padrecito fireplace in Room 5, Structure 1 at the Trujillo House.

Floor. The floor was puddled adobe, and lay above sterile sand. Three plastering episodes were defined. The upper layer was 0.5 cm thick, the middle layer was 3 cm thick, and the lower layer averaged 4.5 cm thick, but was irregular because it was applied to an uneven sand surface.

Room 6

Room 6 was in the southwest corner of the structure, and measured 4.1 by 3.8 m (Fig. 11-20). A 1-m-wide trench was excavated by grid from east to west through the approximate center of the room; the remaining fill was removed by quadrants. Most of the fill was removed when the structure was leveled; consequently, the floor was near the surface and very difficult to define.

Stratigraphy. Five strata were defined (Fig. 11-21). Stratum 1 was a thin (5 to 12 cm thick) layer of reddish-brown sand mixed with melted adobe, and was heavily matted by grass roots. This was underlain by Stratum 2, a 1-to-5-cm-thick layer of dark reddish-brown organic matter (probably manure) mixed with melted adobe. Directly beneath this was Stratum 3, a 5-to-10-cm-thick series of reddish-brown laminated adobe floors. It also included a thin layer of sand beneath the bottom floor

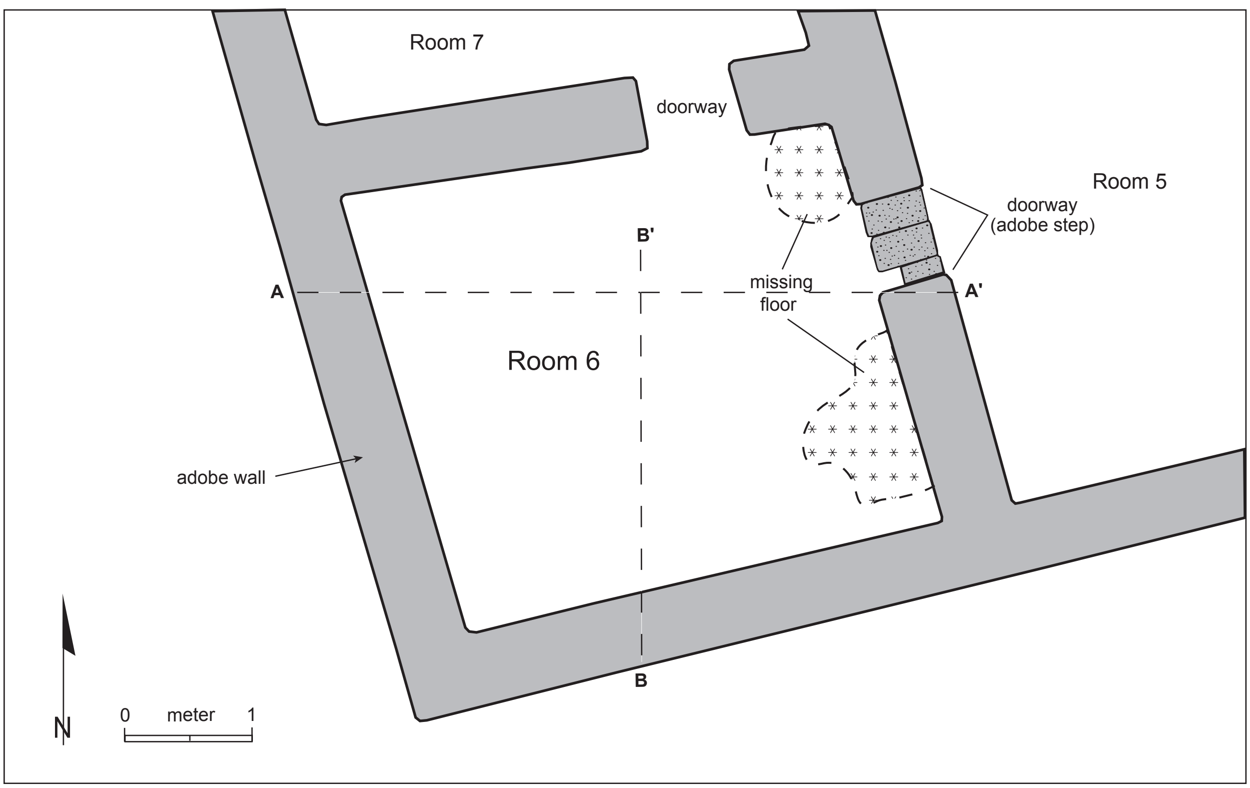

Figure 11-20. Plan of Room 6, Structure 1 at the Trujillo House.

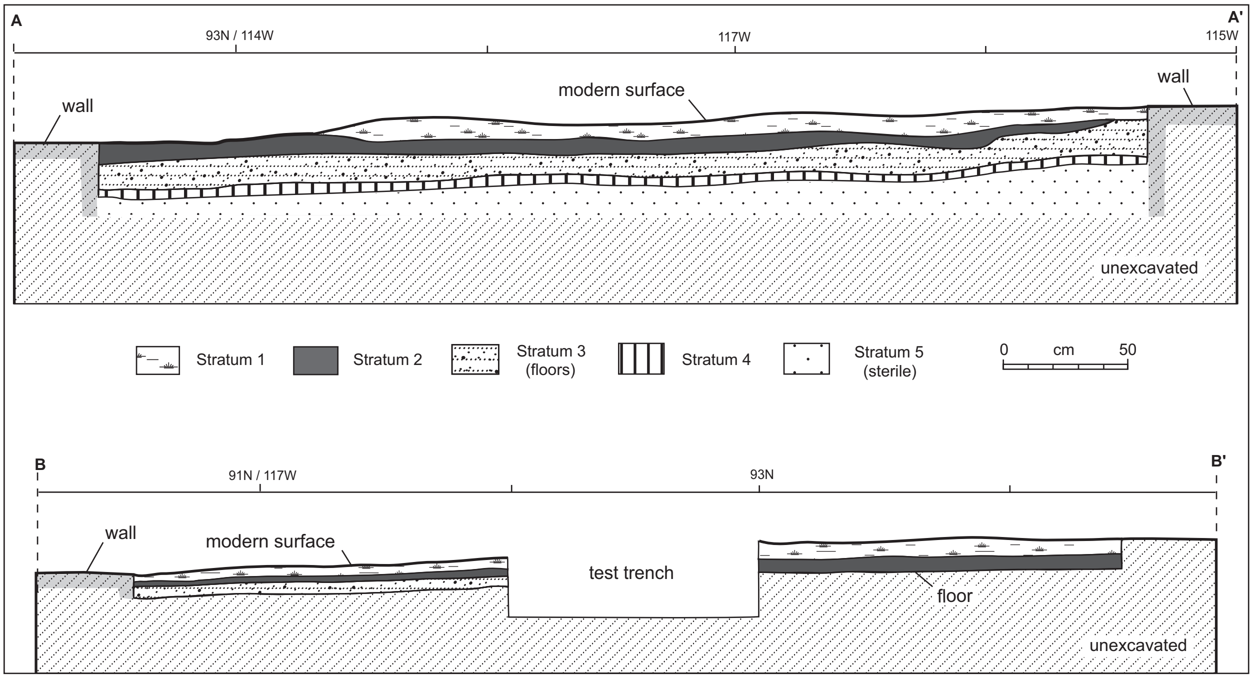

Figure 11-21. Profiles of Room 6, Structure 1 at the Trujillo House.

that was used to level the ground surface before the floor was poured. Stratum 4 was a 2-to-5-cm-thick layer of light brown compacted sand which represented an exterior work surface that predated the building of this room. Sterile sand and gravel occurred below Stratum 4.

Features. Two doorways were the only definite features found in Room 6. The doorway connecting Rooms 5 and 6 was described in the discussion of Room 5. A second doorway was in the north wall near the northeast corner, and connected Rooms 6 and 7. Other than a width of 77 cm, no construction details could be discerned. The floor of Room 6 was higher than that of Room 7, creating a 10- cm drop on the north side of this door.

The floor was missing in three places—the northeast and northwest corners, and along the east wall near the southeast corner. Rodents probably destroyed the floor in the northeast and northwest corners, but the missing floor along the east wall suggests the presence of a feature. The floor was slightly burned around that area, and there were thin deposits of charcoal and ash on its surface. This resembled the zones around fireplaces in other rooms, but there was no other evidence that one existed in this location. It is possible that a wood-burning stove was installed in that area and removed at the time of abandonment.

The surface of Stratum 4 next to the east wall of the room was slightly burned, and seemed to represent a hearth associated with the exterior activity area. The burning was 45 to 50 cm wide by 1.5 to 1.75 m long, and continued up to the wall but did not extend under it. This suggests that the hearth was used before Room 6 was constructed, but after Room 5 was built.

Walls. Walls averaged 9 cm high and 55 to 60 cm wide, and were built of bricks laid side to side. All four walls were plastered and whitewashed, but the thickness and number of layers varied. Unfortunately, both the walls and remaining plaster were in such poor condition that no count of layers could be obtained. Plaster was 1.5 cm thick on the south wall, 2 cm thick on the north wall, and 2.5 cm thick on the east wall. Though the west wall was also plastered, not enough remained to allow its thickness to be measured.

Floor. The floor was puddled adobe, and lay above an exterior activity surface. It ranged between 1.4 and 1.8 cm thick, and evidenced at least four plaster layers. The lowest layer was heavily cracked and uneven, resembling the surface of the activity area it sat upon.

Room 7

Room 7 was in the northwest part of the structure, and measured 5.05 by 4.05 m (Fig. 11-22). A 1-m-wide trench was excavated by grid from north to south through the approximate center of the room; the remaining fill was removed in quadrants. The south, east, and west walls were easily defined, but the only evidence of the north wall was the edge of the floor. A combination of demolition in the 1940s and construction of a telephone cable trench have obscured the wall in that area.

Stratigraphy. Five strata were defined (Fig. 11-23). Stratum 1 was a 15-to-20-cm-thick layer of dark yellow brown alluvial sand mixed with melted adobe that was heavily matted by grass roots. This was underlain by Stratum 2, a thin (1 to 5 cm) layer of dark yellow- brown sandy organic matter (probably manure) containing some burned soil. This unit did not occur consistently, and when present was either at the base of Stratum 1 or was

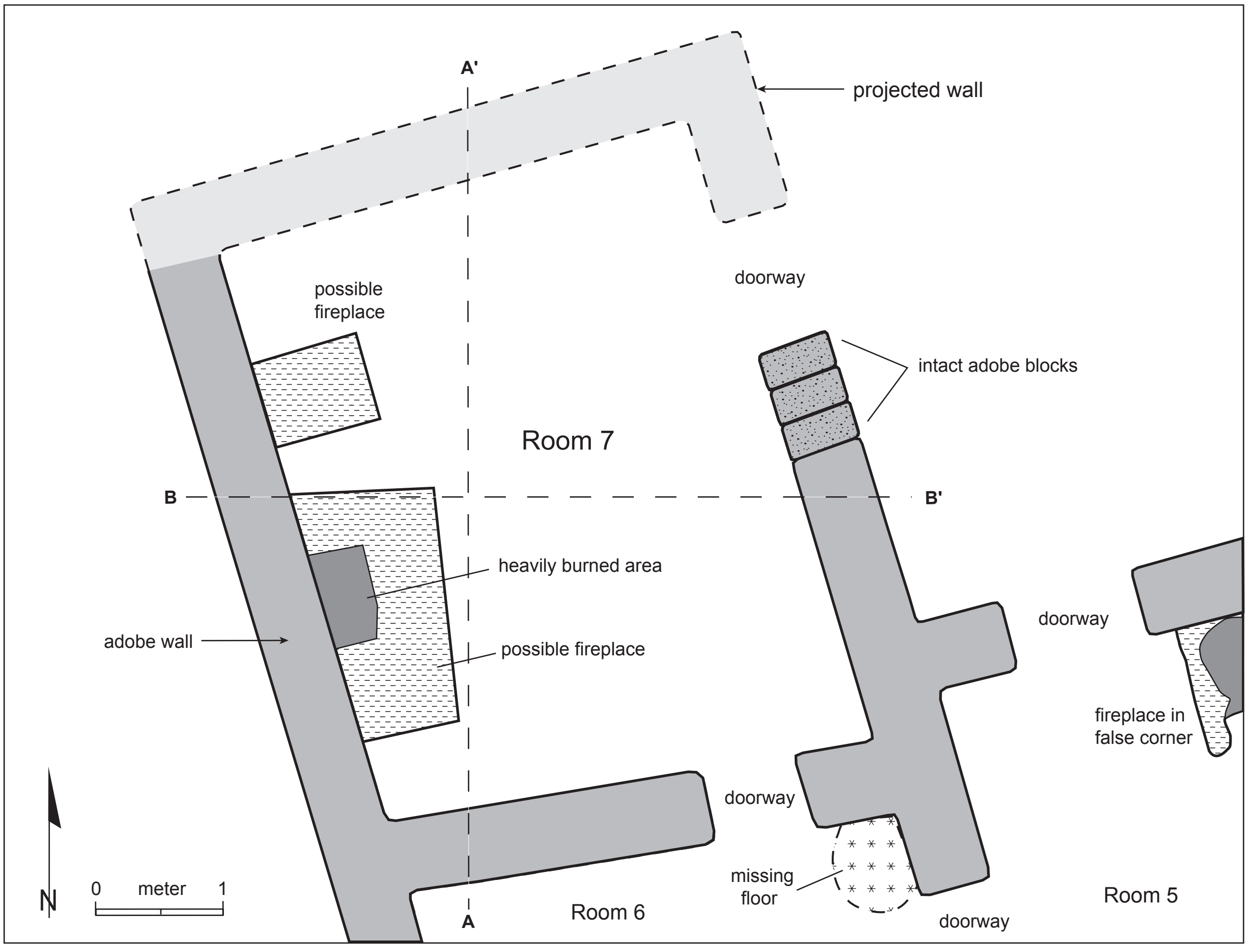

Figure 11-22. Plan of Room 7, Structure 1 at the Trujillo House.

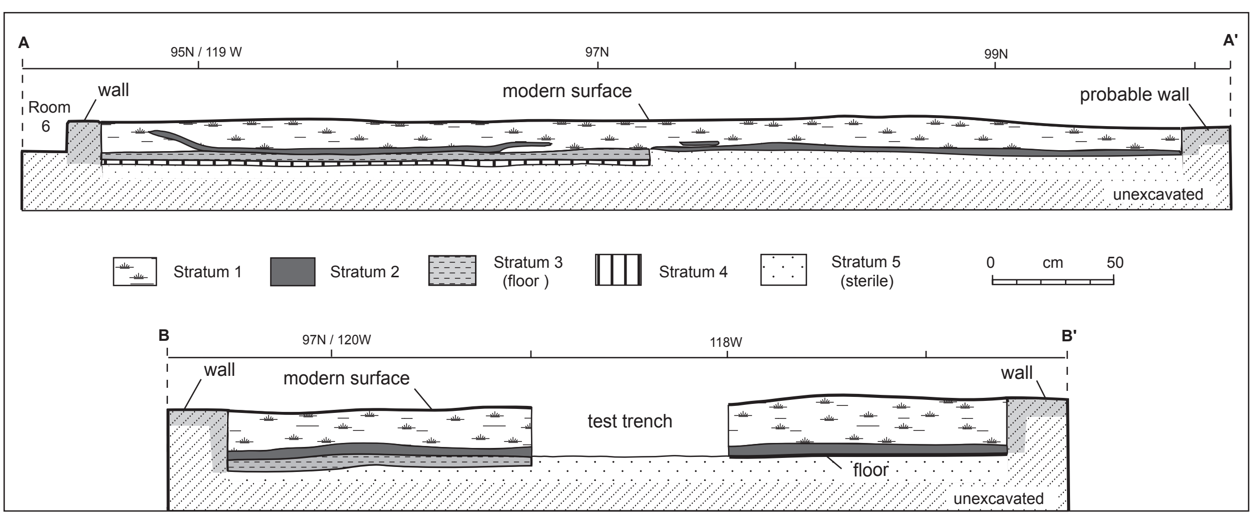

Figure 11-23. Profiles of Room 7, Structure 1 at the Trujillo House.

a lens within it. Stratum 3 was the floor, and is described below. Because the floor was badly deteriorated, it was dug through in the south part of the trench and in the southwest quadrant. Below the floor was Stratum 4, a 2-to-3-cm-thick layer of dark yellow-brown organic matter, probably manure. This lay above Stratum 5, which was sterile yellow-brown sand.

Features. One possible and three definite features were found in Room 7: two doorways and two fireplaces. The doorway connecting Rooms 6 and 7 was described in the discussion of Room 6. A second doorway was in the east wall near the northeast corner, and opened onto the outside of the house. Other than a width of 97 cm, no construction details were discernable.

Two fireplaces seem to have been set against the west wall of this room, but leveling of the house removed most evidence of both. One was in the northwest quadrant, and its remains consisted of the outlines of one vertical and two horizontal bricks placed against the wall. These may have been the remains of a hearth and wingwall, but this identification must be considered tentative.

The second fireplace was in the southwest quadrant. Like the first, leveling of the house left too little to allow an accurate description. It measured 1.48 m by 0.5 to 0.6 m and was rectangular. What little remained was 7 cm higher than the floor, the same height as the nearby wall. An area against the wall in the center of the feature was heavily oxidized, and measured 38 by 25 cm. The surrounding floor surface was discolored by ash and charcoal.

Walls. Remaining walls averaged 16 cm high and 55 to 60 cm wide, and were built of bricks laid side to side. Some whitewashed plaster remained on the south and east walls, but was in such poor condition that no accurate thickness or count of plaster layers could be obtained.

Floor. The floor was puddled adobe, and lay above a layer of probable manure. It consisted of a yellowish-red sandy clay, and was 5 cm thick. Because the floor was near the surface and badly deteriorated, no count of plaster layers could be obtained.

Room 8

Room 8 was in the west-central part of the structure, and measured 4.4 by 2.95 m (Fig. 11-24). Room 4 was ini-

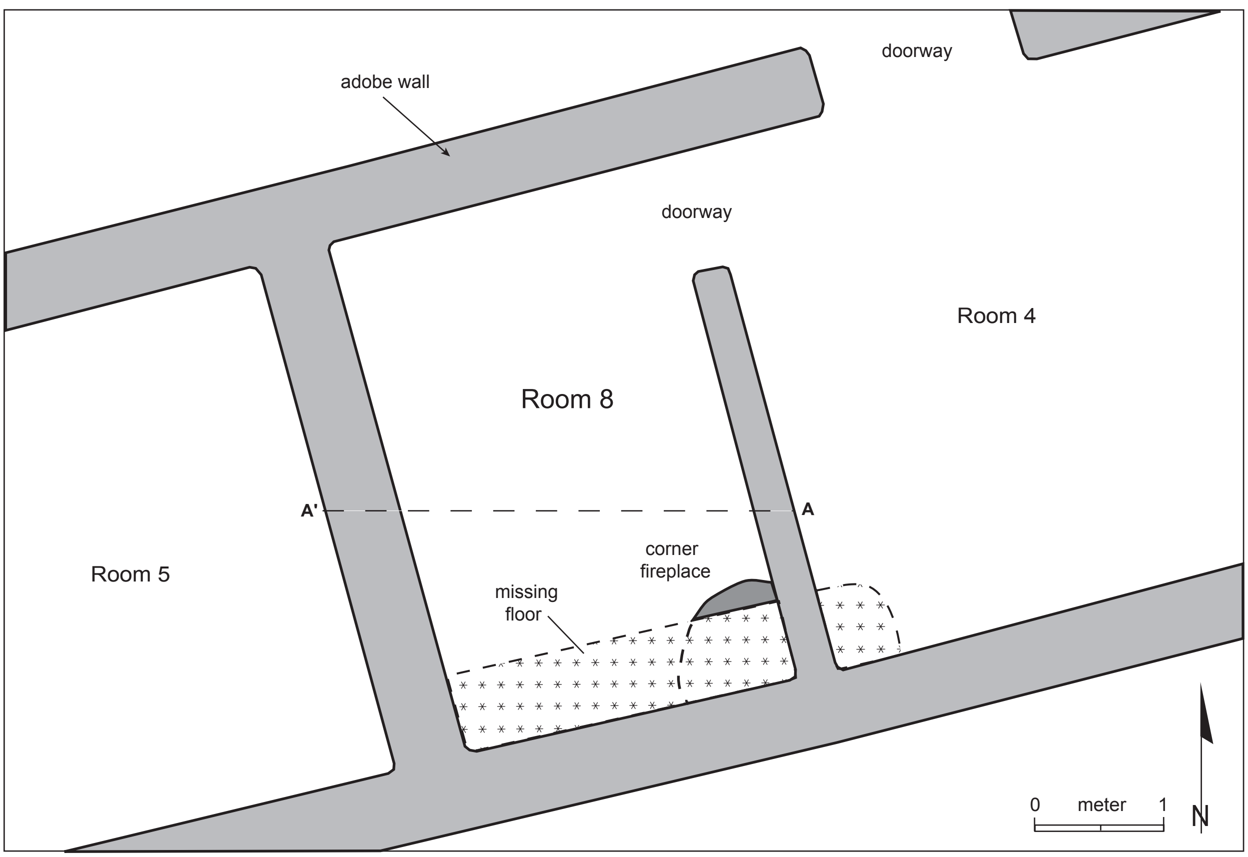

Figure 11-24. Plan of Room 8, Structure 1 at the Trujillo House.

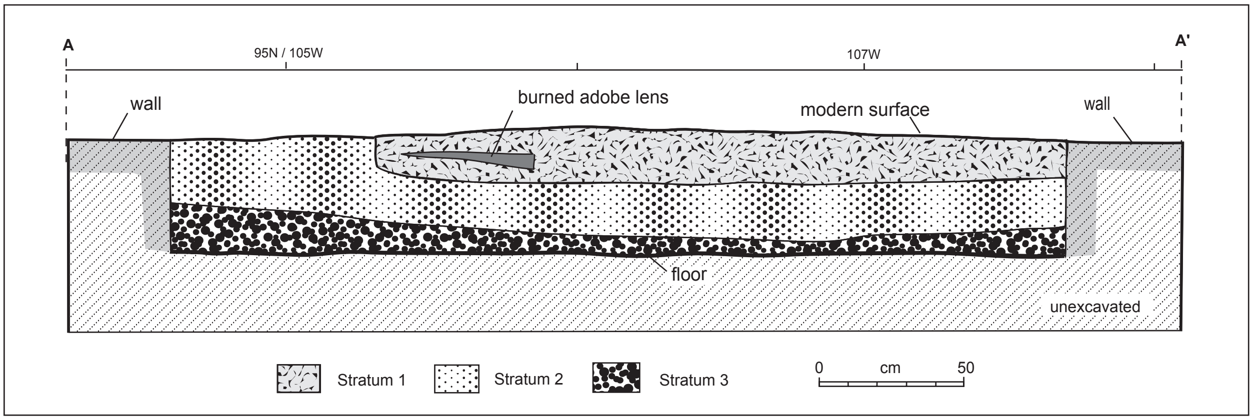

Figure 11-25. Profile of Room 8, Structure 1 at the Trujillo House.

tially thought to be larger than it actually was, and as first defined extended to the west wall of Room 8. The dividing wall was encountered as excavation proceeded, and Room 8 was defined. A single grid rather than a trench was excavated in the approximate center of the room because of its small size; the remaining fill was removed by halves.

Stratigraphy. Three strata were defined (Fig. 11-25). Stratum 1 was uppermost across much of the room, and was a 15-to-25-cm-thick layer of light brownish-gray melted adobe and adobe chunks, which contained some gravels. A discrete lens of dark brown burned adobe occurred in this unit. Stratum 1 was underlain by Stratum 2, a 15-to-30-cm-thick layer of light yellow-brown melted adobe and roof fall. Several cobbles were found at the base of this level, suggesting they were on the roof at the time it fell or was demolished. Stratum 3 was a 5-to-15-cm-thick layer of brown melted adobe mixed with organic matter (probably manure) lying above the floor. Because numerous artifacts were found in Stratum 3, it was screened. A considerable amount of charcoal and ash occurred in this unit around the fireplace in a zone that extended 1.75 to 2.0 m toward the center of the room.

Features. Two features were found in Room 8: a doorway and a fireplace. The doorway was described in the discussion of Room 4. The fireplace was in the southeast corner, and was the only corner fireplace that was not removed by remodeling. It measured about 90 by 88 cm, but so much of it was destroyed by an animal burrow that accurate measurements were not possible. The hearth was 11 to 14 cm above the floor, and there was some evidence of a hood on the south wall. No other construction details were discernable.

Walls. Walls averaged 28 cm high and 55 to 60 cm wide, except for the east wall which was 31 cm wide. The east wall was constructed of bricks laid end to end; the others were built of bricks laid side to side. All four walls were plastered, but the thickness and number of layers varied. There were four plaster layers on the north and west walls. The three outermost layers were whitewashed, and were 0.25 to 0.5 cm thick. The inner layer was not whitewashed and was 1 to 2 cm thick. Three layers were defined on the south wall; the outermost was 0.5 cm thick and whitewashed, the middle layer was 0.25 cm thick and gray, and the innermost was up to 2 cm thick and was not whitewashed. Perhaps the middle layer was gray because it was painted a different color or clay from a different source was used. Inner plaster layers had uneven thicknesses because they were applied to unprepared wall surfaces. The remaining walls were generally in good condition, except in the southeast corner where a 50-cm-wide segment of the east wall, including much of the fireplace, was destroyed by an animal burrow.

Floor. The floor was puddled adobe, and lay above sterile sand. At least two plastering episodes were defined. The upper floor was a 1-cm-thick layer of adobe. Under this was a layer of sandy adobe that averaged 5 cm thick, but was irregular because it was applied to an uneven sand surface.

Construction Sequence

Several lines of evidence indicate that the Trujillo House was not built all at once, but grew by accretion over time. Construction details encountered during excavation are discussed in this section. This information is supplemented by data from materials and artifact analyses in a later chapter, and the probable construction sequence is documented.

Rooms 1 and 2 form the east unit of the house. Because the wall that divides these rooms was built of bricks laid end to end rather than side to side, as were the exterior walls of the house, it appears that they were initially built as a single unit and subdivided at a later time.

Figure 11-26. Cow hoofprint pressed through fallen plaster in Room 4.

This is supported by wall abutments; the ends of the dividing wall abut the exterior walls, suggesting that they were already in existence when the rooms were divided.

Rooms 3, 4, and 8 form the central unit of the house. The wall between Rooms 2 and 3 was similar in thickness to the exterior walls, suggesting it was an outside wall at one time, and adding credence to the notion that Rooms 1 and 2 represent a separate unit. Rooms 3, 4, and 8 were built as a single long room, which was later subdivided by the addition of interior walls. This was demonstrated by interior wall abutments. Layers of plaster were found in the joints between interior dividing walls and the south exterior wall. These layers were contiguous from one room to another, and indicate that several plasterings occurred before the dividing walls were added. In addition to this, the floor extended beneath both dividing walls, showing that it was poured as a unit before the large room was subdivided. No adobe samples were obtained from the wall dividing Rooms 3 and 4, but a sample taken from the wall separating Rooms 4 and 8 suggests it was built after 1880 (see Chapter 17).

Rooms 5, 6, and 7 form the west unit of the house. Room 5 was added as a single unit, but whether this occurred before or after the central unit was subdivided could not be determined. The wall separating Rooms 5 and 8 was similar in thickness to the exterior walls, and there were no intervening plaster layers like those found in the central unit. This suggests that the east wall was once an outside wall, and Room 5 was added to the central unit.

Similarly, Rooms 6 and 7 were added as a unit after Room 5 was built. This was demonstrated by wall thicknesses and abutments, and by the presence of an exterior activity surface under the floors of Rooms 6 and 7. A hearth associated with the activity surface under Room 6 extended up to but not under the west wall of Room 5, showing it was used after that room was built. The manure layer under the floor of Room 7 indicates that at least part of this area was used as a corral before the rooms were built. Like the central unit, Rooms 6 and 7 were originally a single room, and were subdivided after a period of use. The dividing wall was narrower than the exterior walls and plaster layers were contiguous from one room to the next, extending through the wall abutments. The lowest floor was also contiguous between rooms. The doorway between Rooms 5 and 6 was a later addition, and was probably cut through the wall after Rooms 6 and 7 were added.

Evidence of numerous building and remodeling episodes suggests a lengthy period of occupation. Interior doors connect several series of rooms and form three to four apartments, suggesting that an extended family lived here. At least part of the roof seems to have been salvaged after abandonment, as suggested by the presence of large amounts of tree bark and wood chips in the lower strata of Rooms 4 and 8. Thus, the roof appears to have been dismantled, and useable vigas and latillas salvaged for use elsewhere. However, the house may have stood abandoned for quite some time before this occurred. Several cow hoofprints were noted in the floor of Room 4, and were pressed through a layer of plaster that had fallen off nearby walls (Fig. 11-26). Layers of deteriorated manure were also noted in several rooms, either just above the floor or mixed into the lower strata. Thus, before materials were salvaged from the house it appears to have stood empty for some time, and was used as shelter by livestock.

Exterior Trenches

Four trenches were excavated outside the house to look for foundations and determine wall widths. Trench 1 was a continuation of the trench in Room 4 on the north side of the house (Fig. 11-2). Four grids were excavated in this area, and no evidence of a foundation was discovered. The original ground surface was 20 cm below the current surface, and began sloping sharply downward 2.5 m north of the house. Chunks of adobe bricks, melted adobe, and eolian sand were encountered.

Trench 2 was a continuation of the trench in Room 2 on the east side of the house (Fig. 11-2). One grid was excavated, and no evidence of a foundation was discovered. The original ground surface was 24 cm below the current surface. Layers of melted adobe and eolian sand were found in this area.

Trench 3 was on the south side of the house, next to the back wall of Room 8 (Fig. 11-2). One grid was excavated in this area. The original ground surface was 42 cm below the current surface, and excavation continued beneath that surface to determine whether there was a footing trench. The sterile substrate consisted of alluvial sand and gravels, and there was no evidence of a foundation or footing trench. Postoccupational deposits were eolian sand and melted adobe. A simple hearth measuring 1.85 by 1.50 m was found about 6 cm below the current ground surface, and probably postdates demolition of the structure in the 1940s.

Trench 4 was on the west side of the house, next to Room 5 (Fig. 11-2). Two grids were excavated, and encountered the original ground surface 25 cm below the current surface. No foundation or footing trench was found. Postoccupational deposits consisted of layers of melted adobe and eolian sand. Adobes at the base of the wall sloped to the north, suggesting that the ground surface was not leveled before it was built.

In summary, exterior trenches established that the house had no footing trench or foundation. Floors were at or slightly above the base of the exterior walls. Outside the house, postoccupational fill consisted of adobe rubble, melted adobe, and eolian sand.

Trash Pit

During survey, a potential midden was identified as a dense scatter of surface artifacts about 6.5 m north of the house (Fig. 11-1). Excavation revealed deep stratified deposits in an apparent borrow pit that was reused for trash disposal. This feature was 5.4 m in diameter and 1.6 m deep. Nearly 57 percent of the pit was excavated (Fig 11-27), yielding most of the cultural materials recovered at the site.

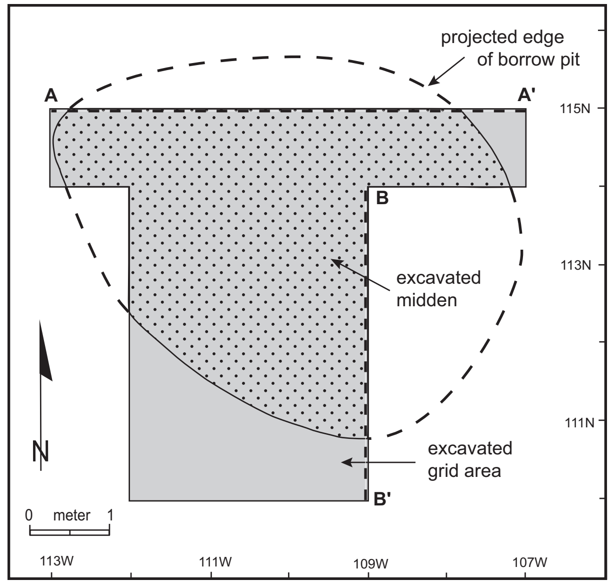

Figure 11-27. Plan of midden at the Trujillo House showing area excavated.

Stratigraphy

Six strata were defined in the trash pit (Figs. 11-28 and 11-29), and will be described from the surface to the base of the pit. Stratum 1 was a 24-cm-thick layer of brown eolian sand containing charcoal and a few artifacts, and was probably deposited after the house was abandoned. Stratum 2 was a 10-to-18-cm-thick group of trash lenses ranging in color from gray to dark gray, and was heavily mottled by sand, gray clay, and charcoal. Soil was loose and sandy, and contained dense concentrations of organic materials, charcoal, ash, and artifacts. The amount of charcoal and ash varied from lens to lens, and all contained clay.

Stratum 3 was a 15-to-20-cm-thick group of trash lenses, and was less mottled than Stratum 2. The upper half of this unit consisted of an ashy gray soil mixed with reddish-brown and brown sand, and contained many artifacts and a considerable amount of charcoal. The lower half consisted of brown sand containing more adobe chunks and fewer artifacts than the upper half. Stratum 3 was light colored, and pinched out near the north end of the pit.

Stratum 4 was a 20-to-25-cm-thick layer of tan adobe melt containing artifacts and an ash and charcoal lens. A 5-cm-thick layer of charcoal was at the base of this unit, and separated it from Stratum 5, which was another 20-to-25-cm-thick layer of adobe melt. Like Stratum 4, it contained ash and charcoal lenses, but few artifacts were present.

Stratum 6 was the lowest of the culturally deposited units; it was a 5-to-30-cm-thick layer of yellow-brown sand containing ash, charcoal, and numerous artifacts. This stratum began as narrow band of charcoal at the north end of the pit, expanded in the center, then narrowed again to a thin lens of ash near the south edge. Augering below Stratum 6 encountered sterile sand.

EUROAMERICAN ARTIFACTS

JEFFREY L. BOYER

Excavations at the Trujillo House yielded 1738 Euroamerican artifacts, most from the trash pit. Of these,

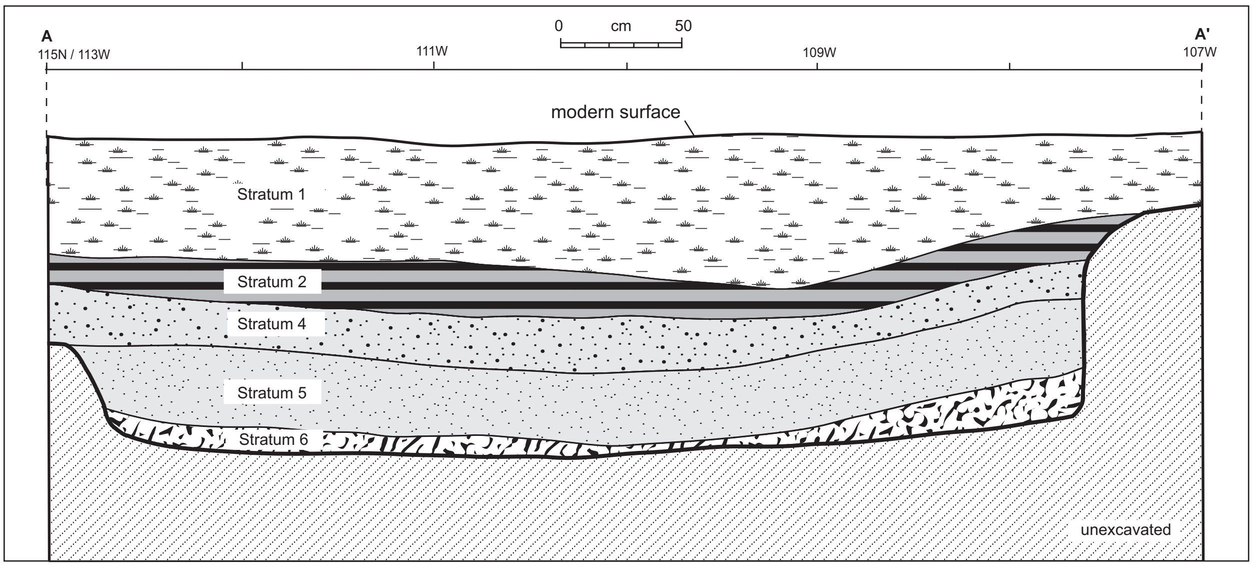

Figure 11-28. East to west profile of midden at the Trujillo House.

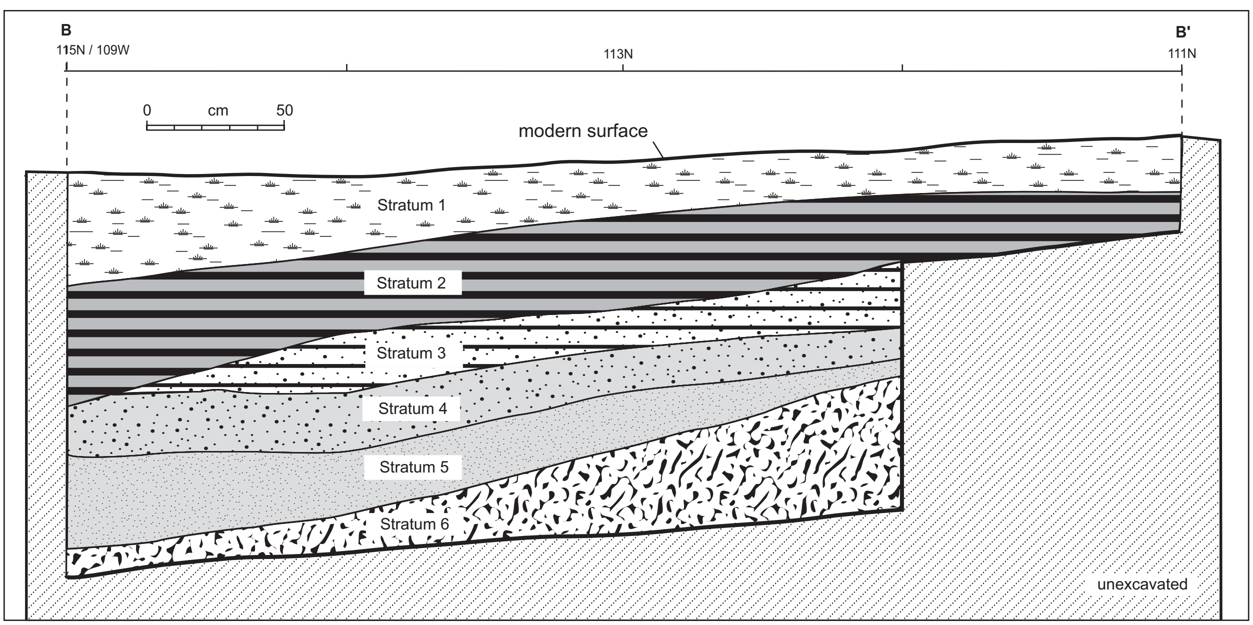

Figure 11-29. North to south profile of midden at the Trujillo House.

864 (49.7 percent) were datable. They provide a mean artifact date of 1879.3 and a minimum date range of 1840 to 1930. However, differences in artifact dates from the midden strata and from artifact material groups show that the midden pit, and therefore most of the Euroamerican assemblage, date after about 1880—during the last 15 to 20 years of site occupation. While the Euroamerican artifacts do not point to a date for the first occupation of the site, they support historical information suggesting that it was abandoned about 1900. A detailed discussion of artifact and site dating is found in a later chapter.

Table 11-1 shows a simple ranking of functional categories, types, and functions by percentage of the entire

Table 11-1. Simple ranking of functional categories, types, and functions for the Trujillo House.

Category / *type* / function	No.	Percent of Category	Percent of Assemblage
Domestic Routine	565	100.0%	32.5%
dishes, serving and eating	553	97.9%	31.8%
unidentifiable	464	82.1%	26.7%
cup or mug	36	6.4%	2.1%
plate	28	5.0%	1.6%
bowl	25	4.4%	1.4%
cutlery	7	1.2%	0.4%
kitchen knife	5	0.9%	0.3%
spoon or fork handle	2	0.4%	0.1%
glassware	4	0.7%	0.2%
unidentifiable	3	0.5%	0.2%
drinking glass	1	0.2%	0.1%
unidentified	1	0.2%	0.1%
unidentifiable	1	0.2%	0.1%
Construction or Maintenance	536	100.0%	30.8%
building materials	417	77.8%	24.0%
window glass	417	77.8%	24.0%
hardware	119	22.2%	6.8%
common nail	87	16.2%	5.0%
finish nail	23	4.3%	1.3%
unidentifiable	5	0.9%	0.3%
screw	2	0.4%	0.1%
bolt	1	0.2%	0.1%
staple	1	0.2%	0.1%
Unassignable	377	100.0%	21.7%
unidentified	377	100.0%	21.7%
unidentifiable	315	83.6%	18.1%
bottle fragment	57	15.1%	3.3%
leather fragment	2	0.5%	0.1%
leather strap	1	0.3%	0.1%
awl	1	0.3%	0.1%
cork	1	0.3%	0.1%
Personal Effects	154	100.0%	8.9%
boots or shoes	98	63.6%	5.6%
unidentifiable	42	27.3%	2.4%
outer sole, heel	24	15.6%	1.4%
heel	12	7.8%	0.7%
inner sole fragment	9	5.8%	0.5%
outer sole fragment	5	3.2%	0.3%
toe	5	3.2%	0.3%
heel fragment	1	0.6%	0.1%
unidentified	23	14.9%	1.3%
unidentifiable	23	14.9%	1.3%
clothing	22	14.3%	1.3%
button, 4-hole, shirt or dress	11	7.1%	0.6%
button, shank, coat or jacket	4	2.6%	0.2%
belt buckle	2	1.3%	0.1%
button, 3-hole, shirt or dress	1	0.6%	0.1%
button, 2-hole, shirt or dress	1	0.6%	0.1%
button, shank, shirt or dress	1	0.6%	0.1%
clothing (continued)			
button, type unidentified	1	0.6%	0.1%
brass hook	1	0.6%	0.1%
jewelry	3	1.9%	0.2%
bead	1	0.6%	0.1%
shell ornament	1	0.6%	0.1%
ring	1	0.6%	0.1%
grooming items	3	1.9%	0.2%
rubber comb	1	0.6%	0.1%
lice comb, wood	1	0.6%	0.1%
razor	1	0.6%	0.1%
medicine	3	1.9%	0.2%
patent or extract bottle	3	1.9%	0.2%
personal items	1	0.6%	0.1%
pocket knife	1	0.6%	0.1%
military clothing	1	0.6%	0.1%
sword belt buckle	1	0.6%	0.1%
Indulgences	81	100.0%	4.7%
alcohol, wine	78	96.3%	4.5%
bottle fragments	78	96.3%	4.5%
tobacco	3	3.7%	0.2%
pipe	3	3.7%	0.2%
Food	11	100.0%	0.6%
storage	6	54.5%	0.3%
olive jar	6	54.5%	0.3%
canned goods	5	45.5%	0.3%
can lid	5	45.5%	0.3%
Economy-Production	11	100.0%	0.6%
hunting or shooting	7	63.6%	0.4%
cartridge, center-fire	2	18.2%	0.1%
unidentifiable	1	9.1%	0.1%
cartridge, rim-fire	1	9.1%	0.1%
percussion cap	1	9.1%	0.1%
cartridge, pistol, .45 cal.	1	9.1%	0.1%
bullet, .45 cal.(?)	1	9.1%	0.1%
stock supplies	4	36.4%	0.2%
carding comb	1	9.1%	0.1%
sheep shears	1	9.1%	0.1%
horseshoe nail	1	9.1%	0.1%
spur rowel	1	9.1%	0.1%
Entertainment	2	100.0%	0.1%
music	2	100.0%	0.1%
mouth harp	2	100.0%	0.1%
Household Equipment	1	100.0%	0.1%
lighting-lamps	1	100.0%	0.1%
chandelier crystal	1	100.0%	0.1%
Total	1738		100.0%

Euroamerican assemblage. Of the 1738 artifacts recovered, 822 (47.3 percent) were identifiable by function. The remaining 916 functionally unidentifiable artifacts are spread primarily between the categories of Unassignable, Domestic Routine, and Personal Effects, and consist of otherwise unidentifiable sherds and metal, glass, and leather fragments. Functionally identifiable artifacts are dominated by sherds in the Domestic Routine category. Most are not identifiable by vessel form, although three forms are distinguishable. Following Domestic Routine is the Construction/Maintenance category, which consists primarily of window glass fragments.

Analysis shows that the actual number of window pane fragments is considerably smaller than indicated by this table, and that the Construction/Maintenance category is actually not as prominent as it appears. Personal Effects contains the greatest diversity of artifacts, including boot/shoe parts, clothing buttons, jewelry, grooming items, and medicine, personal, and military artifacts. Indulgences are minimally represented, as are Food, Economy/Production, Entertainment, and Household Equipment artifacts.

Ceramic Artifacts

DAISY F. LEVINE

The ceramic assemblage from the Trujillo House is summarized here, and is discussed in more detail in a later chapter. The assemblage consisted of Hispanic, Tewa, Apache, and Tiwa sherds, and a handful of prehistoric and unknown wares. The prehistoric pottery was probably picked up from nearby sites, such as Poshu'ouinge. Unlike La Puente, no historic sherds manufactured outside of the immediate area were found.

Of the 5783 sherds collected, 1346 were examined during the detailed analysis. Sherds were collected almost exclusively from the trash pit, as very few were found within the house. Table 11-2 presents ceramic types and frequencies by vessel form. Hispanic Blackware bowl sherds had the highest frequency, followed by Casitas Red-on-black bowls. Tewa Black and San Juan Red-on-tan, though considerably lower in frequency, had the highest jar frequency. Temper was one of the main criteria for distinguishing Tewa wares from Hispanic wares. A predominantly tuff temper was characteristic of the Tewa wares, while a predominantly sand temper was found in the Hispanic wares. The ceramics from the site, mostly plainwares, were not reliable temporal indicators. Ceramic ratios, rather than absolute dates, were used to obtain a rough time period.

Chipped Stone Artifacts

Chipped stone artifacts are summarized here and discussed in detail in Chapter 16 (Spanish Chipped Stone Artifacts). A total of 189 chipped stone artifacts were recovered, the majority of which were Pedernal chert (Table 11-3). Cortex on obsidian artifacts was waterworn, suggesting it was procured from streams rather than at the source in the Jemez Mountains. Cortex on other materials was also waterworn, suggesting that they were obtained in local gravel terraces. Predominantly fine-grained materials were selected for reduction (Table 11-4). Though 93.7 percent of the assemblage was comprised of fine-grained materials, 98.6 percent of the tools were made from fine-grained materials and the remainder were glassy, suggesting that only the most suitable materials were selected for tool manufacture and use.

Ground Stone Artifacts

KAREN WENING

Ten ground stone artifacts were recovered (Table 11-5). Two mano fragments exhibited faceted surfaces caused by shifting pressure from the back edge (nearest the user) to the front edge during use. On a coarse-grained sandstone mano this occurs on opposing surfaces, creating a parallelogram-like cross-section. The second faceted mano exhibited this wear on only one surface, which was opposed by a minimally used flat surface. Both faceted manos had straight edges smoothed by grinding. Two mano fragments exhibited one flat use surface each; one was unshaped and the other was marginally shaped along its edges.

A small base stone was partially reconstructed from three fragments. It was a thin subrectangular slab ground to shape on its bottom and along all four edges. Although the entire use surface was ground, most of the wear was confined to a small longitudinally striated area with a very fine-grained surface. The second base stone fragment had an irregular ground surface, and was classified as such because the concave areas of the use surface were also ground. The slab metate fragment exhibited a deeply concave use surface which appeared to have been shaped by pecking. Wear extended to within 2 cm of the outside edge.

A basalt cobble ball was ground over its entire surface, presumably to smooth and shape the stone. The abrasion did not appear to be related to use. A quartzite ball was ground and pecked around its margins, creating a beveled edge. This tool did not appear to have been used in food processing, and may have been part of a weapon. An unshaped piece of sandstone was ground on

Table 11-2. Ceramic type and frequency by vessel form for the Trujillo House (frequencies and table percentages).

Ceramic Type	Jar	Bowl	Flange Plate	Indeterminate	Row Total Percent of Total
Tewa Red	1 0.1%	5 0.4%	1 0.1%	0 0.0%	7 0.5%
Tewa Black	105 7.8%	77 5.7%	56 4.2%	20 1.5%	258 19.2%
Tewa, other	14 1.0%	5 0.4%	2 0.1%	4 0.3%	25 1.9%
San Juan Red-on-tan	102 7.6%	7 0.5%	0 0.0%	0 0.0%	109 8.1%
Powhoge Polychrome	36 2.7%	0 0.0%	0 0.0%	0 0.0%	36 2.7%
Unknown Tewa polychrome	12 0.9%	2 0.1%	0 0.0%	2 0.1%	16 1.2%
Hispanic Black	11 0.8%	261 19.4%	86 6.4%	34 2.5%	392 29.1%
Casitas Red-on-brown	5 0.4%	203 15.1%	20 1.5%	15 1.1%	243 18.1%
Casitas Red-on-brown, smudged	0 0.0%	32 2.4%	3 0.2%	0 0.0%	35 2.6%
Mica slipped	6 0.4%	1 0.1%	0 0.0%	1 0.1%	8 0.6%
Mica paste	33 2.5%	7 0.5%	1 0.1%	42 3.1%	83 6.2%
Apache Micaceous	62 4.6%	2 0.1%	0 0.0%	23 1.7%	87 6.5%
Chacon Micaceous	8 0.6%	0 0.0%	0 0.0%	0 0.0%	8 0.6%
Plain utility	2 0.1%	1 0.1%	0 0.0%	0 0.0%	3 0.2%
Biscuit A	0 0.0%	3 0.2%	0 0.0%	1 0.1%	4 0.3%
Biscuit B	0 0.0%	8 0.6%	0 0.0%	1 0.1%	9 0.7%
Wiyo Black-on-white	0 0.0%	1 0.1%	0 0.0%	0 0.0%	1 0.1%
Potsui'i Incised	0 0.0%	0 0.0%	0 0.0%	1 0.1%	1 0.1%
Corrugated	0 0.0%	0 0.0%	0 0.0%	2 0.1%	2 0.1%
Glazeware	2 0.1%	1 0.1%	0 0.0%	0 0.0%	3 0.2%
Unknown	3 0.2%	5 0.4%	0 0.0%	8 0.6%	16 1.2%
Column total Percent of total	402 29.9%	621 46.1%	169 12.6%	154 11.4%	1346 100.0%

one flat surface, but the artifact was too fragmentary to be assigned to any specific type. Ten thin fragments of slate were ground on both surfaces, and appeared to be pieces of slateboards.

Floral Remains

The analysis of flotation and macrobotanical samples is summarized here and described in more detail in Chapter 15 (Plant Materials from La Puente and the Trujillo House). Eleven flotation samples and 42 macrobotanical samples were examined; with the exception of two flotation samples from a hearth in Room 5, floral materials originated in the trash-filled borrow pit north of the house. Economic plant remains recovered include squash, chile, corn, peach, and apricot. A few wild plants may have been used economically, including piñon nuts, cholla, and sedge seeds. Several varieties of wood were burned as fuel, including juniper, piñon, other unidentified conifers, cottonwood or willow, and other unidentified nonconifers.

Table 11-3. Chipped stone artifact type by material type for the Trujillo House.

Reduction Debris	Flakes	Angular Debris	Cores	Row Total
Chert	2	0	0	2
Pedernal chert	80	19	7	106
Quartzite	1	0	1	2
Basalt	1	0	0	1
Obsidian	5	1	0	6
Igneous undifferentiated	1	0	0	1
Column total	90	20	8	118
Tools	Strike-a-Light Flint		Biface	Row Total
Pedernal chert	70		0	70
Obsidian	0		1	1
Column total	70		1	71

Table 11-4. Chipped stone artifact material texture by material type for the Trujillo House.

Material	Glassy	Fine	Medium	Coarse	Row Total
Chert	0	1	1	0	2
Pedernal chert	0	175	1	0	176
Quartzite	0	0	0	2	2
Basalt	0	1	0	0	1
Obsidian	7	0	0	0	7
Igneous undifferentiated	0	0	0	1	1
Column total	7	177	2	3	189
Percent of total	3.7%	93.7%	1.1%	1.6%	100.0%

Faunal Remains

The faunal analysis was completed by Bertram (1990), and is summarized from that report. Over 6500 pieces of animal bone were recovered from deposits at the Trujillo House (Table 11-6). Over a fifth of the assemblage (22.1 percent) was completely unidentifiable as to taxa, presumably because of butchering practices that tended to chop the bone into stew-sized (4 to 7 cm long) pieces. An additional 39.7 percent were identifiable only as bone from variably sized mammals, and 0.3 percent of the assemblage was from variably sized birds. Of the 38 percent of the faunal assemblage that was identifiable, domestic species comprised 91.8 percent. Nondomestic species comprised only 8.2 percent of the assemblage. Of the nondomesticated remains recovered, 99.5 percent

Table 11-5. Ground stone artifact type by material type for the Trujillo House.

Ground Stone Type	Sandstone	Quartzite	Basalt	Row Total
Mano	4	0	0	4
Slab metate	1	0	0	1
Base stone	2	0	0	2
Stone ball	0	1	1	2
Indeterminate fragment	1	0	0	1
Column total	8	1	1	10

Table 11-6. Rough-sorted bone frequencies for the Trujillo House.

Species	Structure 1	Midden	Row Total	Percent of Total
Bos taurus	0	261	261	4.0%
Equus sp.	0	3	3	0.0%
Sus scrofa	0	109	109	1.7%
Bos or elk	0	17	17	0.3%
Large mammal	0	1157	1157	17.7%
Canis sp.	0	4	4	0.1%
Ovis aries	0	96	96	1.5%
Capra hirca	0	20	20	0.3%
Ovacaprid	17	1757	1774	27.1%
Medium or large mammal	13	1409	1422	21.7%
*Mus musculus**	200	0	200	3.1%
Squirrel	1	0	1	0.0%
Small mammal	0	3	3	0.0%
Small or medium mammal	0	1	1	0.0%
Gallus gallus	0	13	13	0.2%
Medium bird	0	15	15	0.2%
Large bird	1	2	3	0.0%
Toad	0	4	4	0.1%
Unknown	2	1443	1445	22.1%
Column total	234	6314	6548	100.0%
Percent of total	3.6%	96.4%	100.0%	-

*Estimated

were mouse (*Mus musculus*) or toad, and probably represented intrusives. The single remaining nondomestic bone was from a squirrel, and could represent either economic use or intrusion. Because it was found in the remains of Structure 1, the latter is most likely. Thus, there is no good evidence for the consumption of nondomestic animals at this site.

Ovicaprid bones dominated the domestic portion of the faunal assemblage, comprising 82.9 percent. Only a small percentage was identifiable as the remains of either sheep (*Ovis aries*) or goat (*Capra hircus*). Most of the ovicaprid bones could belong to either species, though it is likely that the majority represented the remains of sheep. The next most common species was cow (*Bos taurus*), which comprised 11.5 percent of the domestic assemblage. Pig (*Sus scrofa*) remains constituted a rather sizeable portion of the identifiable domestic animal bone as well, comprising 4.8 percent of that assemblage. There was a small amount of chicken (*Gallus gallus*) bone (0.2 percent of domestic assemblage). Two of the domestic species were probably not consumed. Horse (*Equus equus*) and dog (*Canis* sp.) made up 0.3 percent of the domestic assemblage. The latter bone could also represent the remains of coyotes or wolves, but it is more likely dog.

With the possible exception of squirrel, there is no good evidence for the consumption of nondomestic animals at this site. However, 17 bones (0.3 percent of assemblage) were either from cows or elk, suggesting the possibility that some large-game hunting was used to supplement domestically produced meat supplies.

Large percentages of the faunal assemblage consisted of bones from unidentified mammals and birds of various sizes. It is probable that, like the identified portion of the assemblage, these bones are from domestic animals. Thus, the unidentified large mammal bones (17.7 percent of assemblage) are probably from cattle or horses. Unidentified medium or large mammal bones (21.7 percent of assemblage) are probably from ovicaprids, though some unidentified pig bone might also be present. Few small or small/medium mammal bones were represented (0.07 percent of assemblage), and these specimens could be from a variety of domestic or wild animals. Unidentified bird remains comprised 0.25 percent of the assemblage, and probably represent chickens or turkeys, though the latter is speculative since no turkey remains were actually identified.

By pooling remains from strata it was possible to develop information on individual animal remains represented at the site (Bertram 1990:9); this information is presented in Table 11-7. A minimum of 71 animals are represented, 70 of which were probably used as food. The single dog in the assemblage was undoubtedly not consumed. Animals in this assemblage include cows

Table 11-7. Identified remains of individual animals from the Trujillo House, including estimated age at death and season of butchering, when available.

Provenience	Species	Approximate Age at Death	No.	Approximate Season of Butchering
Structure 1	sheep	mature	2	-
Room 2	cow	yearling	1	-
	sheep/goat	yearling	1	-
Structure 1	sheep	yearling	1	-
Room 4	sheep/goat	7 months	1 (+?)	fall?
		newborn	1	spring?
Structure 1 Room 5	sheep/goat	?	1	-
Structure 1	sheep	yearling or older	1	-
Room 8	sheep/goat	yearling	1+	-
Midden	goat	old	1	-
Stratum 11	cow?	?	1	-
Midden	sheep/goat	immature	1	-
Stratum 12	cow	?	1	-
	chicken	?	1	-
	sheep	?	1	-
		old	1	-
		immature	1	-
Midden	cow	old	1	-
Stratum 13		immature	1	-
	goat	old	1	-
	sheep	mature	1	-
		9-12 months	1	winter-spring
	sheep/goat	9-12 months	1	winter-spring
		2.5 years	1	-
	pig	10 month	1	winter
Midden	cow	old	1	-
Stratum 14	goat	yearling	1	-
	sheep	mature	1	-
	sheep/goat	infant	1	spring?
	pig	yearling	1	-
Midden	cow	old	1	-
Stratum 15	goat	yearling	1	-
	sheep	yearling	1	-
	sheep/goat	infant	1	-
	pig	yearling	1	-
Midden	cow	?	1	-
Stratum 16	goat	yearling	1	summer?
		3-4 years	1	-
	sheep	2.5 years	1	-
	sheep/goat	infant	1	-
Midden	cow	?	2	-
grids		yearling	1	-
excavated		old	2	-
by level	goat	yearling	1	-
		immature	1	-
		2.5-3.5 years	1	-
		old	1	-
	sheep	?	1	-
		immature	1	-
		8 months	1	winter
		mature	1	-
		2.5-3 years	1	-
		old	1	-
	sheep/goat	newborn	3	spring
		immature	1	-
		old	1	-
	pig	?	1	-
		7 months	1	fall-winter
		mature (1.5-3 years)	4	-
	chicken	?	2	-
	chicken/rabbit	?	1	-
	dog	?	1	-

(13), goats (10), sheep (17), pigs (9), and chickens (3). The exact species of several individuals was impossible to specify, including sheep/goat (17) and chicken/rabbit (1).

With the exception of chickens, for which no approximate ages were available, domestic animals were consumed at a variety of ages from newborn to old. Most cows were slaughtered when they were yearlings or younger, or when they were old. Mature, presumably productive, cattle do not seem to have been consumed. The same is not true of sheep and goats. With these species combined to account for individuals that could not be separated out, all age groups are represented. However, there appears to have been a tendency for animals to be slaughtered when they were yearlings or younger. Among the young sheep and goats consumed were two newborns, 12 immature individuals (less than a year old), and eight yearlings; these individuals represent 56 percent of the ovicaprid population. Eleven mature and six old individuals are also represented. Thus, animals slaughtered when still productive comprise 28 percent of the population, while those consumed before or after their productive years make up 72 percent. The few pigs represented in the assemblage follow a similar pattern, with 80 percent consumed when they were yearlings or younger; only one mature individual (20 percent) was slaughtered.

Individuals of little or no economic value dominate the three domestic large mammal species represented at the site. No cattle seem to have been consumed during their most productive years, and only small percentages of ovicaprids and pigs were slaughtered during those years. Individuals that were consumed tended to be yearlings or younger, or were past their prime. Animals in these age groups comprise about 77 percent of the aged population. Thus, productive stock was mostly retained, undoubtedly to continue producing progeny and adding to the rancher's moveable wealth.

Consumption seasonality information is available for 10 individuals, all newborn or immature. From these limited data, it is evident that animals were slaughtered in all seasons, though 90 percent were consumed between fall and spring. It is possible that this is an indication of seasonal transhumance, with herds being moved to higher pastures during the summer to take advantage of vegetation that was not accessible during most of the year. Unfortunately, data limitations make this proposal very tentative.

PART 4

Discussion, Interpretations, and Conclusions

CHAPTER 12

PREHISTORIC AGRICULTURE IN THE LOWER RIO CHAMA VALLEY

JAMES L. MOORE

INTRODUCTION

LA 6599 and LA 59659 were small and unimpressive when compared with the large multistoried villages of the Classic period that exist in the Rio Chama Valley. By considering them integral components of the Anasazi adaptive system, however, they assume an importance unrelated to size or complexity. While farming features are well documented in this region, few detailed analyses have been completed. This discussion summarizes information currently available on prehistoric farming features in the Rio Chama Valley, and addresses the organizational and ecological implications of such systems. After these subjects are explored it will be possible to place the excavated sites in a regional perspective.

DEFINITIONS OF FARMING FEATURES

Before describing the region's prehistoric farming system, definitions for the features that are discussed must be provided. Since the literature abounds with definitions, this should prevent confusion. Two classes of farming systems are recognized in this study: irrigation and dry-farming. Irrigation systems transport water from permanent sources through canals to fields. Lateral ditches, diversion walls, head gates, field borders, water spreaders, and retaining walls are features that are often associated with canals. Dry-farming relies on impermanent water sources like rainfall and runoff. Features used for dry-farming include terraces within gullies or on slopes, diversion walls, gridded plots, and ditches for distributing water. Water is sometimes collected from an area, or harvested, by dry-farming features for transport to fields.

The main difference between *canals* and *ditches* is the source of the water transported. Canals carry water from permanent sources to fields; ditches carry water from impermanent sources to fields. Thus, a canal moves water from a perennial stream or reservoir to a farming area, and ditches transfer water from canals, temporary holding ponds, or water-harvesting features to fields. The size of the channel makes no difference; a canal can be smaller than a ditch.

Check dams are linear alignments placed across erosional channels to trap soil and slow runoff velocity. Conservation-oriented *contour terraces* are linear alignments placed perpendicular to a slope to stabilize existing soil, trap eroded soil, and slow runoff velocity. These features are similar in construction and function, varying only in placement, and both provide small farming plots. A second type of contour terrace is supplemental in nature, and rather than being filled by natural processes is filled artificially. Thus, they supplement existing farmland by creating small plots on otherwise unusable slopes. These features are more costly to build and maintain than the conservation-oriented variety, and are rare in the Southwest.

Diversion walls fall into several categories. When placed across gullies they can deflect flow in a new direction. Water can thus be conducted into ditches, and some of that flow can be temporarily impounded for later use. Another variety occurs in combination with check dams or contour terraces, and helps conduct excess runoff from the system. Still another type acts as a spreading device in fields, redirecting water flow. These walls are often impermanent, and were built to ensure equal delivery of water through fields during a runoff episode.

Holding dams are built across erosional channels to impound water. The main difference between holding and diversion dams is that the former impounds water on a permanent basis, while the latter redirects flow, though temporary impoundment often occurs. The area holding water behind a dam is one type of *reservoir*. A second is an artificial excavation for storing water, whose source is runoff or diverted stream flow.

Grids are linear alignments subdivided into a series of cells forming a checkerboard of small adjoining plots. These features usually occur on level land surfaces or very gentle slopes, and are sometimes mulched with rock. *Headgates* occur in several types of systems. In canals and ditches they are used to regulate water flow. In contour terraces they are breaks that allow excess runoff to pass into lower parts of the system or exit without causing damage.

Functions of the More Common Types of Agricultural Features

Water and soil control systems can be divided into two broad categories. *Supplemental* systems represent an attempt to augment existing supplies of land or water by artificial means. *Conservation* systems have a similar function but also represent an attempt to reclaim or protect agricultural land from erosion. Canals, reservoirs, and artificially filled contour terraces are examples of supplemental systems. Although there is some evidence of prehistoric canals and reservoirs in the upper Rio Grande, no artificially filled contour terraces have been found in that region. The considerably more numerous conservation-oriented systems are the focus of this study.

Conservation-oriented systems can be further divided into erosion-control and water-harvesting systems. The former are built when erosion is active or expected. The latter actually combine purposes, and both conserve and supplement resources. Simply put, water-harvesting systems collect surface runoff from one area and move it to another. These types of systems in the Negev Desert often include areas that were stripped of surface stone to increase runoff, which was then channeled into fields (Evanari et al. 1982). Water-harvesting systems in the Southwest were usually simpler than those in the Negev, but the philosophy behind their construction was the same: water was collected from an unplantable area and redirected or transported to fields. While a few of the water-harvesting features in the Rio Chama Valley are described below, the main focus of this discussion is on features built to control or prevent erosion.

Controlling erosion is important for many reasons. Water erosion causes gullying, removes topsoil, and results in the loss of moisture that could be used for farming. It also causes soil to lose organic carbon, directly affecting the availability of associated nutrients like nitrogen, and indirectly affecting fertility by decreasing cation exchange capacity (Lowrance and Williams 1988:1445). Similarly, wind erosion removes topsoil, decreases the fertility and water-holding capacity of soil, and reduces agricultural productivity by abrading plant materials (Finkel 1986). Like water erosion, it can also remove organic material, causing soil structure to deteriorate, and reducing water-holding capacity and the availability of nutrients (Lyles and Tatarko 1986).

Check Dams and Contour Terraces

Check dams and contour terraces were the most common types of farming features built by the pre-Classic Anasazi, and were frequently used during the Classic period as well. These features occur in areas where erosion was a concern. Check dams were built across gullies to slow runoff and trap soil that would otherwise have been lost (Doolittle 1985; Finkel 1986; Hausenbuiller 1972; Herold 1965). They also prevent further downcutting by reducing the velocity of flow in the center of erosional channels (Finkel 1986:104). Properly built features retard the flow of water without stopping it completely, which can lead to erosion of depressions below dams (Finkel 1986).

Contour terraces stabilize soil on slopes, trap sheetwashed soil, and slow runoff (Finkel 1986; Foster and Highfill 1983; Herold 1965; Highfill 1983; Schwab et al. 1981). They are an important means of erosion control because they perform a function that no other conservation practice does: they control sheet and rill erosion by breaking slopes into shorter lengths (Finkel 1986; Foster and Highfill 1983; Highfill 1983). By intercepting runoff and slowing its velocity before it reaches erosional channels, gullies on and at the base of slopes are given a chance to heal (Highfill 1983:336). Thus, both water and soil are conserved by these devices, and they protect arable land at the base of slopes from gullying or being covered by sediments originating uphill (Doolittle 1985; Schmidt and Gerold 1988).

Gravel-Mulched Grids

Three basic varieties of grids have been found: earth-bordered, cobble-bordered, and gravel-mulched. Only a few earth-bordered grid systems have been identified in the northern Southwest because they are virtually invisible to surface inspection. A few systems of this type have tentatively been identified on La Bajada Mesa south of Santa Fe, but though easily identified from the air they are difficult to find on the ground (T. Maxwell, personal communication, 2002). No features of this type are currently recorded for the Rio Chama Valley. Cobble-bordered grids are common in other parts of the eastern Anasazi region, but it is the third variety—rock- or gravel-mulched grids—that are most common in the Rio Chama Valley. Gravel-mulched grids were considerably more expensive to construct and maintain than the cobble-bordered variety, but both were ultimately aimed at reducing the effects of erosion. Because of the probable connection between many cobble-bordered grids and rock piles, those features are discussed together later.

The high costs of gravel mulching may have been offset, at least temporarily, by benefits provided by this type of feature. Surface mulches are the best means of controlling runoff and erosion in fields (Mannering and Meyer 1963:84). Mulches intercept raindrops before they impact the soil surface, dissipating their force and preventing detachment of soil particles and sealing of the soil surface (Adams 1966; Epstein et al. 1966; Mannering and Meyer 1963). Gravel mulches are also effective in preventing wind-generated soil loss (Chepil et al. 1963; Finkel 1986).

Mulches increase and conserve soil moisture. A gravel cover increases the rate of water infiltration during rainfall and prevents soil surface compaction through raindrop impact (Corey and Kemper 1968; Epstein et al. 1966; Fairbourn and Gardner 1975; Wang 1972). They then conserve the increased supply of moisture by providing a barrier to evaporation (Adams 1966; Fairbourn and Gardner 1975; Wang 1972). Evaporative losses are minimized because large pores in gravel beds prevent the rise of moisture to the surface through capillary action, forcing water to move across the pores as vapor (Fairbourn 1973; Fairbourn and Gardner 1975:377). However, experiments suggest that when a gravel mulch is used, wind-generated evaporation rates are similar to or somewhat greater than those experienced by unmulched plots (Hanks and Woodruff 1958). Thus, the moisture-conserving benefits of gravel mulches may be partly offset by windy conditions.

In addition to erosion prevention and moisture conservation, gravel mulches can also affect surface temperatures. Unlike vegetal mulches which reduce the soil temperature profile, gravel mulches increase upper soil temperature (Adams 1965; Allmaras et al. 1964; Burrows and Larson 1962; Fairbourn 1973; Lamb and Chapman 1943; Van Wijk et al. 1959). This warming seems to be restricted to upper soils because of the effect increased soil moisture has on heat transfer. Moist soils transfer heat more readily than dry soils, but they also require more energy input per unit to raise their temperatures (Hausenbuiller 1972). Thus, the increased heat provided by gravel-mulching is probably only enough to raise temperatures in the upper 10 to 15 cm of soil. These benefits are more likely to accrue when dark-colored materials are used. Experiments demonstrate that dark gravels increase upper soil temperatures, while light-colored gravels do not (Fairbourn 1973:927). This is because the lower albedo of dark materials increases their radiation-*absorbing* capability (Wang 1972:440); the higher albedo of light-colored materials increases their radiation-*reflecting* capability.

The higher soil temperatures provided by gravel mulches can be beneficial during the early growing season. An increase in soil temperature during that time can stimulate the growth of corn seedlings, especially when the temperature is between 10 and 30 degrees C (Van Wijk et al. 1959). Gravel mulches have been shown to hasten corn germination by 2 to 3 days, and tasseling occurred 4 to 7 days earlier when compared to crops grown on bare soil or with vegetal mulches (Fairbourn 1973:927). Mulches stabilize air temperatures at and above the ground surface, and, like plant canopies, act as a barrier to radiant heat flow from below, minimizing soil temperature variation (Hausenbuiller 1972). By decreasing moisture loss through capillary action and reducing air movement next to the ground surface, they also curtail evaporative cooling (Wang 1972). This type of protection is important in areas like the Rio Chama Valley where late killing frosts are a problem (Cordell et al. 1984).

Though the benefits of gravel mulching are many, there are also problems associated with its use. Natural and cultural processes, including wind action, raindrop splash, and traffic across the surface of a mulch, can cause soil to mix with the gravel (Fairbourn 1973:928). This decreases porosity and increases compaction, reducing the moisture-conserving efficiency of the mulch. Thus, a gravel mulch should be regenerated annually to preserve its benefits (Fairbourn 1973). This is an expensive proposition, especially in an economy lacking mechanization.

Some evidence suggests that mulching reduces manganese availability in soils (Parker 1962); however, this study was conducted on fields mulched with vegetal materials, so some of the contributing factors may not pertain to gravel mulching. Gravel mulches can adversely affect crops on hot sunny days by reflecting heat upward and raising temperatures at the plant stem (Adams 1965). This risk can be offset by applying the gravel mulch in strips, leaving an area around plant bases bare (Fairbourn 1973). This effect can also be countered by using a vegetative canopy to shade the mulch surface. If economic weeds were allowed to grow alongside domesticates on gravel-mulched plots, the mid- and late-summer canopy could have provided enough shade to minimize this effect (Fairbourn 1974; Wang 1972).

Rock Piles and Cobble-Bordered Grids

Cobble piles are among the more puzzling features found in the Rio Chama Valley. In addition to those at LA 6599 and LA 59659, cobble piles are associated with Coalition and Classic period remains at LA 48656, and with extensive and varied farming features at LA 48679, LA 48680, LA 49452, and LA 53670 (Anschuetz et al. 1985; Vierra 1986). Rock piles commonly occur with other agricultural features at the edge of La Bajada Mesa, and probably resulted from field clearing both before and during cultivation (Acklen et al. 1984; Moore 1984; Moore and Harlan 1984). A linear alignment of cobble piles was found next to a fieldhouse at one site, an arrangement very similar to that found at LA 59659 (Acklen et al. 1984).

Cobble piles are also common in the Taos area. On Taos Pueblo grant land they often occur with cobble alignments and appear to be the result of field clearing (Greiser and Greiser 1989). Similar features were noted by Jeançon (1929) during a limited survey of the same area, and interpreted as tower bases. However, reexamination suggests they were actually farming features (Greiser and Greiser 1989). Steen (1976) recorded cobble piles at a site in Taos, some of which appear to have been farming features. Survey around Pot Creek Pueblo has located many agricultural devices, with cobble piles being among the most common (Moore 1994).

Cobble piles also occur in the Hohokam region. Many have been found in the Salt-Gila Basin (Crown 1984a, 1984b; Dart 1983; Debowski et al. 1976; Doelle 1976; Kearns et al. 1975), the Tucson Basin (Doyel 1977; Frick 1954; Hammock 1971; Masse 1979), and the Tonto Basin (Wood and McAllister 1984). The most intensive study of these features was at the Marana Community near Tucson (Fish 1987; Fish et al. n.d.; Fish et al. 1985; Fish et al. 1989). There it was concluded that rock piles were specialized features for agave cultivation, acting as a mulch to increase moisture infiltration. Similarly, Dart (1983) suggests that rock piles in the Gila Valley served as mulches, with planting occurring in and around the features.

This discussion illustrates the widespread distribution of rock piles in the Southwest, and suggests that they served different purposes in various regions. Rock piles in the upper Rio Grande probably represent materials cleared from fields before and during cultivation, but like other types of farming features they may have had several functions. This is suggested by the structure of features at BAN 10 at the edge of La Bajada Mesa (Moore and Harlan 1984). There, what appears to be an extensive agricultural system is, in fact, a series of small individual farming areas. Agricultural features cluster in discrete groups around fieldhouses, suggesting use by individual farmers or small co-operative groups. Since soils in that area are rocky, cobbles seem to have been removed during soil cultivation and placed in piles along field margins. The removal of stones from the surface reduces its roughness (configuration or microrelief of the soil surface), reducing the moisture infiltration rate and increasing the amount of runoff (Epstein et al. 1966; Evenari et al. 1982; Lamb and Chapman 1943; Lehrsch et al. 1988). Reduction of surface roughness can also increase the rate of soil loss through wind erosion (Hausenbuiller 1972; Tibke 1988).

As use of the fields continued, cobble piles were connected by low walls constructed from rock that either originated from further removal of cobbles during cultivation or from the stockpiles at the corners of plots. This process formed a series of small adjoining grids. As the agricultural potential of each grid was exhausted or more plots were required to increase production, the systems were expanded. Individual farming areas at sites along the edge of La Bajada Mesa often contain grids with unconnected rock piles along their periphery (Moore 1984; Moore and Harlan 1984). This suggests that the development of cobble-bordered grids was a dynamic process, with expansion of the systems occurring while they were in use. Construction of formal grids may have been prevented at some sites by the paucity of local cobbles, a low agricultural potential, or because erosion did not begin.

Connecting rock piles with low walls into a pattern of grids had two benefits. When the walls were stacked relatively high (30 to 40 cm) they may have served as heat reservoirs, storing energy during the day and releasing it at night. This is similar to a technique used by the Hopi, who plant early corn in narrow gullies where nocturnal heat radiation protects the young plants from frost (Bradfield 1971; Hack 1942). A second benefit is the prevention of both water and wind erosion. Cobble borders restore some of the surface roughness lost during clearing for cultivation, creating a barrier to runoff. By eliminating or significantly reducing the velocity of runoff from plots, the amount of soil removed by erosion is decreased. Similarly, cobble borders may have helped reduce soil loss from wind erosion. In structure and function, cobble borders resemble the low earth ridges that are recommended for reducing wind-caused soil loss in modern farming (Armbrust et al. 1964; Hausenbuiller 1972; Schwab et al. 1981; Tibke 1988). Like earth ridges, cobble borders create a surface configuration of alternating ridges and depressions. The depressed areas behind borders trap saltating soil particles by causing a change in surface air-flow patterns, stopping them from detaching other particles through impact and causing deposition of particles already in motion (Finkel 1986; Schwab et al. 1981; Tibke 1988). By forming closed grids, farmers were able to eliminate the need to align features perpendicular to prevailing winds (Finkel 1986; Schwab et al. 1981).

The generally small size of individual grids may have helped decrease the risk of wind erosion. Both the narrow width of gridded plots and the close spacing of grid walls reduce soil loss: the total amount of soil set in motion by wind is related to the distance particles can move without being obstructed (Hausenbuiller 1972:408; Lyles 1988). Thus, by limiting the width of fields by spacing grid borders closely together, saltating soil particles were able to move only a short distance before meeting an obstruction.

The collection of cobbles into piles defining the boundaries of farming plots may have been an early stage in the development of some prehistoric fields, and was probably responsible for the rock piles at LA 6599 and LA 59659. Formal construction of cobble borders may only have begun when soil started eroding or when enough raw materials were stockpiled. Since closed grids were never constructed at these sites, it is likely that erosion never began or the fields were abandoned before soil loss became a problem.

Though many benefits are gained by construction of cobble-bordered grids, there are also deficits. Gridding helps retain runoff, but it also alters surface drainage patterns, preventing other sources from contributing moisture to many plots. While cobble borders retain soil, they also prevent its replenishment by sediments washed in from nearby. This would have been particularly detrimental if entire plants were removed after harvest. A net loss in soil fertility over time would have necessitated the expansion of individual systems—a process that seems to have occurred.

Implications of Water and Soil Control

When man-made farming features occur they are usually indicative of real or perceived stress on the food production system. They may be built to relieve a food production deficit or to provide more security and/or predictability to the food production system, and are either oriented toward resource conservation or supplement. The resource being conserved or supplemented can take various forms. Where erosion is a concern, features that conserve arable land by countering the effects of gullying and soil loss can be built. When arable land or water are in short supply, systems that augment existing resources can be built. By examining the types and placement of features in a region and the techniques used to construct them, an idea of the resource under stress can be gained.

The construction of water and soil control systems is one in a series of possible responses to a population/food resource imbalance (Moore 1981). The least expensive option is switching to an alternate food source, such as increasing the proportion of hunting and gathering to farming, or complete reversion to hunting and gathering for a time. If this response is not possible, the use of more extensive farming techniques is a second alternative. More labor is expended in farming larger or more scattered and distant fields than before, but the overall cost increase is not very high. If the distribution of arable land or population precludes switching to more extensive farming methods, movement to an unused part of the local region is a somewhat more expensive alternative. This type of movement entails a large initial labor investment, but in the long run labor costs will remain nearly the same as before. If these options are closed it may be necessary to adopt more intensive farming methods to alleviate stress without requiring new territory or access to resources for which there is already heavy competition. The cost of this option will vary according to the technique selected. The building of extensive canal systems like those of the Hohokam, or elaborate terraced fields like those of the Inca would incur considerable construction and maintenance costs. Construction of less elaborate gridded fields, check dams, and contour terraces would require less labor, but would still necessitate more energy input over time than other options. When both construction and maintenance costs are considered, the use of intensive farming techniques is likely to be the most expensive alternative available at the local level.

This sequence of options is not necessarily linear. Rather than intensifying the farming system, a population might choose to combine slightly higher dependence on wild foods with a somewhat more extensive farming system, keeping labor costs low while temporarily solving the population/food resource imbalance. Rather than moving elsewhere within the local region, a group might adopt more intensive farming methods, or combine intensification with a more extensive system, constructing agricultural features in association with fieldhouses. Thus, solving a population/food resource imbalance may not be as simple as the model suggests.

Two other mechanisms for relieving stress on the food production system must also be considered. The first is use of alliance networks to redistribute population or supply needed food in exchange for other goods. Alliance networks can temporarily alleviate food production shortfalls, but are generally ineffective against long-term or permanent imbalances. The final solution is movement to a completely different region. This type of migration requires considerable labor input: not only must new homes be built and new farmland cleared and prepared for cultivation, new alliance and exchange networks must often also be established. At times these tasks may have to be completed in the face of hostile locals resentful of the unfamiliar element in their midst.

As examples of more intensive farming methods, water- and soil-control systems are indicative of the types of stress affecting a population, and point to the alternatives that are no longer open. When this option is adopted, the ability to fall back on hunting and gathering, use more extensive farming methods, move elsewhere within the local region, or use alliance ties to redistribute population or exchange goods for food are either closed or in use but unable to correct the imbalance.

The cause of a population/food resource imbalance is often difficult to discern, but can include climatic change, population growth, environmental deterioration, a local catastrophe, or a combination of some or all of these. The solution selected to correct the imbalance can depend on social organization as well as the source of the stress. Societies capable of fielding large cooperative groups may undertake large-scale projects, while those capable of mustering only small cooperative groups may proceed in a more piecemeal fashion.

Agricultural Features in the Lower Rio Chama Valley

The earliest descriptions of farming features in the lower Rio Chama Valley were provided by Bandelier (1892; in Lange et al. 1975). Based on experience gained in Sonora and southern Arizona, Bandelier described grids and contour terraces near Homayo, Pose'ouinge, and Sapawe, noting heavy gravel mulching in the latter grids (in Lange et al. 1975: 91). According to one of his informants there were traces of "ancient ditches" close to a ruin which lay near the road to Abiquiú, possibly Poshu'ouinge (Bandelier 1892:53). Conversely, he was assured by other informants that no prehistoric "irrigation ditches" had been found in the Ojo Caliente Valley (Bandelier 1892:40).

Hewett (1906) described numerous grids on a mesa south of Abiquiú which he mistook for the remains of structures, an error made by more than one investigator. Bandelier (1892:51) recognized this problem early on, noting that the linear stone alignments he characterized as gardens were frequently mistaken for foundations. Rather than foundations, Jeançon (1923:71) mistook farming features around Poshu'ouinge for shrines. However, he did recognize the remains of fields near Peseduinge, describing linear stone alignments with associated ditches (Jeançon 1911). These may have been the remains of water-harvesting systems.

During investigations in the Rio Chama Valley between 1929 and 1933, Greenlee (n.d.) found and described many farming features, mistaking several for the remains of villages. Thus, his Frijoles Creek Ruin, upper Abiquiú Ruin, Plaza Colorada Ruin, and "foundation type" ruins along El Rito Creek were probably farming complexes rather than villages. He discussed the grids near Homayo that Bandelier (1892) had described, noting their resemblance to his "foundation type" ruins, but rejecting the possibility that his were anything other than villages. An "old Indian ditch" was seen west of Sapawe, and some of the canals in use near Tsama were considered prehistoric, but no justification for this opinion was provided.

Hibben (1937) found extensive grids during his Rio Chama Valley survey, and concluded they were fields. Leubben (1951, 1953) noted numerous gravel-mulched grids around Leafwater Pueblo (Kap), extending in both directions along the mesa edge from that site. A probable borrow pit was trenched, as was a grid system next to the village. The grids were built on slumped material from the outer wall of the pueblo and postdated occupation of the village, suggesting that the area continued to be used for farming after Leafwater was abandoned (Leubben 1951). A few contour terraces were also found nearby. Peckham (1981) noted a similar feature near Palisade Ruin.

Several investigations have examined farming features near Sapawe. Skinner (1965) described 24 fieldhouses and two rectangular cobble-bordered fields. Ellis (1970) documented contour terraces, cobble-bordered and gravel-mulched grids, check dams, diversion walls, and canals. Tjaden (1979) located 20 grids, eight with one-room fieldhouses in association. Numerous undocumented systems containing gravel-mulched grids and other features have also been observed around Sapawe.

Fiero (1978) found gravel-mulched grids and cobble-bordered fields at three sites on a terrace north of the Rio Chama, opposite Abiquiú Mesa. Cobble-bordered fields, gravel-mulched grids, and stone-lined channels associated with floodwater fields were recorded near Ponsipa'akeri (Bugé 1984, n.d.a, n.d.b). Gravel-mulched grids, check dams, and contour terraces were found near Howiri (Fallon and Wening 1987), and a gravel-mulched grid complex was recorded near Te'ewi (Lang 1980). At least one reservoir has been noted at Tsiping (Dougherty 1980). Cobble piles and alignments, cobble-bordered and gravel-mulched grids, contour terraces, and borrow pits occur near Medanales (Anschuetz et al. 1985; Vierra 1986). Similar systems have also been recorded and investigated on terraces above the Rio Chama west of Abiquiú (Moore 1992).

From this discussion, it is obvious that agricultural features are common in the lower Rio Chama Valley. They range in size from individual grids as small as six meters square to complexes covering most of a mesa or terrace top. The types of features found include cobble-bordered grids, gravel-mulched grids, borrow pits, cobble piles, contour terraces, check dams, ditches, diversion walls, and possible canals.

Precise dating for the construction and use of most farming features is difficult. Few contain cultural deposits or have diagnostic artifacts in clear association. Fortunately, dating is not as big a problem in this region as it is in others. As discussed in Chapter 4, there was no sizeable farming population in this area until the Classic period. Though there was a small Coalition period farming population, it is unlikely that the numerous agricultural features were constructed during that phase. The Rio Chama Valley was abandoned by pueblo farmers by A.D. 1620 at the latest. Thus, these features were built between A.D. 1325 and 1620.

Comparison with Other Regions

A detailed overview of the distribution of farming features in the Southwest is beyond the scope of this discussion. Moore (1981) has addressed this topic, and shows that contour terraces, check dams, grids, holding and diversion dams, reservoirs, canals, and ditches were common to the Anasazi, Mogollon, and Hohokam regions. However, since grids are the most common features in the Rio Chama Valley, their distribution in the Southwest is discussed.

Grids have been documented in northern Mexico along the Magdelena River (Huntington 1914) and near Casas Grandes (DiPeso 1974). While canals have received most of the attention in the Hohokam region, other features, including grids, are also common. Grids occur in many parts of the Salt-Gila Basin around Phoenix. They have been found at Gila Buttes (Rice et al. 1979), along Cave Creek (Ayers 1967; Holiday 1974), along New River (Dove 1970; Doyel 1984; Weed 1972), near Florence (Crown 1984a, 1984b; Dart 1983), and at the confluence of the Gila and Verde Rivers (Kearns et al. 1975). Grids have also been recorded in the Tucson Basin (Masse 1979). In the Mogollon region, grids are found near Gallo Mountain (Kayser 1972), possibly around Grasshopper Pueblo (Tuggle et al. 1984), and in the Mimbres area (Herrington 1979).

The Anasazi region can be divided into two subareas: western and eastern. The western subarea encompasses the San Juan, Kayenta, Sinagua, and upper Little Colorado districts; the eastern subarea includes the Chaco and upper Rio Grande districts (Cordell 1979b; Plog 1979). In an overview of the Kayenta district, Lindsay (1970) observed that farming features, including grids, were built after A.D. 1150, and became increasingly common until the region was abandoned around A.D. 1300. Grids have also been documented in the Verde Valley (Fish and Fish 1984; Mindeleff 1896), at Walhalla Glades on the north rim of the Grand Canyon (Hall 1942; Judd 1926; Schwartz et al. 1981; Jones 1987, n.d.), and along Beaver Creek in southeastern Utah (Lindsay 1961).

Grids are common in the eastern Anasazi region, particularly the Rio Chama Valley, as discussed earlier. They have also been found near Picurís Pueblo (Gauthier et al. 1978; Nemaric 1975; Woodbury n.d.), on the Pajarito Plateau near San Ildefonso (Moore and Levine 1988), and in White Rock Canyon (Steen 1977). Numerous complex systems occur at the south edge of La Bajada Mesa, in some cases combining grids, contour terraces, and check dams with fieldhouses (Moore 1984; Moore and Harlan 1984; Stein 1976). Stevenson (1894) noted mesa-top grids near Zia which her informants identified as fields. Wiseman (1979) found systems containing grids, contour terraces, and fieldhouses near Zia. Cobble-bordered and potentially gravel-mulched grids with possible nearby borrow pits have been found in the Galisteo Basin (Doleman et al. 1979).

Grids are widely distributed and common in the Southwest. Focusing on the eastern subarea and the San Juan district of the western subarea, the distribution of grids is quite interesting: they are almost exclusively associated with the region occupied after the population dislocations of the late thirteenth and early fourteenth centuries. Grids were widely adopted in the region only after the San Juan and Chaco areas were abandoned. Definite evidence of gravel mulching in combination with gridding has been documented nowhere else in the Southwest (Maxwell and Anschuetz 1987), with one possible exception along the Gila River (Dart 1983:410). Thus, both cobble-bordered and gravel-mulched grids were probably used to adapt to new environmental conditions encountered by the migrant populations of the late thirteenth and early fourteenth centuries.

Adaptation to the Lower Rio Chama

In order to understand the Anasazi adaptation to the Rio Chama Valley, it is necessary to consider the origin of that population and the reasons they left their former homes. Most researchers feel that the source of this population was the upper San Juan district. Whether their migration was direct or indirect is undetermined. Here, it is believed that initial movement was into the Rio Grande Valley, with continued immigration and population growth causing the eventual settlement of more agriculturally marginal zones like the Rio Chama Valley. The lack of direct ties to the presumed forebears of this population is partly explained by Beal (1987:121): "Because of time, distance, and poor economic and social environments, few aspects of the original culture would remain unchanged. Consequently, archaeologists should anticipate diluted, changed and modified technology rather than specific technological replicas of the Chacoan or San Juan cultures in other areas."

Agriculture is one of the areas in which modified technology might be expected. In adapting to a new region with different ecological constraints, innovations in farming techniques were probably needed, and seem to have been developed.

The Great Drought of A.D. 1276 to 1299 is often cited as the cause for Anasazi abandonment of the Four Corners region. Yet this is a simplistic explanation that resolves nothing. Earlier droughts of greater magnitude and duration occurred without causing abandonment, so why was the drought of A.D. 1276 to 1299 so disastrous? The presence of extensive farming features is a clue to the processes involved. The most common agricultural features in the Four Corners region are contour terraces and check dams—devices oriented toward conservation, and which suggest an active erosional regime.

Vivian (1974) linked construction of farming features in Chaco Canyon to a period of erosion resulting from summer-dominant rainfall developing after A.D. 900. However, Cooke and Reeves (1976) indicate that the process of gullying and arroyo cutting is more complex than Vivian's (1974) scenario suggests. Gullying can have many causes, including changes in the erodability of materials through alteration of vegetative patterns, weakening of soil structure, masking of vegetation and soil by sediment, increased erosiveness of flow resulting from an increase in slope or hydraulic radius, and reduction of surface roughness. Thus, reduction of the vegetative mat caused by residential and farming activities as well as exploitation of the local plant community could cause or accelerate erosion, particularly if accompanied by summer-dominant rainfall. Evans and Patric (1983) demonstrated that the amount of runoff from a forested tract is substantially increased by removing more than 20 percent of the tree cover, and soil erosion is substantially accelerated when regrowth is prevented, as would occur in densely populated areas. Experiments in the Negev by Tadmor and Shanan (1969) showed that the amount of runoff on shallow slopes triples when protective vegetation is removed. Certain soil types (e.g., silt loams and silty clay loams) form protective crusts which are resistant to wind erosion during rainfall (Finkel 1986). Disturbance of these crusts during farming or other use of an area can lead to erosion. Thus, human manipulation of local environments can be a major factor in environmental deterioration and the onset of erosion.

Examples from other areas link the development of farming features to deterioration of local vegetative communities and farm land. The Pueblo II and early Pueblo III periods saw the greatest expansion of the Chacoan system in northwestern New Mexico, which was accompanied by the highest population densities in the region. Coinciding with this population growth, increased precipitation and summer temperatures prevailed between A.D. 900 and 1100, followed by a period of summer drought that lasted until A.D. 1180 (Gillespie 1985). It was during this period that most of the farming features in the region were built. Floral and faunal evidence from Chaco suggests that human activities caused deterioration of local vegetative communities (Nancy Akins, personal communication, 2001). Packrat midden studies by Betancourt and Van Devender (1981) indicate that there was a drastic reduction in piñon-juniper woodlands after A.D. 700, and suggest that Anasazi use of wood for building and fuel aggravated the effects of a changing climate. Floral studies by Toll (1985) show that fuels were dominated by shrubs during the early years of occupation, with piñon and juniper dominating the later years of occupation. This may mean that the shrubs that were preferred for use as fuel were no longer common around human residences. The use of wild perennials for food decreased over time, and the smaller size of later corn cobs suggests reduced agricultural productivity (Toll 1985:268). All of these data imply that the Anasazi occupation of Chaco Canyon had considerable impact on the local environment.

Similar trends occurred in the Mimbres area, where population growth was also tied to a period of optimal climatic conditions. During the first two-thirds of the Classic Mimbres phase (A.D. 1000 to 1100) there is evidence for an unusually favorable climatic regime accompanied by massive population growth (Minnis 1981; Stuart and Gauthier 1981). Climatic conditions were less favorable during the last 50 years of the phase (A.D. 1100 to 1150), which may have initiated a population/food resource imbalance by decreasing crop yields. Environmental deterioration linked to farming practices has been suggested for the Mangas Valley (Van Asdall et al. 1982), and throughout the region there is evidence of increased reliance on smaller and more diverse animal species (Stuart and Gauthier 1981). These trends were accompanied by construction of agricultural features and expansion of farming systems into higher elevations (Minnis 1981). Thus, at a time when stress was placed on the food production system by climatic change and environmental deterioration linked to residential and farming practices, an attempt was made to correct the imbalance by combining increased reliance on wild foods, intensification of the agricultural system, and expansion of farm lands into less favorable zones.

In both of these examples, construction of conservation-oriented farming features accompanied population growth and environmental deterioration during a time when climatic conditions were favorable for farming. Increased use of wood for building and heating, clearing of additional fields, and use of more wild plant foods probably contributed to reduction of the vegetative mat, causing erosion in the areas experiencing the most use. Thus, the environment was already under stress when the climate became less favorable for farming. Collapse of the Chaco system by A.D. 1130 and the Mimbres by A.D. 1150 illustrates the inability of both to cope with the hardships imposed by that climatic shift, but the roots of each collapse were firmly set in place before the climate changed. Cooler, drier conditions after A.D. 1100 simply speeded the process. If favorable climatic conditions had continued, perhaps the crisis would have arrived more slowly and the organizational systems would have been able to overcome their mounting problems.

Unfortunately, they could not adapt to climatic change on top of the deterioration of farmlands and continued population growth.

Similar trends are also visible in the upper San Juan district. Two demographic peaks are recognized in areas occupied during the Pueblo III period (A.D. 1100 to 1300): the first around A.D. 900, and the second after A.D. 1100 (Nickens and Hull 1982). Although the first peak occurred in many districts, the second was restricted to the Mesa Verde and southwestern Yellowjacket districts (Nickens and Hull 1982). Pollen and botanical studies suggest that environmental deterioration accompanied residential and agricultural use. Studies of fuel wood consumption in the Dolores area suggest that Anasazi farming and fuel gathering practices substantially decreased local woodlands (Kohler and Matthews 1988:560). Soil samples from check dams on Wetherill Mesa yielded corn pollen, implying that they were used as farm plots (Martin and Byers 1965). The amounts of *Zea* and *Cleome* (a possible cultigen or economic invader) pollen decreased in later deposits while arboreal pollen increased, suggesting that reforestation occurred late in the occupation or after abandonment (Martin and Byers 1965). Wyckoff (1977) examined pollen samples from Mummy Lake and concluded that low arboreal pollen densities near the bottom of the reservoir demonstrated that little forest cover existed before abandonment. An increase in arboreal pollen concomitant with a decrease in nonarboreal pollen densities in later samples was interpreted as evidence of secondary forest succession after abandonment. Studies of bone refuse and coprolites seem to corroborate these findings, and suggest that shrub and grasslands developed as the area was deforested during the Anasazi occupation (Stiger 1979). Minnis (1989) re-examined most of the coprolite data for the Four Corners area, and suggests that a decrease in the consumption of piñon during Pueblo III times at Mesa Verde might reflect the clearing of woodlands for fields.

Disturbance of natural vegetation for building materials, fuel, and farming causes erosion (Evans and Patric 1983; Tadmor and Shanan 1969). This process is confirmed by the presence of numerous check dams and contour terraces in the Mesa Verde area (Hayes 1964; Rohn 1977), one of the two districts that was heavily occupied until A.D. 1300. Evidence suggests that those systems were built near the end of the occupational sequence (Rohn 1977), and erosion was already occurring when they were built: check dams predominate, and most were constructed on exposed sandstone at the bottoms of erosional channels (Stewart and Donnelly 1943). Final abandonment probably resulted from environmental deterioration caused by heavy farming and residential use, exacerbated by the Great Drought. While earlier droughts were more severe, the drought of A.D. 1276 to 1299 struck when the food production system was already under stress. Like the Chacoan and Mimbres systems, the San Juan collapsed, unable to successfully adapt to the changing environment.

A Model for Farming in the Lower Rio Chama Valley

The small Coalition period farming population of the Rio Chama Valley had little need for intensive agricultural methods. Land was plentiful during this first period of settlement, and there was probably little competition for prime farming areas. Expansion of the population during the early Classic period radically altered this situation.

Conditions prevailing during the Classic period necessitated agricultural expansion into environmental zones that were less desirable for farming. Competition for prime farmlands by the much larger population of this period is an oversimplistic explanation for this phenomenon; several causes were probably responsible. A small farming population can afford to concentrate its agricultural efforts in one or a few zones. A temporary shortfall caused by partial or even total catastrophic crop loss could be corrected by increasing the amount of wild animal and plant food in the diet, or by redistributing the population through an alliance network. This is more difficult to achieve when the population is large and in competition for every available resource. To buffer against disaster in that case, a variety of topographic and environmental zones should be exploited to prevent a single catastrophe from affecting the entire crop and causing a severe population/food resource imbalance.

A sophisticated dry-farming system, possibly in combination with irrigation, was used prehistorically in the Rio Chama Valley. Maxwell and Anschuetz (1987) define two basic varieties of agricultural land: fields and gardens. Fields are a distance from residential sites, are generally monocropped, require less tending than gardens, and may or may not contain specialized features. Gardens are usually near residences, are cropped with a variety of specialty plants, require a lot of attention, and may contain formal features. Both are found in the lower Rio Chama Valley.

Fields can be divided into two basic types: irrigated and dry-farmed. Both types are shown in Fig. 12-1, which illustrates an idealized distribution of water and soil control devices in a river valley. While irrigated fields may have existed along the Rio Chama and its tributaries, evidence of their presence has been obscured by historic farming. Thus, it is currently impossible to determine whether the canals reported by Bugé (n.d.a) in the

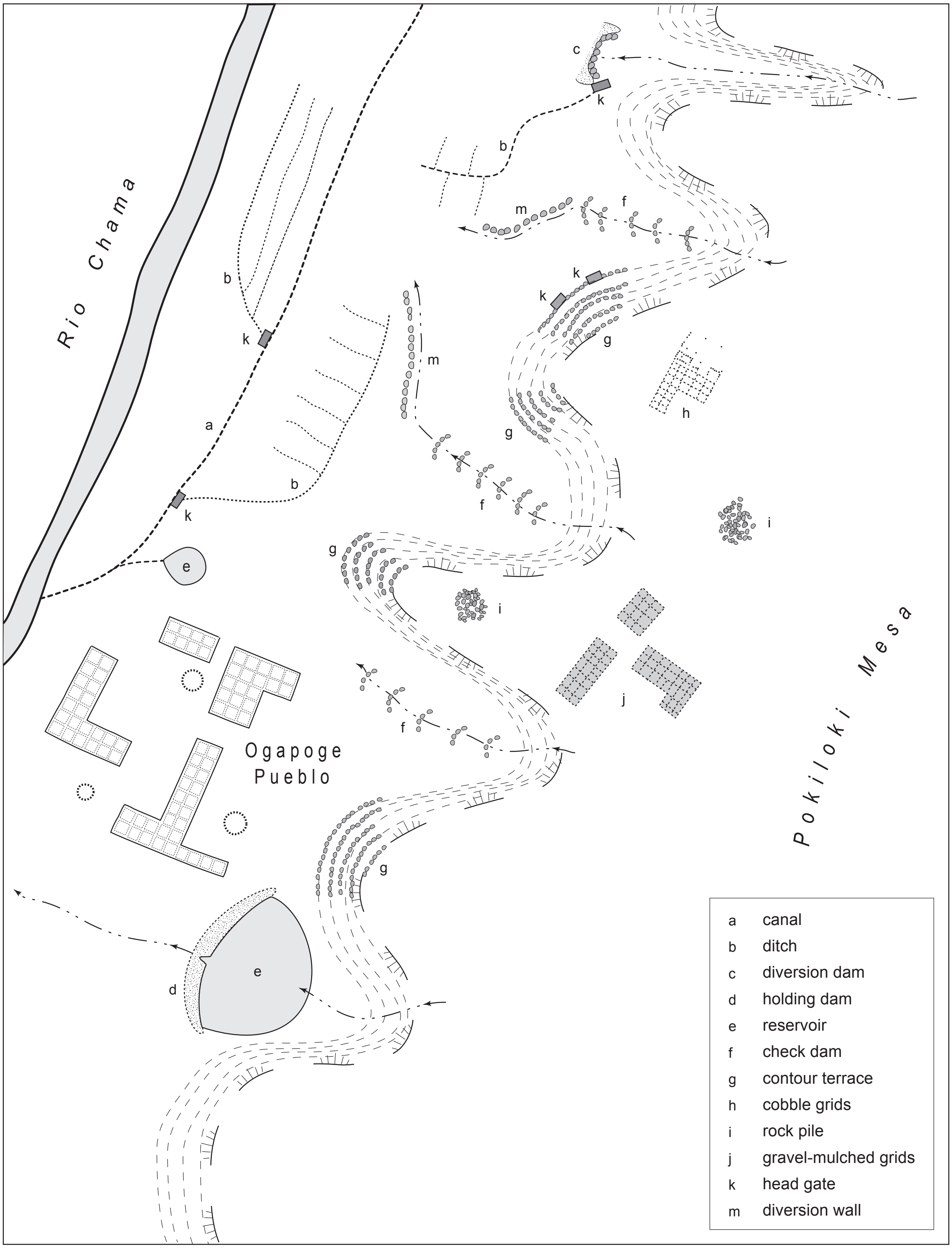

Figure 12-1. Idealized distribution of water and soil control features.

Ojo Caliente Valley, and by Ellis (1970) in the El Rito Valley are of prehistoric or historic origin. Though the existence of prehistoric canals is questionable (Wozniak 1986), if used they would have effectively extended the supplies of watered bottom lands.

A few prehistoric dry-farmed fields have been documented. Jeançon (1911) noted 60-to-300-m-long terraces northwest and southwest of Peseduinge that probably represent dry-farmed fields; ditches were associated with those northwest of the village. Fields near Ponsipa'akeri were usually at the mouths of secondary drainages and sometimes contained grids or slab-lined ditches that distributed water diverted from gullies (Bugé n.d.a). Many of the cobble-bordered plots described by Bugé (1984, n.d.b), Fiero (1978), and Skinner (1965) were dry-farmed fields containing formal features. Dry-farmed fields were placed in valley bottoms and on river terraces, and the heavy use of mesa tops for gardens suggests that they occurred there as well.

The amount of labor attending construction and maintenance of gravel-mulched grids suggests that they were gardens rather than fields. These features occur on terraces and mesas along the Rio Chama and its principal tributaries, and are often found near Classic villages and fieldhouses. Cobble-bordered grids, contour terraces, and check dams are often associated with gravel-mulched grids, and were probably also used as gardens. Piles of cobbles also sometimes occur with these features, and appear to have been related to farming.

The large size of many grid complexes argues against a garden function, and for use as fields. However, the size of these complexes can be explained by exploring some of their limitations. Gravel mulching may be an efficient short-term means of buffering against adverse environmental conditions, but in the long run it can incur massive labor costs. Continued cropping without replenishing soil nutrients and mulch porosity limits the long-term effectiveness of these features. A gravel mulch should be renewed annually to retain its effectiveness, and considering the comparative labor costs it may have been cheaper and easier to build new grids than to clean and renew the old plots (Fairbourn 1973:928; Maxwell and Anschuetz 1987:33). Thus, the number of gravel-mulched grids in the Rio Chama Valley may be deceptive. As gridded plots declined in productivity, the system was probably expanded by construction of adjacent grids. The lower cost of building new grids compared with cleaning and remulching the old ones undoubtedly made this process more economical. It also explains the extreme variation in the number of grids comprising individual systems, like those recorded by Tjaden (1979) which contain between 1 and 58 grids. It is likely that only a few grids in a complex were used concurrently, and that older grids, whose productivity had been sharply reduced by one or more seasons of cropping, lay abandoned while newer grids were built and used.

The prehistoric farming system in the Rio Chama Valley was dynamic, exploiting a variety of topographic and environmental zones. Irrigated fields may have existed in valley bottoms. Dry-farmed fields were scattered among valley bottom and margin, terrace top, and probably mesa top locations. Gardens were built near major villages and fieldhouses, occurring on low terraces, high terraces, and mesa tops. The diverse locations of fields and gardens reflect a need to buffer against the adverse effects of local ecological conditions, both natural and human-caused.

Potential disasters that required buffering against included untimely floods or prolonged inundation of the floodplain, early or late killing frosts, unpredictable or insufficient rainfall, pests, disease, and erosion. Scattering fields through a number of topographic and environmental zones was a partial solution to several of these problems. By distributing fields through a variety of zones rather than concentrating on one, loss of the entire crop through flood, drought, infestation by pests, or disease was avoided. This pattern also took advantage of the unpredictable nature of summer rainfall: by scattering fields across the landscape, farmers were able to increase their chance of having at least part of the crop watered by localized storms.

Several methods were used to prevent crop loss from early or late frosts. Because of cold air drainage patterns, bottom lands are often cooler at night than adjacent highlands (Anschuetz and Maxwell 1987). Studies at Hopi and Mesa Verde demonstrate that cold air drainage can significantly shorten the length of the growing season in valleys (Adams 1979; Cordell 1975). By planting fields on terraces and mesa tops flanking the Rio Chama Valley, some of the risk presented by unseasonal frosts was avoided, and the growing season was probably lengthened by at least a few days. Planting in narrow gullies also helps reduce frost loss because gully walls absorb heat during the day and radiate it at night, producing higher air temperatures than occur in unprotected locales (Bradfield 1971; Hack 1942). No fields of this type have been found in the Rio Chama Valley: evidence of their existence would have been eradicated by erosion. However, gravel mulches probably worked in a similar fashion, storing radiant heat during the day and releasing it at night. As noted earlier, gravel mulching also increases upper soil temperatures and stabilizes air temperature just above the ground surface, helping prevent frost damage.

Loss of crops, arable land, and moisture through rapid runoff and erosion was countered in several ways. Check dams and contour terraces help slow or stop erosion after it begins, but these types of features are not common in the region. The main causes of erosion may have been at least partially countered at their source. Cobble-bordered and gravel-mulched grids replaced the surface roughness that was lost through damage to the vegetative mat and by the removal of stones from fields. Cobble borders slowed runoff by presenting barriers to flow, and gravel mulching prevented raindrops from impacting on bare soil. They were also effective at reducing wind erosion, which is a prevalent danger in arid and semiarid regions (Lyles 1988). Thus, construction of both varieties of grids may have been stimulated by familiarity with erosion resulting from residential and agricultural impact, and may in part have been an attempt to minimize its effects or prevent the process from beginning. Check dams and contour terraces were built to reduce the damage caused by erosion where it did occur.

Social Implications

Both the structure of water- and soil-control complexes, and the presence of a unique type of device have important implications. The structure of farming complexes may be indicative of certain facets of social organization, while the presence of a unique variety of water- and soil-control features may be evidence of information ties with other regions.

Social Organization

The Anasazi normally used farming strategies that required no managerial control over water use, with Chaco Canyon being a possible exception (Vivian 1974:95-96). As Ford (1977) demonstrated for the Rio Grande Pueblos, a central authority regulating water-use rights is not essential to an irrigation system, but a sizeable cooperative group is. Water allotment is regulated by ritual and custom rather than centralized authority. This is similar to irrigation systems in the Swiss Alps, which are self-regulating, and where control is based on an intricate system of individual water-sharing agreements and rights rather than centralized authority (Netting 1974). These systems are maintained by the cooperation of a large group of interested individuals rather than by one or more people with vested powers. Netting (1974:74) suggests that formalization and clarification of rules and rights, a rationalization of distribution, and centralization of controlling power may develop: (1) when the source of water is not locally controlled, and rights in it must be purchased, rented, or acquired by force and thereafter defended from other communities competing for the same resource, and/or (2) when the building and maintenance of the canal system require the joint efforts of several otherwise independent communities.

Spooner (1974:48) agrees with this concept, and separates small- from large-scale irrigation systems based on whether they are operated by one or several villages. Large-scale systems require a degree of centralized organization that small-scale systems do not.

If prehistoric irrigation existed in the Rio Chama Valley, it was on a small scale. The possible canals described by Bugé (n.d.a) and Ellis (1970) were small and probably associated with individual villages. There is no evidence of intervillage cooperative waterworks or conflict over water resources in the valley. The tradition of small-scale irrigation systems regulated by large cooperative groups rather than centralized authority that prevails among the modern Rio Grande Pueblos may be a continuation of the prehistoric system.

Most of the farming complexes in the study area contain discrete clusters of features, either with or without associated fieldhouses. This resembles the distribution of dry-farming systems on the Deh Luran Plain of Iran, which Neely (1974) interpreted as evidence of distinct socioeconomic groups, either nuclear or extended families. This interpretation probably applies to the farming complexes of the Rio Chama Valley, and suggests that farming was accomplished by small cooperative groups. Keeping in mind the lack of intensive studies and systematically collected data, any conclusions concerning social structure are tentative. Yet a few statements can be made, and as more data become available they can be tested and refined.

The structure and distribution of agricultural sites in the Rio Chama Valley suggest that the basic cooperative unit was small, perhaps composed of nuclear or extended families. As shown by Schwartz's (1970) study of ethnographic migrations, construction of larger and better planned communities in early postmigration sites may reflect wider group cooperation. If irrigation systems were present, they also suggest the existence of larger cooperative groups without necessarily implying a centralized authority. It is likely that the basic cooperative group was small, but that a wider network of individuals or families sometimes cooperated on large projects like village and irrigation system construction.

Information Ties

Maxwell and Anschuetz (1987) feel that gravel-mulched grids are unique to the upper Rio Grande region, and are without prehistoric analog in the Southwest. While it is true that, with one possible exception (Dart 1983), the only gravel-mulched grids known to exist in the

Southwest are in the upper Rio Grande, prehistoric analogs may exist.

Knowledge of gridding and gravel-mulching may have been available through information ties to distant regions. While formalized trade probably never existed in the Southwest, goods and information were exchanged. Widespread communication systems were in existence as early as the Archaic (Irwin-Williams 1979; Moore 1980), and continued through the Pueblo period. This is evidenced by the presence of trade goods from distant regions in many sites: Hohokam, Mogollon, and western Anasazi pottery is found in the eastern Anasazi area and vice versa; items with intrinsic and perhaps material value like marine shells, turquoise, macaws, obsidian, and copper bells were widely exchanged; some ceremonial institutions like the kachina cult may have spread through such linkages (Doyel 1991; Eddy 1966; Gladwin et al. 1938; Haury 1976; Hayes and Lancaster 1975; Plog 1989; Rohn 1971; Schaafsma and Schaafsma 1974; Toll 1991; Windes 1977).

It is possible that knowledge of gridding was available from regions where such techniques were used at an earlier date. Because material goods were exchanged between regions, it is likely that information flowed along the same routes. Since all of the groups involved in these exchange systems farmed, it is probable that much of the information that passed between them pertained to agriculture.

An earlier analog for gravel mulching existed in the Sinagua region of northeastern Arizona. There, the eleventh century eruption of Sunset Crater blanketed a large area with a layer of volcanic cinders. Though Colton's (1960) conclusions concerning the demographic effects of this event have been questioned, and the importance of the cinders to improved growing conditions may have been overstated, they did provide a mulch suitable for farming use, and may have facilitated expansion into areas that were not previously amenable to agriculture (Colton 1932, 1960; Hevly et al. 1979; Pilles 1979). Evidence of modifications to fields in cinder-blanketed areas was identified by aerial thermography and verified by pollen and soil analysis, and consisted of a series of alternating ridges and swales, perhaps built to impede runoff or wind erosion (Berlin et al. 1977). Thus, the Sinagua modified naturally mulched fields to either increase production or reduce the effects of erosion.

This is not to suggest that the idea of gridding was derived from the Hohokam, Mogollon, or western Anasazi, or that the idea of using a gravel mulch came from the Sinagua. It is simply meant to illustrate that the *knowledge* of these agricultural techniques existed in parts of a region linked by a low-level exchange and communication system, and that such knowledge might have been included in information flow. Combining gridding with gravel mulching may have been a purely local development; however, knowledge of the benefits of such techniques could have come from areas where they were used at an earlier time.

Conclusions

A number of topics have been discussed, some of which seem only marginally related to the prehistoric sites investigated during this project. However, in order to explain those sites, it was first necessary to develop a context within which they could be discussed. Understanding the origin of the Rio Chama Valley population was needed to establish a background for previously used farming features and methods. Most researchers believe that the Rio Chama Valley population originated in the upper San Juan region (see Chapter 4). Surveys and excavation in that area have found numerous agricultural features, including check dams, contour terraces, reservoirs, and possible ditches (Fewkes 1917, 1919; Hayes 1964; J. Herold 1961; Nordenskiold 1893; Roberts 1930; Rohn 1963, 1977). This indicates a familiarity with water storage techniques, and knowledge of the inception and effects of erosion on farm land. There are also enough physical similarities between the regions to suggest an understanding of mesa top farming techniques and the problem of cold air drainage.

Pueblo farmers in the San Juan region employed a system of scattered fields similar to that used in the Rio Chama Valley. In a general synthesis of the former area, Nickens and Hull (1982:219-222) note evidence of floodwater fields, dry-farming and seep-watered fields, and possible small-scale irrigation systems. Erdman et al. (1969:57-58) found signs of farming in mesa rim washes, gullies, mesa slopes, and canyon floors at Mesa Verde. The most substantive analysis of farming in the upper San Juan was at Hovenweep, where Winter (1975, 1976, 1977, 1978) found fields scattered through several topographic zones that included akchin locations (where arroyos stop downcutting and drop their load of silt), floodplains, arroyo bottoms, slopes, mesa tops, and springs. If population movement reconstructions are correct and the source of the Rio Chama Valley population was the upper San Juan, there is substantial evidence for prior knowledge and use of a variety of agricultural features, as well as a farming system which scattered fields across the landscape. However, as noted in Chapter 4, the origin of the inhabitants of this region remains uncertain. Thus, it is unclear whether the array of farming features and the basic farming system used in this area reflect prior experience in other regions, or a local development with some input through low-level communication systems.

In general, the proposed model of farming suggests the use of a range of environmental and topographic zones. Floodplain fields in the major valleys, possibly irrigated, were undoubtedly very important. Unfortunately, indisputable evidence of such fields has been eradicated by historic farming, and their use must be indirectly inferred from the few data available. Dry-farming fields were situated on valley margins, terrace tops, and mesa tops. Generally, these fields contain few formal agricultural features, and are difficult to define in their absence. Gardens were mostly cobble-bordered or gravel-mulched grids, and were often closely associated with fieldhouses or Classic period villages. The use of a variety of field locations in several topographic zones helped buffer against substantial crop loss from a single disaster, and a sizeable population was supported.

The prehistoric farming population undoubtedly had quite an impact on the Rio Chama Valley's ecology. As has been demonstrated by studies in the San Juan, Chaco, and Mimbres areas, the residential and farming practices of prehistoric Southwestern farmers were not as environmentally sound as tradition holds. The use of wood for building, tool making, and fuel may have deforested heavily populated regions. Field clearing and cultivation, and the use of wild plants for food and production of implements also undoubtedly contributed to deterioration of the vegetative community. Foot traffic disturbed soil crusts and created trails. When all of these factors were combined, a situation ripe for the inception of an erosional regime was produced. Erosion is inimical to the farmer: it causes the loss of valuable land and top soil; rain runs off rather than soaking into fields; gullying lowers the water table; and soil fertility is reduced. The widespread use of gridding suggests that farmers attempted to protect their land from erosion. With the addition of a gravel mulch the gridded plots became multifunctional, protecting crops against unseasonable frosts as well as erosion.

The presence of cobble piles and a few cobble-bordered grids at LA 6599 and LA 59659 seems insignificant until they are viewed in a regional perspective. Cobble piles occur with other farming features at many sites. Studies of field systems at the edge of La Bajada Mesa suggest that they were constructed as an early stage in field preparation and use, and often occur on the periphery of gridded plots (Moore and Harlan 1984). This suggests that grids were built in a series of steps that began with the stockpiling of cobbles removed before and during cultivation. When erosion began, or simply when enough cobbles were available, walls forming individual grids were built. Further studies are needed to determine whether this process applies only to cobble-bordered grids, or whether gravel-mulched grids developed similarly.

Nothing conclusive concerning social organization was determined by this study; however, several tentative ideas were proposed. From the structure of observed farming complexes, it is likely that the basic cooperative unit was small, but that larger groups were occasionally mustered for specific projects such as village or irrigation system construction. A second, though much less certain, implication is that gridding and gravel-mulching may have been derived through ties to other groups rather than from independent invention.

Though relatively simple and containing no substantial features, LA 6599 and LA 59659 are important because they represent integral components of a complex agricultural system that demonstrates a detailed knowledge of the environment by the Pueblo farmer. The system buffered against a range of potential disasters, and knowledge of environmental processes gained through prior experience in other regions and information ties may have contributed to its development.

The use of this type of farming system undoubtedly helped prevent severe population/food resource imbalances from developing except in very bad years. By spreading fields across a variety of topographic features, prehistoric farmers tried to prevent famines that can result from a single environmental disaster. Fieldhouses often occur in conjunction with unimproved fields as well as agricultural features, indicating that the options of using more extensive farming areas as well as more intensive farming techniques were in use, often in combination. Nearly all of these features were built during the Classic period occupation of the region when the population was at its peak. All in all, the array of farming features and the amount of area they cover suggest that prehistoric farmers in this region pursued a strategy aimed at providing a secure and predictable food supply for the large population of the valley. Land resources that could be farmed without any modifications were both protected and supplemented by a wide array of farming features. In this way, the prehistoric farmers were probably able to raise enough food that severe population/food resource imbalances were usually averted.

CHAPTER 13

X-RAY FLUORESCENCE ANALYSIS OF POTTERY FROM LA PUENTE AND THE TRUJILLO HOUSE

Bart Olinger

Samples of pottery from La Puente and the Trujillo House were analyzed using x-ray fluorescence. A concise description of the discrimination procedure used is as follows: the exposed paste along the edge of a sherd was irradiated with monochromatic x-rays from a Cd-109 source with an energy of 22 keV. Elements in the sherd paste that were excited by these x-rays emitted secondary x-rays whose energies are characteristic of their sources and whose intensities are proportional to the elements' concentrations. The largest numbers detected that are readily distinguished come from iron (Fe), strontium (Sr), and zirconium (Zr). The proportion of x-rays from these three elements was used as the signature for a sherd. When needed, x-rays from other elements were also considered to enhance the signature.

Figures 13-1 to 13-5 show cluster plots for pottery from the villages of San Juan, Nambé, Santa Clara, San Ildefonso, and Pojoaque. The pottery types measured for these plots were plain red and black wares from the Spanish Colonial and Territorial periods. These types of pottery were produced at all of the northern Tewa pueblos for domestic consumption, and for sale and trade to neighboring Indian and Hispanic communities. Descriptions of the pastes for these wares are published elsewhere (Olinger 1988).

As shown in Figs. 13-1 to 13-5, each of these neighboring historic Pueblo villages displays a cluster of data that can be distinguished from the others. There are some overlaps in the data, and in those cases the physical characteristics of the pottery must be considered. Statistically, however, the clusters are unique.

The x-ray fluorescence data are in Appendix 1. Relative numbers of x-ray counts for each element are based on the sum of iron, zirconium, and strontium counts. Of the sherds examined, 32 Tewa polychrome series sherds from La Puente were identified and dated by Francis Harlow, as were 25 polychrome sherds from the same site that originated in the Zia/Santa Ana area. The remaining sherds from La Puente and all of those from the Trujillo House that were analyzed were plain wares (i.e., polished red wares, polished black wares, buff or gray wares, and micaceous paste wares).

Data are displayed in a series of cluster/scatter plots (Figs. 13-6 through 13-23). The cluster/scatter patterns for Casitas Red-on-buff and Hispanic Polished blackwares are identical to those for Tewa Polished redwares and blackwares from San Juan Pueblo, indicating that they were made from materials originating in the same clay and temper sources.

These x-ray fluorescent similarities are the heart of a dilemma for this study. Though the Casitas Red-on-buff and Hispanic Polished blackwares are essentially like the Red-on-buff and Tewa Polished blackwares produced at San Juan Pueblo, the former two have different forms and are decorated differently than the pottery from San Juan. In addition, the pastes vary in appearance: the pottery from San Juan is softer, the pastes are not glassy as the presumed Hispanic types are, and the walls are thicker than the Hispanic wares. These differences are probably caused by firing the Casitas Red-on-buff and Hispanic Polished blackwares at higher temperatures than were used for the San Juan wares. Thus, all of these types are probably made from the same geologic clays, but were fired differently.

In preparation for this study, sherds from San Juan Pueblo (LA 864) were examined. While plenty of historic Tewa wares were found at La Puente and the Trujillo House, pottery attributed to Hispanic manufacture was not similarly found in the sample from San Juan. It is reasonable to assume that, had these types been manufactured by San Juan potters, sherds of these wares should have been found there. Thus, at this time it does not seem likely that either the Casitas wares or the Hispanic Polished blackwares were made by Tewa potters. Data from San Juan are plotted in Figs. 13-24 to 13-29.

One final note concerns the micaceous pottery submitted for analysis. The micaceous-slipped pottery appears to be Tewa made, and was probably manufactured at San Juan Pueblo. In contrast, the sample of pottery with a micaceous paste seems to be from many sources, and was probably manufactured by Apache potters.

Thus, this analysis tentatively suggests three sources for the locally manufactured historic pottery at these sites. Data from San Juan Pueblo suggest that the Casitas wares and Hispanic Polished blackwares were not made in Tewa villages, and can tentatively be attributed to local Hispanic manufacture. Some micaceous wares were probably made by Apache potters, and were undoubtedly acquired by site occupants through trade. A small amount of the decorated wares used at La Puente seem to have originated at Zia or Santa Ana pueblos, suggesting that some pottery was traded over fairly long distances. The bulk of the decorated wares, redwares, blackwares, and micaceous wares were probably made at Tewa villages located south of the study area. A similarity in the clays used to produce the Hispanic wares and the Tewa wares, especially those from San Juan, suggests that the same geologic clays were being used by potters from both groups.

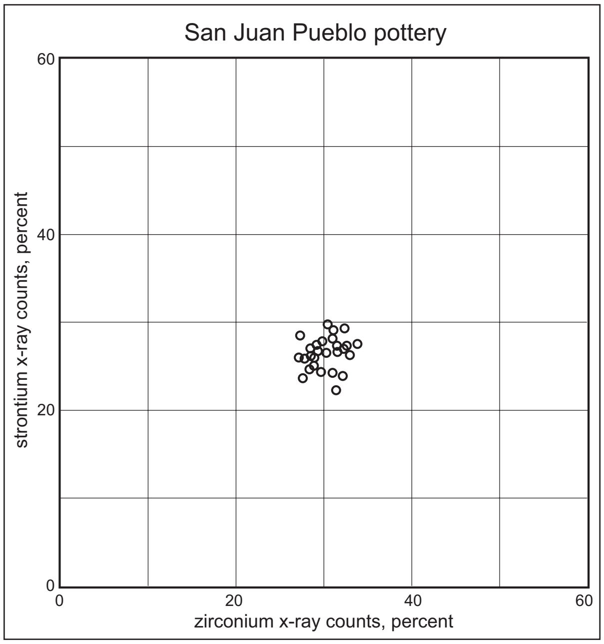

Figure 13-1. X-ray fluorescence signature for San Juan Pueblo.

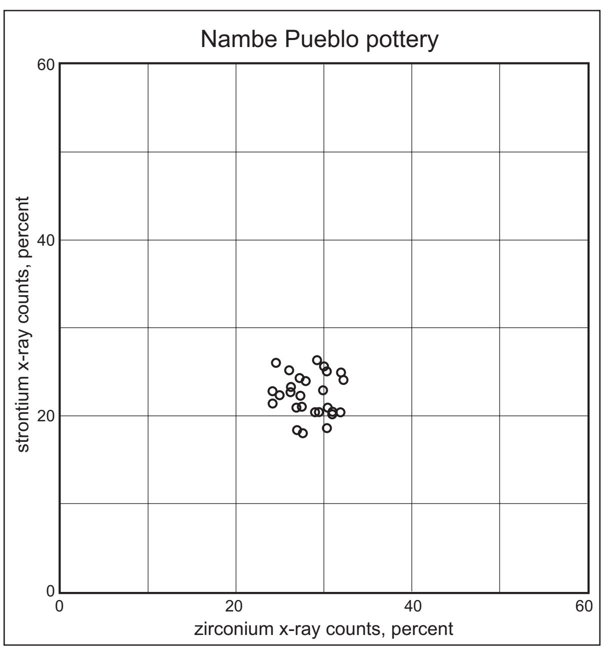

Figure 13-2. X-ray fluorescence signature for Nambé Pueblo.

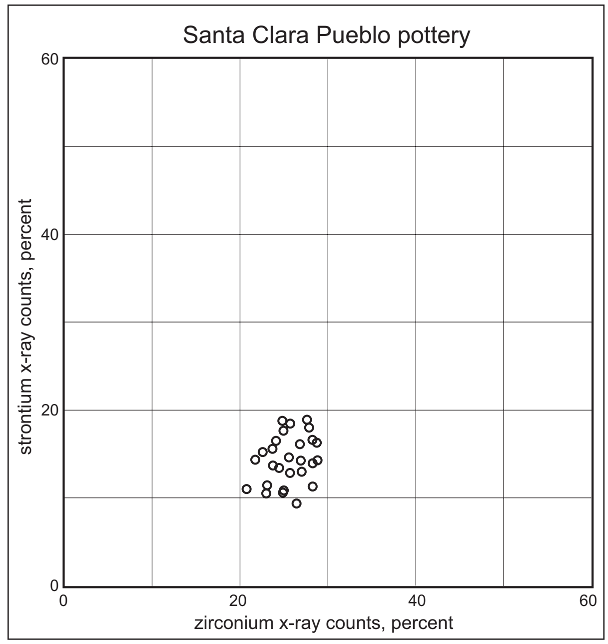

Figure 13-3. X-ray fluorescence signature for Santa Clara Pueblo.

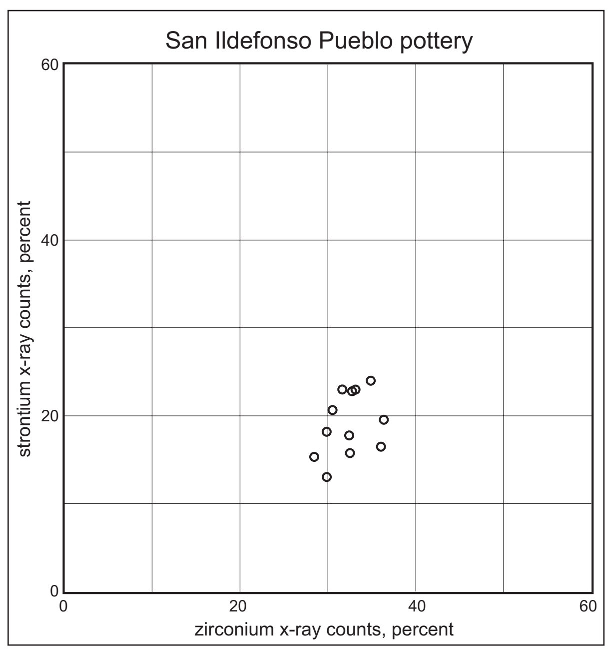

Figure 13-4. X-ray fluorescence signature for San Ildefonso Pueblo.

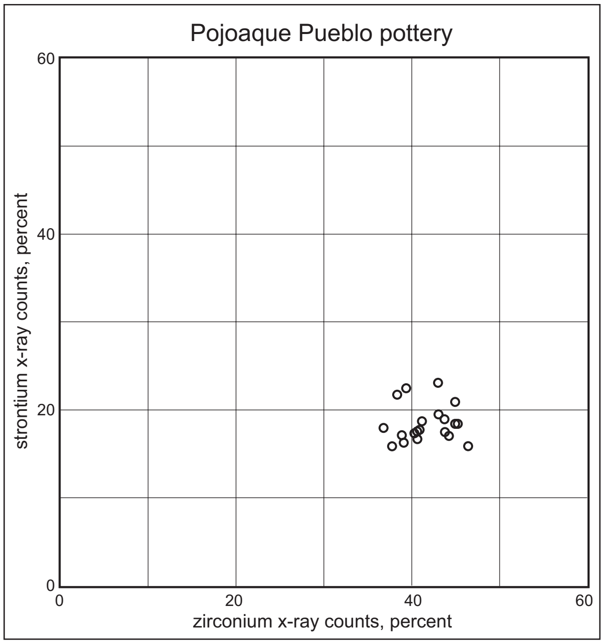

Figure 13-5. X-ray fluorescence signature for Pojoaque Pueblo.

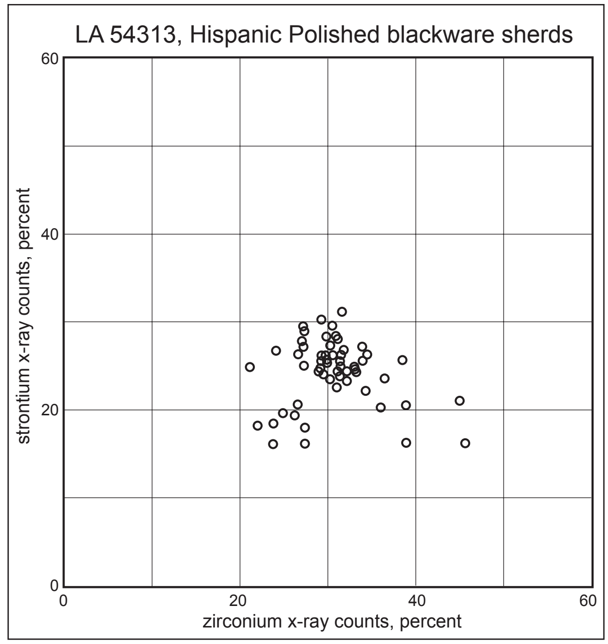

Figure 13-7. Scatter plot for Hispanic Polished blackware sherds from La Puente.

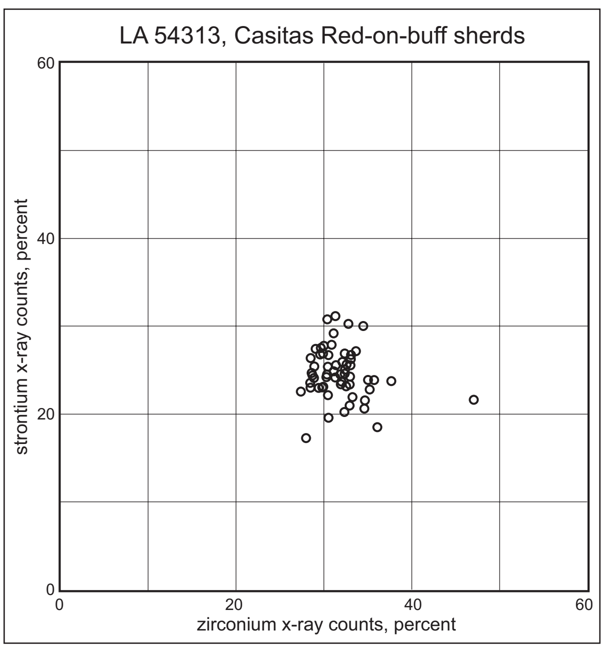

Figure 13-6. Scatter plot for Casitas Red-on-buff sherds from La Puente.

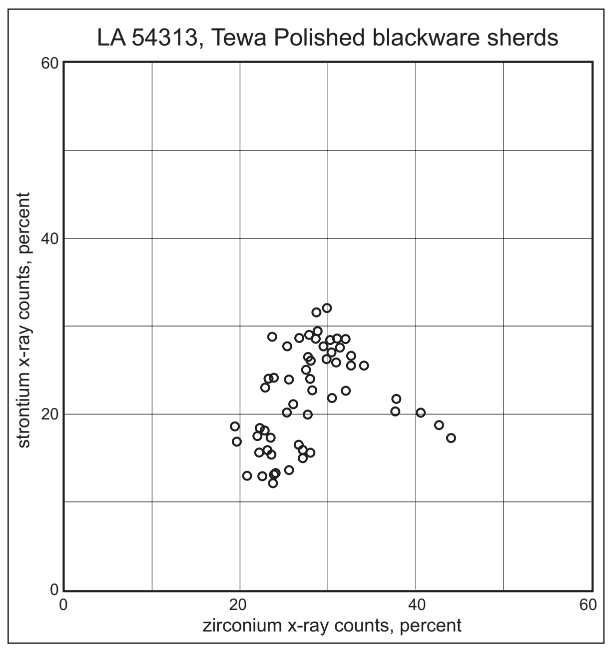

Figure 13-8. Scatter plot for Tewa Polished blackware sherds from La Puente.

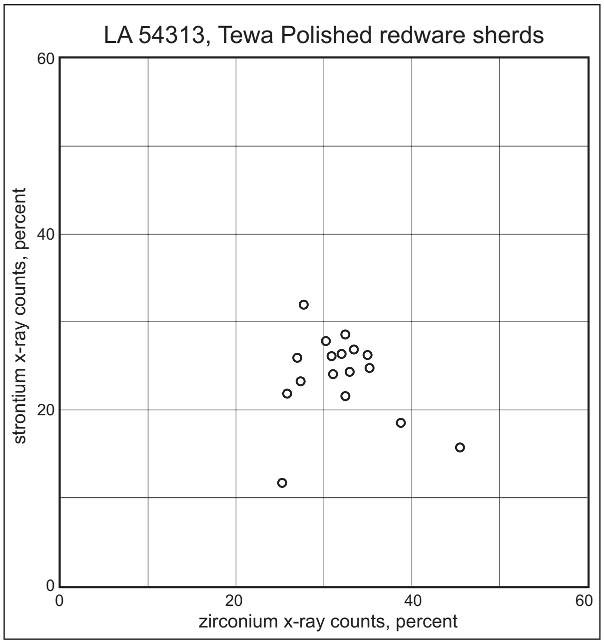

Figure 13-9. Scatter plot for Tewa Polished redware sherds from La Puente.

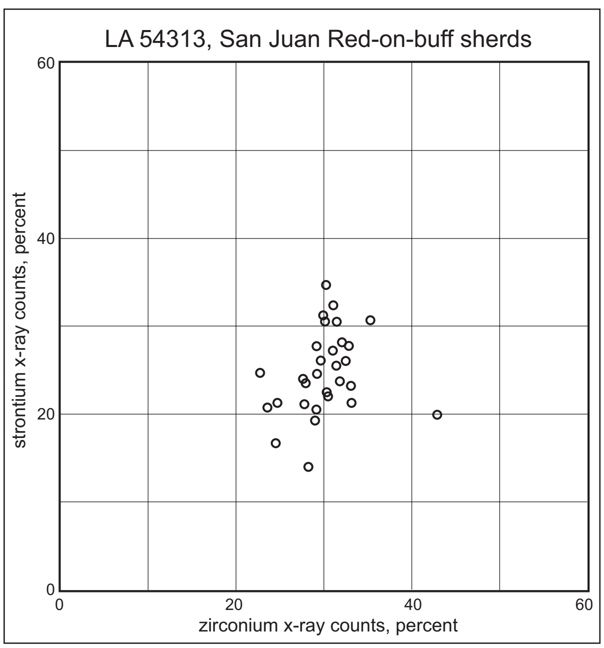

Figure 13-10. Scatter plot for San Juan Red-on-buff sherds from La Puente.

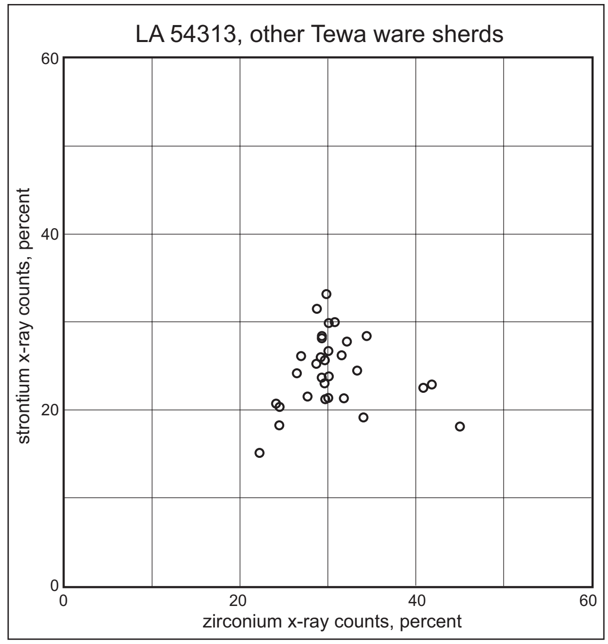

Figure 13-11. Scatter plot for other Tewa ware sherds from La Puente.

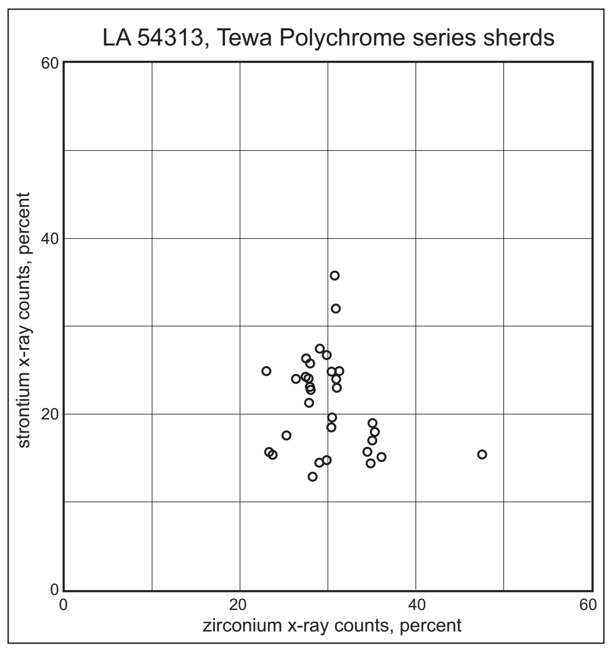

Figure 13-12. Scatter plot for Tewa Polychrome series sherds from La Puente.

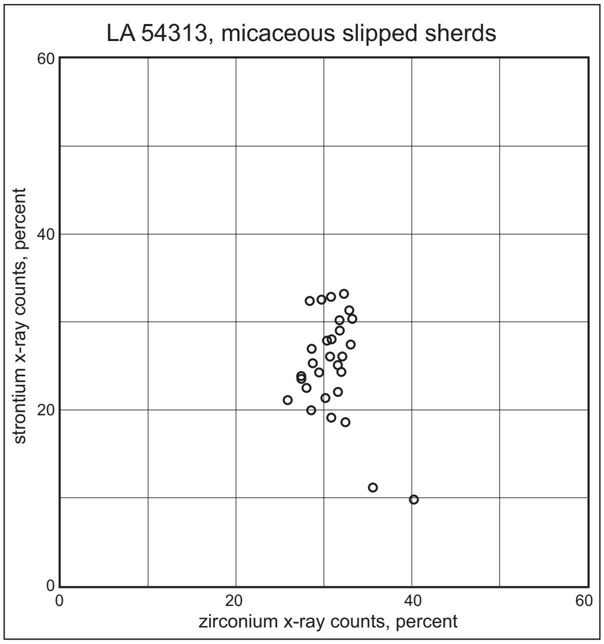

Figure 13-13. Scatter plot for micaceous slipped sherds from La Puente.

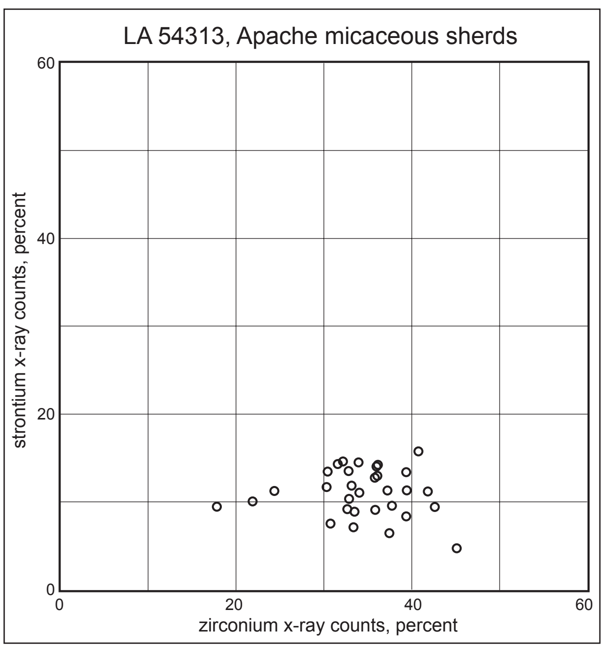

Figure 13-14. Scatter plot for Apache micaceous sherds from La Puente.

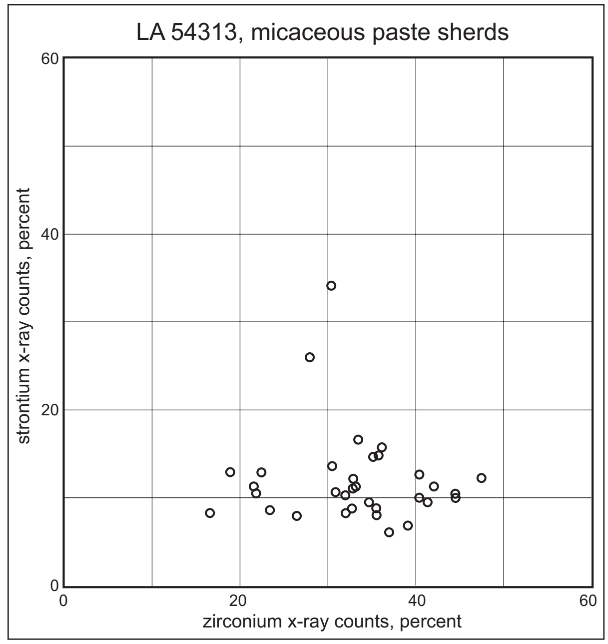

Figure 13-15. Scatter plot for micaceous paste sherds from La Puente.

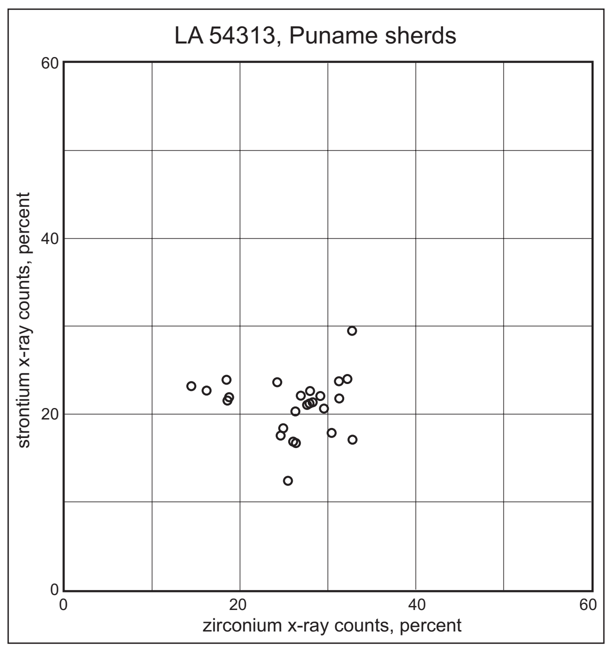

Figure 13-16. Scatter plot for Puname sherds from La Puente.

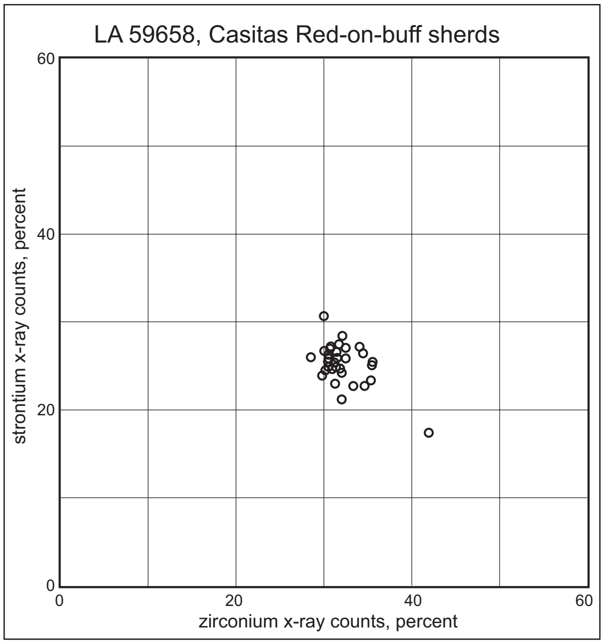

Figure 13-17. Scatter plot for Casitas Red-on-buff sherds from the Trujillo House.

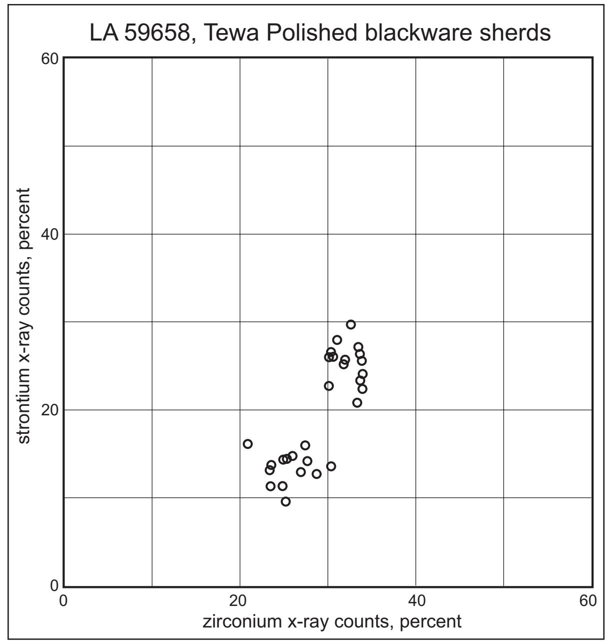

Figure 13-19. Scatter plot for Tewa Polished blackware sherds from the Trujillo House.

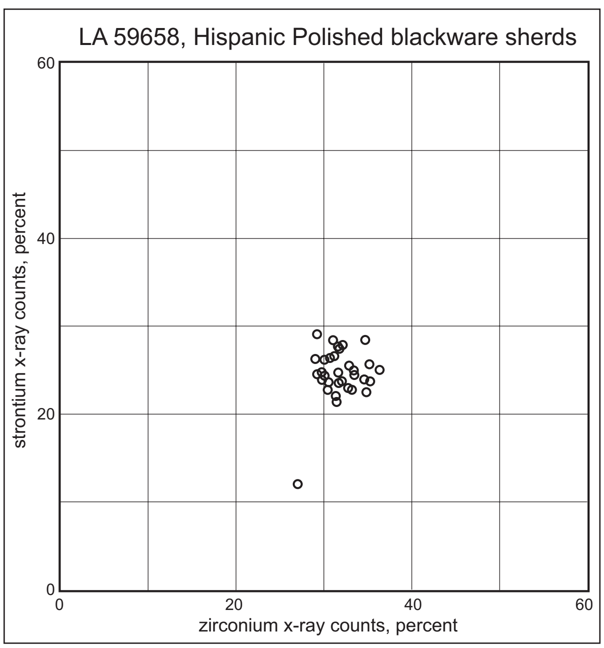

Figure 13-18. Scatter plot for Hispanic Polished blackware sherds from the Trujillo House.

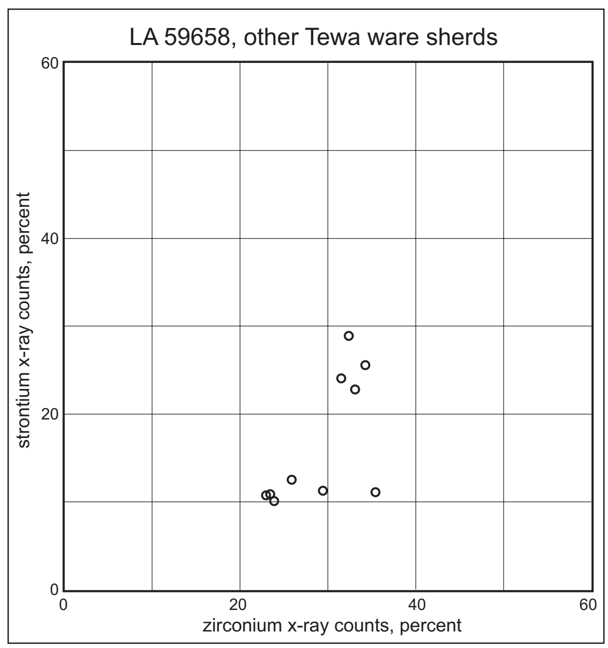

Figure 13-20. Scatter plot for other Tewa ware sherds from the Trujillo House.

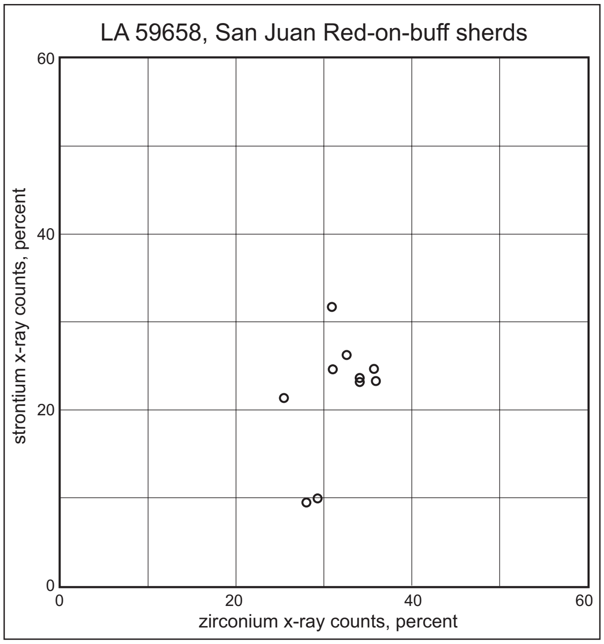

Figure 13-21. Scatter plot for San Juan Red-on-buff sherds from the Trujillo House.

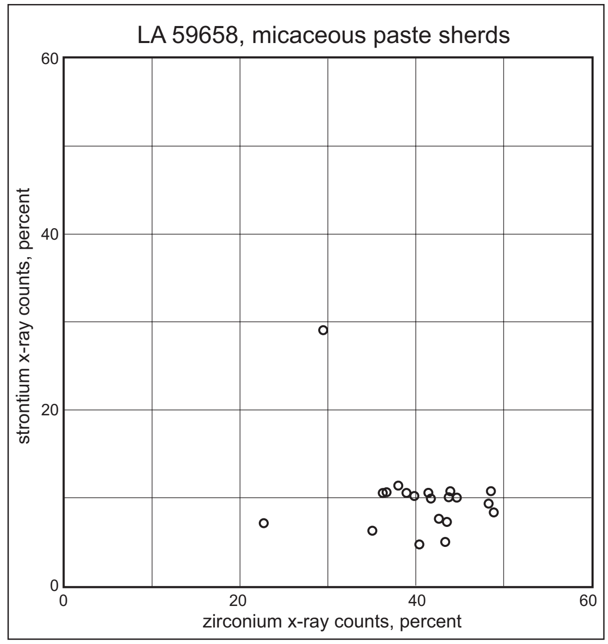

Figure 13-23. Scatter plot for micaceous paste sherds from the Trujillo House.

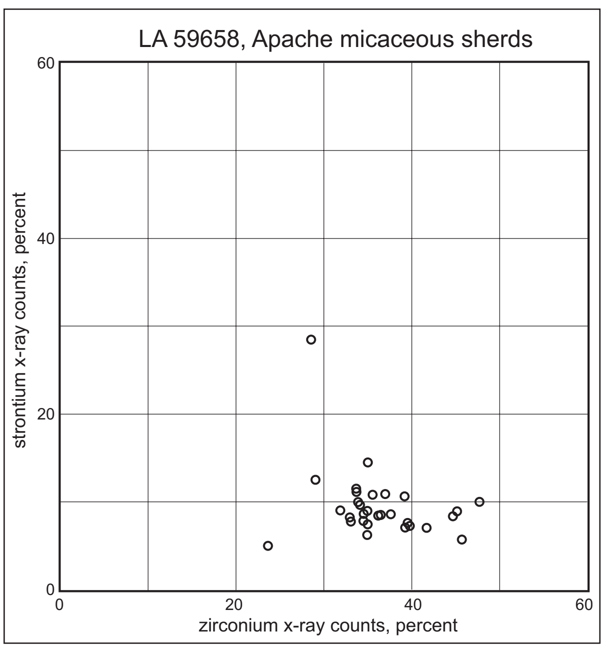

Figure 13-22. Scatter plot for Apache micaceous sherds from the Trujillo House.

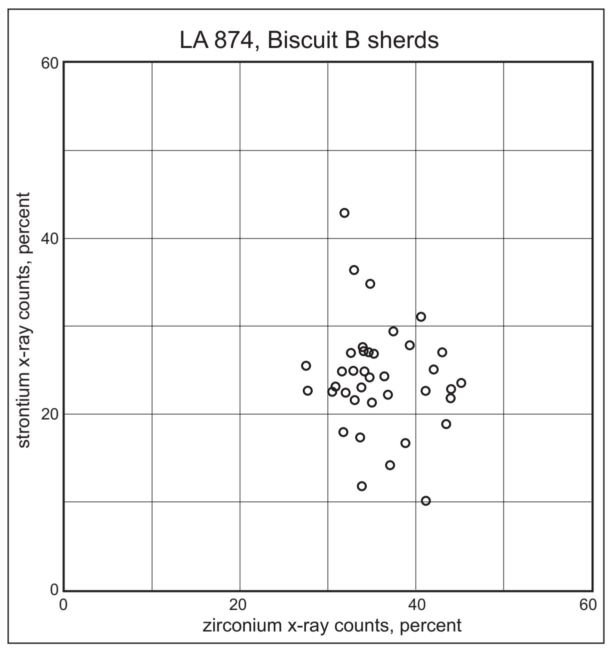

Figure 13-24. Scatter plot for Biscuit B sherds from San Juan Pueblo.

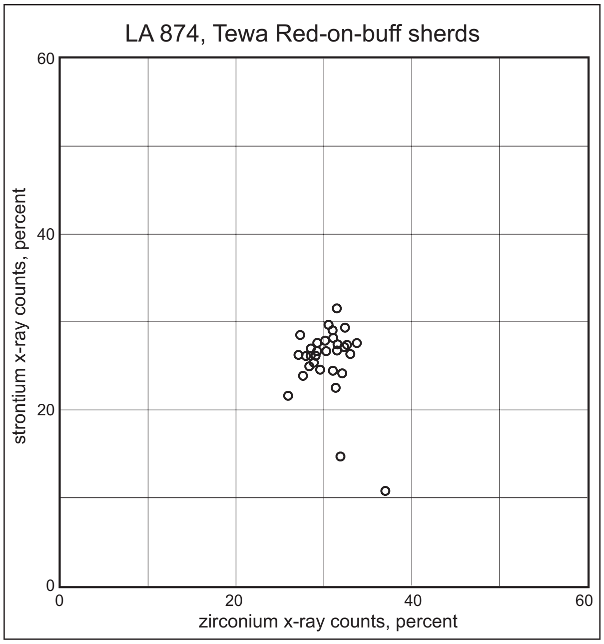

Figure 13-25. Scatter plot for Tewa Red-on-buff sherds from San Juan Pueblo.

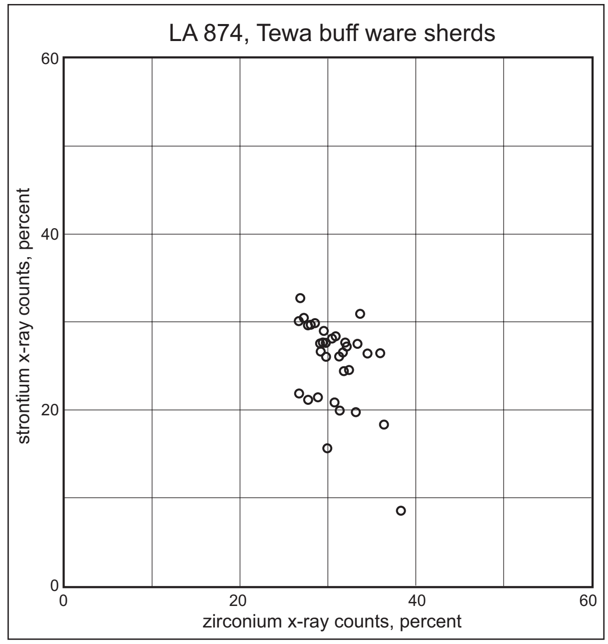

Figure 13-27. Scatter plot for Tewa buff ware sherds from San Juan Pueblo.

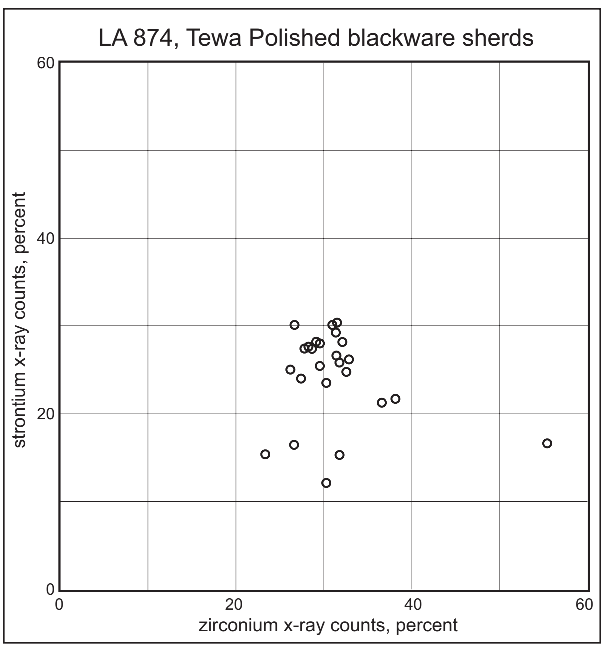

Figure 13-26. Scatter plot for Tewa Polished blackware sherds from San Juan Pueblo.

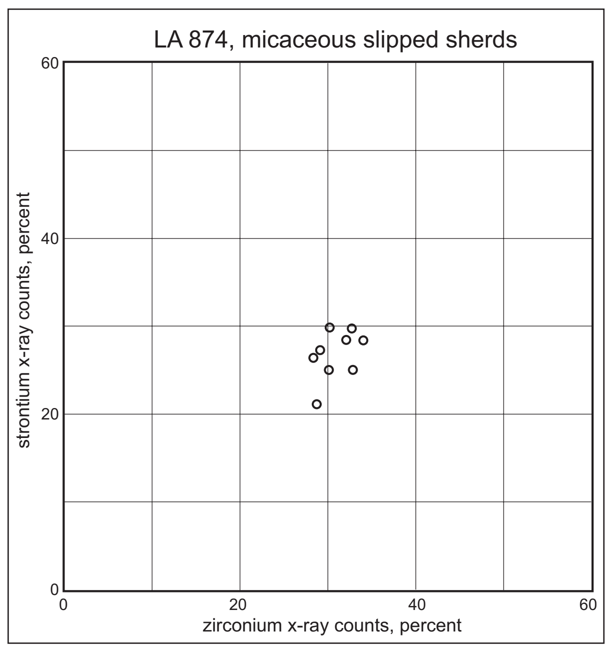

Figure 13-28. Scatter plot for micaceous slipped sherds from San Juan Pueblo.

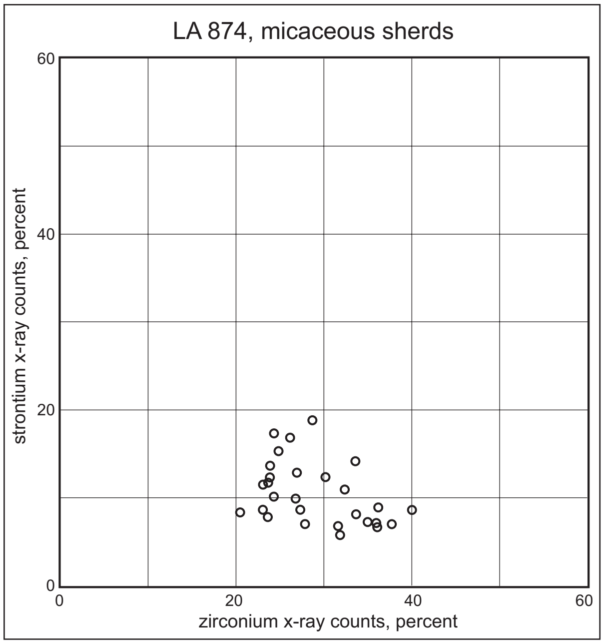

Figure 13-29. Scatter plot for micaceous sherds from San Juan Pueblo.

CHAPTER 14

NATIVE CERAMIC ANALYSIS AND INTERPRETATION

DAISY F. LEVINE

HISTORICAL BACKGROUND

Following his excavations at Pecos, Kidder (1936) concluded that Plain red and Plain black wares came into general use during the period following the Pueblo Revolt (ca. 1694). He found the redwares to be typically sand tempered, while the temper in blackwares is almost evenly split between sand and tuff. The two varieties of blackware can usually be distinguished macroscopically. Tuff-tempered sherds are usually thinner, the surface is better smoothed, and the paste is homogenous in appearance. The paste of the sand-tempered sherds is not as fine, and has visible grains of coarse sand. Sand temper also occurs within the associated polychromes, though the majority are tuff tempered. The sand-tempered variety has a coarser, more friable paste. They are noticeably cruder in workmanship, often being carelessly smoothed, with a thin and streaky slip and a poorly executed design (Kidder 1936:542-544).

Brody and Colberg (1966) found three varieties of blackwares at the Ideal Site, a nineteenth century Spanish homestead near Placitas. The first is probably a utility ware, since only the interior is polished and the exterior was left rough. The second type is a polished blackware with pulverized tuff temper, resembling modern Santa Clara pottery. The third type ranges in surface color from gray to black, and is occasionally brown or red. Surface finish varies from poor to fine, and tuff temper can be seen macroscopically. This type of temper did not occur at any of the other sites the authors examined. The tuff was tentatively identified as coming from Frijoles Canyon. However, since this pottery could not be associated with any local pueblos, Brody and Colberg (1966:16) remark that "it may be a Spanish-made pottery (but) we simply do not know enough as yet about the pottery making habits of the 19th century, both Indian and Spanish, to draw any firm conclusions."

At Las Huertas, which is also near Placitas, Ferg (1982) found that approximately half of the blackwares had sand temper, rather thick walls, and poorly polished surfaces. He states that "the source of this material is uncertain, but it is almost certainly not Tewa in origin, as temper, thickness and finish are all in marked contrast to the Kapo Gray and Kapo Black at the site" (Ferg 1982:40).

Casitas Red-on-brown was also found in the Las Huertas ceramic assemblage, and Ferg was convinced that it was a Spanish pottery type, based on Dick's (1968) findings at the site of Las Casitas near El Rito. Sherds from the type site are tempered with local sand, which, combined with the lack of this ceramic type in pueblo assemblages, led Dick (1968) to argue that Casitas was of Hispanic manufacture.

A Hispanic pottery-making tradition has been documented by several researchers. Hurt (1939) recorded a tradition of blackware and redware pottery manufacture in the village of Manzano, which was occupied between 1824 and 1870. His informant was an elderly Hispanic woman whose aunt was one of the potters. The technique for making pottery was said to have been taught to the villagers by a Navajo woman, though neither the technology nor the pottery itself resemble Navajo ware. The sherds are thick, poorly fired, and sand tempered with a plain black, gray, brick red, or cream finish. Hurt and Dick (1946) later refer to these wares as Manzano Coarse Ware, Manzano Black Burnished Ware, and Manzano Thin Red-on-buff. These names were later revised to Carnue Plain, Kapo Black (named by Mera [Mera 1939]), and Casitas Red-on-brown (Dick 1968). Since Hurt and Dick believed these wares did not resemble either prehistoric or historic pueblo pottery, and no transitional forms had been found, they suggested that this style was introduced by Spanish missionaries from Mexico, or by Mexican Indians who came with them (Hurt and Dick 1946:309). They felt that once the new ceramic styles were introduced to the Spanish-American settlers in New Mexico, they then began to manufacture their own pottery.

At Paraje de San Cristobal, a Territorial period site in the Rio Abajo region, a coarse sand-tempered ware fitting the description of Carnue Plain was found (Boyd 1986). This pottery type is common in southern New Mexico, and has been considered Hispanic in origin. Paraje was a considerable distance from the northern Rio Grande pueblos, and that may have been a factor in obtaining pottery. Boyd (1986:235) suggests that Indian pottery may have been harder to get late in the Territorial period, and that the locals began making their own.

The exact source for these pottery types in Mexico is unknown. However, there are strong resemblances between the Manzano wares and prehistoric wares found on the Rio Balsas in Mexico (Hurt and Dick 1946:309). Wendorf and Reed (1955:156) also believe these types were introduced from Mexico, stating: "This seems to be the most plausible explanation, since the strongest appearance of these types was in the area first colonized, and since essentially similar pottery was made in southern Mexico."

Mera (1939) concedes that blackwares first appeared at the end of the seventeenth century, since polished black sherds are rarely found at pre-Revolt sites, but he believes that this treatment was merely a new and refined version of a method used prehistorically. Smudged bowl interiors occurred more or less continuously along the lower and middle Rio Grande from before the twelfth century until the beginning of the eighteenth century. It might simply be the result of a natural progression that bowl exteriors were eventually smudged as well.

The controversy also includes a possible Hispanic micaceous pottery-making tradition. At the village of Cordova near Truchas, ethnohistoric research by Brown et al. (1978) documented a barter system practiced by widows and single women. A micaceous clay source was located near their village, and women who had no land or means of acquiring food made pottery, which they then traded for the amount of grain or beans it took to fill the vessel. A similar tradition has been documented at the village of Abiquiú (Cordova 1973).

Many innovations in ceramic styles and manufacturing techniques were noted at seventeenth, eighteenth and nineteenth century Spanish sites in the Cochiti area. These include pottery comales, soup plates, ring-base vessels, fiber-tempered pottery, mold-made vessels, mica-slipped utility wares, and new decorative styles (Warren 1979: 235). Mexican Indians were often members of Spanish Colonial households, and these changes have been attributed to Mesoamerican influence. Warren (1979) believes that the settlers not only introduced a new style of pottery, but that they produced their own ceramics for almost 300 years. They moved into the Cochiti area after the Reconquest and selected tempering materials that differed from those used by the local pueblos, producing plain red, black, and red-on-buff wares. These changes first appeared at seventeenth century sites, such as Las Majadas (Warren 1979). Many of these changes apparently continued through the next two centuries. Hemispherical bowls came into use during the eighteenth century, replacing the traditional shouldered style, and soup plates were common. During the nineteenth century, there was a general trend towards uniformity in vessel form and a decrease in the occurrence of decorated vessels (Warren 1979).

Carrillo (1987) is perhaps the most outspoken proponent of a Hispanic ceramic tradition. Here, semantics become an issue. Carrillo (personal communication, 1988) makes a distinction between "Spanish" and "culturally Hispanic" populations. The latter encompasses several groups, in particular genízaros (detribalized and Hispanicized Indians, largely Hopi and Plains groups at Abiquiú). Mexican Indians who accompanied Spanish families to New Mexico and later became acculturated into the Spanish lifestyle, Pueblo and genízaro women who married Spanish men and had families, and the descendants of these populations are all considered culturally Hispanic. Evidence of this mixing is apparent in ceramics, with the Mexican influence affecting the plainwares, and the pueblo influence exhibited in the decorated wares.

The genízaros were an important influence during the Spanish Colonial period, and they may have been one of the main suppliers of pottery. Documentation both at Abiquiú (Cordova 1973) and the genízaro village of Belen indicates that they made pottery and traded it to their Spanish neighbors. The genízaros were generally looked down upon because they were part Indian, they were poor in both land and money, and they had acquired a reputation as being lazy, thieves, and gamblers, probably as a result of the first two factors. The resident Franciscan priest at Abiquiú claimed the genízaros were lazy because they would not weave even though they knew how, and did not plant enough food for their families despite having good land. Instead, they traded the pottery their women made for food, and rented their lands to neighboring Hispanics at excessive rates (Horvath 1979). These actions were frowned upon by the Franciscans, but perhaps indicate that the genízaros did not identify with either the Pueblo or Hispanic traditional roles, creating their own economy that relied heavily on barter to attain the basic necessities.

However, there is historical evidence discounting a tradition of Hispanic pottery manufacture (Adams and Chavez 1956; Hackett 1937; Schroeder 1964; Snow 1984). Snow (1984) rejects the premise primarily on the grounds that evidence is scarce and the oral traditions are not trustworthy. He believes that these traditions refer to a period no earlier than 1800 to 1850 (Snow 1984:105). There are several instances of local Franciscans implying that Spanish colonists did not make pottery. In 1761, Fray Pedro Serrano complained that the alcaldes of New Mexico "do not visit their pueblos except to...gather pots, plates, jars, jugs, etc..." (Hackett 1937:486). Speaking of the Spanish settlers in 1776, Fray Atanasio Dominguez states that "they do not know how to make pottery, the father supplies what is necessary" (Adams and Chavez 1956:123). In 1795, Fray Jose de la Prada remarked that genízaro women of Abiquiú "made pottery which was sold to the vecinos for food supplies" (Swadesh 1974:41).

Regarding the Manzano ceramic tradition, Snow (1984:94-95) cites Hurt's description of the smudging technique. Hurt's informant claimed that "the vessel was covered with a thin layer of ground liver and then fired. This resulted in a carbonized black exterior" (Hurt 1939:247).

David Snow expressed surprise at Hurt's uncritical acceptance of this technique, and suggests that he was unfamiliar with historic pueblo pottery manufacture, since he made no comparisons between the Manzano Ware and contemporary smudged blackwares of Santa Clara and San Ildefonso. Still, Snow (1984:98-99) concedes that Spanish Americans may have made micaceous pottery at Cordova. However, he feels that if they did, the technique was learned from Jicarilla, Taos, and Picurís women who all shared the same clay source. He apparently differentiates between "learned behavior" and a "ceramic tradition." The oral accounts from Manzano and Cordova are thus dismissed as being "little more than circumstantial fact and romantic folklore in support of the claim that pottery was a 'traditional' Hispanic craft in those villages" (Snow 1984:99).

Snow (1984:101-102) suggests that there was no need for Spanish colonists or their descendants to produce pottery. This is based on evidence that the production and exchange of pottery by the Pueblos and the Apaches was a significant economic activity in New Mexico, eliminating the need for colonists to make their own. There are many nineteenth century observations documenting Pueblo women trading pots to the Spanish for food, and of Pueblos producing excessive amounts of pottery for trade (Bloom 1936; Davis 1938; Moorhead 1954). In the 1880s at Zia Pueblo, Stevenson (1894:12-12) noted that the women "labor industriously at the ceramic art as soon as their grain supply becomes reduced, and the men carry the wares to their unfriendly (Spanish) neighbors for trade in exchange for wheat and corn."

Jicarilla Apaches reportedly visited the upper San Juan district every summer to trade pottery for wheat, corn, beef, and mutton (Dittert et al. 1961:157). Pottery from San Juan Pueblo was manufactured as a trade item for the Spanish American market, and was traded to the Hispanics of Cañones for kaolin slip (Schroeder 1964:46).

Another factor contributing to the belief that Hispanics did not make pottery was the fact that they regarded ceramic manufacture to be a low-class occupation. In 1807, Zebulon Pike commented that a vast quantity of pottery was made by the "civilized (Pueblo) Indians, as the Spaniards think it more honorable to be agriculturalists than mechanics" (Quaiffe 1925: 305). In Latin America, pottery production was traditionally the role of Indians, who were at the bottom of the socioeconomic ladder. Thus, pottery manufacture was considered a very low-status activity.

Originally, there is no doubt that the Spanish colonists in New Mexico were dependent on their Pueblo neighbors for a wide variety of domestic needs. There was a shortage of iron in New Mexico in the Spanish Colonial and Mexican Territorial periods, particularly at frontier settlements like Cochiti (Snow 1973:43-44) and Abiquiú. This led to a reliance on the pueblos for many domestic needs, including pottery, since iron cooking pots were not available. Majolica was a luxury item, so Pueblo bowls and plates would have been needed. With the seventeenth century *encomienda*, or tribute, system no longer in use, pottery in the eighteenth century was obtained through barter.

Hayes (1981:73), in discussing Tabira Plain at Gran Quivira, noted that pitchers in the late European form were universally of crude manufacture and had such a thick paste that they were separated out and given a new name. He suggests that the crude pottery was probably made primarily for the Spanish by the neighboring pueblos, either for trade or as tribute. Wiseman (1988b:29-30) agrees with this scenario, remarking that Indians would typically not produce their best wares for the Hispanic market.

It is possible that "inferior" styles may have originated during the pre-Revolt period, and continued to be produced into the Spanish Colonial period. However, if this was the case, why were the pueblos producing traditional, well polished, tuff-tempered jars in addition to poorly polished, sand-tempered bowls, for trade? It could be argued that the bowls and soup plates were "inferior" because they were not traditional pueblo forms, and therefore the Indians had less interest in using traditional temper and slip. But the Spanish probably would have been aware of this inconsistency and demanded the same quality they saw in pueblo jars. Conversely, the bowls and soup plates may be of Hispanic manufacture. These are relatively easy forms to make, especially since they all appear to have been molded. More bowls and plates than jars were probably needed, since being in constant daily use entails more breakage than storage jars, which are handled less.

Though there is disagreement on the issue of Hispanic versus Tewa pottery manufacture, evidence of a Hispanic ceramic tradition is based on technological differences and archaeological and ethnographic documentation. Data from the Ideal Site, Las Huertas, Paraje de San Cristobal, Manzano, Cordova, Las Majadas, and Abiquiú all point to Hispanic pottery manufacture. Hispanics may have combined techniques from Mexican, Pueblo, and Athabaskan potters to produce their own pottery. Using technological attributes, ceramics are divided into Tewa and Hispanic wares in this analysis.

Tewa and Hispanic Wares

During the analysis of ceramics from La Puente and the Trujillo House, several technological differences became apparent within the assemblages that potentially represent a dichotomy between Tewa and Hispanic wares. In the following discussion, blackwares and redwares are referred to as plainwares, in contrast to polychromes, which are referred to as decorated wares. The most obvious difference between Tewa and Hispanic ceramics is in temper. Tewa blackwares (also known as Kapo Black and Santa Clara Black) and redwares (San Juan Red-on-tan and Tewa redware) typically have vitric tuff temper, often with pumice and/or fine sand mixed in. Hispanic blackware (a term used in this analysis) and Casitas Red-on-brown (referred to as Hispanic redware) have fine to medium sand temper; occasionally a very small amount of tuff or pumice was also added. Differences were also observed in surface treatment. The Tewa blackwares have a thick slip and are well polished, while the Hispanic blackwares are thinly slipped and not as highly polished. Tewa blackware bowls are generally well slipped on both interior and exterior; Hispanic blackware bowls are usually slipped on the interior, with only a narrow band extending over the rim onto the exterior.

San Juan Red-on-tan and Casitas Red-on-brown both have a red-slipped band below the vessel rim. Again, surface treatment differs between these types. The red slip was applied with a rag on Casitas Red-on-brown (C. M. Carrillo, personal communication, 1988), leaving uneven edges between the red band and the polished buff surface (Fig. 14-1). A brush was used to paint San Juan Red-on-tan, producing a fine line with an even edge (Fig. 14-2). The red band is the only decoration on San Juan Red-on-tan. Crude, rag-applied designs, including scrolls, circles and bulls-eyes, sometimes decorate Casitas bowl interiors (Fig. 14-3; Dick 1968:81). The red band on San Juan jar exteriors does not extend over the rim into the interior, whereas an extension of the band into the interior is common on Casitas jars. As with the Hispanic blackwares, the band around the interior of Casitas bowls usually continues onto the exterior, forming a narrow band below the rim. These types are so similar that Hispanic blackware might be referred to as a smudged Casitas, in the same way that Tewa blackware is a smudged redware.

Significant differences were seen in the amount of plainwares recovered from each site. At La Puente (LA 54313), which contained Spanish Colonial to American Territorial period deposits, there was slightly more Tewa blackware than Hispanic blackware (Table 14-1). Interestingly, there was more Hispanic redware than Tewa blackware, and the Tewa redwares comprised only a small percentage of the sample. At the Trujillo House (LA 59658), which dated to the American Territorial period, there was significantly more Hispanic blackware than Tewa blackware (Table 14-2). Compared with La Puente, there was also slightly more Hispanic redware, which was less common than Hispanic blackware but slightly more plentiful than Tewa blackware. Tewa redwares comprised only a small percentage of this assemblage.

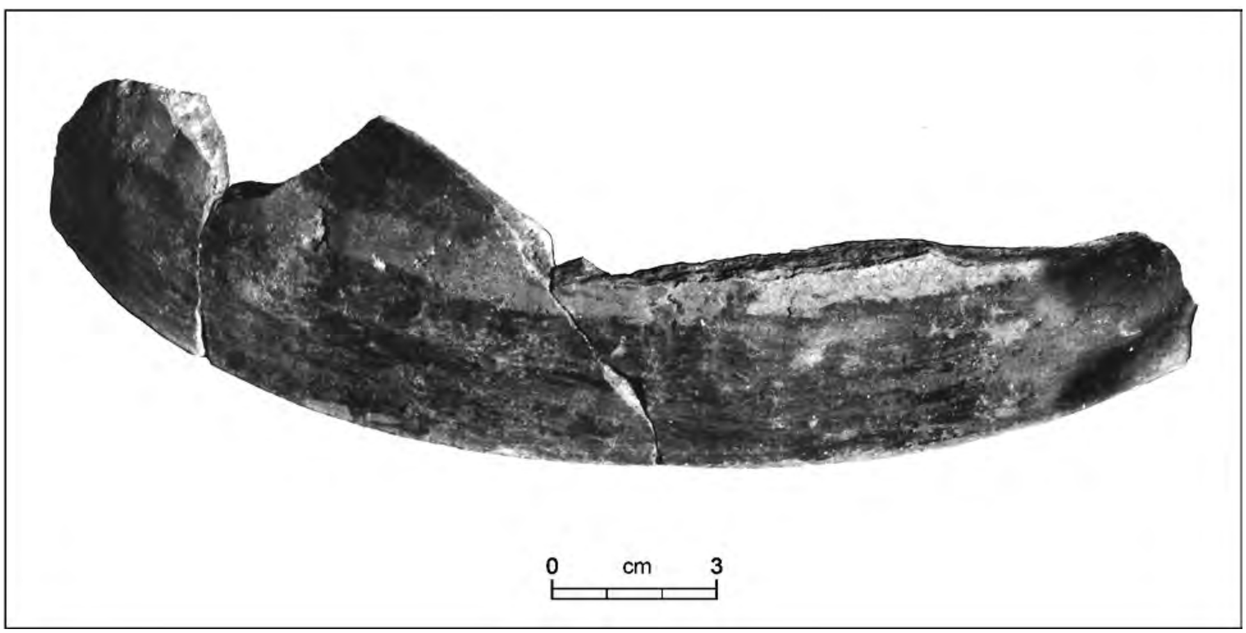

Figure 14-1. Casitas Red-on-brown sherds showing the exterior slipped band.

Variability was also observed in the jar to bowl to soup plate ratios. Tewa blackware is the only type that remains consistent in vessel form over time. In descending order of frequency, Tewa blackware vessel forms are jar-bowl-soup plate at both sites (Fig. 14-4). In contrast, Hispanic blackware forms are bowl-jar-soup plate at La Puente, which overall contained earlier deposits (Table 14-3), and bowl-soup plate-jar at the Trujillo House (Table 14-4), which contained deposits dated later than most of those at La Puente (Fig. 14-5). Hispanic blackware bowls increase in percentage through time, while jars decrease sharply. The percentage of soup plates remains consistent at both sites.

Tewa and Hispanic redwares both follow the same pattern of bowl-jar-soup plate during the Spanish Colonial period, though Hispanic redware has a higher percentage of bowls and a lower percentage of jars than Tewa redware. A dramatic shift occurs in American Territorial period deposits, where Tewa redware vessels are almost all jars; only a few bowls and no soup plates were found. Hispanic redware follows the same pattern as Hispanic blackware with bowls being dominant, followed by a few soup plates and hardly any jars (Fig. 14-6). This is not to say that all Territorial period jars are Tewa redwares and all bowls are Hispanic redware. Most of the plainware jars are Tewa black and redwares, and

Table 14-1. Percentages of blackwares and redwares at La Puente.

Blackwares	Percent	Redwares	Percent
Tewa blackware	15	Tewa redware	4
Hispanic blackware	12	Hispanic redware	16

Table 14-2. Percentages of blackwares and redwares at the Trujillo House.

Blackwares	Percent	Redwares	Percent
Tewa blackware	19	Tewa redware	9
Hispanic blackware	29	Hispanic redware	21

Figure 14-2. San Juan Red-on-tan jar.

most of the bowls are Hispanic blackware. At La Puente, most of the jars are Tewa blackware, most of the bowls are Hispanic redware, and most of the soup plates are Hispanic blackware.

An interesting occurrence noted in the Trujillo House assemblage was the consistency in Hispanic blackware bowl diameters. Of the measurable vessels, 36 percent had a diameter of 16 cm, 17 percent had an 18-cm diameter, and 16 percent had a 14-cm diameter; other diameters occur but were comparatively rare (Table 14-5). As the shapes of the bowls are also consistent, this probably indicates that the vessels were mold-made (Fig. 14-7). Measurable vessels from La Puente are too rare to accurately obtain comparable information, though most of the bowls were 16 cm in diameter. There were only 19 measurable Tewa Black bowls from the Trujillo House, and, again, a 16-cm diameter was most common.

By not including other ceramic types in the discussion so far, these conclusions might be misleading. Tewa polychromes appear to influence the jar to bowl ratios in the plainwares. There was a high percentage of Tewa polychromes at La Puente, and more than half were jars

Table 14-3. Vessel form by ceramic type for La Puente (percentages).

Vessel Form	Tewa Blackware	Hispanic Blackware	Tewa Redware	Hispanic Redware
Jar	42	24	33	11
Bowl	34	47	55	68
Soup plate	13	20	11	10
Indeterminate	12	10	2	12

Table 14-4. Vessel form by ceramic type for the Trujillo House (percentages).

Vessel Form	Tewa Blackware	Hispanic Blackware	Tewa Redware	Hispanic Redware
Jar	40	3	94	2
Bowl	30	67	6	85
Soup plate	22	22	0	8
Indeterminate	8	9	0	6

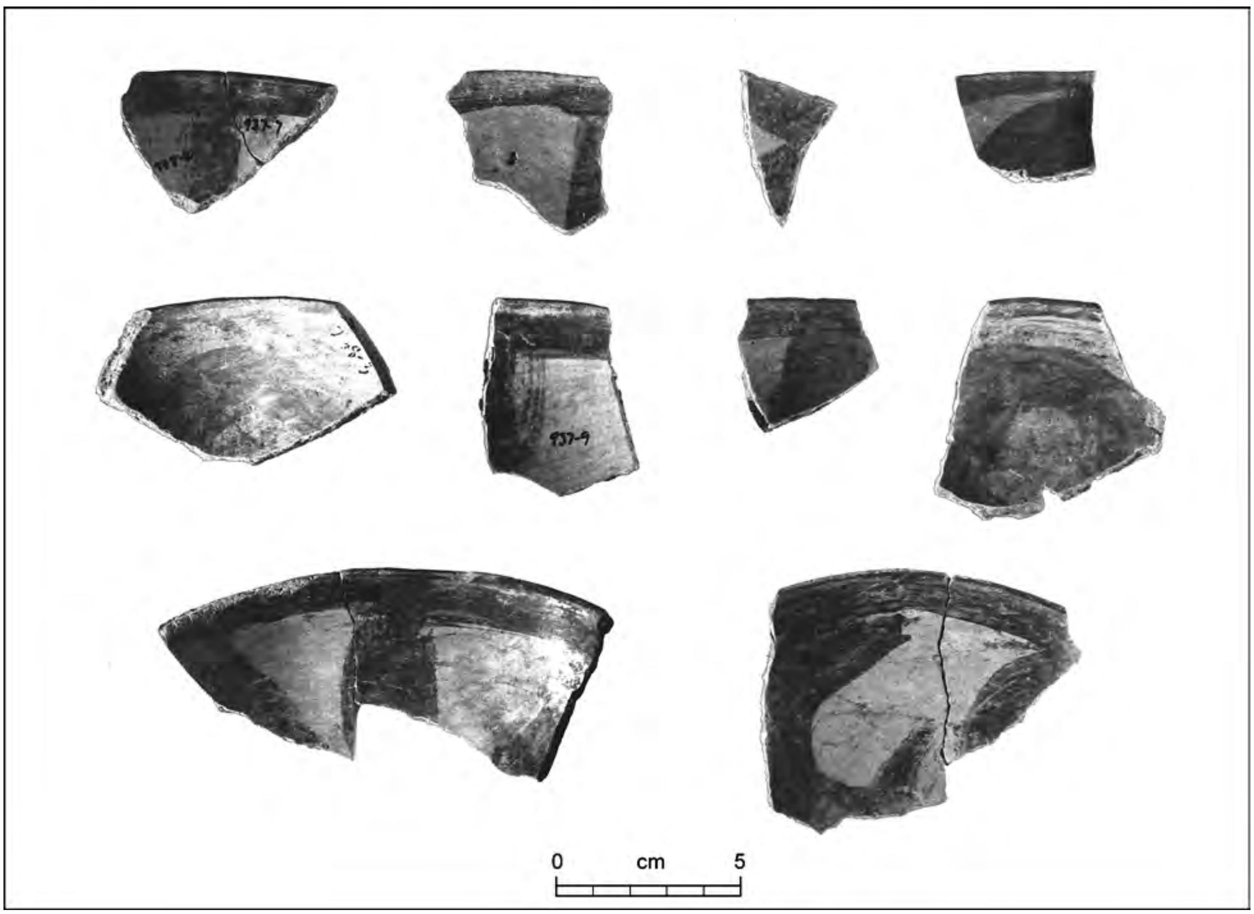

Figure 14-3. Casitas Red-on-brown sherds showing interior designs.

Table 14-5. Hispanic blackware bowl rim diameters for the Trujillo House (cm).

	Rim Diameter (cm)											
	11	12	13	14	15	16	17	18	19	20	22	Total
Number	1	5	5	16	4	35	4	17	5	5	1	98
Percent	1.0%	5.1%	5.1%	16.3%	4.1%	35.7%	4.1%	17.3%	5.1%	5.1%	1.0%	100.0%

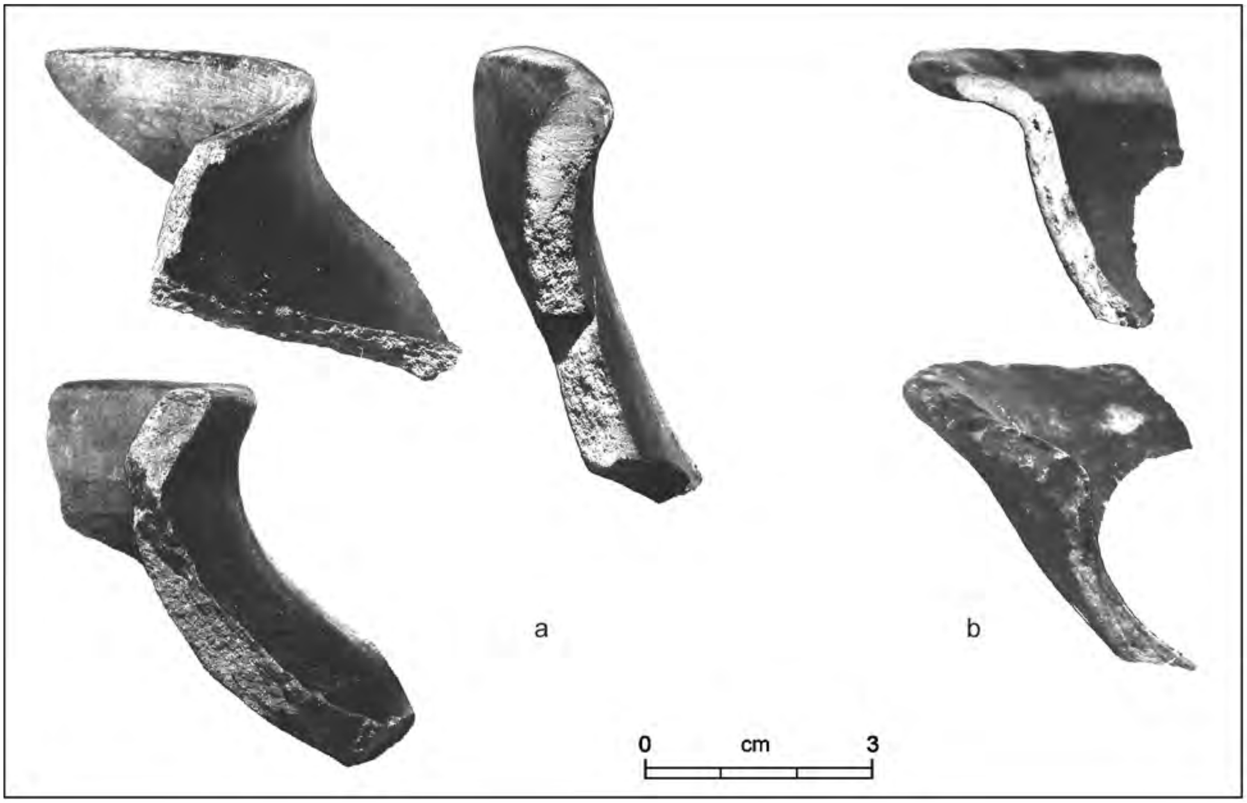

Figure 14-4. Tewa blackware jar (a) and soup plate (b) rims.

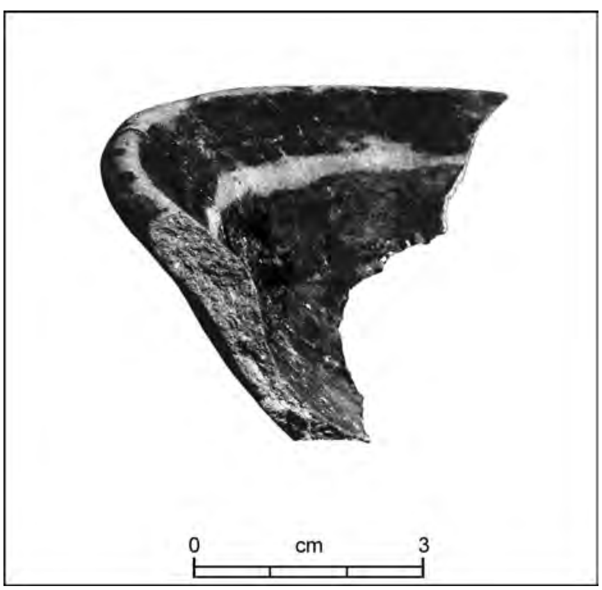

Figure 14-5. Hispanic blackware soup plate rim.

Figure 14-6. Casitas Red-on-brown soup plate (a) and bowl (b) rims.

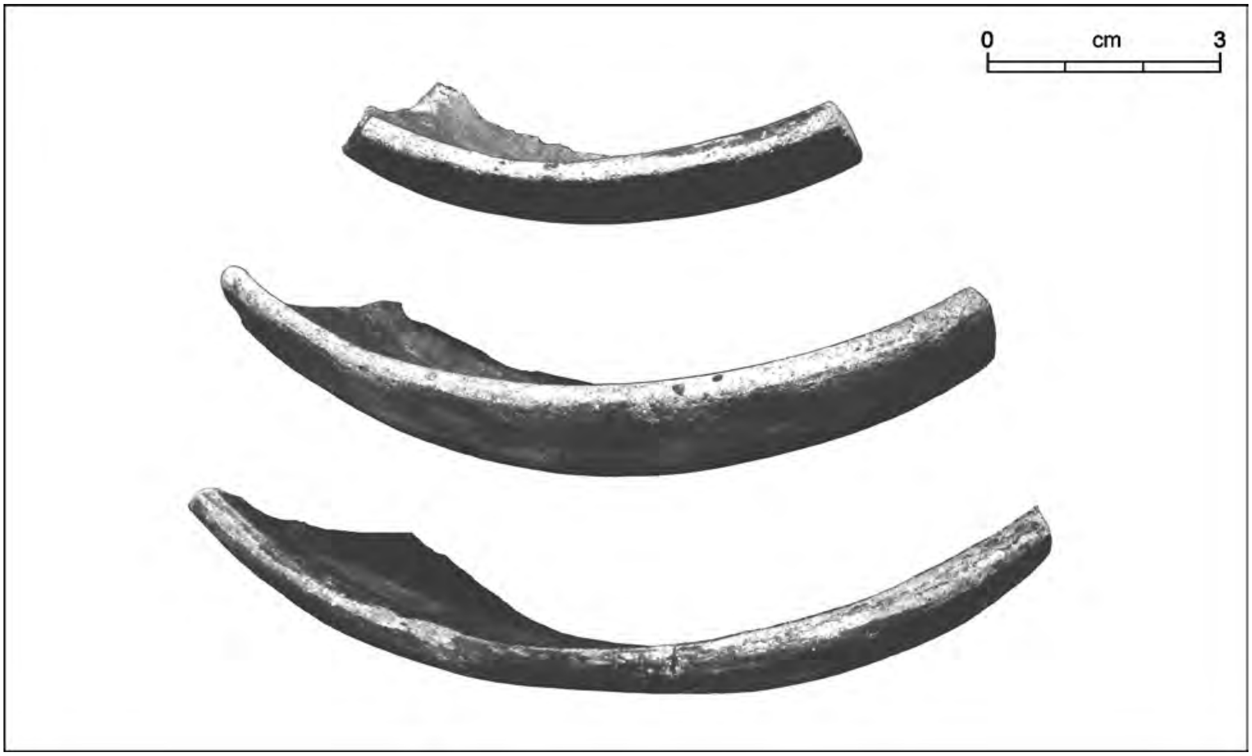

Figure 14-7. Hispanic blackware bowl fragments showing similarities in vessel diameter.

(Fig. 14-8). This jar to bowl ratio is higher than that of any of the plainwares. Since most plainware categories have a higher percentage of bowls than jars, it would appear that polychrome jars were preferred over undecorated types. Few polychromes were found at the Trujillo House. Perhaps jars were not as necessary in the American Territorial period because of Euroamerican goods that became available after the opening of the Santa Fe Trail.

X-ray fluorescence (XRF) analysis was performed on plainwares from both sites by Bart Olinger of Los Alamos National Laboratory. This analysis revealed identical chemical signatures for the Tewa wares and the possible Hispanic wares, the sources mainly being San Juan and Nambe Pueblos, though some vessels seem to have originated in the Zia/Santa Ana area. This does not necessarily imply that most of the Tewa and Hispanic wares were made by the same people; there are several plausible alternative explanations. First, Tewas and Hispanics may have obtained clay from the same source. Second, San Juan women who married Hispanic men may have continued to use the pueblo clay source. Third, the same clay may outcrop at different locations within the same geological formation. Thus, an outcrop close to San Juan Pueblo and another close to Abiquiú would have the same XRF signature. More XRF analysis of both clay and temper sources is needed to test these possibilities.

Temper Analysis

As mentioned previously, temper was a strong determinant when separating Hispanic wares from Tewa wares. Tuff and/or pumice was the dominant temper in 81 percent of the Tewa sherds from La Puente, with no apparent differentiation made between plainwares and polychromes. This temper combination occurs in only 4 percent of the Hispanic types. In contrast, sand was the predominant material in 96 percent of the Hispanic wares from La Puente, compared to only 7 percent of the Tewa wares. Numerous temper combinations were observed and monitored (Tables 14-6 and 14-7). Pumice/tuff was most prevalent within the Tewa types (28 percent), followed by a combination of mainly tuff with a small amount of sand (16.5 percent). Within the Hispanic wares, sand temper occurred in 76.9 percent of the sherds, followed by a predominantly sand temper with a small amount of tuff mixed in (18.5 percent). Other temper components included mica, quartz, and feldspar in various combinations, which occurred in small percentages.

The same general trends were observed in the assemblage from the Trujillo House (Tables 14-8 and 14-9). Tuff and/or pumice was the dominant tempering material in 75.8 percent of the Tewa wares (temper categories include tuff; crystal pumice; pumice and tuff; tuff, sand, and crystal pumice; tuff, sand, and mica; and mainly sand, some tuff), and in only 9.6 percent of the

Hispanic wares (temper categories include pumice and sand; tuff, sand, and crystal pumice; tuff, sand, and mica; and mainly tuff, some sand). Sand temper occurs as the dominant temper in 89 percent of the Hispanic types (categories include sand; and mainly sand, some tuff), and in 17.9 percent of the Tewa sherds (categories include sand; and mainly sand, some tuff). Within the Tewa wares at this site, tuff/sand is the most common temper (39.1 percent; categories include tuff, sand, and mica; mainly sand, some tuff; and mainly tuff, some sand), followed by pumice/tuff (16.5 percent), a reversal from La Puente. Sand/tuff (58.5 percent; categories include mainly sand, some tuff; and mainly tuff, some sand), followed by sand (34.3 percent) predominates in the Hispanic wares, again a reversal from La Puente.

At both sites, a striking difference in temper was observed between sherds identified as Tewa types and those classified as Hispanic. Tuff (and combinations thereof) predominates in Tewa wares at both sites, while sand (and combinations) predominates within the Hispanic wares. Source areas for different types of tempering material may be the explanation for this dichotomy, coupled with cultural affiliation. Volcanic materials (tuff and pumice) are found south of Abiquiú in the Tewa area. Around Abiquiú, sand is the easiest and most prevalent tempering material. The Hispanics may have used sand, while the Tewas used tuff. Therefore, the temper differences support the idea of Hispanic pottery manufacture.

Micaceous Wares

Three varieties of micaceous wares occur in the northern Rio Grande: (1) those tempered with mica or mica schist; (2) those with a mica slip; and (3) those made from residual clays containing mica flakes. Problems often arise when trying to distinguish residual clays from a paste that has had micaceous rock added to it.

Problems similar to those discussed for the plainwares also occur when micaceous wares are considered. Specifically, what are the origins of the micaceous wares that were manufactured in the eighteenth and nineteenth

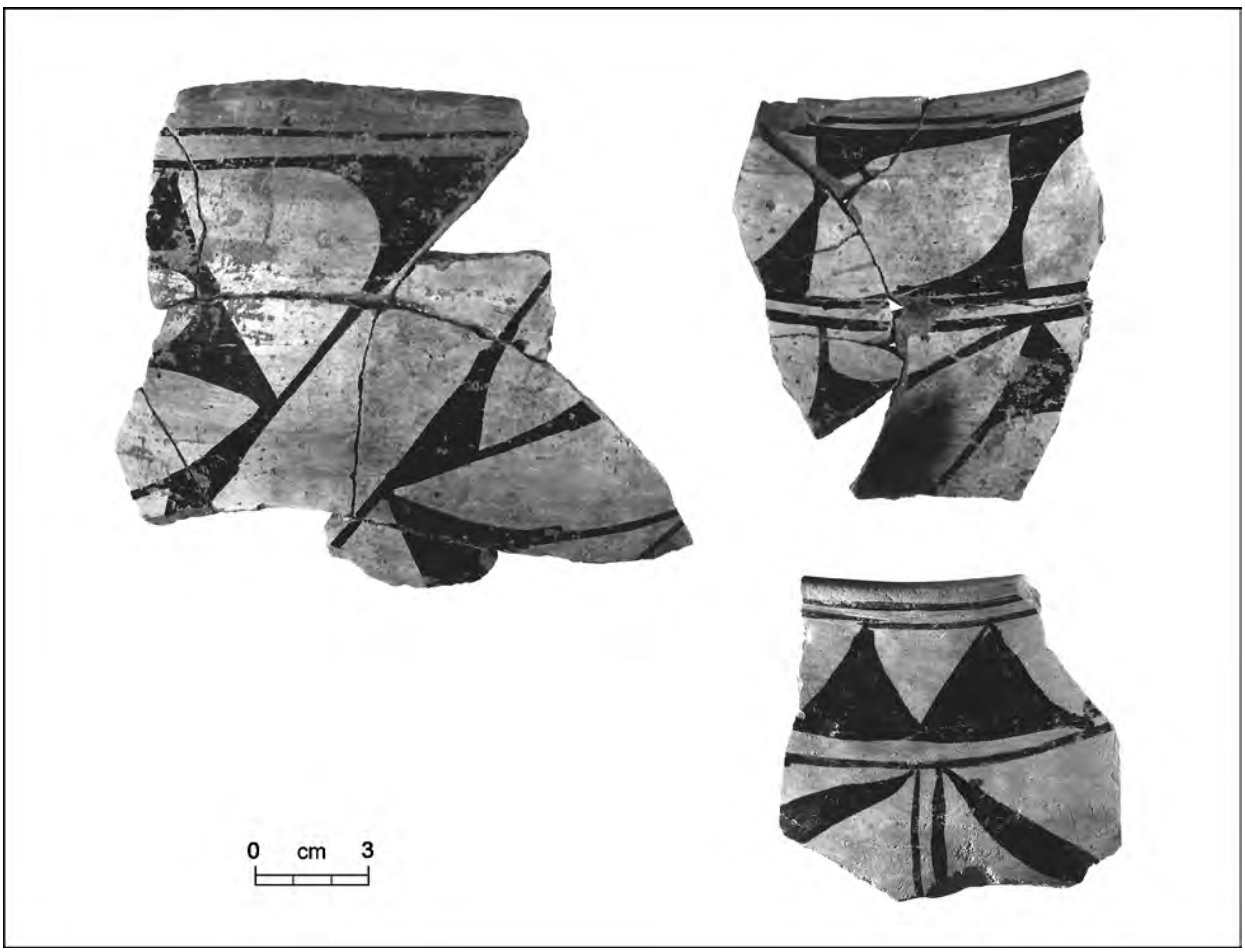

Figure 14-8. Partial Powhoge Polychrome jars from the Trujillo House.

centuries? Micaceous wares of the Rio Grande region have long been the subject of speculation, with three viewpoints emerging as to their origin. The first, and most widely accepted, is that there was a long-standing micaceous pottery making tradition among the pueblos, and that the Jicarilla Apache learned from them as well as from Plains villagers (Baugh and Eddy 1987; Brugge 1982; Opler 1971). Micaceous pottery first appeared in the northern Rio Grande around A.D. 1300. The early types, Cordova and Cundiyo Micaceous, are ribbed and

Table 14-6. Tewa ceramic types by temper for La Puente (frequencies, row and column percentages).

Temper	Tewa Redware	Tewa Blackware	Tewa Other	Ogapoge Polychrome	Powhoge Polychrome	San Juan Red-on-tan	Unknown Polychrome (not Tewa)	Unknown Black-on-red	Unknown Tewa Polychrome	Row Total Row Percent
Unknown	0 0.0% 0.0%	0 0.0% 0.0%	2 50.0% 0.8%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	1 25.0% 1.9%	0 0.0% 0.0%	1 25.0% 0.1%	4 - 0.2%
Tuff	4 2.0% 5.5%	50 25.1% 6.6%	11 5.5% 4.3%	4 2.0% 25.0%	2 1.0% 3.8%	11 5.5% 9.4%	3 1.5% 5.7%	0 0.0% 0.0%	114 57.3% 12.0%	199 - 8.7%
Sand	11 7.0% 15.1%	27 17.1% 3.5%	21 13.3% 8.2%	0 0.0% 0.0%	11 7.0% 20.8%	3 1.9% 2.6%	17 10.8% 32.1%	1 0.6% 11.1%	67 42.4% 7.1%	158 - 6.9%
Mica and tuff	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	1 16.7% 0.9%	0 0.0% 0.0%	0 0.0% 0.0%	5 83.3% 0.5%	6 - 0.3%
Crystal pumice	6 2.6% 8.2%	106 45.9% 13.9%	45 19.5% 17.6%	1 0.4% 6.3%	0 0.0% 0.0%	10 4.3% 8.5%	4 1.7% 7.5%	0 0.0% 0.0%	59 25.5% 6.2%	231 - 10.1%
Pumice and tuff	13 2.0% 17.8%	273 42.7% 35.9%	68 10.6% 26.6%	2 0.3% 12.5%	7 1.1% 13.2%	26 4.1% 22.2%	2 0.3% 3.8%	3 0.5% 33.3%	246 38.4% 26.0%	640 - 28.0%
Pumice and sand	4 2.1% 5.5%	75 39.7% 9.9%	11 5.8% 4.3%	0 0.0% 0.0%	6 3.2% 11.3%	8 4.2% 6.8%	2 1.1% 3.8%	0 0.0% 0.0%	83 43.9% 8.8%	189 - 8.3%
Tuff, sand, and crystal pumice	3 1.4% 4.1%	64 30.9% 8.4%	21 10.1% 8.2%	4 1.9% 25.0%	7 3.4% 13.2%	8 3.9% 6.8%	2 1.0% 3.8%	2 1.0% 22.2%	96 46.4% 10.1%	207 - 9.1%
Tuff, sand, and mica	1 11.1% 1.4%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	1 11.1% 1.9%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	7 77.8% 0.7%	9 - 0.4%
Mica and pumice	0 0.0% 0.0%	1 100.0% 0.1%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	1 - 0.0%
Mainly sand, some tuff	13 5.4% 17.8%	44 18.3% 5.8%	16 6.6% 6.3%	4 1.7% 25.0%	8 3.3% 15.1%	16 6.6% 13.7%	2 0.8% 3.8%	1 0.4% 11.1%	137 56.8% 14.5%	241 - 10.5%
Mainly tuff, some sand	18 4.8% 24.7%	121 32.1% 15.9%	60 15.9% 23.4%	1 0.3% 6.3%	11 2.9% 20.8%	33 8.8% 28.2%	1 0.3% 1.9%	2 0.5% 22.2%	130 34.5% 13.7%	377 - 16.5%
Mica and sand	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	2 100.0% 0.2%	2 - 0.1%
Quartz and feldspar	0 0.0% 0.0%	0 0.0% 0.0%	1 100.0% 0.4%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	1 - 0.0%
Quartz	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	2 100.0% 3.8%	0 0.0% 0.0%	0 0.0% 0.0%	2 - 0.1%
Other	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	1 5.6% 0.9%	17 94.4% 32.1%	0 0.0% 0.0%	0 0.0% 0.0%	18 - 0.8%
Column total Column percent	73 3.2%	761 33.3%	256 11.2%	16 0.7%	53 2.3%	117 5.1%	53 2.3%	9 0.4%	947 41.4%	2285 100.0%

smeared-indented utility wares, and are associated with Wiyo Black-on-gray (Mera 1935). Sapawe Micaceous Washboard followed, and occurs on Biscuitware sites dating between A.D. 1450 and 1600. These three pottery types are tempered with crushed rock containing mica. Potsui'i Gray and Potsui'i Incised are mica-slipped wares tempered with vitric tuff which date between A.D. 1475 or 1500 and 1600 (Warren 1981).

Table 14-7. Hispanic ceramic types by temper for La Puente (frequencies, row and column percentages).

Temper	Plain Utility	Casitas Red-on-Brown	Casitas Red-on-Brown Smudged	Hispanic Polished Blackware	Row Total Row Percent
Tuff	0 0.0% 0.0%	1 100.0% 0.1%	0 0.0% 0.0%	0 0.0% 0.0%	1 - 0.1%
Sand	35 3.0% 77.8%	650 55.6% 78.6%	27 2.3% 84.4%	458 39.1% 74.1%	1170 - 76.9%
Mica and quartz	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	2 100.0% 0.3%	2 - 0.1%
Crystal pumice	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	1 100.0% 0.2%	1 - 0.1%
Pumice and tuff	1 20.0% 2.2%	1 20.0% 0.1%	0 0.0% 0.0%	3 60.0% 0.5%	5 - 0.3%
Pumice and sand	3 15.8% 6.7%	8 42.1% 1.0%	0 0.0% 0.0%	8 42.1% 1.3%	19 - 1.2%
Tuff, sand, and crystal pumice	1 3.3% 2.2%	18 60.0% 2.2%	0 0.0% 0.0%	11 36.7% 1.8%	30 - 2.0%
Tuff, sand, and mica	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	1 100.0% 0.2%	1 - 0.1%
Mica and pumice	0 0.0% 0.0%	1 100.0% 0.1%	0 0.0% 0.0%	0 0.0% 0.0%	1 - 0.1%
Mica schist	1 50.0% 2.2%	0 0.0% 0.0%	0 0.0% 0.0%	1 50.0% 0.2%	2 - 0.1%
Mainly sand, some tuff	2 0.7% 4.4%	144 51.1% 17.4%	5 1.8% 15.6%	131 46.5% 21.2%	282 - 18.5%
Mainly tuff, some sand	0 0.0% 0.0%	3 60.0% 0.4%	0 0.0% 0.0%	2 40.0% 0.3%	5 - 0.3%
Mica and sand	0 0.0% 0.0%	1 100.0% 0.1%	0 0.0% 0.0%	0 0.0% 0.0%	1 - 0.1%
Quartz	2 100.0% 4.4%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	2 - 0.1%
Column total Column percent	45 3.0%	827 54.3%	32 2.1%	618 40.6%	1522 100.0%

In the Middle Rio Grande, between A.D. 1400 and 1600, the predominant utility ware was Rio Grande Micaceous, which is tempered with quartz mica schist (Mera 1935). This type is also referred to as Blind Indented Corrugated. Another type, Faint Striated Utility Ware, was described at Pecos Pueblo by Kidder (1936). It is characterized by fine-grained micaceous sandstone temper, with minute flecks of mica on the exterior surfaces of jars.

The Jicarilla Apache arrived in the Taos area around A.D. 1730, fifty years after the Pueblo Revolt (Carrillo n.d.a; Olinger 1988). During the Refugee period there

Table 14-8. Tewa ceramic types by temper for the Trujillo House (frequencies, row and column percentages).

Temper	Tewa Redware	Tewa Blackware	Tewa Other	Powhoge Polychrome	San Juan Red-on-Tan	Unknown Tewa Polychrome	Row Total Row Percent
Tuff	0 0.0% 0.0%	5 83.3% 2.4%	1 16.7% 4.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	6 - 2.2%
Sand	0 0.0% 0.0%	5 62.5% 2.4%	3 37.5% 12.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	8 - 2.9%
Mica schist and quartz	0 0.0% 0.0%	3 37.5% 1.4%	0 0.0% 0.0%	1 12.5% 50.0%	0 0.0% 0.0%	4 50.0% 23.5%	8 - 2.9%
Mica	0 0.0% 0.0%	2 100.0% 0.9%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	2 - 0.7%
Mica and quartz	0 0.0% 0.0%	4 80.0% 1.9%	0 0.0% 0.0%	0 0.0% 0.0%	1 20.0% 9.1%	0 0.0% 0.0%	5 - 1.8%
Crystal pumice	0 0.0% 0.0%	23 92.0% 10.9%	2 8.0% 8.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	25 - 9.2%
Pumice and tuff	0 0.0% 0.0%	37 82.2% 17.5%	5 11.1% 20.0%	1 2.2% 50.0%	0 0.0% 0.0%	2 4.4% 11.8%	45 - 16.5%
Pumice and sand	1 2.6% 14.3%	32 82.1% 15.2%	4 10.3% 16.0%	0 0.0% 0.0%	0 0.0% 0.0%	2 5.1% 11.8%	39 - 14.3%
Tuff, sand, and crystal pumice	1 3.8% 14.3%	16 61.5% 7.6%	2 7.7% 8.0%	0 0.0% 0.0%	2 7.7% 18.2%	5 19.2% 29.4%	26 - 9.5%
Tuff, sand, and mica	0 0.0% 0.0%	2 100.0% 0.9%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	2 - 0.7%
Mica and pumice	0 0.0% 0.0%	0 0.0% 0.0%	1 100.0% 4.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	1 - 0.4%
Mainly sand, some tuff	0 0.0% 0.0%	36 87.8% 17.1%	2 4.9% 8.0%	0 0.0% 0.0%	1 2.4% 9.1%	2 4.9% 11.8%	41 - 15.0%
Mainly tuff, some sand	5 7.8% 71.4%	45 70.3% 21.3%	5 7.8% 20.0%	0 0.0% 0.0%	7 10.9% 63.6%	2 3.1% 11.8%	64 - 23.4%
Mica and sand	0 0.0% 0.0%	1 100.0% 0.5%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	1 - 0.4%
Column total Column percent	7 2.6%	211 77.3%	25 9.2%	2 0.7%	11 4.0%	17 6.2%	273 100.0%

was contact between Pueblo and Apache people, with the Apache presumably learning or being exposed to pottery-making techniques. Contact with the more sedentary Pueblo people also resulted in a significant change in Apache lifestyle, with a shift from a mobile hunting and gathering existence to part-time farming and pastoralism. Baugh and Eddy (1987) believe that Athabaskan pottery manufacture correlated with this shift in lifestyle.

Apache micaceous wares bear a strong resemblance to those produced by the Pueblos, with the main distinction being deep corn-cob striations on the interiors of Apache ware jars. Opler (1971), after studying modern Apachean ceramic manufacture, concluded that the method used was identical to that of Taos and Picurís Pueblos, and was thus inspired and influenced by Pueblo peoples.

The Jicarillas obtained their clay from the Taos area, and the need to transport this clay has been presented as one of the reasons for raiding to the east for horses (Opler 1938). Opler further points out that the Jicarillas never fired pots out on the plains because they were afraid of the Plains people, and the Plains people were afraid of them. This may indicate more of an affinity with the Pueblos and their lifestyle than with nomadic groups to the east.

The second viewpoint is that the Jicarilla Apache brought a micaceous pottery-making technology with them when they arrived in the Taos area, and that they taught this technology to the Pueblos. Olinger (1988) believes that Taos traded for pottery with Jicarillas who moved into the area around A.D. 1730. This is also the

Table 14-9. Hispanic ceramic types by temper for the Trujillo House (frequencies, row and column percentages).

Temper	Plain Utility	Casitas Red-on-Brown	Casitas Red-on-Brown Smudged	Hispanic Polished Blackware	Row Total Row Percent
Sand	1 0.5% 33.3%	96 45.9% 42.5%	6 2.9% 33.3%	106 50.7% 29.3%	209 - 34.3%
Mica schist and quartz	0 0.0% 0.0%	2 50.0% 0.9%	0 0.0% 0.0%	2 50.0% 0.6%	4 - 0.7%
Mica and quartz	1 33.3% 33.3%	1 33.3% 0.4%	0 0.0% 0.0%	1 33.3% 0.3%	3 - 0.5%
Pumice and sand	0 0.0% 0.0%	1 5.0% 0.4%	1 5.0% 5.6%	18 90.0% 5.0%	20 - 3.3%
Tuff, sand, and crystal pumice	0 0.0% 0.0%	2 18.2% 0.9%	0 0.0% 0.0%	9 81.8% 2.5%	11 - 1.8%
Tuff, sand, and mica	0 0.0% 0.0%	1 25.0% 0.4%	0 0.0% 0.0%	3 75.0% 0.8%	4 - 0.7%
Mainly sand, some tuff	0 0.0% 0.0%	118 35.4% 52.2%	11 3.3% 61.1%	204 61.3% 56.4%	333 - 54.7%
Mainly tuff, some sand	0 0.0% 0.0%	4 17.4% 1.8%	0 0.0% 0.0%	19 82.6% 5.2%	23 - 3.8%
Mica and sand	0 0.0% 0.0%	1 100.0% 0.4%	0 0.0% 0.0%	0 0.0% 0.0%	1 - 0.2%
Quartz	1 100.0% 33.3%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	1 - 0.2%
Column total Column percent	3 0.5%	226 37.1%	18 3.0%	362 59.4%	609 100.0%

Figure 14-9. Micaceous ware jar with a smoothed and polished exterior.

date when micaceous wares first appeared in the Taos refuse mound. The Apache were forced into the area by raiding Utes and Comanche, and sometimes actually lived within the pueblo. This close relationship probably resulted in intermarriage, thus bringing the micaceous pottery tradition to the pueblo (Olinger 1988).

A third, and less likely, alternative is presented by Warren (1977), who suggests that Mexican Indians accompanying Spanish colonists brought the micaceous pottery tradition with them. Since micaceous wares were produced in the Valley of Mexico from 400 B.C. to after A.D. 1500, she correlates this idea with the Mexican origin of the Manzano wares as suggested by Dick (1946). A further justification for this idea is that a large number of mica-slipped sherds have been found at Spanish Colonial villages in northern New Mexico. However, given the presence of micaceous wares in the northern Rio Grande as early as A.D. 1300, this explanation is not as plausible as the other two.

La Puente

A total of 1076 micaceous sherds (20 percent of the sampled assemblage) was found at La Puente. This category includes mica slipped, mica paste, Apache Micaceous, and Chacon Micaceous (see Chapter 3, Field and Analytic Methods, for definitions and discussion). Most of the micaceous wares are mica paste (48 percent; Table 14-10). This category includes Peñasco, Petaca, and an unknown amount of Apache micaceous wares, which could not be distinguished if rims were missing and striations were not apparent. Twenty-three percent were coded as Apache wares. There is no obvious range in thickness which would indicate the presence of both Ocate and Cimarron Micaceous. Ocate Micaceous ranges from 1.5 to 6 mm thick, with an average of 3 to 4 mm; Cimarron Micaceous ranges from 4 to 9 mm thick, with an average of 4 to 6 mm (Gunnerson 1969). At La Puente, the thickness range for most of the Apache wares was 4 to 5 mm. Since 4 mm overlaps the average for both types, and 5 mm can legitimately be either type, thickness appears to be a vague distinction in this assemblage. If there was a higher percentage of very thin sherds (3 mm or less) it would have been more valid, but with only 8 percent of the sherds measuring 3 mm in thickness or less, the proportion of very thin sherds is not significant. However, since Ocate Micaceous is an early type dating between A.D. 1550 and 1750, this ware cannot really be expected to occur in large quantities at La Puente. A third Apache type, Chacon Micaceous, comprises an insignificant portion of the micaceous assemblage (2 percent). This can be attributed to its late beginning date (A.D. 1840), as well as difficulty in recognizing it.

Table 14-10. Micaceous wares by temper for La Puente (frequencies, row and column and percentages).

Temper	Mica Slipped	Mica Paste	Apache Micaceous	Chacon Micaceous	Row Total Row Percent
Tuff	1	0	0	0	1
	100.0%	0.0%	0.0%	0.0%	-
	0.3%	0.0%	0.0%	0.0%	0.1%
Sand	157	1	2	1	161
	97.5%	0.6%	1.2%	0.6%	-
	52.7%	0.2%	0.8%	5.6%	15.0%
Mica schist and quartz	0	79	26	0	105
	0.0%	75.2%	24.8%	0.0%	-
	0.0%	15.3%	10.7%	0.0%	9.8%
Mica	0	15	8	0	23
	0.0%	65.2%	34.8%	0.0%	-
	0.0%	2.9%	3.3%	0.0%	2.1%
Mica and quartz	6	342	131	3	482
	1.2%	71.0%	27.2%	0.6%	-
	2.0%	66.3%	53.7%	16.7%	44.8%
Mica and tuff	0	3	1	0	4
	0.0%	75.0%	25.0%	0.0%	-
	0.0%	0.6%	0.4%	0.0%	0.4%
Pumice and sand	5	0	0	0	5
	100.0%	0.0%	0.0%	0.0%	-
	1.7%	0.0%	0.0%	0.0%	0.5%
Tuff, sand, and crystal pumice	6	0	0	0	6
	100.0%	0.0%	0.0%	0.0%	-
	2.0%	0.0%	0.0%	0.0%	0.6%
Tuff, sand, and mica	0	0	1	0	1
	0.0%	0.0%	100.0%	0.0%	-
	0.0%	0.0%	0.4%	0.0%	0.1%
Mica and pumice	2	0	0	0	2
	100.0%	0.0%	0.0%	0.0%	-
	0.7%	0.0%	0.0%	0.0%	0.2%
Mica schist	7	39	26	0	72
	9.7%	54.2%	36.1%	0.0%	-
	2.3%	7.6%	10.7%	0.0%	6.7%
Mica schist and feldspar	0	25	25	0	50
	0.0%	50.0%	50.0%	0.0%	-
	0.0%	4.8%	10.2%	0.0%	4.6%
Mainly sand, some tuff	35	1	0	0	36
	97.2%	2.8%	0.0%	0.0%	-
	11.7%	0.2%	0.0%	0.0%	3.3%
Mainly tuff, some sand	5	1	0	0	6
	83.3%	16.7%	0.0%	0.0%	-
	1.7%	0.2%	0.0%	0.0%	0.6%
Mica and sand	0	4	2	2	8
	0.0%	50.0%	25.0%	25.0%	-
	0.0%	0.8%	0.8%	11.1%	0.7%
Quartz and feldspar	9	0	1	4	14
	64.3%	0.0%	7.1%	28.6%	-
	3.0%	0.0%	0.4%	22.2%	1.3%
Quartz	65	6	21	8	100
	65.0%	6.0%	21.0%	8.0%	-
	21.8%	1.2%	8.6%	44.4%	9.3%
Column total	298	516	244	18	1076
Column percent	27.7%	48.0%	22.7%	1.7%	100.0%

The characteristic interior striations were not as much of a determinant of Apache wares as was the square rim form. Only 14 percent of the Apache wares have interior striations, 4 percent have exterior striations, and 3 percent have both interior and exterior striations. The most common surface finish on all of the micaceous wares is smoothed and unpolished (76.8 percent; Fig. 14-9). The only other category of mica-slipped wares that contains a significant percentage is unpolished exterior with a polished interior (9.8 percent). Since many of these resemble polished blackwares with an exterior mica slip, this was not unusual.

Rim forms are almost evenly split between everted (51.8 percent) and straight (42.4 percent), with a slightly higher percentage of everted rims on mica slipped, mica paste, and Apache Micaceous. Chacon Micaceous has a higher percentage of straight rims, but the sample number is negligible.

Mica-quartz is the prevalent temper in both the mica paste wares and the Apache micaceous types. This may imply a micaceous clay rather than an added temper. This temper type was difficult to distinguish during analysis, however, because the distinction between mica and mica schist was often unclear. Mica schist, with or without quartz, is next in frequency. Within the mica-slipped wares, more than half are sand tempered, a criterion used to identify both Vadito and El Rito Micaceous. Quartz follows in frequency, with all other temper types being minimal. Chacon Micaceous has mainly quartz temper, followed by quartz/feldspar, though again there is not a large enough sample to make any precise determinations.

The frequency of each micaceous category differs between trash areas. It is interesting to note that none match the overall site ratio, which is mica paste-mica slip-Apache-Chacon. In Trash Areas 2 and 3, percentages of Apache wares are slightly higher than in Trash Area 1, which was deposited at an earlier date (an increase of 1 percent and 2 percent, respectively). In Trash Area 3, which contained only 36 micaceous sherds, Apache wares comprise the highest percentage.

Trujillo House

The micaceous assemblage at the Trujillo House resembles that of Trash Area 3 at La Puente. Apache Micaceous is most common, followed closely by mica paste (Table 14-11). Mica-slipped wares and Chacon Micaceous comprise only a small part of the assemblage. Seven percent of the Apache wares fall within the average for Ocate Micaceous. Most, however, are in the 4 to 5 mm thick range, as at La Puente, and are probably Cimarron Micaceous based on the late date for the site. The increase in Apache wares appears to correlate with the transition from the Spanish Colonial to the American Territorial Period. Again, mica/quartz is the most frequently observed temper (67 percent) for all micaceous types, followed by mica schist/feldspar (8 percent), which occurs mostly in the mica paste wares.

Temporal Components at La Puente

To examine temporal patterns between features within each trash area, ceramic types were collapsed into broad categories to observe the Tewa to Hispanic to Apache ratios. Tewa plainwares (red, black, and other), Ogapoge Polychrome, Powhoge Polychrome, Powhoge Black-on-red, San Juan Red-on-tan, and indeterminate (Ogapoge/Powhoge) Tewa polychrome were all lumped into the Tewa category. Casitas Red-on-brown, Casitas Smudged, and Hispanic polished blackware are included in the Hispanic category. The Apache category contains Apache and Chacon Micaceous. Since “mica-slipped” and “mica-paste” could be either Pueblo or Hispanic wares, they were put into an indeterminate micaceous group. Prehistoric types and unknowns were excluded for this portion of the analysis.

In order to assign temporal affiliations at La Puente, it was first necessary to be able to identify Spanish Colonial versus Mexican and American Territorial assemblages. Since the Trujillo House was known to date to the American Territorial period, the broad ceramic categories described above were examined for this site. The results are presented in Table 14-12. Assemblages from the three trash areas at La Puente were then compared to these ratios as an experimental independent dating method.

Assigning temporal affiliations to these features was based on certain assumptions derived from trends observed in the assemblages: (1) Hispanic wares increased while Tewa wares decreased through time; (2) utility wares and polychromes decreased after the opening of the Santa Fe Trail as they were replaced by Euroamerican goods; and (3) Apache wares increased slightly in the Territorial period, while Pueblo/Hispanic micaceous wares decreased sharply. These dates were then correlated with those derived from analysis of the Euroamerican assemblages.

Trash Area 1

Feature 2. The assemblage from this feature differed appreciably from those of the other features within Trash Area 1 (Table 14-13). Apache wares comprise 25 percent of this assemblage, whereas Features 3, 7, and 9 each contained only 4 percent of this type.

There is a resemblance to the Trujillo House in that the percentage of Apache wares is similar to the percentage of indeterminate micaceous wares, though the percentages are much higher here than at the Trujillo House. Otherwise, the Feature 2 assemblage differs dramatically from the assemblage at the Trujillo House. The Tewa to Hispanic ware ratio is 35 percent to 19 percent, a difference of 16 percent. This is the same amount of variation seen at the Trujillo House, but the categories are reversed. Based on this difference, and on the fact that

Table 14-11. Micaceous wares by temper for the Trujillo House (frequencies, row and column percentages).

Temper	Mica Slipped	Mica Paste	Apache Micaceous	Chacon Micaceous	Row Total Row Percent
Sand	0	0	1	2	3
	0.0%	0.0%	33.3%	66.7%	-
	0.0%	0.0%	1.2%	25.0%	1.7%
Mica schist and quartz	0	0	8	0	8
	0.0%	0.0%	100.0%	0.0%	-
	0.0%	0.0%	9.5%	0.0%	4.6%
Mica	0	6	3	0	9
	0.0%	66.7%	33.3%	0.0%	-
	0.0%	8.0%	3.6%	0.0%	5.1%
Mica and quartz	3	52	59	1	115
	2.6%	45.2%	51.3%	0.9%	-
	37.5%	69.3%	70.2%	12.5%	65.7%
Tuff, sand, and crystal pumice	1	0	0	0	1
	100.0%	0.0%	0.0%	0.0%	-
	12.5%	0.0%	0.0%	0.0%	0.6%
Tuff, sand, and mica	0	0	1	0	1
	0.0%	0.0%	100.0%	0.0%	-
	0.0%	0.0%	1.2%	0.0%	0.6%
Mica and pumice	0	1	0	0	1
	0.0%	100.0%	0.0%	0.0%	-
	0.0%	1.3%	0.0%	0.0%	0.6%
Mica schist	0	3	4	2	9
	0.0%	33.3%	44.4%	22.2%	-
	0.0%	4.0%	4.8%	25.0%	5.1%
Mica schist and feldspar	0	9	3	1	13
	0.0%	69.2%	23.1%	7.7%	-
	0.0%	12.0%	3.6%	12.5%	7.4%
Mica and sand	0	0	4	0	4
	0.0%	0.0%	100.0%	0.0%	-
	0.0%	0.0%	4.8%	0.0%	2.3%
Quartz and feldspar	1	0	1	2	4
	25.0%	0.0%	25.0%	50.0%	-
	12.5%	0.0%	1.2%	25.0%	2.3%
Quartz	3	4	0	0	7
	42.9%	57.1%	0.0%	0.0%	-
	37.5%	5.3%	0.0%	0.0%	4.0%
Column total	8	75	84	8	175
Column percent	4.6%	42.9%	48.0%	4.6%	100.0%

Table 14-12. Pottery categories for the Trujillo House (%).

Cultural Affiliation	Percentage
Hispanic	51
Tewa	35
Apache	7
Indeterminate (micaceous)	7

Table 14-13. Pottery categories from Trash Area 1, Feature 2 at La Puente (%).

Cultural Affiliation	Percentage
Tewa	35
Apache	25
indeterminate (micaceous)	22
Hispanic	19
Total sherds	n=69

Table 14-14. Ceramic types from Trash Area 1, Feature 2 at La Puente (%).

Ceramic Type	Percentage
Tewa blackware	26
Tewa, other	1
Powhoge Polychrome	1
Unidentified Tewa polychromes	6
Hispanic blackware	15
Casitas Red-on-brown	4
Mica slipped	4
Mica paste	17
Apache micaceous	25
Total sherds	n=69

Table 14-15. Pottery categories from Trash Area 1, Features 3 and 9 at La Puente (%).

	Percentage	
Cultural Affiliation	Feature 3	Feature 9
Tewa	49	50
Indeterminate (micaceous)	26	22
Hispanic	21	22
Apache	4	4
Historic, non-Tewa	1	2
Total sherds	n=226	n=1454

Hispanic wares comprise the lowest percentage of all groups in Feature 2, this assemblage appears to be Spanish Colonial in date. However, the high number of Apache wares may indicate the presence of later deposits as well.

Returning to specific categories, the Tewa wares are mostly blackwares; no San Juan Red-on-tan was found in this trash area, and less than 10 percent of this assemblage is Tewa polychrome (Powhoge and Unidentified Tewa polychromes). The Hispanic wares are also almost all blackwares, with less than 5 percent consisting of Casitas Red-on-brown (Table 14-14).

Feature 3 and 9. These features are discussed together since they are very similar (Table 14-15). Both have a 28 percent difference between Tewa and Hispanic Wares, with Tewa wares comprising the majority of the assemblages. Both contain only a small amount of Apache wares, and have five to six times as many indeterminate micaceous wares. Because half of each assemblage is made up of Tewa types, there are more than twice as many Tewa wares as Hispanic wares, and few Apache wares are present. Features 3 and 9, therefore, both appear to be of Spanish Colonial origin.

Looking at specific types, some differences were observed between these features (Table 14-16). Feature 3 resembles Feature 2 in that there were many more blackwares than redwares of both Tewa and Hispanic types, and very few Tewa polychromes (only 1 percent Unidentified Tewa polychromes). Feature 9, however, contained more polychromes than any other type. These included Ogapoge, Powhoge, and Unidentifiable Tewa polychrome types dating from 1720 to 1850. It also has more Casitas Red-on-brown than either of the blackwares, and the lowest percentage of Hispanic blackware of any of the Trash Area 1 features.

Feature 7. Since the sample from this feature is so small (n=25), it may not be as informative as other features. Nevertheless, the Tewa to Hispanic to Apache ratios are similar to those of Features 3 and 9, though differences were noted in actual percentages. Tewa wares jump to 68 percent, the highest of any feature, and Hispanic wares comprised only 24 percent of the assemblage. Indeterminate micaceous wares dropped from the 22 to 26 percent range down to only 4 percent, making it equal to the Apache types. This feature also appears to represent a Spanish Colonial occupation.

Trash Area 2

Overall, Trash Area 2 appears to represent a later occupation than Trash Area 1. Hispanic ware percentages range from 25 to 42 percent, as opposed to 19 to 24 percent in Trash Area 1. Tewa to Hispanic ratios are also closer than in Trash Area 2.

Feature 1. Tewa wares predominate in Feature 1, but only by 13 percent (Tewa wares—38 percent, Hispanic wares—25 percent). This is less of a difference than seen at any of the features in Trash Area 1. The amount of indeterminate micaceous wares is high, which is similar to Trash Area 1, and Apache ware percentages are low (Table 14-17). This assemblage suggests a slightly later date than that derived for Trash Area 1, based on the higher percentage of Hispanic wares.

Differences were also seen in specific types within the broad categories. Mica-paste sherds predominated, followed by Tewa blackware. This is the only feature in any of the trash areas that is dominated by a micaceous type. There is more Casitas Red-on-brown than Hispanic blackware, something that otherwise only occurs in Feature 9, Trash Area 1. Polychromes comprise only 12 percent of the assemblage (Table 14-18).

Features 5 and 6. These features contain very similar assemblages and are discussed together (Table 14-19). Both features are dominated by Hispanic wares: Feature 5 by only a 2 percent margin, and Feature 6 by 9 percent. Tewa wares are next in frequency, followed by the typically high percentage of indeterminate micaceous wares and a small percentage of Apache wares. The Hispanic to Tewa ratio approaches that seen at the Trujillo House. However, though both features contain more Hispanic wares than would a Spanish Colonial assemblage, they contain too high a percentage of indeterminate micaceous ware to fit the Territorial period model; one quarter of each of these assemblages is composed of this type. At the Trujillo House, there is less than 10 percent each of both this category and Apache wares. This can probably be attributed to the influx of goods from the Santa Fe Trail, such as metal cooking pots, which would have replaced the micaceous vessels. Therefore, the high number of micaceous wares combined with the Hispanic wares in Features 5 and 6 may suggest a Mexican Territorial period date.

The individual ceramic types have similar distributions in both of these features (Table 14-20). In Feature 5, Hispanic blackware, Tewa blackware, and Casitas Red-on-brown are most common and occur in the same percentages, followed by mica paste. In Feature 6, Casitas Red-on-brown is the dominant type, followed by mica paste, Hispanic blackware, and Tewa blackware. Tewa polychromes comprise low percentages in both features (with no Ogapoge represented), a characteristic seen at the Trujillo House.

Features 8 and 10. These features are similar in their Tewa and Hispanic ware frequencies, but differ in their micaceous ware ratios (Table 14-21). Feature 8 contains only 3 percent more Tewa wares than Hispanic wares, and Feature 10 contains 8 percent more Tewa than Hispanic wares. Since these percentages are so similar,

Table 14-16. Ceramic types from Trash Area 1, Features 3 and 9 at La Puente (%).

Ceramic Type	Percentage	
	Feature 3	Feature 9
Tewa blackware	27	13
Tewa redware	2	5
Tewa, other	10	7
Ogapoge Polychrome	0	1
Powhoge Polychrome	0.4	2
Unidentified Tewa polychromes	9	19
Hispanic blackware	13	8
Casitas Red-on-brown	8	13
Mica slipped	7	12
Mica paste	19	9
Apache micaceous	4	4
Imported Historic polychromes	1	2
Unknown	1	3
Total sherds	n=226	n=1454

Table 14-17. Pottery categories from Trash Area 2, Feature 1 at La Puente (%).

Cultural Affiliation	Percentage
Tewa	38
Indeterminate (micaceous)	30
Hispanic	25
Apache	7
Total sherds	n=878

Table 14-18. Ceramic types from Trash Area 2, Feature 1 at La Puente (%).

Ceramic Type	Percentage
Tewa blackware	16
Tewa redware	2
Tewa, other	6
Powhoge Polychrome	1
Unidentified Tewa polychromes	11
Hispanic blackware	9
Casitas Red-on-brown	15
Mica slipped	5
Mica paste	23
Apache micaceous	6
Plain utility	5
Total sherds	n=878

the micaceous wares once again become a decisive factor in determining temporality. Feature 10 contains an assemblage that has thus far been typical of Spanish Colonial deposits: 23 percent indeterminate micaceous wares, and 4 percent Apache wares. In Feature 8, ratios of 10 percent Apache wares and 4 percent indeterminate micaceous wares more closely resemble those of the Territorial period deposits. The low percentage of micaceous pottery, combined with a slight increase of Apache types over other micaceous wares, and a relatively high percentage of Hispanic wares, suggests a Mexican Territorial period date for Feature 8.

One interesting aspect observed when examining the specific ceramic types from these features was the high frequency of Tewa polychromes in both (Table 14-22). Feature 9 in Trash Area 1 was the only other location where this high frequency was seen. The Trujillo House assemblage contained a very low percentage of Tewa polychromes, as did the earlier Spanish Colonial period deposits. Perhaps the incidence of these wares peaks at the transition between the Spanish Colonial and Mexican Territorial periods.

Table 14-19. Pottery categories from Trash Area 2, Features 5 and 6 at La Puente (%).

	Percentage	
Cultural Affiliation	Feature 5	Feature 6
Hispanic	36	42
Tewa	34	33
Indeterminate (micaceous)	25	24
Apache	4	1
Total sherds	n=215	n=232

Table 14-20. Ceramic types from Trash Area 2, Features 5 and 6 at La Puente (%).

	Percentage	
Ceramic Type	Feature 5	Feature 6
Tewa blackware	17	15
Tewa redware	1	1
Tewa, other	8	9
Unidentified Tewa polychrome	8	7
Hispanic blackware	17	18
Casitas Red-on-brown	17	23
Mica slipped	9	3
Mica paste	14	20
Apache micaceous	3	1
Imported Historic polychromes	1	0
Unknown	4	3
Total sherds	n=215	n=232

Trash Area 3

The Trash Area 3 assemblage is similar to that of Feature 8 in Trash Area 1 (Table 14-23). It is dominated by Tewa and Hispanic wares, with very few micaceous wares. Tewa types comprise half of the assemblage, suggesting a Spanish Colonial period assemblage. However, the low number of micaceous wares, and the ratio between Tewa and micaceous wares, are more indicative of a Territorial period occupation. These characteristics, combined with the high frequency of Tewa polychromes (Table 14-24), again may suggest an origin during the transition between the Spanish Colonial and Mexican Territorial periods.

Summary

Trash Areas 1 and 2 appear to contain features indicative of multicomponent use. In Trash Area 1, Feature 2 has characteristics of both the Spanish Colonial and Territorial periods, whereas Features 3, 7, and 9 appear to contain Spanish Colonial assemblages. In Trash Area 2, the assemblage from Feature 8 was Spanish Colonial in date; Feature 1 was possibly late Spanish Colonial; Features 6 and 8 were possibly of Mexican Territorial period date; and Feature 10 was Spanish Colonial. Trash Area 3 was similar to Features 5 and 6, and is also considered Mexican Territorial.

Table 14-21. Pottery categories from Trash Area 2, Features 8 and 10 at La Puente (%).

	Percentage	
Cultural Affiliation	Feature 8	Feature 10
Tewa	44	41
Hispanic	41	32
Apache	10	4
Indeterminate (micaceous)	4	23
Imported Historic polychromes	0.5	1
Total sherds	n=183	n=473

CONCLUSIONS

Besides being a cultural indicator, the ceramics from these assemblages also functioned as temporal indicators in distinguishing Spanish Colonial, Mexican Territorial, and American Territorial components at sites. Patterns observed during this analysis indicate that Hispanic wares increased in frequency through time, while Tewa and Apache wares decreased. Vessel form was also a temporal indicator. Only Tewa blackware remained consistent in vessel form over time. The frequency of Hispanic blackware and redware bowl forms increased from the Spanish Colonial to the American Territorial period. During the Spanish Colonial period, most of the plainware jars were Tewa blackware, most of the bowls were Hispanic redware, and most of the soup plates were Hispanic blackware. During the American Territorial period, Tewa blackware and redware jars and Hispanic blackware bowls dominated the plainware assemblage. Tewa polychromes were common during the Spanish Colonial period and rare in the Mexican and American Territorial periods.

Regardless of who actually made the pottery in question, the fact remains that two similar but distinct ceramic traditions occur throughout the state. Dick (1968) felt that Casitas Red-on-brown ranges from Mesilla north to southern Colorado, and the sand-tempered blackwares may have a similar distribution. Despite Snow's assertion that pottery found at Hispanic sites is technologically indistinguishable from pueblo ceramics (Snow 1984:93), analytical results from several Spanish sites, including La Puente and the Trujillo House, demonstrate the opposite. Both the blackwares and the red-on-buff wares have fine to coarse sand temper, and are generally more friable than the tuff-tempered Tewa wares. The extent of slip and polish also differs on both the red and the black wares, and design style and quality vary within the redwares. There is enough of a difference to suggest that Tewas were not producing this pottery.

There is convincing evidence for both sides of the controversy. The pueblos probably did supply pottery to the colonists when they first settled in New Mexico. Eventually, though, through intermarriage and acculturation, pottery manufacture may have become an integral part of Hispanic society. Further ethnographic and archaeological research into this question is needed to settle the dispute, and to provide information on the extent of acculturation in Colonial New Mexico.

Table 14-22. Ceramic types from Trash Area 2, Features 8 and 10 at La Puente (%).

Ceramic Type	Percentage	
	Feature 8	Feature 10
Tewa blackware	16	11
Tewa redware	3	5
Tewa, other	2	5
Ogapoge Polychrome	1	1
Powhoge Polychrome	1	1
Unidentified Tewa polychromes	22	18
Hispanic blackware	22	12
Casitas Red-on-brown	18	17
Mica slipped	1	10
Mica paste	3	11
Apache micaceous	10	4
Imported Historic polychromes	1	1
Unknown	0	4

Table 14-23. Pottery categories from Trash Area 3 at La Puente (%).

Cultural Affiliation	Percentage
Tewa	49
Hispanic	37
Apache	8
Indeterminate (micaceous)	6
Total sherds	n=135

Table 14-24. Ceramic types from Trash Area 3 at La Puente (%).

Ceramic Type	Percentage
Tewa blackware	18
Tewa redware	1
Tewa, other	1
Unidentified Tewa polychromes	25
Hispanic blackware	17
Casitas Red-on-brown	17
Mica slipped	2
Mica paste	3
Apache micaceous	6
Imported Historic polychromes	1
Prehistoric wares	4
Unknown	3

CHAPTER 15

PLANT MATERIALS FROM LA PUENTE AND THE TRUJILLO HOUSE

MOLLIE S. TOLL

INTRODUCTION

Botanical materials analyzed from La Puente consisted of 14 flotation samples, 18 macrobotanical samples, 20 charcoal samples submitted for radiocarbon dating, and 12 charcoal samples obtained from flotation samples (Table 15-1). Eleven flotation and 42 macrobotanical samples from the Trujillo House were analyzed. Two derived from a corner fireplace built along a wing wall in Room 5; the nine remaining samples documented strata in the trash-filled borrow pit. Eight samples produced sufficient charcoal for species composition analysis. No additional charcoal was submitted for identification. The macrobotanical samples examined included corn cobs, squash seeds, and peach and apricot pits.

Botanical materials examined in this project could provide direct documentation of economic activities in a little-known period in this area of northern New Mexico. Chief obstacles are the shallow and mixed deposits at La Puente, and the lack of cultural deposits associated with most proveniences inside the Trujillo House.

Table 15-1. Summary of botanical samples analyzed: La Puente and the Trujillo House.

Sample Type	Material	La Puente	Trujillo House
Flotation	Macrobotanical	14	11
Wood	Charcoal from flotation	12	8
	Carbon-14	20	0
	Macrobotanical	2	0
	Total	34	8
Macroremains	Corn cobs	7	25
	Cucurbit seeds	3	1
	Prunus pits	4	16
	Unknowns	2	0
	Total	16	42

RESULTS

La Puente

Flotation. The extensive, shallow midden strata in Trash Area 1 were deposited during the Spanish Colonial occupation. Radiocarbon dates were later than expected, and seem to indicate Spanish Colonial occupation in the eighteenth and nineteenth centuries.

A carbonized Russian thistle (*Salsola*) seed in Level 3 (Table 15-2) warns of contamination by **burned** modern seeds. There is no doubt that *Salsola* postdates the Spanish Colonial village (this species was introduced to the American West in the late nineteenth century), and the seed's very distinctive morphology leaves no doubt about its identification. The New Mexico State Highway and Transportation Department controls weeds by burning them, which is a problem for roadside archaeology in that it puts into limbo any interpretation of burned floral material as cultural versus intrusive. Knowing that burned Russian thistle is present as a contaminant, burned seeds of any other common roadside plants must be suspected as potentially intrusive. Weedy annuals, with their large seed crops and tendency to increase in disturbed areas, are particularly suspect. Despite their widespread economic use both prehistorically and historically in the Southwest, then, charred pigweed (present in level 3 and especially numerous in Stratum 2) and goosefoot (Stratum 2) are probably not related to occupation at La Puente, nor are two lesser economics, doveweed and groundcherry. Juniper twigs in Stratum 2 **may** be cultural, but the only certain economic species are corn (represented by a single cupule in level 3, and by seven cupules in Stratum 4) and chile (one seed in level 2).

Several trash-filled pits in Trash Area 1 appear to be intrusive from the Territorial occupation. Feature 2 contained many charred pigweed seeds, one charred goosefoot seed, and at least seven other weed and grass taxa (Table 15-3), all of which are doubtful in terms of their relevance to historic site occupation. The partial prickly pear seed is a likely rodent transport item, but piñon and sedge, coming from farther afield, may be cultural. The few corn cupules were the only items clearly assignable to cultural activity. Feature 3 was immediately to the north and slightly larger than Feature 2. The upper strata are represented by three flotation samples. Seeds were most abundant and diverse in Stratum 9, probably reflecting a higher level of contamination towards the surface. Two possible charred barley grains were recovered from the lowest trash stratum, and corn was present in low frequency throughout. Feature 8 in Trash Area 2a

Table 15-2. Flotation results: Spanish Colonial proveniences in Trash Area 1 at La Puente.

Plant Type		Number of Seeds Recovered (from 5 samples)[1]				
		Level 3	Stratum 4	Stratum 3	Stratum 2	Level 2
Weedy annuals	*Amaranthus* (pigweed)	3 (**3**)[2]	0	0	293 (*406.7*)[2]	1 (**1**)
	Chenopodium (goosefoot)	89 (**89**)	1 (**2**)	0	1 (*2.7*)[2]	18 (**18**)
	Portulaca (purslane)	271 (**271**)	27 (**60**)	0	5 (*12.0*)	66 (**66**)
	Cleome (beeweed)	9 (**9**)	0	0	0	0
	Croton (doveweed)	0	154 (**193**)[2]	0	0	0
	Descurainia (tansy mustard)	0	0	0	0	4 (**4**)
	Physalis or *Solanum* (nightshade family)	3 (**3**)	0	3 (**3**)	1 (*1.3*)[2]	1 (**1**)
	Salsola (Russian thistle)	1 (**1**)[2]	0	0	0	0
	Unidentifiable	0	0	0	5 (*8.0*)[2]	0
Perennials	*Juniperus* (juniper)	0	0	0	twigs[2]	1 (**1**)
Cultivars	*Capsicum* (chile)	0	0	0	0	1 (**1**)[2]
	Zea mays (corn)	cupules[2]	cupules[2]	0	0	0
Totals	Total taxa	7	4	1	5	7
	Total burned taxa	3	2	0	4	1

[1]First number is actual number of seeds recovered. Numbers in parentheses are: (**bold**) estimated total seeds for the entire sample, where soil volume is unknown; and (*italic*) estimated seeds per liter of soil, including any subsampling.

[2]Some or all specimens charred.

is thought to be a blacksmith's dump. The deposit was extensive, but shallow (10 cm). All seed remains are unburned and probably intrusive.

Two pits in Trash Area 2b were dated to the American Territorial period, and midden deposits in Trash Area 3 were probably from the Mexican Territorial period. Feature 5 cut through Feature 1, and mixing of fill from the two pits is likely. Both trash pits contained an abundance and variety of unburned weedy annuals (Table 15-4). Cultural materials include piñon nutshell and bean in Feature 1, and possible corn in Feature 5. The sample from Trash Area 3 contained only modern seeds (nine taxa, in considerable numbers).

Wood. Species composition of charcoal from La Puente flotation samples (Table 15-5) and larger pieces selected for radiocarbon dating (Table 15-6) showed a general pattern of conifer dominance (92 to 98 percent), with occasional small quantities of riparian wood. Juniper was the principal component of every sample deriving from flotation, but in several of the samples field-collected for radiocarbon dating, piñon was predominant, and higher elevation conifers (with wider latewood bands) were noted among the undetermined conifers.

Macrobotanical remains. The few corn remains at La Puente consist of charred cob fragments (Table 15-7). The ears represented are generally small, and include 10-, 12-, and 14-rowed specimens. Unburned peach pits in ashy matrix (Table 15-8) were recovered from an intrusive Territorial period trash pit. Most specimens are split halves, but some small pits are intact. Apricot pits, on the other hand, are charred and fragmentary; all derived from trash strata laid down during the Spanish Colonial occupation. At least two groups of cucurbits are represented by seeds recovered at La Puente. Both charred and uncharred seeds of a squash or pumpkin type (*Cucurbita* sp.) and unburned bottlegourd seeds (*Lagenaria* sp.) were found in proveniences of mixed or uncertain date (Table 15-9).

Trujillo House

Flotation. Little cultural fill remained inside this structure, and the only flotation samples were taken from a hearth in Room 5. With the exception of three beeweed seeds, both upper and lower fill contained unburned modern weed and grass seeds that were probably intrusive (Table 15-10).

Flotation samples document five of six strata distinguished during excavation of the trash-filled borrow pit (Table 15-11). Stratum 1 contained high densities of goosefoot, purslane, and prickly pear seeds. Russian thistle capsule lids are a marker of disturbance postdating the late nineteenth century; a charred juniper twig probably relates to the prominent use of juniper wood as fuel. Two samples from Stratum 2 contain similar arrays of unburned weed seeds plus burned juniper, corn, and chile. The ashy gray soil of Stratum 3 contained fewer intrusives, some charred juniper, but no crop species. Stratum 4, largely adobe melt, was not sampled. Likely contaminants (modern weed and grass seeds) are again prominent in Stratum 5, approximately a meter below the surface. Burned juniper twigs were not present in the two deepest strata (5 and 6), though juniper wood continues to be the dominant element in the charcoal assemblage. Cultivars are absent from Stratum 5, but cholla (because it was burned) and sedge (representing a specialized habitat with permanent water) are significant. Stratum 6 contains chile and corn, and a very reduced panoply of intrusives.

Wood. Charcoal composition showed no significant changes throughout the Trujillo House midden strata (Table 15-12). In any given stratum, coniferous wood did not waiver far from the overall average of 93 to 94 percent. Nonconiferous types included cottonwood/willow in an upper stratum, and oak lower down.

Macrobotanical remains. Carbonized corn cobs were abundant in the midden, chiefly in Strata 3 and 4 (Table 15-13). No significant differences are apparent over time in the assemblage. Cobs with 12 rows are most common, followed by those with 14 and 10 rows. The general morphological pattern is a relatively stout cob with broad cupules.

Orchard fruit pits from the midden include both burned and unburned specimens. Peach pits are most often unburned, and are most common in midden Stratum 2 (Table 15-14). Apricot pits are burned slightly more often than unburned, and tend to be fragmentary. Two unburned and badly eroded squash seeds were recovered from the deepest stratum of the midden (Table 15-11).

Discussion

Composition of the Assemblage as a Whole

Differences between floral materials at these two historic sites seem to be based more on conditions of deposition

Table 15-3. Flotation results: Territorial period proveniences at La Puente.

Plant Type		Number of Seeds Recovered (from 5 samples)[1]				
			Feature 3			
		Feature 2	Stratum 9	Strata 10-11	Strata 11-12	Feature 8
Weedy annuals	*Amaranthus* (pigweed)	573 (*184.8*)[2]	2 (**4**)[2]	20 (**53**)	52 (*31.7*)	0
	Chenopodium (goosefoot)	1 (*0.3*)[2]	34 (**68**)[2]	6 (**12**)[2]	24 (*14.8*)	52 (*80.0*)
	Portulaca (purslane)	45 (*14.5*)	120 (**240**)[2]	48 (**183**)[2]	33 (*15.7*)	16 (*24.6*)
	Croton (doveweed)	0	1 (**2**)[2]	0	0	0
	Cryptantha (hiddenflower)	0	1 (**1**)	0	0	0
	Descurainia (tansy mustard)	0	50 (**100**)	0	0	17 (*26.1*)
	Euphorbia (spurge)	1 (*0.3*)	4 (**8**)	0	0	0
	Helianthus (sunflower)	5 (*1.6*)	0	0	1 (*0.4*)	0
	Kallstroemia (Arizona poppy)	1 (*0.3*)	0	0	0	0
	Nicotiana (wild tobacco)	1 (*0.3*)	0	0	0	0
	Physalis or *Solanum* (nightshade family)	3 (*1.0*)	6 (**12**)	7 (**7**)	0	0
	Unidentifiable	3 (*1.0*)	1 (**2**)	0	0	0
Grasses	*Panicum* (panic grass)	3 (*1.0*)	0	0	0	0
	Sporobolus (dropseed)	0	0	0	0	1 (*1.5*)
Perennials	*Juniperus* (juniper)	0	0	twig[2]	0	0
	Opuntia (prickly pear)	1 (*0.3*)	0	0	0	0
	Pinus edulis (piñon)	1 (*0.3*)	0	0	0	0
	Scirpus (sedge)	5 (*1.6*)	0	0	0	0
Cultivars	*Hordeum* (barley)	0	0	0	2 (*0.9*)[2]	0
	Zea mays (corn)	cupules[2]	cupules[2]	cob fragment[2]	cupules[2]	0
Totals	Total taxa	13	9	6	6	4
	Total burned taxa	3	5	4	2	0

[1]First number is actual number of seeds recovered. Numbers in parentheses are: (**bold**) estimated total seeds for the entire sample, where soil volume is unknown; and (*italic*) estimated seeds per liter of soil, including any subsampling.

[2]Some or all specimens charred.

Table 15-4. Flotation results: probable Territorial period proveniences at La Puente.

Plant Type		Number of Seeds Recovered (from 4 samples)[1]			
		Feature 1	Feature 1	Feature 5	Trash Area 3
Weedy annuals	*Amaranthus* (pigweed)	2 (*0.8*)	7 (*19.3*)	9 (*5.3*)	44 (**396**)
	Chenopodium (goosefoot)	9 (*3.6*)	27 (*74.5*)	194 (*297.8*)	335 (**6163**)
	Portulaca (purslane)	13 (*5.2*)	5 (*13.8*)	74 (*116.4*)	44 (**710**)
	Boraginaceae (borage family)	0	0	0	1 (**20**)
	Cleome (beeweed)	0	0	1 (*0.4*)	0
	Cycloloma (winged pigweed)	0	0	0	2 (**8**)
	Euphorbia (spurge)	0	0	0	9 (**120**)
	Helianthus (sunflower)	0	0	1 (*0.9*)	0
	Nicotiana (wild tobacco)	0	0	0	8 (**160**)
	Physalis or *Solanum* (nightshade family)	5 (*2.0*)	4 (*11.0*)	1 (*0.9*)	54 (**228**)
	Unidentifiable	1 (*0.4*)	2 (*5.6*)	0	1 (**4**)
Perennials	*Opuntia* (prickly pear)	0	0	1 (*0.9*)	29 (**32**)
	Pinus edulis (piñon)	0	1 (*0.7*)[2]	0	0
Cultivars	*Phaseolus* (bean)	1 (*0.4*)[2]	0	0	0
	Zea mays (corn)	0	0	cupule?[2]	0
Totals	Total taxa	6	5	8	9
	Total burned taxa	1	1	1	0

[1]First number is actual number of seeds recovered. Numbers in parentheses are: (**bold**) estimated total seeds for the entire sample, where soil volume is unknown; and (*italic*) estimated seeds per liter of soil, including any subsampling.

[2]Some or all specimens charred.

Table 15-5. Species composition of charcoal from La Puente flotation samples.

Type	Species	Pieces		Weight (g)	
		Total	Percent	Total	Percent
Conifer	*Juniperus* (juniper)	181	75.0	9.3	70.0
	Pinus edulis (piñon)	16	7.0	1.4	11.0
	Undetermined	24	10.0	1.8	14.0
	Total conifer	221	92.0	12.5	95.0
Nonconifer	*Populis* or *Salix* (cottonwood or willow)	17	7.0	0.7	5.0
	Undetermined	2	1.0	< 0.05	< 0.5
	Total nonconifer	19	8.0	0.7	5.0

Table 15-6. Species composition of charcoal from La Puente radiocarbon samples.

Type	Species	Pieces		Weight (g)	
		Total	Percent	Total	Percent
Conifer	*Juniperus* (juniper)	173	59.0	84.8	48.0
	Pinus edulis (piñon)	78	27.0	71.8	41.0
	Undetermined	23	8.0	16.6	9.0
	Total conifer	274	93.0	173.2	98.0
Nonconifer	*Populis* or *Salix* (cottonwood or willow)	15	5.0	3.7	2.0
	Undetermined	3	1.0	0.8	< 0.5
	Total nonconifer	18	6.0	4.5	2.0

and postdepositional disturbance than on any major differences in utilization of wild and cultivated plants (Table 15-15). At neither site was there evidence of significant utilization of wild plant products, other than as firewood. Seeds of several weedy annuals seem to be present at both sites in a more or less uniform seed rain; goosefoot, purslane, and pigweed are found in 79 to 100 percent of La Puente samples, and 64 to 100 percent of the Trujillo House samples. Beeweed, doveweed, hiddenflower, tansy mustard, groundcherry/nightshade, and Russian thistle also put in appearances at both sites, with Russian thistle the alarm signal in both cases that recent contamination is at work. The principal difference between the two sites is the occurrence at La Puente of charred intrusives, presumably from roadside weed control by burning, and the much higher overall density of seeds (3474 recovered at La Puente, compared to 609 at the Trujillo House) in the very shallow, eroded La Puente deposits. Grasses are rare at both sites. Among perennials, prickly pear cactus seeds were probably brought in by rodents, but juniper twigs, piñon nutshell, cholla and sedge seeds (all fairly low-frequency occurrences) are likely human introductions. Cultivars are here the most reliable indicators of cultural activity, with corn most consistently represented in the flotation assemblage, and patchy appearances by bean, chile, and barley.

The charcoal assemblages were far less subject to the effects of deposition and postdeposition conditions. A consistent pattern of heavy reliance on low-elevation conifers (88 to 99 percent) is evident at both sites (Table 15-16). Riparian woods, greasewood, and oak make only minor contributions to the array. Larger pieces of charred wood collected for radiocarbon dating from Spanish Colonial and Territorial period proveniences at La Puente show significant quantities of piñon, perhaps utilized earlier on or brought in from farther away for construction wood.

With by far the largest contingent of floral materials from these two sites being intrusive noise, and the number of flotation samples for any given time period fairly

Table 15-7. *Zea mays* cob morphometrics by occupation at La Puente.

					Dimensions (mm)[1]					
		Number of Rows			Eroded Cobs			Uneroded Cobs		
Period		10	12	14	Diameter	Cupule Width	Cupule Height	Diameter	Cupule Width	Cupule Height
Colonial	%	-	-	-	-	10.0	5.3	-	11.8	4.8
	n	-	-	-	-	1	1	-	2	2
Territorial	%	33.0	33.0	33.0	17.6	9.9	4.3	18.9	8.5	4.4
	n	1	1	1	2	2	2	2	2	2
Uncertain or mixed	%	-	-	100.0	19.2	7.6	3.3	-	-	-
	n	-	-	1	1	1	1	-	-	-
Total	%	25.0	25.0	50.0	18.1	9.4	4.3	18.9	10.1	4.7
	n	1	1	2	3	4	4	2	4	4

[1]All cobs were carbonized; actual measurements were divided by 0.79 to compensate for estimated 21 percent shrinkage during carbonization (Cutler 1956).

Table 15-8. *Prunus* pit dimensions at La Puente.

		Prunus persica (peach) pit dimensions (mm)			
Period		Length	Width	Thickness	Fragments (n)
Colonial	Average	-	12	-	-
	Range	-	11.4-12.6	-	-
	n	-	2	-	7
		Prunus armeniaca (apricot) pit dimensions (mm)			
		Length	Width	Thickness	Fragments (n)
Territorial	Average	25.7	17.9	14.5	-
	Range	22.3-28.8	14.9-20.7	14.1-14.7	-
	n	5	6	3	1

Table 15-9. Cucurbit seed dimensions at La Puente and Trujillo House.

Cucurbit / **Site** / Provenience	Average Size (mm) Length	Width	Condition
Cucurbita sp. (squash)			
La Puente			
Trash Area 1	16.0 (n=1)	6.7 (n=1)	charred, eroded
Trash Area 2b	16.7 (n=1)	8.9 (n=1)	unburned
Trujillo House			
Midden	19.0 (n=1)	8.7 (n=2)	unburned, eroded
Lagenaria sp. (bottlegourd)			
La Puente			
Trash Area 2b	17.0 (n=3)	7.6 (n=3)	unburned, eroded

small, little patterning in plant utilization over time is discernible. The Territorial period pits at La Puente show the greatest density and diversity of plant remains as a whole, perhaps amplified by the higher levels of contamination at that site. Looking at flotation remains alone, the Territorial period pits at La Puente also appear to be a more consistent repository for corn. Macrobotanical remains give a different picture, however, with corn most common at the Trujillo House.

Table 15-10. Flotation results from the hearth in Room 5 at the Trujillo House (Feature 1).

		Number of Seeds[1]	
Type	Species	Fill	Bottom
Weedy annuals	*Amaranthus* (pigweed)	6 (4.9)	2 (0.6)
	Chenopodium (goosefoot)	3 (1.8)	20 (15.4)
	Portulaca (purslane)	7 (6.2)	18 (20.9)
	Cleome (beeweed)	3 (1.3)[2]	0
	Descurainia (tansy mustard)	3 (2.7)	0
	Physalis or *Solanum* (nightshade family)	0	1 (0.3)
Grasses	Gramineae	1 (0.4)	0
Total seeds	Number recovered	23	41
	Estimated number per liter	18.2	37.2
Totals	Total taxa	6	4
	Number of burned taxa	1	0

[1]Value is actual number of seeds recovered; value in parentheses is estimated number seeds per liter of soil, taking into account any subsampling.

[2]Some or all specimens charred.

La Puente and Trujillo House Collections in a Regional Perspective

So few botanical collections exist for the historic period in the Rio Grande Valley (and those collections tend to be plagued by problems of meager sampling and heavy contamination), that seeing where the present study fits in is not easy. In spite of excellent documentation of the use of a wide variety of wild plants as herbal remedies and preventatives in the historic period right up to the present (Ford 1975), the proliferation of intrusives (mostly weedy annuals) leaves us with little or no archaeological documentation of such utilization. The La Puente assemblage is a particularly apt example of this problem. As in the earlier Anasazi and Archaic periods, perennial plant products make up a very small part of the paleobotanical record; given the small sample of historic sites, we still know practically nothing about the importance of gathered wild perennial products in the Hispanic economy. Two areas provide some confidence of correlation of archaeological plant remains with cultural behavior in the historic era: charred fuel and wood manufacturing and construction debris, and cultivated crops.

Wagons, horses, and burros enabled Spanish colonists and settlers to obtain coniferous wood, which seems to have been the fuel of choice. Despite proximity to major river valleys, Spaniards largely ignored riparian woods at both LA 54147 (Toll 1987) and La Puente/Trujillo. The wide gamut of fuel types found at

Table 15-11. Flotation results from the midden at the Trujillo House.

		Number of Seeds Recovered (from 9 samples)[1]								
Type	Species	Stratum 1	Stratum 2	Stratum 2	Stratum 3	Stratum 5	Stratum 5	Stratum 6	Stratum 6	Stratum 6
Weedy annuals	*Amaranthus* (pigweed)	0	12 (11.2)	90 (78.8)	-	1 (0.3)	1 (0.2)	1 (0.6)	0	0
	Chenopodium (goosefoot)	27 (32.1)	7 (6.5)	1 (1.2)	2 (1.5)	4 (1.4)	7 (2.2)	5 (3.1)	0	4 (3.5)
	Portulaca (purslane)	79 (99.5)	55 (51.2)	51 (60.0)	12 (9.2)	12 (4.1)	43 (16.0)	10 (6.2)	1 (0.3)	5 (4.3)
	Croton (doveweed)	0	0	0	0	0	0	0	2 (0.7)[2]	0
	Cryptantha (hiddenflower)	0	1 (0.2)	1 (0.3)	3 (1.2)	8 (2.7)	-	-	-	-
	Euphorbia (spurge)	0	4 (3.7)	23 (27.1)	1 (0.8)	1 (0.7)	1 (0.2)	0	0	0
	Physalis or *Solanum* (nightshade family)	0	1 (0.9)	3 (2.4)	-	1 (0.3)	-	-	-	-
	Salsola (Russian thistle)	capsule lids	-	0	0	0	-	-	-	-
	Suaeda (soapweed)	5 (5.3)	0	0	0	0	3 (1.1)	0	0	0
	Unidentifiable	0	2 (1.9)	0	0	0	-	-	-	-
Grasses	Gramineae	florets	0	0	florets	6 (2.7)	-	-	-	-
Perennials	*Juniperus* (juniper)	twig[2]	twigs[2]	twigs[2]	twigs[2]	0	-	-	-	-
	Opuntia (prickly pear)	25 (13.2)	1 (0.2)	0	0	0	1 (0.2)	0	0	0
	Cylindropuntia (cholla)	0	0	0	0	1 (0.3)	-	-	-	-
	Scirpus (sedge)	0	0	0	0	1 (0.3)	-	-	-	-
Cultivars	*Capsicum* (chile)	0	1 (0.2)[2]	1 (0.3)[2]	0	0	0	0	1 (0.3)	0
	Zea mays (corn)	0	1 (0.2)[2]	cupules[2]	0	0	0	1 (0.2)[2] cupules[2]	2 (0.7)[2] cupules[2]	0
Total seeds	Number recovered	136	83	170	18	35	56	17	6	9
	Estimated number per liter	150.1	75.8	170.1	14.3	16.5	19.9	10.7	7.2	7.8
Totals	Total taxa	7	11	9	6	9	6	5	5	2
	Number of burned taxa	1	3	3	1	0	0	2	3	0

[1]Value is actual number of seeds recovered; value in parentheses is estimated number seeds per liter of soil, taking into account any subsampling.

[2]Some or all specimens charred.

Anasazi sites, including a variety of local shrubs, conifers, and riparian woods or scrub oak where available, does not seem to be characteristic of Spanish wood-gathering habits.

The Trujillo House corn sample provides some welcome documentation of morphological attributes, as "our knowledge of Spanish or Mexican varieties of corn brought to the Southwest with early settlers is extremely scant" (Bohrer 1985:8-31). Macrobotanical corn from both La Puente and the Trujillo House shows some clear departures from expected attributes of Pueblo period corn. The Abiquiú cobs resemble historic types more closely in their substantial diameter and wide cupules (Table 15-17). Higher average row number is characteristic of the most recent populations tabulated here: LA 48672 at Medanales, corn grown by modern-day Spanish Americans in the Rio Chama Valley, and in a twentieth century sample from Walpi. La Puente and Trujillo House corn fit best with eighteenth and nineteenth century populations observed at Zuñi and Walpi, where

Table 15-12. Species composition of charcoal from the Trujillo House midden flotation samples.

	Stratum											
	2		3		5		6		Total		Percent	
	No.	Grams	No.	Grams	No.	Grams	No.	Grams	No.	Grams	No.	Grams
Conifers												
Juniperus	16	0.6	13	0.2	31	1.1	28	1.5	88	3.4	55	42.0
Pinus edulis	6	0.6	3	0.1	-	-	8	0.7	17	1.4	11	17.0
Undetermined	13	0.8	3	0.1	4	0.2	24	1.7	44	2.8	28	34.0
Total	35	2.0	19	0.4	35	1.3	60	3.9	149	7.6	94	93.0
Nonconifers												
Populus or *Salix*	2	0.1	-	-	-	-	-	-	2	0.1	1	1.0
Undetermined	3	1.2	1	< 0.5	5[1]	0.3	-	-	9	0.5	5	6.0
Total	5	2.3	1	< 0.5	5[1]	0.3	-	-	11	0.6	6	7.0

[1]*Quercus* (oak): 2 pieces (0.2 g) in stratum 15; 1 percent of total number, 2 percent of total weight.

Table 15-13. *Zea mays* cob morphometrics by stratum in the Trujillo House midden.

										Dimensions[1]					
		Number of Rows								Eroded Cobs			Uneroded Cobs		
Provenience		8	10	12	14	16	18	Avg. Total		Diameter	Cupule Width	Cupule Height	Diameter	Cupule Width	Cupule Height
Stratum 2	%	0.0	20.0	20.0	20.0	40.0	0.0	13.6	mm	16.7	7.2	4.1	28.7	9.0	4.9
	n	0	1	1	1	2	0	5	n	3	3	3	2	2	2
Stratum 3	%	0.0	12.0	50.0	27.0	12.0	0.0	12.8	mm	20.1	7.9	4.2	23.2	10.0	4.7
	n	0	3	13	7	3	0	26	n	4	4	4	22	22	22
Stratum 4	%	3.0	21.0	34.0	32.0	8.0	3.0	12.6	mm	19.5	9.3	5.2	25.2	10.7	4.8
	n	1	8	13	12	3	1	38	n	13	13	13	25	25	25
Stratum 5	%	0.0	0.0	67.0	33.0	0.0	0.0	12.7	mm	17.8	8.6	4.8	21.2	9.9	4.8
	n	0	0	4	2	0	0	6	n	3	3	3	3	3	3
Stratum 6	%	0.0	14.0	72.0	14.0	0.0	0.0	12.0	mm	22.6	9.7	4.5	23.6	11.3	4.9
	n	0	1	5	1	0	0	7	n	3	3	3	4	4	4
Trench 2	%	0.0	0.0	100.0	0.0	0.0	0.0	12.0	mm	11.0	7.3	4.3	29.5	12.2	4.3
	n	0	0	1	0	0	0	1	n	1	1	1	1	1	1
Total	%	1.0	16.0	44.0	28.0	10.0	1.0	12.7	mm	19.1	8.8	4.8	24.3	10.4	4.8
	n	1	13	37	23	8	1	83	n	27	27	27	57	57	57

[1]Measurements divided by 0.79 to compensate for shrinkage during carbonization (Cutler 1956).

Table 15-14. Average dimensions of *Prunus* pits from the Trujillo House (mm).

Provenience		Length	Width	Thickness	Fragments
		Dimensions (mm)[1]			
Prunus persica (peach)					
Midden					
Stratum 2	average	25.1	18.9	13.6	0
	number	1	2	1	11
Stratum 3	average	25.8	20.1	16.2	0
	number	1	2	2	2
Stratum 4	average	25.7	16.8	14.3	0
	number	1	1	1	1
Structure					
Room 6	average	25.0	20.3	15.8	0
	number	1	1	1	0
Total site	average	25.4	19.2	15.2	0
	coefficient of variation	0.016	0.074	0.080	0
	range	25.1-25.8	16.8-20.3	13.6-16.5	0
	number	4	6	5	14
Prunus armeniaca (apricot)					
Midden					
Stratum 2	average	-	-	11.9	0
	number	-	-	1	6
Stratum 3	number	-	-	-	1
Structure					
Room 1	number	-	-	-	5
Total site	average	-	-	11.9	0
	number	-	-	1	12
	average	28.8	20.7	14.7	0
	number	5	6	3	1

Table 15-15. Flotation results compared by occupation at La Puente and the Trujillo House.

Category	Type	Colonial	Territorial		Uncertain/Mixed
		La Puente	La Puente	Trujillo	La Puente
Diversity[1]	Burned taxa	2.2	3.0	1.4	0.8
	Total taxa	5.0	8.6	6.4	7.5
	Annuals	4.0	6.0	4.8	6.0
	Perennials	0.4	1.3	0.7	0.0
	Grasses	0.0	0.2	0.4	0.3
	Cultivars	0.6	1.0	0.6	0.5
Ubiquity[2]	*Zea mays*	40%	80%	36%	25%
	Phaseolus	0	0	0	25%
	Hordeum	0	20%	0	0
	Capsicum	20%	0	27%	0
	Low-elevation conifers[3]	40%	40%	36%	25%
	Burned annual	40%	60%	18%	0
No. of samples		5	5	11	4

[1]Average number of taxa per sample.
[2]Percent of samples containing this taxonomic category.
[3]*Pinus edulis* (piñon nutshell) or *Juniperus* (juniper twigs, scale leaves, or seeds).

Table 15-16. Percent composition of charcoal by occupation: La Puente and the Trujillo House.

Site / *Period* / sample type		Conifer			
		Juniperus	*Pinus edulis*	Undetermined	Total
La Puente					
Colonial					
flotation	n (%)	61 (76)	1 (1)	3 (4)	65 (81)
	g (%)	3.0 (81)	+ (+)	0.2 (5)	3.2 (86)
carbon-14	n (%)	93 (65)	29 (19)	7 (5)	127 (89)
	g (%)	49.3 (70)	11.1 (16)	5.7 (8)	66.1 (94)
macro-botanical	n (%)	15 (100)	0	15 (100)	0
	g (%)	3.5 (100)	0	3.5 (100)	0
total	n (%)	169 (72)	28 (12)	10 (3)	207 (88)
	g (%)	55.8 (73)	11.1 (14)	5.9 (8)	72.8 (95)
Territorial					
flotation	n (%)	73 (73)	13 (13)	10 (10)	96 (96)
	g (%)	3.4 (58)	1.2 (20)	1.1 (19)	5.7 (97)
carbon-14	n (%)	32 (57)	21 (38)	3 (5)	56 (100)
	g (%)	9.6 (24)	28.3 (71)	2.2 (5)	40.1 (100)
total	n (%)	105 (67)	34 (22)	13 (8)	152 (97)
	g (%)	13.0 (28)	29.5 (64)	3.3 (7)	45.8 (99)
Trujillo House					
Territorial					
flotation	n (%)	88 (55)	17 (11)	44 (28)	149 (94)
	g (%)	3.4 (42)	1.4 (17)	2.8 (34)	7.6 (93)
Uncertain or mixed date					
flotation	n (%)	47 (79)	2 (3)	11 (18)	60 (100)
	g (%)	2.9 (80)	0.2 (6)	0.5 (14)	3.6 (100)
carbon-14	n (%)	48 (51)	30 (31)	13 (14)	116 (96)
	g (%)	25.9 (38)	32.4 (47)	8.7 (13)	67.0 (98)
macro-botanical	n (%)	1 (100)	0	0	1 (100)
	g (%)	14.2 (100)	0	0	14.2 (100)
total	n (%)	96 (62)	32 (20)	24 (15)	152 (97)
	g (%)	43.0 (50)	32.6 (38)	9.2 (11)	84.8 (99)

Site / *Period* / sample type		Nonconifer		
		Populus or *Salix*	Undetermined	Total
La Puente				
Colonial				
flotation	n (%)	13 (16)	2 (3)	15 (19)
	g (%)	0.5 (14)	+ (+)	0.5 (14)
carbon-14	n (%)	11 (8)	3 (3)[1]	14 (11)
	g (%)	0.4 (1)	2.9 (5)[1]	3.3 (6)
total	n (%)	24 (10)	5 (2)	29 (12)
	g (%)	0.9 (1)	2.9 (4)	3.8 (5)
Territorial				
flotation	n (%)	4 (4)	0	4 (4)
	g (%)	0.2 (3)	0	0.2 (3)
total	n (%)	4 (3)	0	4 (3)
	g (%)	0.2 (1)	0	0.2 (1)
Trujillo House				
Territorial				
flotation	n (%)	3 (1)	9 (5)[2]	11 (6)
	g (%)	0.1 (1)	0.5 (6)[2]	0.6 (7)
Uncertain or mixed d				
carbon-14	n (%)	4 (4)	0	4 (4)
	g (%)	1.2 (2)	0	1.2 (2)
total	n (%)	4 (3)	0	4 (3)
	g (%)	1.2 (1)	0	1.2 (1)

+ (+) = less than 0.05 g (less than 0.5%).
[1]Two percent of pieces and 1 percent by weight are *Sarcobatus* (greasewood).
[2]One percent of pieces and 2 percent by weight are *Quercus* (oak).

more lower-row-number cobs were present, including eight-rowed cobs, which were entirely lacking in the twentieth century sample from Walpi.

Cucurbit remains from the Abiquiú sites are few and in poor condition, so we know little about the types of this varied class used here, or their morphological variability. The seeds in question may belong to either of two *Cucurbita* species in use at the time. Whitaker (in Bohrer 1960:198) pointed out that *C. pepo* has been found archaeologically in the San Juan Basin and the Zuñi and Hopi areas as far back as the Basketmaker and Pueblo I periods, but seems to have been displaced by better quality varieties from *C. mixta* (a later prehistoric introduction) and *C. maxima* (banana squash, with seeds not likely to be confused with the former two types). The four Abiquiú seeds (two from each site) fit within the ranges of size and length to width ratio observed for **both** *C. pepo* and *C. mixta* at Zuñi (M. Toll 1988) and at Walpi (Gasser 1980). Distinctive bottlegourd seeds provide a clear record of use of a taxon whose prehistoric itinerary includes Chaco and Mesa Verde, but not the Rio Grande Valley.

Peach pits have been found in some abundance at several historic sites. These heavily lignified discard structures have a distinct preservation advantage over more perishable materials. In the archaeological record, this taphonomic bias puts extra emphasis on the well-documented popularity of peaches since their Spanish introduction (Stevenson 1904:354; Whiting 1939:79). At Walpi, peach remains found in over 43 percent of sampled proveniences document a history of constant use over a 285-year span, from the late seventeenth century (Gasser 1980). Peach pits and fragments were also

Table 15-17. Historic *Zea* cob dimensions compared.

		Number of Rows								Dimensions[1]					
										Eroded Cobs			Uneroded Cobs		
Provenience		8	10	12	14	16	18	Avg. Total		Diameter	Cupule Width	Cupule Height	Diameter	Cupule Width	Cupule Height
La Puente	%	0.0	25.0	25.0	50.0	0.0	0.0	12.5	mm	18.1	9.4	4.3	18.9	10.1	4.7
	n	0	1	1	2	0	0	4	n	3	4	4	2	4	4
Trujillo House	%	1.0	16.0	44.0	28.0	10.0	1.0	12.7	mm	19.1	8.8	4.8	24.3	10.4	4.8
	n	1	13	37	23	8	1	83	n	27	27	27	57	57	57
									cv[6]	0.227	0.172	0.160	0.187	0.144	0.132
Mendanales[2]	%	0.0	0.0	0.0	0.0	0.0	0.0	14.6	mm	-	-	-	22.8	9.3	4.3
	n	0	0	0	0	0	0	12	n	0	0	0	12	12	12
Chama Valley	%	0.0	0.0	0.0	0.0	0.0	0.0	13.3	mm	-	-	-	-	8.5	-
20th century[3]		-	-	-	-	-	-	-							
Zuñi HIP[4]	%	20.0	24.0	53.0	0.0	0.0	0.0	10.7	mm	-	-	-	21.1	10.7	4.5
	n	3	4	8	0	0	0	15	n	0	0	0	16	16	16
									cv[6]	0	0	0	0.158	0.173	0.118
Walpi	-	-	-	-	-	-	-	-	mm	-	-	-	21.5	-	-
19th century[5]	-	-	-	-	-	-	-	-	n	0	0	0	96	0	0
									cv[6]	0.0	0.0	0.0	0.161	0.0	0.0
Walpi	-	-	-	-	-	-	-	-	mm	-	-	-	24.3	-	-
20th century[5]	-	-	-	-	-	-	-	-	n	0	0	0	48	0	0
									cv[6]	0	0	0	0.159	0	0

[1] Unless noted otherwise, cobs were carbonized, in which case actual measurements were divided by 0.79 to compensate for shrinkage during carbonization (Cutler 1956).

[2] Toll 1986:Table 6; LA 48672, late 19th century to early 20th century.

[3] Ford 1978:57; uncharred cobs.

[4] Toll 1988:Table 2; uncharred cobs, 18th to 20th century.

[5] Gasser 1980:Chapter 2, Appendix A.

[6] Coefficient of variation.

Table 15-18. Peach pit dimensions at historic sites in the Southwest.

Provenience		Length	Width	Thickness	Number
La Puente	average (mm)	25.7	17.9	14.5	6
	range (mm)	22.3-28.8	14.9-20.7	14.1-14.6	
	coeff. of variation	0.109	0.118	0.022	
Trujillo House	average (mm)	25.4	19.2	15.2	6
	range (mm)	25.0-25.8	16.8-20.3	13.6-16.2	
	coeff. of variation	0.016	0.074	0.080	
Medanales[1]	size (mm)	21.5	15.8	-	1
Zuni HIP[2]	average (mm)	24.8	18	13.5	7
	range (mm)	22.2-26.6	-	-	
	coeff. of variation	0.060	0.079	0.058	
Navajo Indian	average (mm)	26.2	-	-	182
Irrigation Project[3]	range (mm)	23.0-35.0	-	-	

[1]LA 48672: Toll 1986.

[2]Toll 1987.

[3]Struever and Knight 1979; Donaldson and Toll 1981, 1982.

recovered in over half of the flotation samples from the Zuñi Waterline project, where Gasser (1982:429) called them "the predominant plant macrofossil." Note that earlier peach collections (Table 15-18: La Puente, the Trujillo House, Medanales, and probably the Zuñi material) tend toward slightly smaller size, while the relatively recent collections of peach remains from Navajo sites in the Four Corners area show greater variability. Fruit size in peaches tends to exhibit greater variability under stressful growing conditions such as insufficient moisture and lack of pruning (USDA Forest Service 1974:665). More marginal rainfall is certainly a likely condition for peaches grown on the Navajo Reservation, at least with respect to the Abiquiú area.

The lower frequency of apricot versus peach remains at both Abiquiú sites is a pattern repeated at other historic sites. In addition to reflecting dietary preferences or availability, the emphasis on peaches may be affected by postoccupational disturbance and preservation conditions. Gasser and Adams (1981:187) note that rodent predators attack apricot pits, but avoid peach pits.

Chile remains are rare in historic sites. Selective preservation is surely at work in this case, as is *Capsicum*'s dietary role as a condiment rather than a major source of calories. Seeds from La Puente (Table 15-2) and the Trujillo House (Table 15-12) are all carbonized; the few known pepper remains elsewhere are mostly from dry sites with exceptional preservation. Fruit pods, stems, and seeds have been recovered in low frequency from Zuñi (Toll 1987:13), Walpi (Gasser 1980:167), and Abo Mission (Jones 1949:31).

Cultivated grains were introduced early in the Spanish occupation of the Rio Grande Valley, but their dissemination into the farming repertoire of individual households was very patchy. Both social and technological barriers restricted the cultivation of wheat to the missions through the eighteenth century, for instance. Wheat was grown especially for communion bread, and required plowing and intensive irrigation (Beck 1962:263). A single carbonized grain of wheat was recovered at a nineteenth century American Territorial period homestead, and four grains of wheat and one of oats were found in the remains of a Spanish settlement on the margins of the present Abiquiú reservoir (Bohrer 1985:8-25, 8-28). Two charred grains most closely resembling barley, found in a Territorial trash pit at La Puente, add to the very slim array of documented occurrences of cultivated grains in the historic period.

Summary

Flotation and macrobotanical remains from Spanish Colonial and Mexican and American Territorial period midden deposits at the Spanish village of La Puente and from American Territorial period trash at a nineteenth century Hispanic homestead have provided some much-needed documentation of cultivated crops and wood use during those periods in north-central New Mexico. Sufficient corn is present to point to morphological characteristics intermediate between late Anasazi types, and more recent types grown in the nineteenth and twentieth centuries by Pueblo and Hispanic farmers. Cobs with 12 rows are most common, followed by 14 and 10 rows. In the later historic era, higher-row-number cobs became predominant. The Abiquiú cobs show the influence of new genetic material from the South, and have stouter cobs and broader cupules than most Anasazi corn populations. Other cultivars recovered are squash or pumpkin (*Cucurbita* sp.), bottlegourd (*Lagenaria*), peach (*Prunus persica*), apricot (*P. armeniaca*), bean (*Phaseolus*), chile (*Capsicum*), and barley (*Hordeum*). Wood use at both sites was overwhelmingly coniferous, despite the availability of fast-growing riparian woods in the river corridor. The typical Anasazi pattern of utilization of a broad array of wood types, including local shrubs and riparian woods in addition to larger trunks and branches of resinous conifers, was distinctly absent at these Hispanic sites. Any utilization of wild plant products for food or medicine at these sites was obscured by the considerable amount of postoccupational noise provided by intrusive weed and grass seeds. Shallow deposits, roadside disturbance, and rodent activity all served to introduce modern contaminants to the cultural strata. Burning to control weeds thoroughly confused interpretive efforts by introducing carbonized seeds (including those of annuals widely utilized as economics) into the cultural deposits. Taxa whose appearance at La Puente or the Trujillo House may signal some human economic activity include juniper twigs and seeds, piñon nutshell, cholla and sedge seeds.

CHAPTER 16

SPANISH CHIPPED STONE ARTIFACTS

JAMES L. MOORE

INTRODUCTION

When chipped stone artifacts are found at historic sites they are often considered to be intrusive or evidence of a prehistoric component. Only rarely are manufacture and use by historic occupants considered. This has been particularly true in the Southwest. Chipped stone artifacts have been attributed to local Indians at missions, even when they were found in the convento (Robinson 1976), or the mission was converted to military use (Fox et al. 1976). When chipped stone artifacts could not be attributed to local Indians it has often been concluded that they washed in from a nearby prehistoric site (Bussey and Honea 1971; Haecker 1976; Snow 1976), or represent an earlier undefined prehistoric occupation (Brody and Colberg 1966; Tunnell and Ambler 1967). Gunflints are the only chipped stone artifacts that are generally considered to be of Spanish manufacture and use.

Unfortunately, chipped stone artifacts are too common at Spanish sites for their presence to be as coincidental as these explanations suggest. The focus of this chapter is the documentation and analysis of Spanish chipped stone tool manufacture and use. To do this, several topics must be explored. First, the occurrence of chipped stone artifacts on Spanish sites is documented. Next, a framework for explaining the presence of chipped stone tools on historic sites is developed, drawing upon ethnographic and historic sources. Finally, chipped stone artifacts from La Puente, Santa Rosa de Lima, the Trujillo House, and the La Fonda Parking Lot Site in Santa Fe (Wiseman 1988b) are discussed. In this discussion the Mexican and American Territorial periods are usually combined and simply referred to as the Territorial period (A.D. 1821 to 1912).

DOCUMENTING THE OCCURRENCE OF CHIPPED STONE TOOLS ON SPANISH SITES

Numerous reports detailing excavations at Spanish sites and a few containing survey results were examined. While this study concentrates on New Mexican sites, reports from Arizona, Florida, and Texas were also studied. Since site and assemblage size as well as reporting detail vary from report to report, the presence and not the number of chipped stone artifacts was deemed important. Thus, the number of lithic artifacts ranged from only a few to over a thousand.

Of the 47 New Mexican sites studied, 44 contained chipped stone artifacts that can be ascribed to Hispanic manufacture and use (Table 16-1). One of the three sites that contained no chipped stone artifacts (LA 9139) had only 14 associated artifacts (Chapman et al. 1977), the second (LA 10111) was an undated corral complex that contained no artifacts (Chapman et al. 1977), and the third (Paraje de Fra Cristobal) was a Territorial period village (Boyd 1986).

Nine sites containing chipped stone artifacts attributable to Hispanic manufacture were found in Arizona, Florida, and Texas (Table 16-2). Several other sites were studied but eliminated because they served as missions for most of their history. The convento from Mission Guevavi was included because that part of the complex was probably occupied by Spanish priests, and the Alamo was included because it served as a presidio during much of its history.

Chipped stone artifacts occurred consistently in the sample of New Mexican sites, and were relatively common at sites in Arizona, Florida, and Texas. They were too common to be attributed to underlying prehistoric sites, to contamination from earlier sites occurring nearby, or to reoccupation by historic Indians. The possibility that they were produced and used by Hispanic site occupants cannot be ignored.

Documentary evidence for the use of stone tools by Hispanics in New Mexico exists, but lacks detail. A Mexican Territorial period report discusses a campaign in which stone projectile point-tipped arrows (*la puenta de Pedernal*) were used by at least one militia member (Carrillo n.d.b). Regrettably, the document does not mention whether he produced them himself or obtained them in some other way. Curtis (1927:125) notes that the Spanish often used "stone-headed clubs" when fighting the Navajo and Comanche. Information gathered by a W.P.A. writer at Placitas in the 1930s indicates that a local Hispanic carpenter used hand-made tools to produce furniture, many of which were stone (Taylor and Bokides 1987). Unfortunately, whether they were chipped or ground stone tools is not mentioned. Finally, the Penitente Brotherhood has a long history of using

Table 16-1. Spanish sites in New Mexico containing chipped stone artifacts.

Colonization period	
	Cochiti Springs Site (LA 34)
	Las Majadas (LA 591)
	La Fonda Parking Lot Site (LA 54000)
	LA 5013
	Pueblo Encierro (LA 70)
	The Sánchez Site (LA 20000)
Colonial period	
	Santa Rosa de Lima (LA 806)
	Torreon Site (LA 6178)
	Ideal Site (LA 8671)
	Signal Site (LA 9142)
	Las Huertas (LA 25674)
	Mantanza Point (LA 31750)
	Casa Maes (LA 31765)
	Big Jo (LA 46174)
	Los Poblanos (LA 46635)
	Los Ranchos (LA 46638)
	The Pedro Sánchez Site (LA 65005)
	Palace of the Governors (LA 4451)
	Baca-Larranaga Site
	LA 160
	LA 9138
	LA 10110
	LA 10114
	LA 12161
	LA 12438
	LA 12507
	LA 16769
	ENM 200
	ENM 3405
	ENM 3422
Territorial period	
	San Antonio de Padua (LA 24)
	Trujillo House (LA 59658)
	LA 12465
	LA 13291
	LA 46651
	LA 99029
Mixed or unknown period	
	La Puente (LA 54313)
	Sena Plaza (LA 55368)
	Washington Ave. (LA 71605)
	Manzano
	LA 12525
	LA 46645
	LA 46651
	LA 46652

References
Alexander 1971; Boyd 1986; Brody and Colberg 1966; Bussey and Honea 1971; Chapman et al. 1977; Doleman 1980; Elliot 1986; Ferg 1982; Haecker 1976, 1987; Hunter-Anderson et al. 1979; Hurt and Dick 1946; Laumbach et al. 1977; Levine et al. 1985; Marshall and Walt 1984; Maxwell n.d.; Moore 1988, 1989a, 1989b, 2001; Moore and Gaunt 1993; Rudecoff 1987; Sargeant 1985; Schuetz 1979a; Schutt 1979; Seifert 1979; Snow 1973, 1979a, pers. comm. 1990; Snow and Warren 1976; Wilmer 1990; Wiseman 1988a, 1988b.

stone or glass flakes in ceremonies (Carrillo n.d.b; Chavez 1954; Gregg 1844; Weigle 1971).

Use of Chipped Stone Tools in Recent and Contemporary Societies

Several examples of chipped stone or glass tool use have been recorded in recent and contemporary societies. Klingelhofer (1987) found chipped stone and glass tools in a nineteenth century slave quarters in Maryland, and discusses similar artifacts on other sites in that area. These tools were produced by reworking gunflints, glass tumblers, bottles, and a mirror.

Chipped stone tools are still used by several groups in south-central Ethiopia (Gallagher 1977). Obsidian is the most common material used, but glass was used for tool manufacture in at least one case. The Gurage use stone tools more often than other Ethiopian groups because they are cut off from the market system during the rainy season and desire self-sufficiency rather than dependence on imported goods (Gallagher 1977:412). The most commonly manufactured tools are scrapers for leather working, but flakes are sometimes used for shaving or nail cutting. Most reduction is done with metal percussors, but quarrying is accomplished with hammerstones.

Recent studies among the Highland Maya of Guatemala demonstrate a continuing tradition of chipped stone tool use despite 400 years of acculturation (Hayden and Nelson 1981). Chipped stone tools are now used only in the final stages of metate and mano manufacture, but their use was more frequent before 1950 because metal tools were too expensive; metal hatchets and chisels rapidly wore out when used to cut stone and were difficult to replace. Glass tools are sometimes used for finishing wood, bone, horn, and antler implements, cutting and dehairing leather, and ritual bloodletting (Hayden and Nelson 1981:893).

There is evidence that beer and wine bottle glass was used as microlithic cores in nineteenth century western India (Malic 1961), and a similar tradition was recorded in the Andaman Islands (Man 1885). Flakes were used for shaving and ritual scarification in the latter area.

Chipped stone implements occur as components in threshing sledges in some parts of Turkey (Bordaz 1969). Flintknappers use iron hammers to produce blades by direct percussion. The blades are then retouched by the sledge maker, who uses a metal percussor to produce a uniform product.

Runnels (1982:371) documents chipped stone tool use in Greece during the Iron Age, the Classical period, and in contemporary times. Glass, chert, and obsidian are still used in the final stages of woodworking by contemporary

Table 16-2. Spanish sites in Arizona, Florida, and Texas containing chipped stone artifacts.

Arizona	Florida	Texas
Mission Guevavi (Robinson 1976)	de la Cruz Site (Deagan 1983)	Presidio San Augustín de Ahumada (Tunnell and Ambler 1967)
Tubac Presidio (Shenk and Teague 1975)	Palm Row Site (Deagan 1978)	The Gresser House (41BX369) (Ivey 1978)
Tucson Presidio (Olson 1985)	de Hita Site (Shepard 1983)	The Alamo (Fox et al. 1976; Greer 1967)

shepherds in the southern Argolid, though they are rapidly being replaced by sandpaper (Runnels 1975, 1976).

Chipped stone tools are sometimes found in medieval British sites, and are usually considered to be intrusive prehistoric artifacts even when there is no evidence of contamination and no other prehistoric materials are recovered (Runnels 1982:369). Similar interpretations have been applied to chipped stone tools in many Southwestern Spanish sites.

These examples show that chipped stone tools survived into the nineteenth and twentieth centuries. Use of such tools by nineteenth century slaves might be evidence of the survival of traditional technologies, or it could indicate restricted access to manufactured goods. As Adams and Boling (1989) point out, slaves on some plantations participated directly in the market system. On other plantations, goods were supplied by the owner or produced by the slaves themselves, and there was no direct access to outside markets.

There were economic reasons for the use of chipped stone and glass tools in most of the other examples. The Gurage are cut off from the Ethiopian market during part of the year (Gallagher 1977). This, combined with their desire for self-sufficiency, has led to continued use of stone tools. The Highland Maya use stone tools because the high cost of metal tools and their tendency to quickly wear out when used for stone cutting make them an economical alternative (Hayden and Nelson 1981).

Runnels (1982) feels that the Classical Greeks used chipped stone tools for similar reasons: "Iron was too expensive to have been acquired for reasons of efficiency alone. In this circumstance, where the marginal benefits of iron tools could not effect these costs, stone tools would continue to be used, especially in areas of production, such as agriculture, requiring low capital investment" (Runnels 1982:372).

This is based on a cost-benefit analysis, where cost includes both production and transport expenses. As distance from the manufacturing center increased, so did the cost of acquiring metal tools. Beyond a certain distance, the benefits accruing from metal tool use were negated by the additional cost of transport:

> This economic reasoning allows us to make a precise deduction about the conditions under which metal in general would have failed to replace stone as tools. To wit: as the economic distance (e.g., kilograms/kilometer) from the production or distribution location of metal tools increased, the use of stone for tools increased proportionately. The preference for stone tools therefore is stated as a function of the price of metal tools, which is directly proportional...to the economic distance of consumption location from production location. In other words, as one moves away from the source of metal its price goes up making the use of stone an economical alternative. (Runnels 1982:373)

Chipped stone technology might be retained or initiated when distance from the source of metal tools makes their cost prohibitively high. Wealth differentiation might also be a factor in determining chipped stone versus metal tool use. To wealthy individuals better able to afford expensive goods, the cost of transport might not be the prohibiting factor that it is for those with less money.

Historic Conditions in Spanish New Mexico

New Mexico was supplied by wagon caravan from New Spain during the Colonization period, a service that was controlled by the missions (Moorhead 1958). Caravans were scheduled for every three years, but their departures were actually quite irregular (Moorhead 1958). The caravan service constituted the only reliable means of communication and supply for the province, and though:

> In theory the supply service was established and maintained for the exclusive use of the religious stations...in practice some wagons were commandeered or chartered for purely secular purposes, first by the governors and later by the merchants of New Mexico. (Moorhead 1958:34)

This system led to shortages of critical goods, such as metal, and kept the cost of manufactured items high. During this period, the economy was based on forced Indian labor and tribute: the *encomienda* and *repartimiento* systems. These practices, combined with intolerance for the traditional Pueblo religion and a campaign to convert them to Christianity, resulted in a tremendous resentment of Spanish rule. In addition, these problems were exacerbated by nomadic Indian raids, either in retaliation for Spanish slaving expeditions or because of drought-induced famine (Ellis 1971:52; Sando 1979:195). Putting aside their differences, most of the Pueblos combined in a general uprising that temporarily succeeded in forcing the Spanish out of New Mexico in 1680.

The Spanish return was successfully negotiated by Don Diego de Vargas in 1692, who exploited the factionalism that had once again developed among the Pueblos (Ellis 1971:64; Simmons 1979:186). Hostilities continued until 1700, but the Pueblos were unable to again combine to force the colonists out. The Spanish were once again firmly in control by the early years of the eighteenth century. Though missionization continued, the focus of Spanish occupation shifted during the post-Revolt period. The province became a buffer between enemies on the frontier and the wealthy inner provinces of New Spain (Thomas 1941). Those enemies took two forms. Of more immediate danger were the Apache, Navajo, Comanche, and Ute. Conflict with these tribes limited Spanish expansion in New Mexico for the first three-quarters of the eighteenth century, causing tremendous property loss and the occasional abandonment of exposed communities. They also made trade along the Camino Real, the lifeblood of New Mexico, very hazardous, and may have contributed to the close relationship that developed between Spanish and Pueblos during this period.

The other enemy was distant, but just as important. The French presence in Louisiana threatened the border's security, and much of the trouble caused by the Comanche during the eighteenth century can be indirectly traced to French influence. Conde de Revilla Gigedo wrote to Governor Cachupín in 1751, noting that the Comanche acquired guns from the Jumano, who in turn got them from French traders (Thomas 1940:75). During the 1740s this trade contributed to the ferocity of the heavy raids that decimated the eastern frontier from Albuquerque northward (Thomas 1940). The Comanche may have been better armed than the Spanish settlers! The French also attempted to initiate direct trade with New Mexico. The Mallet brothers reached New Mexico from Louisiana in 1739, and by 1748 there were 33 French traders in La Jicarilla dealing with the Comanche (Thomas 1940:15, 17). Spanish policy discouraged such contacts, and several French traders were arrested and had their goods confiscated.

New Mexico continued to be supplied by caravan after the Pueblo Revolt, though caravans were now controlled by merchants rather than the church. By the middle of the eighteenth century the merchants of Chihuahua were in control of the supply system (Moorhead 1958). A considerable trade developed during this period (Athearn 1974), benefiting the Chihuahuan merchants at the expense of the New Mexicans. This was documented by Father Juan Augustín de Morfi in 1778, who described the way in which the Chihuahuans overcharged for their goods and underpaid for the items they purchased (Simmons 1977:19). In addition to these practices, they invented an illusory monetary system which was manipulated to further increase profits (Simmons 1977:16). New Mexico was poorly supplied with goods sold at exorbitant prices. This problem was partly rectified by trading with local Indians for essentials such as pottery and food. Substituting for other goods was more difficult to accomplish.

Metal, especially iron, was in short supply (Simmons and Turley 1980). Though some iron was smelted in Mexico, only insignificant amounts were produced. Nearly all iron came from Spain, and Royal policy forbade colonial production in order to protect the monopoly enjoyed by the city of Vizcaya in Spain (Simmons and Turley 1980:18). This lack is illustrated by a letter from the cabildo of Santa Fe to the Viceroy in 1639:

> Iron tools for cultivation and ploughing the land are especially needed...in particular iron for horse shoes, for without it it is not possible to make any punitive expedition, as the enemy lives in rough mountainous country and on stony mesas; but no iron has been sent since the year 1628. Consequently we are perishing, without a pound of iron or a plough. (Bandelier and Bandelier 1937:73)

Imported iron was inexpensive in Mexico, but by the time it arrived in New Mexico it was quite costly. The lack of metal tools led most people to get along with little furniture, and farm tools were often made entirely of wood (Gregg 1844; Jones 1932).

The lack of metal and the unreliable supply system hurt New Mexico in its role as a defensive buffer. A 1752 inventory showed only 388 muskets and 53 pistols in the province (Reeve 1960:211). A typical example of this shortage was the Abiquiú district, where Governor Cachupín's inspection tallied only 10 muskets, 7 lances, 4 pistols, and 1 sword among 22 Spanish men of arms-bearing age (Miller 1975:176). Between 1766 and 1768, Nicolas de Lafora observed that firearms were rarely used in New Mexico because of the scarcity of powder and the cost and effort required to obtain them (Kinnaird 1958). A 1775 letter to Viceroy Bucareli cited a report by Governor Mindinueta, which stated that the colonists were in no position to buy arms, and that they had a supply of only 600 muskets and 100 pistols in the province (Thomas 1940). Though presidial soldiers were required to possess a sword, lance, shield, musket, and brace of pistols, an 1816 list demonstrates that most were underequipped (Simmons 1968:139-140).

Other weapons supplemented or replaced the firearms and ammunition that were in short supply. Presidial soldiers relied on the lance, both because of this scarcity and because the troops were badly disciplined and trained (Kinnaird 1958; Thomas 1941). Since few regular soldiers were stationed in New Mexico—80 at Santa Fe and 50 at El Paso in the late 1700s (Simmons 1968)—a militia was necessary. Citizens formed loosely organized militia companies from an early date, but in 1776 it was noted that manpower was poorly used because of a lack of discipline and organization, and the scarcity of firearms (Simmons 1968). Bows and arrows were commonly used by the militia, and often outnumbered guns by a considerable margin (Carroll and Haggard 1942; Curtis 1927; Hurt 1939; James 1846; Kinnaird 1958; Simmons 1968; Thomas 1929; Worcester 1951).

The undependable and irregular system of supply continued until 1821, when Mexico gained its independence from Spain after several years of sporadic rebellion. This resulted in an opening of trade barriers (Levine et al. 1985). Trade with Missouri began immediately after Mexican independence, and dominated developments in New Mexico for the next quarter century (Connor and Skaggs 1977). New Mexicans began exporting foreign goods to Chihuahua and Sonora, and hard money began circulating in the province for the first time (Carroll and Haggard 1942).

Shortages of important goods did not end, however. The 1827 will of Severino Martínez illustrates the persisting shortage of iron (Minge 1963). One or more pounds of iron were bequeathed to several heirs, showing that it remained an important commodity. Gregg (1844) saw several ciboleros (buffalo hunters) armed with bows and arrows during a trip across the Santa Fe Trail in 1839. He noted that regular troops were armed with English muskets, but the militia still used old-fashioned escopetas, bows and arrows, or lances (Gregg 1844). Even with the increased level of trade resulting from the opening of the Santa Fe Trail, manufactured goods did not become common in New Mexico until the American Territorial period.

To summarize, economic conditions in New Mexico until the Mexican Territorial period may have made chipped stone tool use economically desirable. The supply system was irregular, undependable, and dangerous. Prices were kept artificially high by the Chihuahuan merchants, and the amounts paid for New Mexican exports were kept low. This created shortages of critical goods, and made items like metal tools and raw iron expensive. In many cases, chipped stone tools were probably more economical than metal tools. This is similar to the situation described by Runnels (1982) for Classical Greece. The distant source of metal tools made them very expensive, and this situation was further exacerbated by the unreliability of the supply system and the danger involved with transporting goods to New Mexico from Chihuahua. When the greed of the Chihuahuan merchants is factored in, the use of chipped stone tools is no longer surprising, but almost predictable.

The lack of manufactured goods adversely affected New Mexico in its defensive role. Guns and powder were in short supply, forcing the militia to depend on bows and arrows. Since iron was expensive and hard to obtain, some recourse to stone projectile point-tipped arrows seems to have occurred (Carrillo n.d.b). Conversely, the lack of firearms and ammunition suggests that gunflints should be uncommon, particularly at poor frontier settlements. Several categories of chipped stone tools might be expected, including alternatives for metal tools like knives and hammers, replacements for metal parts in certain weapon systems, components in fire-making kits, and locally produced gunflints.

Chipped Stone Artifacts

As discussed above, chipped stone artifacts have been found at many Spanish sites in the Southwest. Examples of surviving chipped stone tool traditions have been examined and in most cases are linked to the cost and availability of metal tools. Similar circumstances prevailed in New Mexico until the American Territorial period. Metal tools were scarce, metal was expensive, and people were poor.

What does the presence of these artifacts mean? Were they salvaged from prehistoric sites for use or as curiosities? Are they the remains of gunflint or strike-a-light manufacture? Or are they evidence of the production and use of other types of chipped stone tools? Flintknapping was not a lost art in Europe; strike-a-light flint production began during the Renaissance (Witthoft 1966), and the manufacture of gunflints began by the sixteenth century (Cadiou and Richard 1977; Peterson 1956). In addition, several chipped stone tool using groups lived near the Spanish in New Mexico, especially during the Colonization and early Spanish Colonial periods. Such peoples may have provided an example for the use of stone tools.

Several characteristics should be present if chipped stone tools were made and used at Spanish sites. The distribution of material types should reflect the uses to

Table 16-3. Material selection by site (%).

Material	Percentages: Santa Rosa	La Puente	Trujillo House	La Fonda
Chert	4.7	8.6	1.1	20.1
Pedernal chert	74.4	76.4	92.9	20.1
Madera chert	0.0	0.0	0.0	41.1
Silicified wood	0.0	1.2	0.0	0.8
Obsidian	9.3	4.4	3.8	7.5
Basalt	2.3	0.3	0.6	0.0
Rhyolite	0.0	0.9	0.0	0.0
Granite	0.0	0.0	0.0	2.2
Igneous undifferentiated	0.0	0.6	0.6	0.0
Quartz	0.0	0.6	0.0	1.5
Quartzite	9.3	6.9	1.1	6.0
Quartzitic sandstone	0.0	0.3	0.0	0.8

Table 16-4. Selection of cherts versus noncherts (%).

Site or Component	Cherts	Noncherts
Santa Rosa	79.1	20.9
La Puente[1] (Colonial)	80.6	19.4
La Fonda Parking Lot Site	82.1	17.9
La Puente[2] (Territorial)	91.8	8.2
Trujillo House	94.0	6.0

[1]Trash Area 1 surface and subsurface (except Features 2 and 3), Trash Area 3 surface and subsurface, Feature 9.

[2]Trash Area 2 surface and subsurface (except Feature 9), Features 2 and 3.

which the tools were put. Evidence of lithic reduction should be apparent in the ratios between the various types of lithic debris. There should also be evidence of the manufacture and use of tools other than gunflints and strike-a-light flints.

In order to address this problem, it is necessary to examine the chipped stone assemblages from the excavated sites. The assemblage from the La Fonda Parking Lot Site (LA 54000) has been added to expand the data base. Materials from a few other Spanish sites have been studied to provide additional information that will be discussed where pertinent. Besides the traditional discussion of material selection, reduction technology, and tool manufacture and use, three tool types will be discussed in detail: gunflints, strike-a-light flints, and projectile points.

Material Selection

Table 16-3 illustrates material selection by site. Cherts dominate, comprising between 79 and 94 percent of each assemblage. Nearly all cortex is waterworn, the few exceptions being pieces of Madera chert from the La Fonda Parking Lot Site. This suggests that most raw materials were obtained from local gravel deposits. Pedernal chert dominates the Abiquiú assemblages, reflecting the close proximity of those sites to the source of that material. Madera chert outcrops in the hills around Santa Fe, and dominates the La Fonda Parking Lot Site assemblage. Thus, it was locally obtained, no matter whether the cortex is waterworn or not. Pedernal chert is also common in that assemblage, and was probably obtained from gravel beds along the Rio Grande.

Though chertic materials (including silicified woods) dominate all four assemblages, there are differences between Territorial period and earlier assemblages. Table 16-4 illustrates this variation. Considerably more noncherts occur in the Colonization and Spanish Colonial components than in Territorial components. Chapman (1977:372) suggests that lithic materials are "known to exhibit variability in their physical properties which potentially affects their suitability for task-specific use as tools, and their suitability for certain kinds of manufacturing processes."

This variation may reflect the selection of lithic materials for different sets of tasks. In turn, it could be related to differences in the availability of metal tools, which became more accessible during the Mexican and American Territorial periods. To determine the meaning of this variation, it is necessary to examine manufacturing and tool use patterns.

Manufacture

Distinctive manufacturing characteristics have been noted in Spanish chipped stone assemblages by a number of analysts. In their discussion of LA 16769, Levine et al. (1985:77-92) note a predominance of single-facet platforms and a lack of modified platforms, suggesting a simple core-flake reduction trajectory. More complex reduction techniques indicative of formal tool manufacture were not represented. At San Antonio de las Huertas (LA 25674), the character of the chipped stone assemblage suggests opportunistic flaking by someone who was unaccustomed to flintknapping, or who rarely did it and possessed no real skill (Ferg 1982).

Chapman et al. (1977) found a higher amount of bipolar reduction at Spanish sites in Cochiti Reservoir than at local Archaic and Anasazi sites. A lack of facially retouched artifacts suggested unfamiliarity with flintknapping techniques. Kemrer and Kemrer (1979) note several distinctions between prehistoric and historic

Table 16-5. Platform types (%).

Platform Type	Percentages				
	Colonization and Colonial Components			Territorial Components	
	Santa Rosa	La Puente	La Fonda	La Puente	Trujillo House
Single-faceted	46.0	37.6	33.3	41.0	45.0
Single-faceted and abraded	0.0	0.9	1.1	-	-
Multifaceted	5.4	3.1	2.2	3.0	3.9
Multifaceted and abraded	0.0	0.9	0.0	-	-
Retouched	5.4	1.8	2.2	1.0	2.3
Retouched and abraded	0.0	0.0	3.2	-	-
Cortical	0.0	12.4	9.7	9.7	7.8
Crushed	0.0	2.2	2.2	2.6	3.9
Collapsed	16.2	12.8	22.6	18.0	14.7
Missing	27.0	28.3	23.7	24.1	22.5

chipped stone assemblages from that area. Chipped stone assemblages from Spanish sites form a discrete class, and consistently contain a higher percentage of tools than do the prehistoric assemblages (Kemrer and Kemrer 1979:273). Pearson's *r* tests performed on the ratio between the number of tools and the total number of chipped stone artifacts from these sites suggest that Hispanics performed chipped stone manufacturing and use tasks on a more ad hoc basis than did the Archaic and Anasazi peoples (Kemrer and Kemrer 1979:273).

In short, Spanish chipped stone technology is marked by simplicity, a lack of facially retouched tools, more bipolar reduction than on prehistoric sites, and high ratios of tools to unused debitage. This suggests an expedient technology focusing on the use of debitage as informal tools. Formal tools, or those demonstrating purposeful retouch to modify artifact shape and edge angle, should be rare or lacking, as should evidence of their manufacture.

Flake platforms. Table 16-5 shows the distribution of platform types, with Spanish Colonial and Territorial period assemblages from La Puente separated out. The totals include platforms from flakes and informal tools such as strike-a-light flints and utilized or retouched debitage where use does not obscure platform morphology. Simple unmodified platforms dominate, and include the single-facet, multifacet, and cortical categories. Platforms modified by abrasion or retouch comprise only a small percentage of each assemblage. However, missing platforms and those obscured by collapsing or crushing make up nearly half of each assemblage, and could be masking meaningful variation. Platform collapse and crushing are caused by reduction. In the former, the platform was separated from the body of a flake by the force of the blow used to detach it. In the latter, the platform was damaged by the force of the blow, but did not detach. Platforms are considered missing when only a medial or distal fragment is present.

Table 16-6 presents platform data with obscured or missing platforms removed from consideration. In each case the simplest types—single-facet and cortical—predominate, totaling between 81.0 and 91.9 percent. Multifacet platforms are evidence of earlier flake removals along a core or tool edge. Since none of the flakes in these assemblages with multifacet platforms originated during tool production, they probably represent removals from partially reduced cores.

Platforms can be modified by retouch or abrasion to facilitate the removal of flakes from cores and tools. This increases the platform angle, strengthening it and reducing the possibility that it will shatter when pressure is applied during removal. Control over flake size and length is also increased by platform modification. Only a few modified platforms were found in these assemblages. Between 6.3 and 12.6 percent of pre-Territorial period platforms are modified (Table 16-6), suggesting that some tool manufacture may have occurred in those components, or that core platforms were modified to facilitate flake removal. Only 4.0 percent or less of Territorial period platforms are modified, suggesting that tool manufacture or modification of core platforms were less common in those components.

Flake breakage and post-removal assemblage damage. The amount of post-depositional damage to an

Table 16-6. Platform types excluding the collapsed, crushed, and missing categories (%).

	Percentages				
	Colonization and Colonial Components			Territorial Components	
Platform Type	Santa Rosa	La Puente	La Fonda	La Puente	Trujillo House
Single-faceted	81.0	66.4	64.6	74.1	76.3
Single-faceted and abraded	0.0	1.6	2.1	0.9	0.0
Multifaceted	9.5	5.6	4.2	5.6	7.9
Multifaceted and abraded	0.0	1.6	0.0	-	-
Retouched	9.5	3.1	4.2	1.9	4.0
Retouched and abraded	0.0	0.0	6.3	-	-
Cortical	0.0	21.9	18.8	17.8	13.2

assemblage can be estimated by examining broken flakes. Except for the Santa Rosa de Lima assemblage, which was not analyzed for manufacturing breakage, about a quarter of the flake fragments broke during manufacture. Most of this breakage was probably due to secondary compression (Sollberger 1986), or to impact with the ground after detachment (Cotterell and Kamminga 1987). Percentages of flakes broken during manufacture range from a low of 21.0 at the La Fonda Parking Lot Site to a high of 32.8 in the Spanish Colonial period assemblage from La Puente. All cases of manufacturing breakage were not identified because flakes broken during removal from cores often exhibit snap fractures, which also occur on fragments broken by noncultural processes such as trampling or erosional movement (Moore 1993). Thus, only definite cases of manufacturing breakage were isolated, and the actual amount could be higher than these figures suggest.

A second way to examine manufacturing breakage is to compare proximal to medial and distal fragments. If the ratio is relatively even, most breakage is probably attributable to postreduction processes. If few proximal fragments occur, most of the breakage probably happened during reduction. This results from the mechanics of breakage. When a flake breaks during removal, medial and distal portions are easily recognized as fragments, but proximal portions sometimes look like whole flakes because they possess both platforms and natural terminations, or they shatter into undefinable fragments. Table 16-7 presents flake portion information. Except at Santa Rosa de Lima, broken flakes comprise only a quarter or less of flake assemblages, and few possess platforms. This suggests that most of the flake breakage occurred during removal, except at Santa Rosa de Lima. There, the high percentage of broken flakes and proximal fragments suggest that breakage occurred after removal, and reflects the surficial origin of that assemblage. Thus, only this assemblage appears to have suffered considerable postreduction damage. This means that unless significant and indisputably human-caused damage is represented on chipped stone artifacts from that site, great care must be used in defining informal tool use. Since the other assemblages do not appear to have suffered a similar amount of postreduction damage, the same degree of caution is not necessary in their examination, though the possibility of noncultural damage must still be considered.

Table 16-7. Broken flake portions (%).

	Broken Flakes (%)		
		Platforms	
Site	Total	With	Without
Santa Rosa	54.6	33.3	66.7
La Puente (Colonial component)	26.7	6.9	93.1
La Fonda	25.6	10.0	90.0
La Puente (Territorial component)	25.5	2.4	97.6
Trujillo House	20.9	0.0	100.0

Reduction stages. Flakes can be divided into two categories representing three reduction stages. Core flakes are produced during the primary and secondary stages of reduction. Primary flakes represent the first step in the core reduction sequence—removal of the weathered exterior surface of a nodule—and have 50 percent or more of their dorsal surfaces covered by cortex. Secondary flakes represent the second step in the

Table 16-8. Reduction stage information (%).

Site	Reduction Stage (%)			
	Primary Core Flakes	Secondary Core Flakes	Manufacturing Flakes	Flakes/Angular Debris
Santa Rosa	0.0	97.0	3.0	5.5
La Puente (Colonial component)	16.2	81.9	1.9	3.2
La Fonda	12.2	80.5	7.3	4.6
La Puente (Territorial component)	19.3	77.6	3.0	1.9
Trujillo House	7.7	89.0	3.3	4.6

reduction sequence—the removal of interior flakes from a nodule—and have less than 50 percent of their dorsal surfaces covered by cortex. Core flakes are removed for use as informal tools or for modification into formal tools.

The modification of debitage into formal tools produces manufacturing flakes, and represents the third stage of reduction. Manufacturing flakes were defined using the polythetic set discussed in Chapter 3 (Field and Analytic Methods). The use of this set of attributes to define tool production debris does not identify all of the manufacturing flakes in an assemblage; it only isolates those that are definitely attributable to tool production. High percentages of primary core flakes and low flake to angular debris ratios suggest that the early stages of reduction occurred (mostly primary or secondary). The converse is indicative of the later reduction stages (mostly secondary or tertiary).

Table 16-8 illustrates reduction stage information. The early stages of reduction dominate the Territorial period assemblage from La Puente, whereas the other assemblages are dominated by the later stages of reduction. However, moderate to low flake to angular debris ratios and the presence of few manufacturing flakes suggest that the later reduction stages consisted of mostly secondary core reduction in those cases. The higher percentage of manufacturing flakes at the La Fonda Parking Lot Site may indicate that more tool manufacture occurred there than at the other sites. Similarly, higher percentages of modified platforms at Santa Rosa de Lima may mean that tool production was more common there than is suggested by the percentage of manufacturing flakes identified by the polythetic set. However, considering the small size of this assemblage, sample error could also be responsible. While this analysis could not precisely identify the number of flakes produced during each stage of reduction, it does demonstrate that both core reduction and tool manufacture occurred at these sites.

Unlike the results of the Cochiti Reservoir analysis (Chapman et al. 1977), evidence for bipolar manufacture was found in only two components. One bipolar flake was identified at the Trujillo House, and two were found in the Territorial period assemblage from La Puente. All other debitage appear to have been produced by freehand reduction using soft and hard hammer percussion, and possibly some pressure flaking.

Summary. In general, reduction technology follows the predicted pattern. Simple expedient core-flake reduction dominates at these sites. Most platforms are unmodified, and all assemblages are dominated by the single-facet category. Both modified platforms and manufacturing flakes are rare, though they are somewhat more common at the La Fonda Parking Lot Site. This suggests that some formal tools were manufactured at these sites, though this type of reduction was not common. Since Spanish-style gunflints are usually bifacial in form, some evidence of tool manufacture was expected. The main difference between these results and the predicted pattern was in the lack of evidence for bipolar reduction.

It could be argued that these artifacts were not produced on-site, but were collected from prehistoric sites and discarded in historic deposits. However, certain data suggest that they actually were produced at these sites. The presence of flakes originating during all three reduction stages, angular debris, and cores indirectly suggest that reduction occurred at the sites. A few platforms provide more direct evidence. One platform from the Spanish Colonial period assemblage at La Puente, two from the Territorial period assemblage at La Puente, and eight from the Trujillo House had metal adhesions on them, a strong indication that they were removed by a metal hammer. In addition, there was at least one example of multiple removals from a single core in both components from La Puente and the Trujillo House assemblages. These data demonstrate that lithic reduction occurred at the excavated sites.

Formal and Informal Tools

Other aspects of lithic artifact manufacture and use can be examined by an analysis of formal and informal tools. Formal tools are debitage that were purposefully modified to produce a shape or edge angle suitable for a specific task. Informal tools are debitage or cores used for a task without having their shape or edge angle purposefully modified. Debitage with marginally retouched edges are included in this category because it is often unclear whether that retouch was purposeful or resulted from use. According to the predictions discussed earlier, mostly informal tool use is expected and few formal tools should occur. If the chipped stone artifacts were collected from prehistoric sites for historic use, most of the debitage should evidence use as informal tools.

Table 16-9 illustrates the types and number of formal tools in each assemblage. With the exception of Santa Rosa de Lima, the pre-Territorial period components contain a greater number and variety of formal tools than do the Territorial period components. The proportion of formal tools in the Santa Rosa de Lima assemblage is consistent with the other pre-Territorial period assemblages, but there is little variety. This is probably due to the small size of the sample from Santa Rosa de Lima, since few artifacts were recovered during testing, and most of the chipped stone assemblage data were derived from analysis of a two-square-meter sample area in a midden.

Table 16-10 shows the types and numbers of informal tools for each component. The highest percentages occur in the Territorial period assemblages, but there is little difference between the Territorial and Spanish Colonial period assemblages from La Puente. With the exception of Santa Rosa de Lima, most of the informal tools are strike-a-light flints. In general, Territorial period assemblages contain more strike-a-light flints and fewer utilized or retouched debitage than do the pre-Territorial period components.

When formal and informal categories are combined, tools comprise over 20 percent of each assemblage, with the exception of Santa Rosa de Lima. These percentages are higher than would be expected in a prehistoric component, and are consistent with results from Cochiti Reservoir (Kemrer and Kemrer 1979). This is undoubtedly because many pieces of debitage were used as

Table 16-9. Formal tools (frequencies).

	Formal Tool Frequencies				
	Colonization and Colonial Components			Territorial Components	
Tool type	Santa Rosa	La Puente	La Fonda	La Puente	Trujillo House
Gunflint	0	3	2	-	-
Projectile point	0	2	2	2	0
Biface	0	1	3	0	1
Scraper	0	2	0	1	1
Scraper-spokeshave	0	3	0	-	-
Chopper	0	0	1	-	-
Axe	0	1	0	-	-
Unidentified tool	2	2	0	-	-
Percent of assemblage	4.6	4.1	6.0	1.2	1.1

Table 16-10. Informal tools (frequencies).

	Informal Tool Frequencies				
	Colonization and Colonial Components			Territorial Components	
Tool type	Santa Rosa	La Puente	La Fonda	La Puente	Trujillo House
Strike-a-light flint	2	47	20	72	69
Utilized and retouched debitage	3	17	6	4	6
Percent of assemblage	11.4	18.9	19.4	22.4	40.0

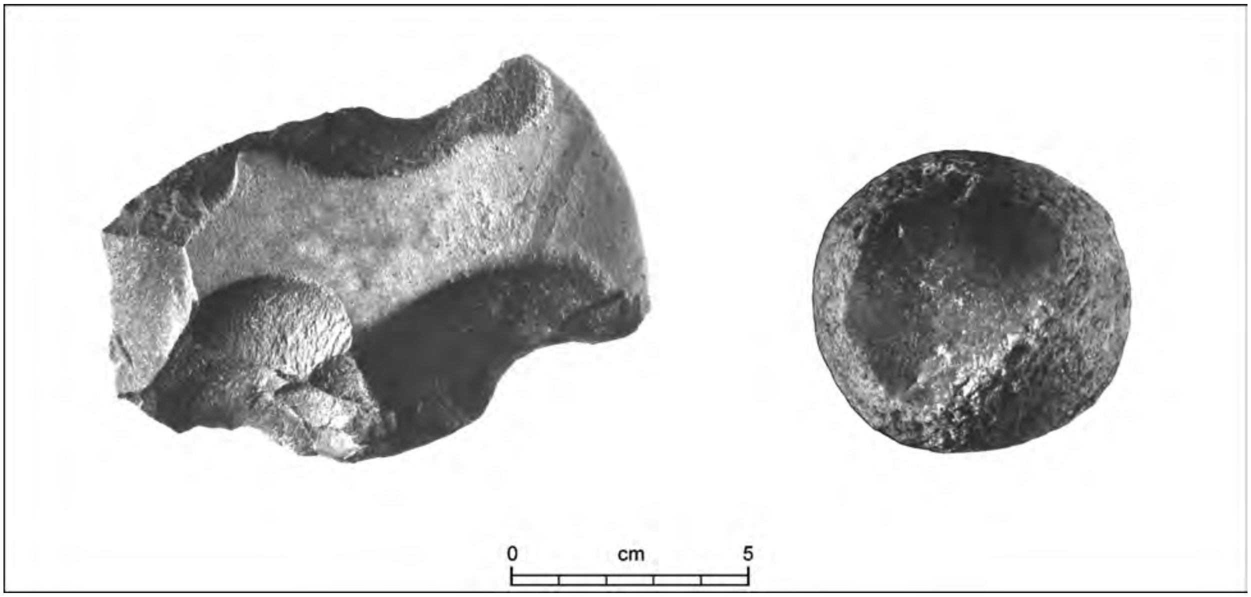

Figure 16-1. Stone axe and disk from La Puente.

strike-a-light flints, an informal tool category that did not occur in the prehistoric Southwest.

Several activities are reflected by the types of tools recovered. Bifaces, scrapers, scraper-spokeshaves, and utilized or retouched debitage are general purpose cutting and scraping tools that could have been used in wood, bone, or leather working. Choppers are also general purpose tools used for vegetal processing or wood working. Most of the other types were probably parts of weapon systems.

Gunflints are diagnostic of a historic occupation, but few other chipped stone artifacts used in weapons are normally accorded a historic origin. Projectile points are common at Spanish sites, and may have been used in military and hunting activities as suggested by the account translated by Carrillo (n.d.b). Two artifacts from La Puente—an axe from the Spanish Colonial period component, and a stone disk from the Territorial period component (Fig. 16-1)—may be examples of the stone-headed clubs said to have been used in battle by the Spanish (Curtis 1927:125). The axe is probably of prehistoric origin but was apparently reused, because it was recovered from stratified Spanish Colonial period midden deposits. However, it is also possible that it was used for wood chopping, or was collected as a curiosity and transported to the site rather than serving as part of a weapon.

Three tool types—gunflints, projectile points, and strike-a-light flints—must be examined in greater detail. The first two are diagnostic of historic site use, yet have not been adequately discussed for the Southwest. Chipped stone projectile points are usually considered to be prehistoric artifacts when found on Spanish sites, but since chipped stone was used for many other purposes at these sites, it is likely that they actually supplemented or replaced metal points.

Gunflints. Gunflints were an important component in weapon systems from the sixteenth century until the percussion cap became common after the 1820s (Cadiou and Richard 1977:18). Dates are usually assigned according to form and manufacturing technique. Traditionally, the earliest gunflints are the bifacially flaked Nordic type, also called Albanian or Aboriginal (Hanson 1970; Witthoft 1966). Bifacial gunflints are usually associated with early varieties of gun locks such as the snaphaunce. Developed in the mid-sixteenth century, the snaphaunce lock (Fig. 16-2) has separate pan cover and frizzen, and the gunflint strikes the frizzen at a steep angle (Peterson 1956; Cadiou and Richard 1977). In later flintlocks the pan cover and frizzen are combined into one unit, and the gunflint grazes the frizzen at an acute angle rather than striking it directly, requiring less force to produce a spark and throw the pan open (Witthoft 1966).

Gunspalls are wedge-shaped flakes produced and trimmed to shape by hammer blows, and were probably first produced in the early seventeenth century; by 1700 gunspalls had mostly replaced bifacial gunflints (Hamilton 1980). At one time they were believed to have been manufactured in the Low Countries (Witthoft 1966), but it is now known that they were produced in England, Denmark, and probably France (de Lotbiniere 1980; White 1975a). Gunflints manufactured from blades struck from prismatic cores (Fig. 16-3) were produced in France by at least 1663 (Blanchette 1975;

Hamilton 1980), were a common article of commerce by 1740, and completely replaced gunspalls by 1775 (Witthoft 1966). The English learned the blade technique around 1775, possibly from French prisoners of war, further refined the method, and were dominating the industry by the early 1800s (de Lotbiniere 1980; Witthoft 1966). Numerous accounts of French and English blade-type gunflint manufacture have been published (Clarke 1935; Hamilton 1980; Knowles and Barnes 1937; Smith 1960; Woodward 1960).

The gunflint sequence is well known and illustrates a continuing improvement of manufacturing techniques, beginning with the wasteful and labor intensive production of bifacial gunflints and ending with the quick and efficient blade technique. It is also of limited use when dealing with the Mediterranean nations and their colonies. Though French and English gunflints occasionally occur in the Southwest, bifacial gunflints are the main variety found. This is because of the type of gunlock in common use.

The Spanish, or miquelet, lock (Fig. 16-2) was probably developed in the Iberian Peninsula around 1600 and remained popular until the mid-nineteenth century (Brinkerhoff and Chamberlain 1972; Lavin 1965; Peterson 1956). It is similar to the early snaphaunce lock in that it delivers a direct and powerful blow to the frizzen and requires a gunflint with a sturdy edge (Peterson 1956). Experiments show that English gunflints are too fragile for such heavy-duty use, and shatter when used in a replica miquelet lock.

Spanish military firearms were equipped with miquelet locks until 1728, when French pattern true flintlocks were adopted (Brinkerhoff and Chamberlain 1972:28). The model 1752 fusil was equipped with a French pattern lock. However, the miquelet lock was readopted for the model 1791 musket because of complaints that the French locks were too fragile (Brinkerhoff and Chamberlain 1972:31). By 1812 the military had returned to French pattern locks, which again became standard in the model 1815 musket (Brinkerhoff and Chamberlain 1972:36). While mainline troops and militia:

> ...in Mexico, Louisiana, and Florida were well armed and supplied with regulation fusils—muskets of the pattern 1752 and 1791, musketoons, pis-

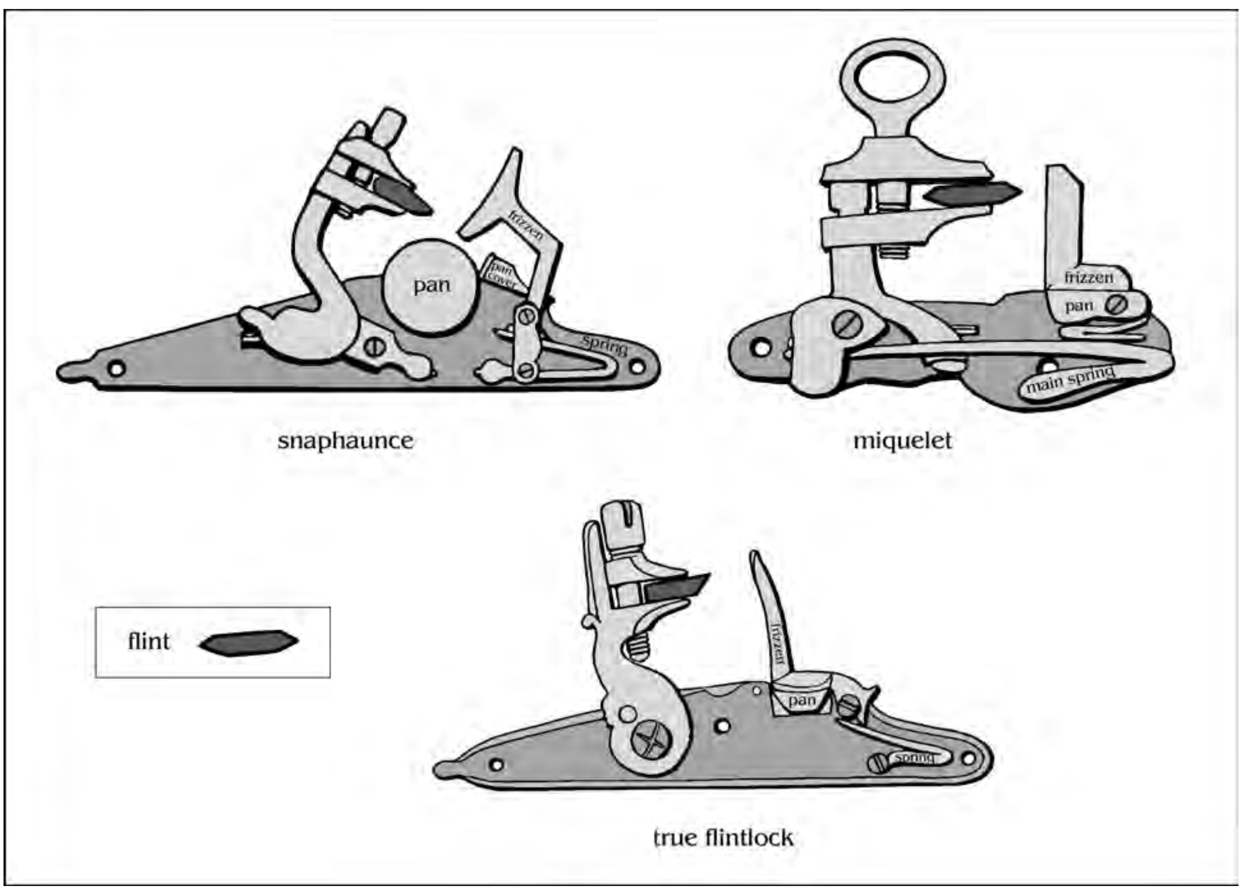

Figure 16-2. Snaphaunce, miquelet, and true flintlocks.

tols, comparable sabers and broadswords and serviceable cannon—the frontier presidial forces, local colonists and militia were not so fortunate. In 1772 less than 250 guns were in the hands of soldiers and settlers in New Mexico....For the sake of economy and, being practical, the king's ministers provided in the regulations for the continued use of the *escopeta*, or light, inexpensive 38.5" barreled musket, caliber .69, similar to civilian weapons widely used on the frontier since the mid-17th century. It was to have the *llave española*, or traditional miguelet lock (Brinkerhoff and Chamberlain 1972:18).

Thus, while mainline troops in Europe, Mexico, Louisiana, and Florida were armed with state-of-the-art equipment, presidial troops and militia in the Southwest continued to use obsolete firearms.

Though studies of Spanish gunflints are limited, most authors suggest they were squared and bifacially flaked (Lavin 1965; Runnels 1982; White 1975b; Witthoft 1966). This style of gunflint was used in many Mediterranean countries and their colonies. In addition to Spain, squared bifacial gunflints have been documented in Portugal, North Africa, and Albania (Evans 1887; Runnels 1982; B. Vierra, personal communication 1999). They have been observed on Spanish sites in Latin America (Witthoft 1966), were sold in Bosnia, Serbia, and Bulgaria as late as the 1880s (Evans 1887), and were still being made in the former Portuguese colonies of Angola and Zambia in the mid-twentieth century (Phillipson 1969).

Manufacture of squared bifacial gunflints accompanied the use of firearms equipped with miquelet locks in the Southwest. Bifacial gunflints were found at Spanish sites in Cochiti Reservoir (Chapman et al. 1977:95), Abiquiú Reservoir (Charles Carrillo, personal communication, 1999), and at LA 16769 (Levine et al. 1985). Two gunflints collected at LA 16769 by Boyd, and curated in the collections of the Museum of International Folk Art, were examined; one is squared and bifacially reduced from local materials, the other is an English gunflint with three sides retouched to produce bifacial edges suitable for use in a miquelet lock. One gunflint from Las Majadas, and 24 from the Torreon Site were examined—all are squared and most are bifacially flaked. A similar

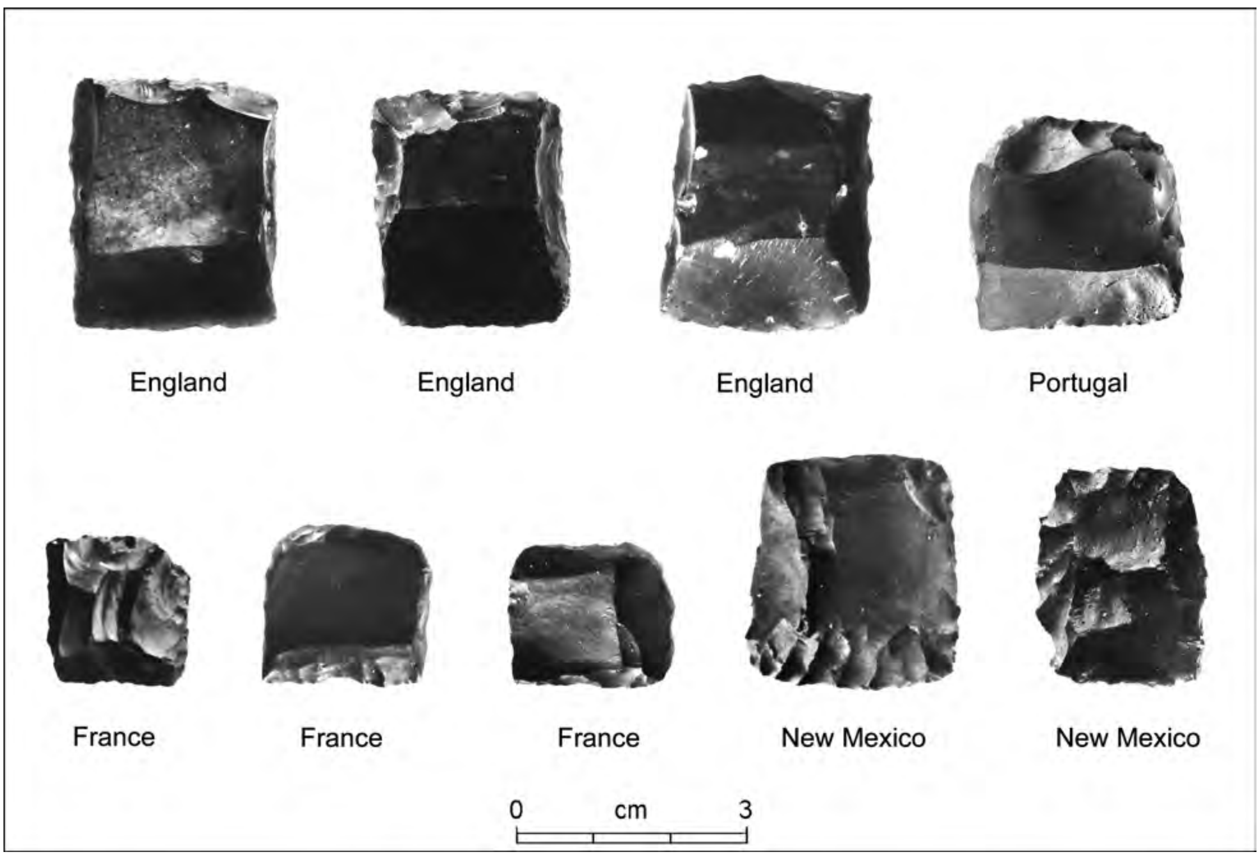

Figure 16-3. Gunflints manufactured from snapped blades in France and England, and bifacial gunflints manufactured in Portugal and New Mexico.

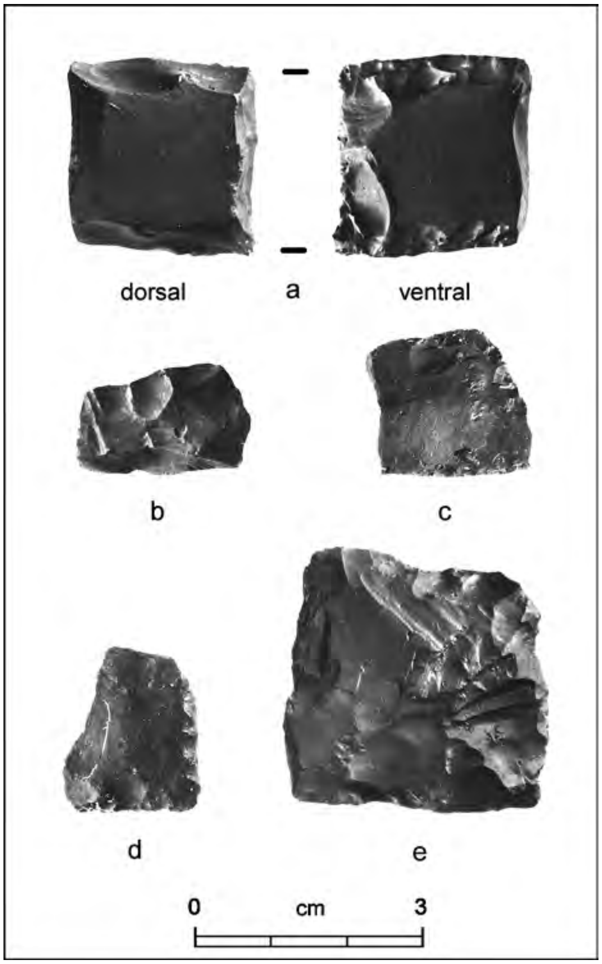

Figure 16-4. (a) Gunflints from LA 16769 (dorsal and ventral views), (b-d) La Puente, and (e) the La Fonda Parking Lot Site. The example from LA 16769 is a modified English gunflint made from a snapped prismatic blade.

gunflint was recovered from the Baca-Larranaga site (Moore 1989b).

Of seven gunflints found at the Tubac Presidio in southern Arizona, two are probably French, and five are squared and unifacially flaked from local materials (Shenk and Teague 1975). Seven gunflints were recovered at Mission Conceptión in San Antonio: one is probably French, three are probably English, one was fashioned from a biface, and two are roughly square and bifacially flaked (Scurlock and Fox 1977). The latter are made from local materials. Forty gunflints were found at Mission San Juan Capistrano, also in San Antonio (Schuetz 1969). The only imported example was of French manufacture. Most of the rest are bifacially flaked (only one is unifacial) and eight are squared. Numerous gunflints have been recovered at the Alamo (Fox et al. 1976; Greer 1967). Many are of English or French manufacture, but at least 12 were locally produced: two are nearly square "spalls," four are bifacially flaked, and six are unifacially flaked. Thus, traditional gunflint dates are of little use in the Southwest unless French or English types are found. Squared, bifacial (sometimes unifacial) gunflints originally accorded a Nordic or Aboriginal origin by Witthoft (1966) are common wherever miquelet locks were used.

All five of the gunflints from La Puente and the La Fonda Parking Lot Site are squared and bifacially flaked, with up to four utilized edges apiece (Fig. 16-4). Retouch is mostly along edge margins, giving the artifacts a pillow-shaped appearance. Four of the five are Pedernal chert, indicating local production. This, coupled with evidence for biface manufacture in the debitage assemblages, implies Spanish manufacture. Bifacial gunflints made from local materials are frequently found in the Southwest, suggesting that their production was common among the Spanish residents of the region.

Edge shape and flaking style suggest that the gunflints recovered from La Puente and the La Fonda Parking Lot Site were used in miquelet locks. Experiments demonstrate that while bifacial gunflints also work well in true flintlocks, different wear patterns are produced by the two types of locks. Both produce heavy battering and abrasion along gunflint edges, and microflakes are removed from upper and lower surfaces (though most originate on the upper surface). However, true flintlocks also produce some abrasion on the upper surface of the gunflint, particularly on ridges between flake scars. This difference results from the varying angles at which the gunflints strike the frizzen. Wear patterns on the La Fonda and La Puente gunflints suggest that they were used in miquelet locks, and examples of such wear are shown in Fig. 16-5.

Several conclusions can be drawn from this discussion. First, the pre-1700 date assigned to bifacial gunflints in the northeastern United States is not applicable in the Southwest or other regions where the miquelet lock was used. Bifacial and occasionally unifacial squared gunflints made from local materials are common at Spanish sites in the Southwest. This suggests that knowledge of flintknapping was widespread, as was the practice of chipped stone tool manufacture. Though miquelet locks began to be abandoned by the Spanish military in 1728, old style escopetas equipped with miquelet locks continued to be used by Southwestern presidial troops, militia, and colonists until at least the mid-1800s. Experiments suggest that different locks produce different wear patterns, and that the gunflints recovered at La Puente and the La Fonda Parking Lot Site were used in firearms equipped with miquelet locks.

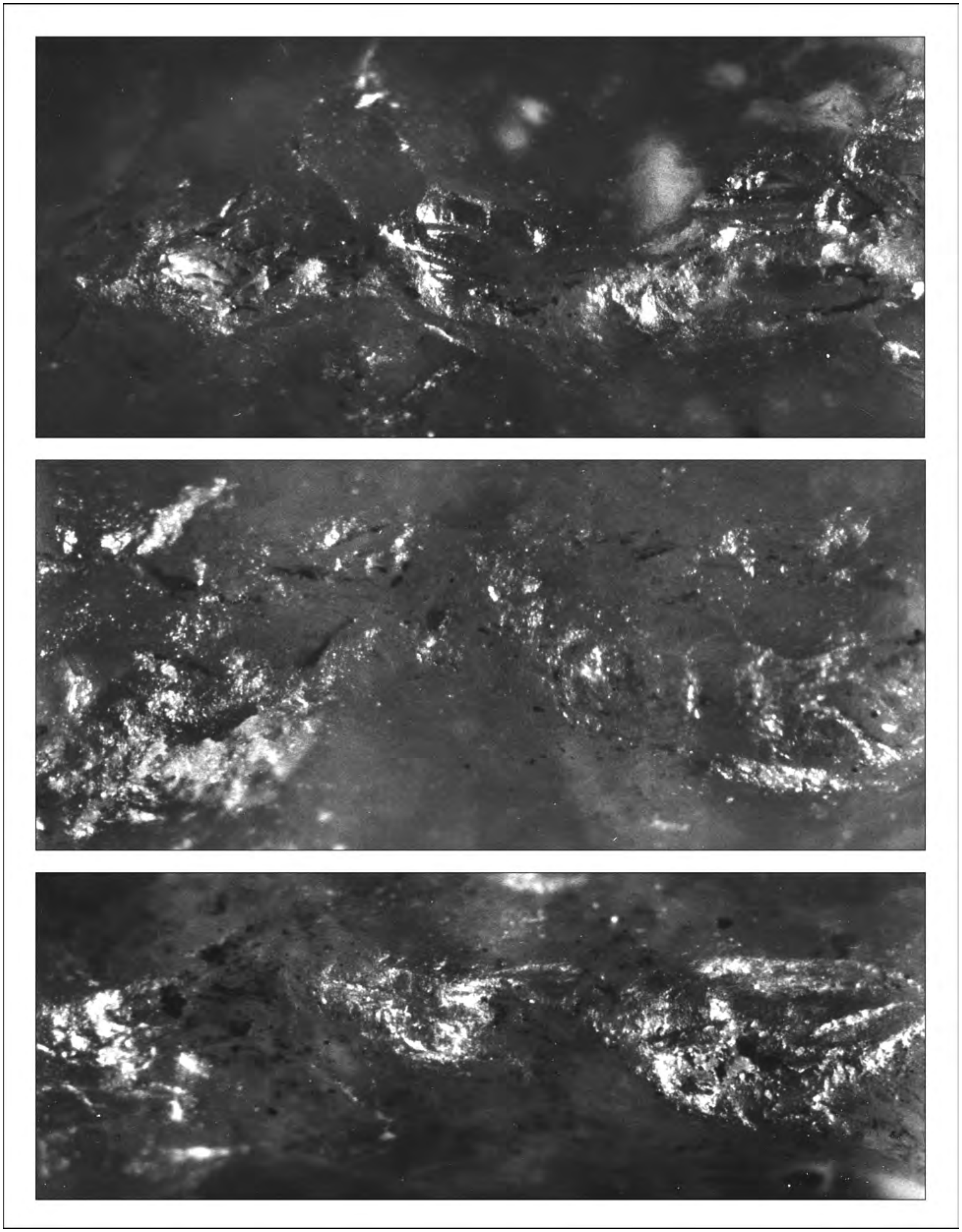

Figure 16-5. Photomicrographs of battering along utilized gunflint edges (15× magnification).

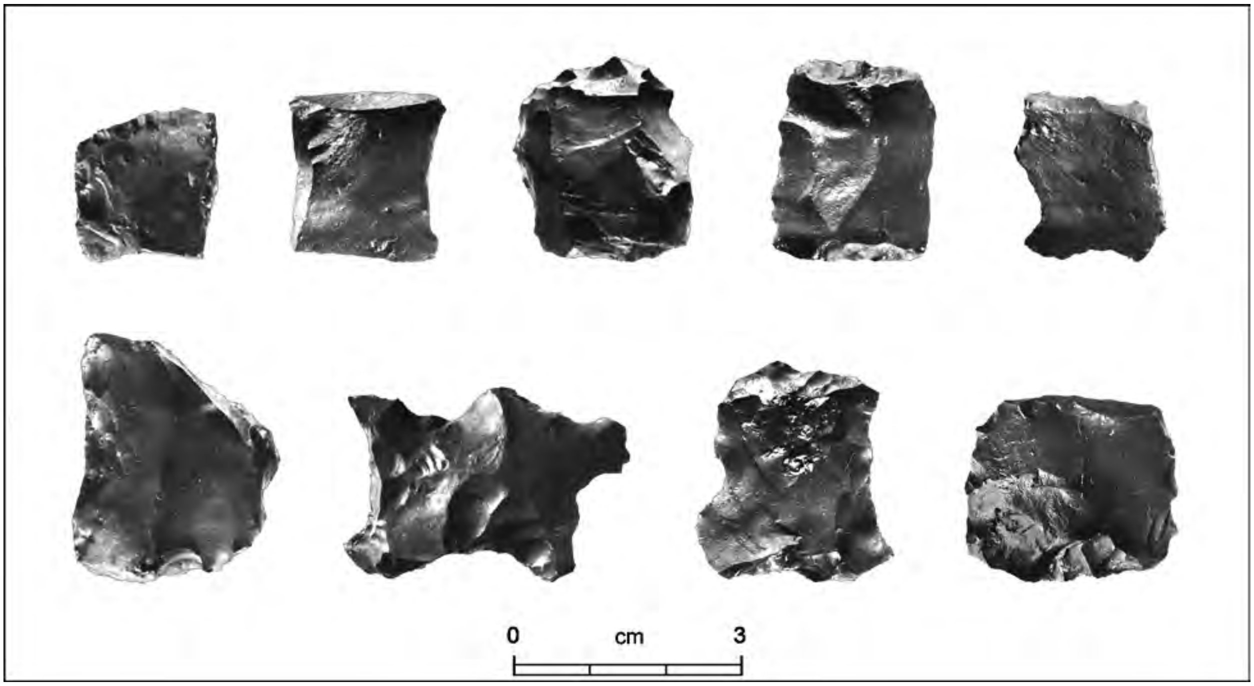

Figure 16-6. Strike-a-light flints from La Puente and the Trujillo House.

Strike-a-light flints. Fire-making has always been an important human activity, and before the invention of the match and the lighter a variety of methods were employed in this task. One of the most popular was the use of a steel strike-a-light and flint. Though European strike-a-light flint manufacture may have been a predecessor and then an adjunct to gunflint production, in Spanish Colonial period America it seems that any conveniently shaped piece of the right material was deemed suitable for use (Boyd 1958).

Witthoft (1966) does not believe that the use of steel strike-a-lights and flints is of great antiquity, suggesting that only with advances in metallurgy during the Renaissance was firemaking by this method made possible. This technique remained in general use until the invention of the match in 1835 (Stevens 1935), and persisted in some regions until the recent past. Stevens (1935) photographed an Estonian using flint and steel to light his pipe in 1925, and notes that English flints were exported to Spain, South America, and Borneo for use in fire-making kits as late as 1924. Arthur Evans (1887) illustrated late nineteenth century Albanian gunflints and strike-a-light flints, and indicates that both were produced by bifacial flaking. Gregg (1844) noted strike-a-light use during his visits to New Mexico in the early Mexican Territorial period, remarking on the speed at which a flame was produced. Finally, Woodward (1960) indicates that strike-a-lights were still being used for fire-making in poorer sections of Mexico as late as 1951.

Proper strike-a-light use produces sparks, which are tiny grains of steel sheared off the strike-a-light by the sharp edge of a flint and ignited by the force of impact (Ripplinger 1984). Experiments demonstrate that several processes occur simultaneously. As the force of impact removes steel shavings from a strike-a-light, it also batters and abrades the edge of the flint. Continued use often results in retouch, producing a steeper edge angle. Since the steeper edge is stronger than the original, it is more resistant to breakage and eventually becomes dulled and stops producing sparks. Retouching often produces a concave edge, very similar in shape to a spokeshave. Edges are heavily abraded, and stepped or feathered microflakes are removed from one or both faces. Metal shavings often adhere to the edge of the flint, melting onto the stone.

Though metal was in short supply in New Mexico before the American Territorial period, strike-a-lights, or *chispas* (Simmons and Turley 1980), were important tools. No whole or fragmentary strike-a-lights were recovered at any of these sites. However, their presence can be deduced by analyzing the chipped stone assemblage for strike-a-light use.

A total of 440 edges on 210 chipped stone artifacts were used as strike-a-light flints (Fig. 16-6). They are all made from chert or an equivalent material like silicified wood. They have no formal shape, and it seems that the only requirement was a sharp edge. Only one strike-a-light flint is bifacially flaked, and it is a fragment of a prehistoric tool. Wear patterns are consistent with those produced by the experiments (Fig. 16-7). Seven basic patterns were recognized (Table 16-11). Retouch is included with wear because experiments show it is incidental to use rather than purposeful edge alteration. Table 16-12 illustrates frequencies of wear patterns by site. Except at Santa Rosa de Lima, unidirectionally retouched edges with mostly unidirectional wear dominate each assemblage. Unretouched edges with predominantly unidirectional wear is the second most frequent pattern. Unretouched edges with bidirectional wear are common overall, but occur at only two sites. The remaining patterns are relatively rare.

To simplify discussion, the seven patterns can be combined into four basic types: unidirectional retouch with uni- or bidirectional wear, bidirectional retouch with uni- or bidirectional wear, uni- or bidirectional wear only, and minimal use. The distribution of edges according to these categories is shown in Table 16-13. Most edges (67.9 percent) show heavy use, with both retouch and wear present. A smaller number (32.1 percent) exhibit light use, consisting of wear with no retouch.

After eliminating strike-a-light flints from Santa Rosa de Lima and the La Fonda Parking Lot Site because of small sample size, it can be seen that the La Puente and Trujillo House assemblages are not comparable. Considerably more edges from the Trujillo House exhibit heavy use. When edges from the Spanish Colonial and Territorial period components at La Puente are separated, it seems that much of this variation is temporal in origin. Light or minimal use occurs on 61.5 percent of Spanish Colonial period edges, contrasting with only 34.8 per-

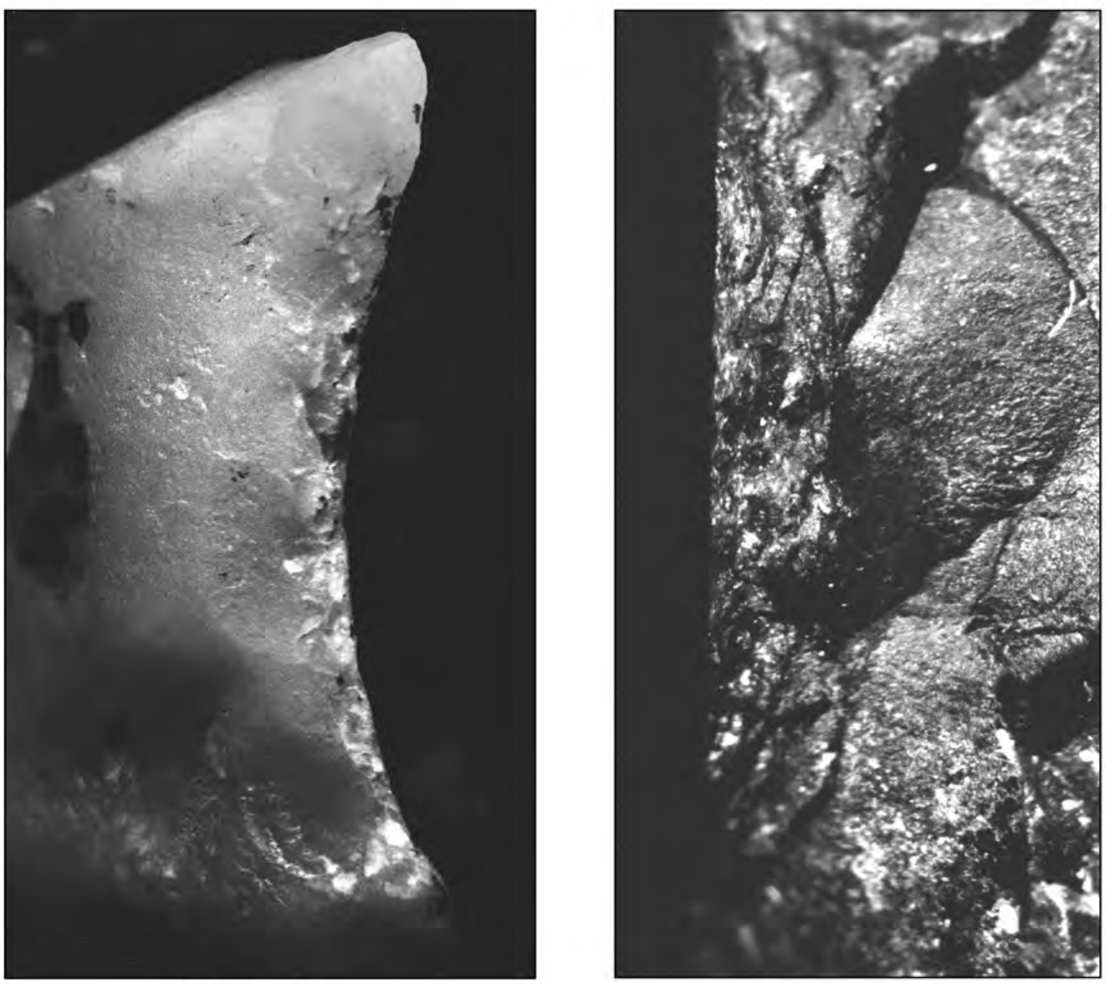

Figure 16-7. Photomicrographs of wear along utilized strike-a-light flint edges.

cent of Territorial period edges. Territorial period strike-a-light flints seem to have been used longer than were Spanish Colonial period flints. This is probably because chipped stone reduction occurred less frequently during the Territorial period than in earlier times. Thus, less debris was immediately available, and suitable flints were used for longer periods of time.

Seven basic edge shapes were defined (Table 16-14). Edges with one or more concavities comprise nearly half of the total, and slightly less than half to two-thirds of individual assemblages. Straight edges make up a quarter of the total, and nearly the same proportion of individual assemblages (except at Santa Rosa de Lima). Nearly 10 percent of the edges are convex, with proportions on individual sites varying widely. Irregular edges comprise only a small percentage of both individual and total assemblages. The remaining edges combine straight, convex, and concave shapes. Straight-convex and concave-convex edges are relatively common, while straight-concave-convex edges are very rare.

Not surprisingly, most shapes have their highest correspondence with wear types 1 and 6 (Table 16-15). This reflects the most common wear patterns rather than a correlation between shape and wear. To get a better idea of the relationship between these attributes, wear patterns were again merged into heavy and light categories. Shapes 1 and 3 have the smallest percentages of heavily used edges (Table 16-16). Shape 4 also has few heavily used edges. The remaining shapes have much higher percentages of heavily used edges. This suggests that straight and convex shapes may have resulted from a short use-life. Concave edges were used for longer periods of time, causing more extensive edge damage. Thus, the degree of edge modification was probably dependent on the length of time a flint was used. However, it is possible that other processes were also at work.

Table 16-17 illustrates mean edge angles for each shape. Though the analysis attempted to identify the angles of edges before use, this was not always possible. Thus, the means are probably skewed slightly upward.

Table 16-11. Strike-a-light flint wear patterns.

Type 1	Unidirectional retouch with mainly unidirectional wear: mostly stepping, with some feathered microflakes. Abrasion and metal adhesions may also be present.
Type 2	Bidirectional retouch with bidirectional wear: mostly stepping, with some feathered microflakes. Abrasion and metal adhesions may also be present.
Type 3	Unidirectional retouch with bidirectional wear: mostly stepping, with some feathered microflakes. Abrasion and metal adhesions may also be present.
Type 4	Bidirectional retouch with mainly unidirectional wear: mostly stepping, with some feathered microflakes. Abrasion and metal adhesions may also be present.
Type 5	No retouch, minimal use only: battering, some stepping and feathering. Metal adhesions may also be present.
Type 6	No retouch, unidirectional wear only: stepped or feathered microflakes. Abrasion and metal adhesions may also be present.
Type 7	No retouch, bidirectional wear only: stepped or feathered microflakes. Abrasion and metal adhesions may also be present.

Table 16-12. Strike-a-light flint wear patterns by site (%).

	Heavy Use (%)				Light Use (%)		
Site	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7
Santa Rosa	0.0	66.7	0.0	33.3	0.0	0.0	0.0
La Puente	48.6	2.7	2.7	0.4	1.5	28.2	15.8
Trujillo House	68.5	6.8	6.8	2.1	1.4	8.9	5.5
La Fonda	70.6	14.7	5.9	5.9	0.0	2.9	0.0
Total	56.8	5.5	2.1	1.6	1.4	19.8	11.1

Table 16-13. Wear patterns on strike-a-light flint edges (%).

	Wear Pattern (%)			
Site	Unidirectional Retouch	Bidirectional Retouch	No Retouch	Minimal Use
Santa Rosa	0.0	100.0	0.0	0.0
La Puente	51.4	3.1	44.0	1.5
Trujillo House	75.3	8.9	14.4	1.4
La Fonda	76.5	20.6	0.0	2.9
Total	60.9	7.0	30.8	1.4

Table 16-14. Edge shape frequencies by site (%).

	Percentage				
Shape	Santa Rosa	La Puente	Trujillo House	La Fonda	Total
1	0.0	29.0	25.3	23.5	27.1
2	66.7	44.0	48.6	58.8	46.8
3	0.0	10.4	7.5	5.9	9.0
4	0.0	1.5	2.7	2.9	2.0
5	0.0	6.6	9.6	8.8	7.7
6	0.0	0.0	1.4	0.0	0.5
7	33.3	8.5	4.8	0.0	6.8

Shape 1 Straight
Shape 2 One or more concavities
Shape 3 Convex
Shape 4 Irregular
Shape 5 Straight and concave segments on same edge
Shape 6 Straight, concave, and convex segments on same edge
Shape 7 Concave and convex segments on same edge

Shapes 1 and 3 (straight and convex) have the steepest angles. Steep edges are more stable and less prone to fracture. This might account for the smaller percentages of retouched edges in these categories. The steeper, more stable edges may have been blunted by use before retouch flakes were detached, and were discarded before significant modification occurred.

Strike-a-light use produces specific wear patterns that can include edge abrasion, stepped and feathered microflakes on one or both surfaces, uni- or bidirectional retouch, and metal adhesions. Edge shape might be related to the amount of use, with prolonged service resulting in removal of retouch flakes to form one or more concavities along an edge. Lighter use, which did not retouch edges, produced less shape modification. However, both shape and length of use-life appear to have been partly dependent on edge angle, with steep edges generally experiencing less reshaping than shallower edges.

Projectile points. Bows and arrows were commonly used by Spanish colonists and militia until the American Territorial period, as documented by numerous sources (Carroll and Haggard 1942; Gregg 1844; Hurt 1939; James 1846; Kinnaird 1958; Worcester 1951). Simmons and Turley (1980) suggest that nearly anyone could make projectile points by cold forging pieces of sheet iron or scrap metal, and note that blacksmiths probably made metal points for trade with Indians and use by Spanish colonists. Chipped stone projectile points occur at many Spanish sites, and it is likely that they, too, were used and perhaps made by Hispanics.

Spanish sites containing chipped stone projectile points include the Signal Site (Alexander 1971), Ideal Site (Brody and Colberg 1966), Torreon Site (Snow 1976), Las Majadas (Snow 1973), ENM 3405 (Haecker 1976), Tucson Presidio (Olson 1985), Tubac Presidio (Shenk and Teague 1975), Mission Guevavi (Robinson 1976), Tumacacori Mission Convento (Whittaker 1983), and the Alamo (Fox et al. 1976). Some of these points are obviously prehistoric. Both points at ENM 3405 were Pueblo II types, and Haecker (1976) suggests that the site may have been occupied by Navajos rather than Spanish. A San Jose point was found at the Ideal Site (Brody and Colberg 1966), and is clearly of prehistoric origin. An Archaic point was recovered at the Signal Site (Alexander 1971), and was probably collected from a prehistoric locale. Some of the projectile points from the Tubac Presidio (Shenk and Teague 1975:80) are similar to local prehistoric types, and one base is a fragment of an Archaic point. Several are also similar to types found at historic Pima, Papago, and Sobaipuri sites.

One of the points from the Alamo resembles types found at other missions. It is triangular, with shallow side-notches and a concave base (Fox et al. 1976). Flaking is along edge margins, and workmanship is crude. Two similar projectile points were found at the Presidio of Tucson (Olson 1985). One is flaked from green bottle glass; workmanship is good, but it differs in shape from local historic Papago points (Olson 1985:265). The second was manufactured from chert, had the same general shape, and appears to have been flaked along edge margins only (Olson 1985:287). Twenty-eight of 29 points from the Tumacacori Mission Convento are small and triangular, with shallow side-notches and concave bases—very similar to those described above. Type 3 points from Tubac Presidio (Shenk and Teague 1975:77) have shallow side-notches

Table 16-15. Correspondence between edge shapes and wear patterns (%).

	Wear Pattern (See Table 16-11); Percentages						
Shape	1	2	3	4	5	6	7
1	41.7	6.7	5.0	0.8	3.3	25.0	17.5
2	64.7	3.4	4.3	2.4	0.5	15.9	8.7
3	45.0	7.5	5.0	2.5	2.5	27.5	10.0
4	55.6	11.1	0.0	0.0	0.0	11.1	22.0
5	58.5	8.8	5.9	0.0	0.0	23.5	2.9
6	100.0	0.0	0.0	0.0	0.0	0.0	0.0
7	70.0	6.7	0.0	0.0	0.0	13.3	10.0

Table 16-16. Correspondence between edge shapes and type of use (%).

	Percentage	
Shape	Heavy Use	Light Use
1	54.2	45.8
2	74.8	25.2
3	60	40
4	66.7	33.3
5	73.2	26.4
6	100	0
7	76.7	23.3

Table 16-17. Mean edge angles for each edge shape.

Shape	Mean Edge Angle	Number of Cases
1	70.6	120
2	62.3	207
3	67.7	40
4	53.1	10
5	61.7	34
6	54.0	2
7	66.2	30

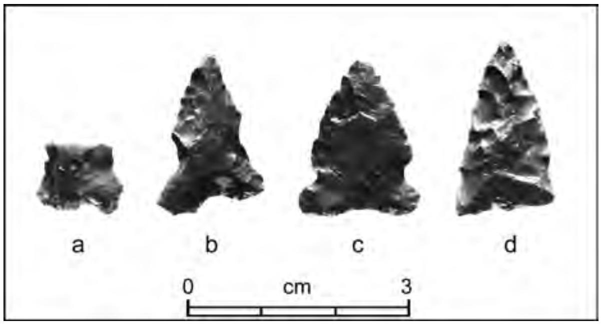

Figure 16-8. (a-c) Projectile points from La Puente, and (d) the La Fonda Parking Lot Site.

and concave bases. Type 1 points are similar in form, with straight or shallow concave bases but no notching (Shenk and Teague 1975:77). Technologically, they are crude, with retouch confined to edge margins rather than extending across their faces. Both types also occur at historic Indian sites in southern Arizona.

Similar projectile points occur at historic Spanish, Mission, and Indian sites in New Mexico, Arizona, and Texas. Usually they are distinct from prehistoric types. This may reflect Spanish influence, similar to that exerted over ceramics. The rapid spread of a new type of lanceolate projectile point through disparate groups of Mission Indians in Texas may be evidence of such influence (Hester 1977). Finding chipped stone projectile points at historic Indian sites and Missions is not surprising; given the shortage of metal, a continuation of prehistoric chipped stone technology was probably necessary. Considering the amount of interaction that occurred between Hispanic and Indian populations, it is also not surprising to find chipped stone points at Spanish sites. But were all of these points produced by Indians, or were many made by Hispanics?

Three projectile points were found at La Puente (Fig. 16-8a-c), one was examined on a midden at Santa Rosa de Lima, and two were recovered at the La Fonda Parking Lot Site. One of the La Fonda specimens is a reused Archaic point, but the other (Fig. 16-8d) is similar to those described above. Flaking is crude and marginal, and it is shallowly side-notched with a straight base. Two of the points from La Puente are complete, and the third is represented by a base. The fragmentary point has shallow side-notches, but too little remains to allow us to assign it a definite temporal or cultural affinity. The complete points are similar to those described above, with shallow side-notches, concave bases, and marginal retouch.

While it is possible that these artifacts were obtained from contemporary Indians, they are more likely of Spanish manufacture. As discussed earlier, chipped stone reduction occurred at these sites, and included some formal tool production, as demonstrated by the presence of manufacturing flakes and gunflints made from local materials. Flaking patterns on the projectile points are similar to those on gunflints from La Puente, the Torreon Site, the La Fonda Parking Lot Site, LA 16769, and a gunflint factory at Azinheira in Portugal. In each case, retouch is marginal and does not extend across artifact faces.

With metal in short supply, a general familiarity with chipped stone technology, and the substitution of chipped stone for metal tools already occurring, it is likely that Hispanic chipped stone tool production included projectile points. This is conjectural, but the widespread occurrence of chipped stone projectile points at Spanish sites suggests that they were used as substitutes for metal points, no matter what their origin.

Flaking patterns on the Abiquiú and La Fonda Parking Lot Site points suggest familiarity with general chipped stone reduction techniques, but a lack of the skill provided by years of practice. From a more personal perspective, they are similar to points made by the author when he was learning to flintknap. Like the tools from Abiquiú and La Fonda, those first efforts were crude, with marginal retouch that rarely extended across artifact faces. Only with continued practice and observation of more skilled flintknappers did he develop the expertise needed to produce uniformly flaked tools.

The crudity of these artifacts suggests manufacture by persons who were unskilled at flintknapping, or were only interested in producing an expedient tool. Similarities between retouch patterns on projectile points and gunflints suggest they were produced by the same manufacturing techniques. Thus, it is likely that both were made by Hispanic site occupants.

Discussion and Conclusions

Chipped stone artifacts are common on Spanish sites. In the sample from New Mexico, 44 of 47 sites contained chipped stone artifacts. Chipped stone artifacts have also been documented at Spanish sites in Arizona, Texas, and Florida. Other than gunflints and strike-a-light flints, chipped stone artifacts are uncommon at Spanish sites in Florida. Debitage was found at only two of six Florida sites, and one was the residence of a mestizo family, suggesting that flintknapping was a continuation of native traditions. This is discussed in more detail later.

Several examples of surviving chipped stone tool use were discussed. In most cases, chipped stone reduction technology survived for economic reasons. The Gurage of Ethiopia use chipped stone tools because it is difficult for them to obtain manufactured goods during the rainy season, and they prefer not to rely on imported goods (Gallagher 1977). Similarly, chipped stone tools have survived among the Highland Maya (Hayden and Nelson 1981). Metal tools were expensive and difficult to obtain until recently; thus, stone tools were used to cut and shape manos and metates so that metal tools would not be worn out. Nineteenth century slaves may have used stone tools because they could not directly participate in the market system and had difficulty obtaining metal tools. However, stone tool use could also simply have been a continuation of native technology.

Runnel's (1982) discussion of chipped stone tool use in Classical and modern Greece indicates that its survival was economic there as well. He suggests that "as one moves away from the source of metal its price goes up making the use of stone an economical alternative" (Runnels 1982:373). Transportation costs can be variable; over equivalent distances, land transport is more expensive than conveyance by sea (Runnels 1982:372).

The New Mexican supply system was irregular and undependable until at least the beginning of the Territorial period. The cost and danger of shipping overland, and price manipulation made manufactured goods very expensive. With Runnels' (1982) arguments in mind, this should have made use of chipped stone tools an economic alternative, particularly among the poorer residents. It also accounts for some of the differences between the Southwest and Florida.

Spanish colonists in New Mexico had only one source for the manufactured goods they did not themselves produce: Mexico. Not only was trade with other European colonies illegal, it was also more difficult, dangerous, and expensive than trade with Mexico. Pottery, hides, and farm produce were available locally, but metal and manufactured goods could only be obtained from the south.

Florida was founded to challenge the French, and because a military presence deterred attacks on the Treasure Fleet in the Bahama Channel and the Straits of Florida (Deagan 1983). The main difference between New Mexico and Florida was the lack of civilian settlers in the latter during the first period of Spanish occupation (1565 to 1763). Florida was underwritten by the Crown, and supplied by the *situado*, a system every bit as inefficient and undependable as that supplying New Mexico. Thus, Florida also lacked critical goods. In contrast with New Mexico, however, an easily accessed source of substitutes was available—the English colonies along the eastern seaboard. English goods were cheaper and of better quality than those supplied by the situado, and trade between Florida and the English colonies in South Carolina and New York began in the late seventeenth century, and intensified after 1730 until it was finally legalized in 1740 (Deagan 1983:35-37). English goods were more affordable because they were shipped by sea, reducing both danger and transport costs.

This explains the rarity of chipped stone artifacts at Spanish sites in Florida (except for gunflints and strike-a-light flints). Transport by ship and easy access to the source made metal tools affordable and local substitutes unnecessary. But New Mexicans had no access to a comparable source and had to make do with local replacements. Circumstantial evidence suggests that chipped stone tools were made and used at Spanish sites in New Mexico. Debitage and formal tools occur with more regularity in site assemblages than can be explained by coincidence or contamination, and by economic conditions conducive to the substitution of chipped stone for metal tools. However, actual proof of chipped stone tool use can only be obtained through analysis of lithic artifacts from Spanish sites.

Five assemblages from four sites were examined. They include a Colonization period assemblage from Santa Fe (La Fonda Parking Lot Site), two Spanish Colonial period assemblages (Santa Rosa de Lima and La Puente), and two Territorial period assemblages (La Puente and the Trujillo House). Only a small surface assemblage was obtained from Santa Rosa de Lima, and it is questionable whether it is representative of the site as a whole. More substantial remains are available from the other components.

Certain characteristics were expected if chipped stone tools were made and used at these sites. The distribution of materials should reflect the uses to which the artifacts were put. Reduction technology should be marked by simplicity, a lack of facially retouched tools, a relatively high degree of bipolar reduction, and high ratios of tools to unused debris. Tools other than gunflints and strike-a-light flints should occur, but since facially retouched tools should be rare, most should be informal.

In general, these expectations were upheld by the analysis. Since most tools were used in firearms or fire-making kits, cherts should and do predominate in each assemblage. Some temporal variation was noted. Cherts and silicified woods comprise about 80 percent of pre-Territorial period, and 90 percent of Territorial period assemblages. This may reflect an increased supply of metal tools coincident with the American occupation, resulting in less need for chipped stone tools except in fire-making kits after 1821.

A full range of reduction debris including flakes, angular debris, and cores was found in each assemblage. Platform information suggests that an expedient core-flake reduction strategy was used, with unmodified platforms comprising between 81 and 91 percent of each assemblage (with broken flakes and obscured platforms eliminated). Again, there is some temporal variation.

Table 16-18. Utilized and retouched debitage by material type for each component (frequencies).

Site	Frequencies: Cherts	Silicified Wood	Obsidian	Percent of Total Assemblage
La Fonda	6	0	1	5.2
La Puente (Colonial component)	11	1	5	4.9
Santa Rosa	2	0	1	6.8
La Puente (Territorial component)	4	0	0	1.2
Trujillo House	7	0	0	3.7

Fewer Territorial period platforms are modified, suggesting that less formal tool manufacture occurred at that time than during earlier periods. Both core reduction and tool production debris occur in each assemblage, but manufacturing flakes comprise only a small portion of each assemblage. Little evidence of bipolar reduction was found, but that it occurred at all might be important.

More direct evidence of reduction was provided by 11 platforms from La Puente and the Trujillo House that had metal adhesions on them, a strong indication that reduction was accomplished by metal hammer and could not have occurred prehistorically. Similar evidence for metal hammer removals was found on one and possibly two platforms from a mixed Anasazi and Spanish assemblage at the Baca Larranaga Site in Santa Fe (Moore 1989), indicating that reduction also occurred at that locale during the Spanish occupation. Evidence of multiple removals from cores in the Trujillo House and both La Puente assemblages shows that lithic reduction occurred at those sites.

A small percentage of formal tools was found in each assemblage. Gunflints are the only tools of indisputably historic (and thus Spanish) manufacture, but there are indications that chipped stone projectile points may also have been manufactured and used by the Spanish occupants of these sites. Informal tools are considerably more frequent, with the highest percentages occurring in Territorial period assemblages. Thus, the expectation was upheld that tools would comprise substantial portions of each assemblage but that most would be informal.

Other than strike-a-light flints, fewer informal tools were found in Territorial period assemblages than in pre-Territorial period assemblages (Table 16-18). Though edge wear can be missed because use does not always produce consistent damage that is visible under moderate magnification (Schutt 1980), it seems that more debitage was used in activities other than fire-making in pre-Territorial period assemblages. This suggests that informal chipped stone tool use declined when a dependable and inexpensive source of metal tools became available.

Chipped stone tool manufacture and use occurred in each assemblage, and generally followed the patterns predicted from analyses of comparable assemblages from other sites. Much of the evidence is circumstantial, but evidence of in situ reduction was also found. Though most of the tools were used in fire-making activities, a variety of other formal and informal types also occur, particularly in pre-Territorial period assemblages. The substitution of chipped stone for metal tools demonstrates the adaptability of early Spanish colonists in New Mexico. Since metal tools were rare and expensive, they had to find suitable substitutes or do without. It is likely that knowledge of flintknapping techniques was widespread through Hispanic culture if, as Witthoft (1966) asserts, gunflint manufacture was a cottage industry. The population may have been predisposed to the use and manufacture of such tools. However, since there is evidence of platform modification, which did not occur in the European gunflint traditions that have been described in detail (Clarke 1935; Evans 1887; Knowles and Barnes 1937; Phillipson 1969; Smith 1960; Woodward 1960), it is possible that some techniques, if not the impetus, for chipped stone tool manufacture and use were derived from neighboring Indian groups. Whatever the source of this knowledge, Spanish New Mexicans made and used chipped stone tools as limited substitutes for expensive and hard to obtain metal tools.

CHAPTER 17

AN ARCHAEOLOGICAL PERSPECTIVE ON ADOBE:
ANALYSIS OF BUILDING MATERIALS FROM THE TRUJILLO HOUSE

JEFFREY L. BOYER

INTRODUCTION

Architecture often comprises the most conspicuous feature of an archaeological site, which is why archaeologists must study architecture as they would any other artifact. However, while we have developed a wide variety of techniques to study pottery, stone tools, and glass or metal items, we have not paid the same amount of attention to architecture as a human artifact.

Architectural studies by archaeologists in the American Southwest generally fall into two categories. The first, construction style and sequence studies, has focused on prehistoric masonry structures. The second, replication experiments, has been limited to prehistoric pit and jacal structures. In both cases, these studies discuss the presence of adobe mortar and plaster but lack detailed material analyses. Archaeologists in Mesoamerica and the Near East have conducted materials analyses of lime and gypsum plasters, stuccos, and mortars from prehistoric sites. While the Near Eastern studies include sites with adobe construction, adobe materials analysis is not a significant part of the research.

Analysis of adobe building material was incorporated into the Abiquiú project to explore its potential for illuminating changing patterns of local and regional material use and settlement, and for comparison with oral tradition. This discussion focuses on analysis of adobe from the Trujillo House.

ARCHITECTURAL ANALYSES IN ARCHAEOLOGY

Before discussing the analyses of adobe from the Trujillo House, it is necessary to digress briefly to summarize architectural studies that have been conducted by archaeologists. This summary is concerned with research-focused archaeology rather than with preservation studies. Many of the latter are conducted by archaeologists, but their goal is defining appropriate materials for preservation rather than behaviorally significant patterns of material use (Caperton and Taylor 1989; see also the papers in Agnew et al. 1990).

As noted above, architectural studies by archaeologists in the Southwest generally fall into two categories. The first is the study of construction styles and sequences. Studies of this nature were begun at Chaco Canyon. The first archaeologist to describe the several types of Chacoan masonry was Judd (1964), who used his work from the 1920s to define a classification of Chacoan masonry styles and their temporal sequence. Judd defined four styles of Chacoan masonry at Pueblo Bonito and noted the presence of a fifth but considered it to be a later intrusion from the Mesa Verde region to the north.

In 1934, Florence Hawley published her seminal volume on excavations at another Chacoan pueblo, Chetro Ketl (Hawley 1934). Hawley defined at least six sequential masonry styles, including one not defined by Judd at Pueblo Bonito, an elaboration of one of Judd's styles, and a final style that she also considered to be a result of Mesa Verdean migration or perhaps of the decline of Chacoan society. A comparison of Judd's and Hawley's sequences is provided by Lister and Lister (1981). Discussion of the variation and distribution of Chacoan stylistic elements within the canyon is provided by Truell (1986), while Powers et al. (1983) provide the some information for the Chacoan outlier sites. Actual construction details are discussed by Lekson (1983) and Truell (1986), who also estimate construction costs in terms of labor and materials.

The work at Chaco Canyon also provided a definition of what would become known as McElmo style masonry, corresponding to Judd's fifth type and Hawley's sixth, and usually attributed to Mesa Verdean immigrants. It also helped lead to the description of masonry styles for the Kayenta region of northeast Arizona (Dean 1970).

South of the San Juan Basin in the Mogollon highlands of western New Mexico and eastern Arizona, Paul S. Martin began defining masonry styles and construction sequences in the 1940s. At South Leggett Pueblo in western New Mexico, he defined two masonry styles (Martin and Rinaldo 1950). Berman's (1979) regional overview suggests that the styles may be sequential. Interestingly, Martin (1979) only mentions one style in his later summary of Mogollon culture. Martin's work at the Mogollon pueblos led to a regional view of intrasite growth patterns using architectural features such as wall abutments. This work is mirrored outside the Mogollon region by that of Dean (1970) at Kiet Siel and Roberts (1931) at Kiatuthlanna. Dean was able to define the basic construction unit at Kiet Siel as a courtyard complex involving one habitation room, several storage rooms, and a courtyard. At Kiatuthlanna, the basic construction unit was a roomblock consisting of a kiva and several habitation and storage rooms. In both cases, sites grew as aggregates of the basic construction units.

The second category of architectural study performed in the American Southwest concerns replication experiments, the most detailed of which were conducted during the Dolores Archaeological Program in southwestern Colorado. During the Dolores project, two experiments provided the impetus for a series of supporting studies related to prehistoric architecture. Glennie (1984) constructed a pit structure using a design dating to about A.D. 800, while Varien (1984) replicated three styles of prehistoric surface architecture. These experiments provided information on prehistoric construction and destruction, abandonment, relationships between surface and subsurface structures and features. They led to a challenge of accepted explanations concerning Anasazi architecture and changes in settlement. Wilshusen (1988a, 1988b, 1988c, 1988d, 1988e) summarized these experiments and the resulting architectural supporting studies. He points out their significance as follows (Wilshusen 1988a:595):

> The examination of architectural form does not explain why changes occurred, but simply makes clear how they occurred. Once it is known how the various architectural forms are constructed and how these forms changed through time, it is possible to examine why the changes might have occurred. A broad shift in the uses of structures may serve to highlight adaptive or organizational changes and would prove to be useful in explaining cultural change.

In addition to these studies, several researchers have conducted materials analyses of lime and gypsum mortars, stuccos, and plasters in Mesoamerica, India, and the Near East. Between 1957 and 1960, Edwin Littman published a series of articles on his analyses of lime mortar, plaster, and stucco from several prehistoric Mayan sites in Mexico (Littman 1957, 1958a, 1958b, 1959a, 1959b, 1960). In the first article, Littman (1957) stated the purpose of his analysis: "The reports of archaeological investigations at ancient Mexican sites frequently refer to mortars, plasters, and stuccos used in the building of the structures. Beyond such observations little or no attention has been paid to the technical aspects of these building elements."

Through his analyses, Littman was able to determine that the lime used in mortars and plasters at the sites of Comalcalco and Las Flores was derived from shell rather than limestone, while the lime at Palenque was obtained from limestone beds under the natural soil. Lime from sites in the Puuc area may have come from some other source, but he was unable to determine that location. At all sites, lime was used to make mortar, plaster, stucco, washcoats, and lime-aggregate masses that were used instead of bricks.

Karanth et al. (1986) conducted chemical and petrographic analyses of lime plasters from the seventh and eighth centuries at Karvan in western India. Their analyses enabled them to characterize the plasters, determine the sources of lime and sand used at the site, and define the processes of making plaster. Finally, Kingery et al. (1988) discuss the differences between lime and gypsum plasters in the Near East and detail the distribution of architectural and nonarchitectural plasters, the latter occurring as adhesives, vessels, balls, sculptures, and beads. They were able to define "techno-complex" areas (Kingery, et al. 1986:236): "Present data indicate that lime plaster was exclusively the material of choice in the Levant and Anatolia; gypsum was the material of choice in the drainage area of the Tigris and Euphrates and further to the east."

The distributions were accounted for in terms of technology transfer. Finally, they discuss the implications of inter- and intrasite variation, suggesting the coexistence of egalitarian villages and towns in which craft specialization began.

An important aspect of all these studies is that they provide both site-specific and regional results. The Chacoan masonry studies began at two large pueblos, but the results have been used in later research to develop criteria for distinguishing outlier sites from other masonry pueblos. The Dolores project replication experiments involved architectural forms common in that area, but had implications for architectural construction and abandonment processes and settlement shifts throughout the Anasazi region. Littman's analyses began at Comalcalco and expanded to include 11 other Mayan sites, finally allowing him to develop a regional perspective on lime use. The study by Kingery et al. (1988) continued an earlier project (Gourdin and Kingery 1975) examining the advent of pyrotechnology throughout the Near East. Their work provides a regional perspective within which specific sites may be evaluated. Karanth et al.'s (1986) research grew from the realization that regional data were lacking, and led them to begin the process of building a regional perspective with data from a single site.

Adobe Building Materials at the Trujillo House

The Trujillo House was constructed of adobe bricks. In some portions of the structure, the bricks could be defined along the top and sides of the wall remnants. However, natural deterioration of the adobe meant that individual bricks could not always be defined. The walls were plastered with one or more layers of adobe that were then covered with very thin layers of gypsum whitewash plaster known locally as *jaspe*. Jaspe is not a Spanish word, and may have been borrowed from the Jicarilla Apache who frequented the area in the eighteenth and nineteenth centuries.

The most common room features were fireplaces. Fireplaces were found in Rooms 1, 2, 3, 5, and 8, and were typical Hispanic corner fireplaces, though only two were actually built in room corners. The other fireplaces were built in artificial corners formed by constructing short wingwalls that extended into the rooms. In each case, the wingwalls served to create a barrier between the fireplace and the door leading into the room, probably protecting them from drafts and thereby increasing their efficiency. The wingwall fireplace in Room 1 was considerably larger than others elsewhere in the house. Its size and location facing directly into a room corner suggested that its function was not limited to heating the room. It may also have been used for cooking; thus, Room 1 may have been the kitchen.

Besides doors, only two other features were found in the house. Evidence of a dismantled *banco* (bench) was found in the northeast corner of Room 1, and an undefined feature was found in Room 7.

Samples and Analytical Methods

Seven adobe brick samples and six adobe plaster samples were collected from the Trujillo House. In addition, two samples were collected from the midden pit to provide control data for the analyses. One sample was taken from the south side of the pit about 50 cm below the present ground surface, while the second was from the bottom of the pit. Figure 17-1 shows sample collection locations; Table 17-1 lists the samples by provenience and type.

The color of each sample was determined using a Munsell Soil Color Chart. The liquid and plastic limits of each sample were determined using methods outlined by Teutonico (1988:96-110). Particle-size analyses were

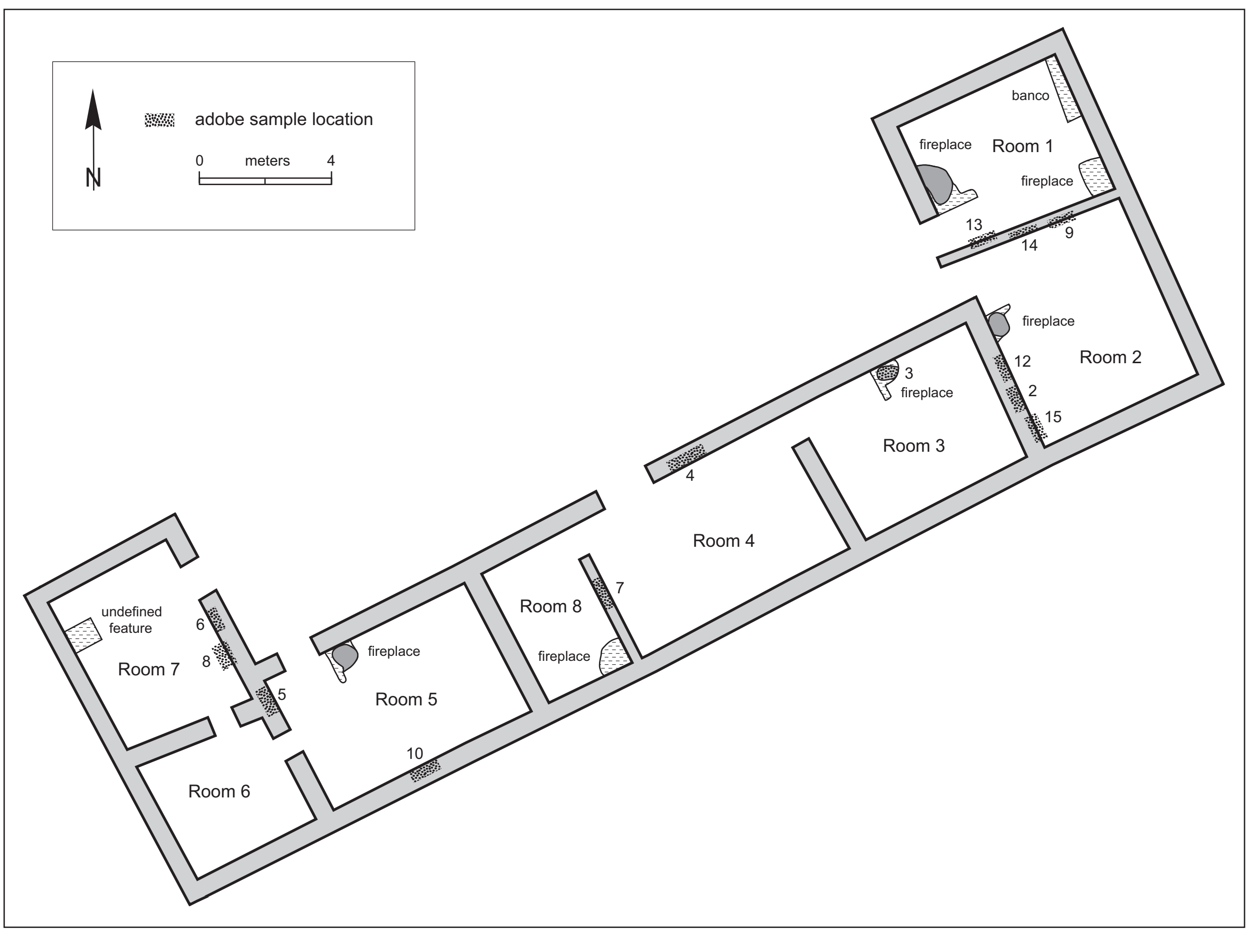

Figure 17-1. Plan of the Trujillo House showing features and adobe collection locations

conducted using a sieve stack ranging from 2 mm to 75 µm for materials larger than 75 µm, and the sedimentation-hydrometer method for particles smaller than 75 µm (Teutonico 1988:83-95). Teutonico's (1988:56-69) qualitative methods were used to test for water-soluble salts and carbonates.

Table 17-1. Trujillo House adobe sample numbers, proveniences, and types.

Sample No.	Provenience	Type
1	Trash Pit, south wall, 0.5 m below modern ground surface	natural soil
2	Room 2, west wall	brick
3	Room 3, hearth floor	plaster
4	Room 4, north wall	brick
5	Room 5, west wall	brick
6	Room 7, east wall	brick
7	Rooms 4 and 8, wall separating rooms	brick
8	Room 7, east wall	plaster
9	Room 2, north wall	plaster
10	Room 5, south wall	plaster
11	Midden pit floor	adobe
12	Room 2, west wall	brick
13	Room 1, south wall	plaster
14	Rooms 1 and 2, wall separating rooms	brick
15	Room 2, west wall	plaster

Analytic Results

Results of the Trujillo House adobe analyses are in Table 17-2; the following discussion summarizes these data.

Color. A variety of factors can affect sample color. One example that is discussed later is burning, which resulted in two different colors in the same sample. However, Boyer's (1992) analysis of adobe from the Vigíl-Torres site near Taos clearly shows that color can be indicative of significant similarities and differences between adobe samples that are confirmed by other analyses.

Three groups of samples from the Trujillo House can be discerned by sample color. The first group consists of four samples with the hue 5YR. Sample 3, consisting of plaster from the hearth floor in Room 3, was clearly burned and two different colors were discernable. The upper portion of the sample, which was most burned, was very dark gray (5YR 3/1). Samples 5 and 15 were reddish-brown (5YR 5/3), and Sample 6 was light reddish-brown (5YR 6/3). Samples 5 and 6 were collected from bricks in Rooms 5 and 7 in the west wing of the house; Sample 15 was plaster from Room 2. This may suggest that the construction of the west-wing rooms and the plastering of Room 2 represent a single building

Table 17-2. Trujillo House adobe: summary of analytical results.

		Particle Size (percent of each sample)[1]						Plasticity[2]			Soluble Salts[3]			
Sample No.	Munsell Color	csd	fsd	slt	cly	sd	slt/cly	ll	pl	ind	sft	chl	nit	car
1	10YR7/3	3.5	67.7	16.6	12.1	71.2	28.7	26.3	21.5	4.8	-	-	-	-
2	10YR6/4	16.5	62.3	14.0	7.1	78.8	21.1	16.2	21.5	-5.2	-	±	+	++
3	5YR3/1 + 7.5YR3/4	1.6	74.5	18.8	5.1	76.1	23.9	16.3	18.5	-2.2	-	±	±	+
4	10YR5/3	24.0	68.9	7.1	0.0	92.9	7.1	14.7	21.2	-6.5	-	-	±	+
5	5YR5/3	-	-	-	-	-	-	20.2	20.6	-0.4	-	-	±	+
6	5YR6/3	13.3	60.6	19.6	6.5	73.9	26.1	19.7	20.6	-0.9	+	?	±	+
7	7.5YR5/4	-	-	-	-	-	-	16.6	19.9	-3.3	-	-	±	+
8	7.5YR5/4	17.7	54.9	24.1	3.3	72.6	27.4	22.5	19.9	2.6	-	-	-	-
9	7.5YR5/4	12.0	67.8	12.9	7.3	79.8	20.2	18.0	21.0	-3.0	-	-	-	-
10	7.5YR5/4	-	-	-	-	-	-	21.6	20.1	1.5	-	-	-	-
11	7.5YR6/4	-	-	-	-	-	-	16.7	19.8	-3.0	±	+	+	++
12	10YR5/3	15.2	71.0	8.8	5.0	86.2	13.8	17.5	18.8	-1.3	-	+	±	++
13	7.5YR5/4	9.3	65.8	15.4	9.4	75.2	24.8	20.8	18.6	2.2	-	-	±	+++
14	7.5YR5/4	12.3	67.8	14.0	5.9	80.1	19.9	20.7	20.4	0.3	+	+	±	+
15	5YR5/3	3.0	73.3	17.1	6.6	76.3	23.7	21.8	20.7	1.7	+++	-	±	+++

[1]**Particle size**
csd Coarse sand
fsd Fine sand
slt Silt
cly Clay
sd Combined sand
slt/cly Combined silt/clay

[2]**Plasticity**
ll Liquid limits
pl Plastic limits
ind Plasticity index (ll minus pl)

[3]**Soluble salts**
sft Sulfates
chl Chlorides
nit Nitrites
car Carbonates
\- Not present
± Perceptible
\+ Present
++ Notable
+++ Strong/dominant
? Unknown

episode, and may indicate that Room 2 was built before the rooms in the west wing were completed.

The second group includes eight samples with the hue 7.5YR. The colors in this hue contain less red than those in the 5YR hue. The darkest sample in this group was Sample 3 from the hearth in Room 3, whose lower portion was dark brown (7.5YR 3/4). Although the lower portion may have been darkened by burning, it was probably closer to the original plaster color than was the upper portion of the sample (which was 5YR 3/1). Six samples (7, 8, 9, 10, 13, and 14) were brown (7.5YR 5/4). They included four plaster samples from rooms in the east and west wings, and brick samples from the walls separating Rooms 1 and 2 and Rooms 4 and 8. One sample (11) was light brown (7.5YR 6/4), and came from the floor of the trash pit. This suggests that Sample 11 was adobe rather than natural soil and, therefore, that the trash pit was originally an adobe borrow or mixing pit. It may also indicate a connection between material in the pit and adobe used during a general replastering episode and for construction of walls between Rooms 4 and 8 and Rooms 1 and 2.

The third group consists of four samples with the hue 10YR, being less red and slightly more yellow than those with the 7.5YR hue. Two samples (4 and 12) are from bricks in Rooms 4 and 2 in the central section and east wing of the house. Sample 12 is from the west wall of Room 2, which would have been the east wall of the original central section of the house. Their color was brown (10YR 5/3). Sample 2, from Room 2 near Sample 12, was light yellowish-brown (10YR 6/4). Sample 1, from the side of the midden pit and collected as a control sample of natural soil, was very pale brown (10YR 7/3). This group suggests comparability between samples from the original central section of the house and natural on-site soil.

Sample color groups point directly to three construction episodes and a general replastering, and indirectly to a fourth construction episode. Group 3, the 10YR samples, probably relates to the original construction of the house and suggests use of the upper 50 cm of on-site soil. Group 1, the 5YR samples, represents a building episode that included construction of the west-wing rooms and plastering in Room 2. This suggests that Room 2 was built before the west-wing rooms, either during the original construction episode or between the original episode and the episode represented by Group 1. Finally, Group 2, the 7.5YR samples, represents a building episode that included construction of the walls separating Rooms 4 and 8 and Rooms 1 and 2, and a general replastering.

Particle size distribution. The percentages of coarse and fine sands, silt, and clay in the samples are shown in Table 17-2 and Fig. 17-2. One group of sam-

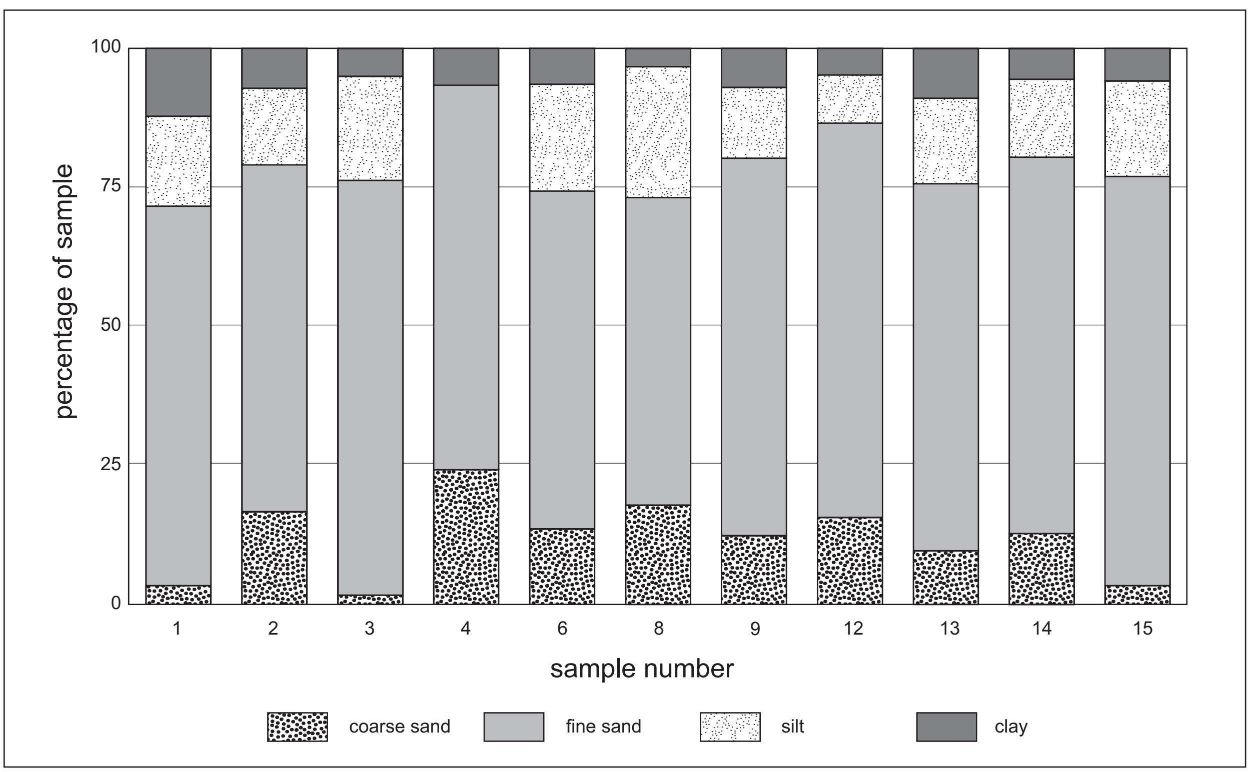

Figure 17-2. Trujillo House adobe particle size distribution.

ples can be discerned based on particle size distribution. Group 1 consists of Samples 1, 3, and 15, all of which were very low (< 3.5 percent) in coarse sand (> 0.42 mm). Sample 1 was the control sample from the side of the trash pit. Samples 3 and 15 were plaster from the hearth in Room 3 (Sample 3) and from the wall of Room 2 (Sample 15). The low percentage of coarse sand is expectable for plaster samples, which should be smoother than adobe used for bricks. Comparing this group to the color data, we see that Samples 3 and 15 were also in Color Group 1, while Sample 1 was in Color Group 3.

In terms of particle sizes, the other samples are not significantly different. In fact, the fine sand, silt, and clay figures for the samples in Group 1 are within the normal ranges for the site. Excluding Sample 4, which was not processed properly in the laboratory, coarse sand figures varied between 9.3 and 17.7 percent, a range of 8.4 percent. Fine sand (75 μm to 0.42 mm) constituted the primary ingredient in each sample, comprising between 54 and 75 percent of each sample. Samples 3 and 15, the two plaster samples in Group 1 that contained almost no coarse sand, also had the highest proportions of fine sand: 73.3 and 74.5 percent, respectively. Excluding these samples, fine sand constitutes from 54.9 to 71.0 percent, with 77.8 percent of the samples containing between 60.6 and 68.9 percent fine sand, a range of 8.3 percent. Silt comprised between 7.1 and 24.1 percent of each sample, with 72.7 percent of the samples containing 12.9 to 19.6 percent silt, a range of 6.7 percent. Finally, clay was present in amounts ranging from 0 to 12 percent, making it generally the least significant ingredient. Again excluding Sample 4, the range was 3.3 to 12.1 percent, with 80 percent of the samples containing between 5.0 and 9.4 percent clay, a range of 4.4 percent. Therefore, we see that variation in sample composition is generally minimal, ranging from 4.4 percent in clay content to 8.4 percent in coarse sand content. The primary exceptions are Sample 4, where poor sample processing resulted in low clay and high coarse sand figures, and samples 3 and 15. Taken together, particle size data do not point to individual construction episodes, but do indicate that the Trujillo House adobe, both plaster and bricks, was made from the same basic material, and that it was made on-site.

In order to evaluate the Trujillo House adobe, samples were compared with modern construction standards. For comparability, the percentages of coarse and fine sands were combined, as were those of silts and clays (Table 17-2). These data were compared with standards set by the USDC National Bureau of Standards (Clifton et al. 1978:12), and contained in Section 2405 of the Uniform Building Code (New Mexico State Building Code, Amendment 6, Chapter 24 [Smith 1982:15, 68-73]; see also Native Products Division n.d.:3, 18-20). Control sample 1 falls near the bottom of the NBS standard range for sand but near the middle of the range for silt and clay. The adobe samples fall below the midpoint of the standard ranges for both sand and silt and clay, indicating that the adobe samples have slightly less clay than recommended, which is important because clay acts as a binder in adobe.

However, a different picture is obtained when the samples are compared to the Uniform Building Code standards. By these standards, the percentages of sand are at or above the midpoint of the standard range, whereas the percentages of silt and clay are well below the midpoint. This further demonstrates that the adobe samples contain more sand and less clay than recommended. Since clay is the binder, these sandy adobes would be relatively weak, perhaps weaker than the natural soil.

Plasticity. Liquid and plastic limits were calculated for all 15 samples. The results of these tests are presented in Table 17-2 and Fig. 17-3, which shows graphically the relationship between liquid and plastic limits for each sample. It is important to note that only the control sample and the plaster samples from Rooms 2, 5, and 7 had positive indices. All other indices were negative. Further, even the positive indices were quite low, indicating that the soil, both natural and as adobe, was essentially nonplastic, probably due to its relatively high sand and low clay content.

Interestingly, the sample from the trash-pit floor more closely resembled the adobe samples than it did the control sample from the side of the trash pit. In fact, the plasticity of the trash-pit floor sample was almost identical to the sample taken from the wall dividing Rooms 4 and 8, and was quite similar to the samples from Room 2 and the hearth in Room 3. This supports the conclusion that, although it was collected as a control, this sample was actually adobe rather than natural soil.

As noted above, the plaster samples from Rooms 5 and 7 were the only adobe samples with positive indices. Interestingly, the brick samples from these rooms, although possessing negative indices, had the highest indices of the remaining adobe samples. These facts place Rooms 5 and 7 in a cluster of indices well below that of the control sample but above those of the other adobe samples. The sample from Room 4 was singular in its very low index. This sample also had the most diverse liquid-limit test figures, perhaps suggesting material diversity within the sample.

Five groups of samples can be defined on the basis of plasticity. The groups are shown in Fig. 17-4. Unlike the groups recognized by color, particle size, or soluble salts, the plasticity groups were defined by statistical tests. Because of their significance in determining the

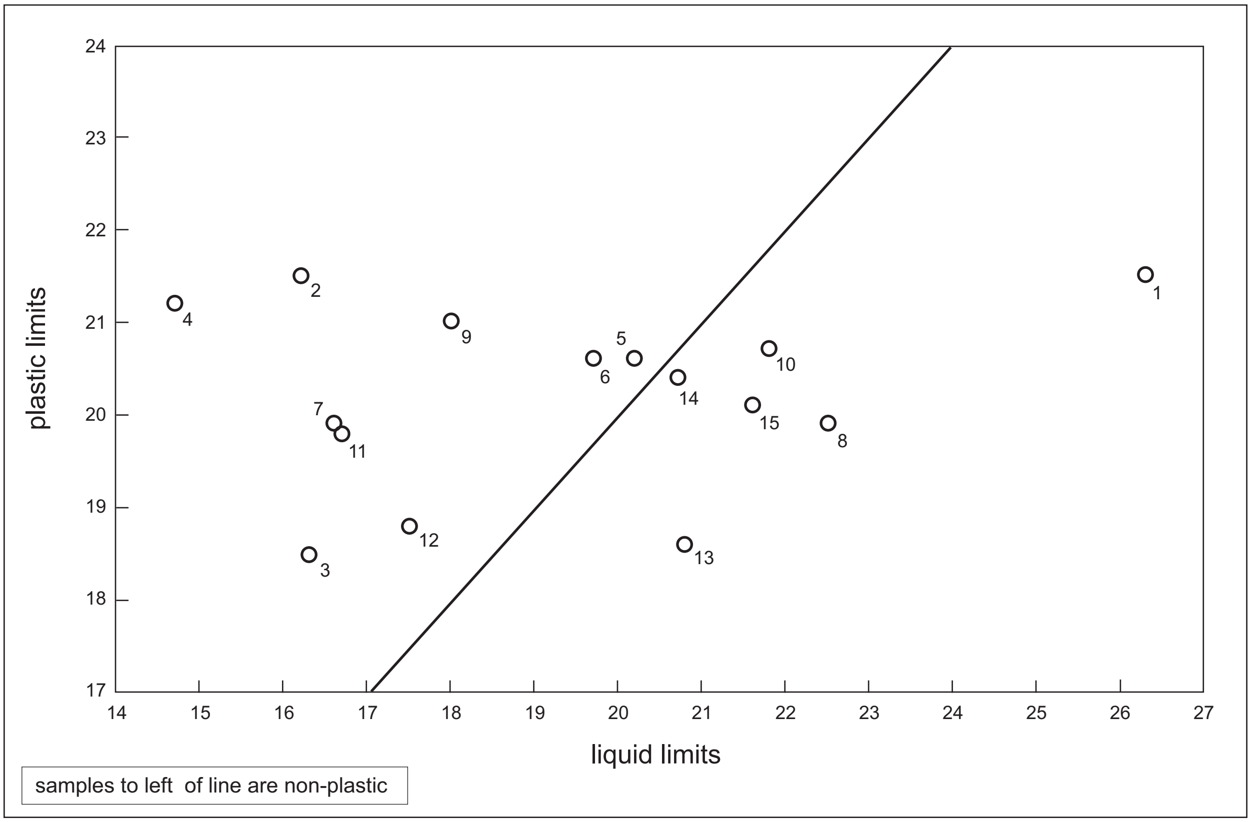

Figure 17-3. Trujillo House adobe plasticity.

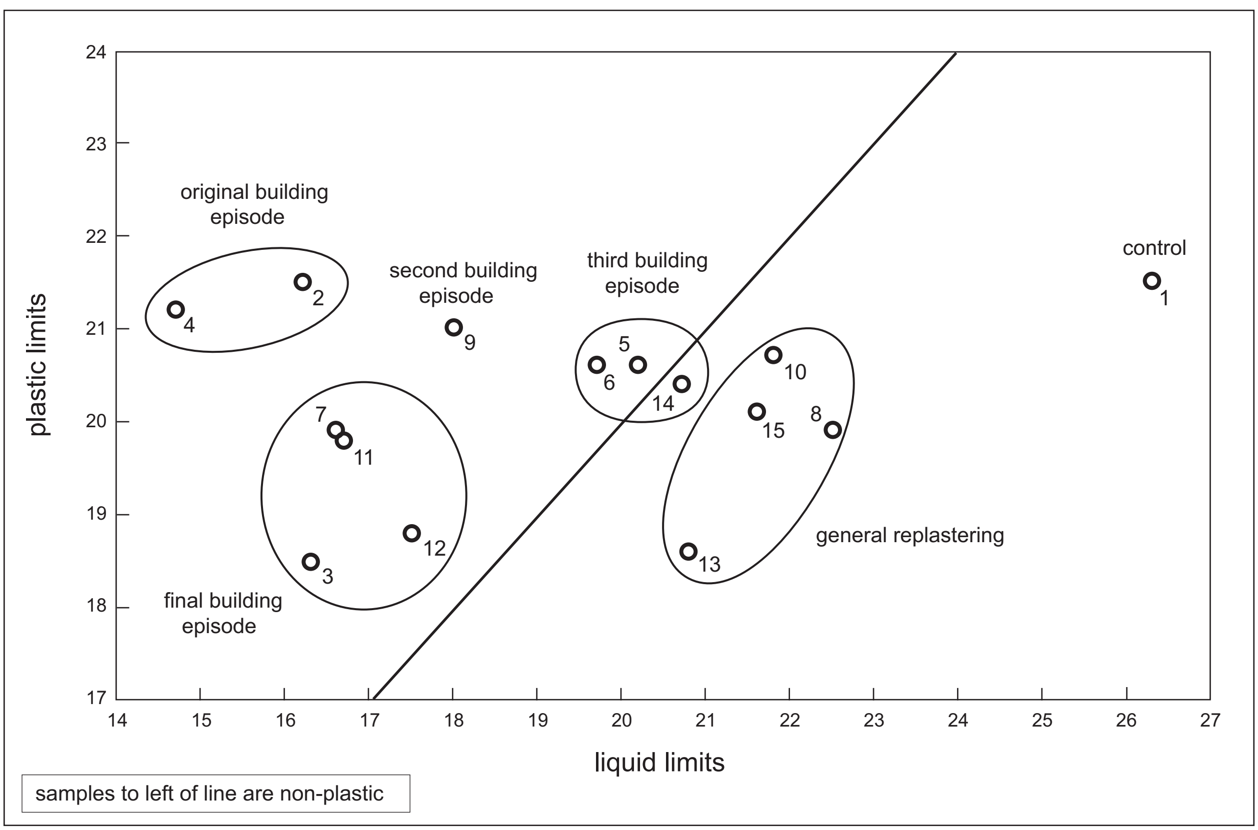

Figure 17-4. Trujillo House adobe plasticity showing construction episodes.

construction sequence of the Trujillo House, the plasticity groups are discussed in more detail below.

Soluble salts. The results of the qualitative tests for soluble salts in seven samples are presented in Table 17-2. The tests show remarkable similarities in these samples. Generally, salts were recorded as absent or only perceptibly present. Sulfates were usually absent. The primary sources of sulfates are calcium sulfate (gypsum) in the soil, and burning hydrocarbons that leave sulfates in the atmosphere (Teutonico 1988:58-59). Because sulfates were not present in Sample 1 from the side of the trash pit, and were only perceptible in the trash-pit floor sample (Sample 11), calcium sulfate is an unlikely source in the three cases where sulfates were present. Only Sample 15 showed a strong sulfate presence. This sample was plaster collected from the west wall of Room 2. Over time, this wall had two different fireplaces; one was dismantled and replaced by the second. The second fireplace faced into the corner from which Sample 15 was collected, and, judging from fireplace construction throughout the house, the first was probably built similarly. It is possible that the continued presence of smoke from the two fireplaces may have resulted in a strong presence of sulfates in the plaster sample. This may also explain the sulfates in Samples 6 and 14, although other plaster samples from the house did not contain sulfates in even perceptible amounts. Teutonico (1988:58) notes that the use of gypsum in construction may introduce sulfates into adobe. Therefore, another source of sulfates may be the gypsum plaster, jaspe. Were this the case, however, sulfates would be expected to be more prevalent throughout the house.

Chlorides usually result from impurities such as sand in the adobe. They were present in samples 11, 12, and 14, and were perceptible in Samples 2 and 3. Sample 11 was from the trash-pit floor and has been identified as adobe. Samples 2 and 12 are from Room 2, Sample 14 was from the wall between Rooms 1 and 2, and Sample 3 was from the hearth floor in Room 3. This may suggest a relationship between the samples from the east wing and the trash-pit adobe, supporting conclusions drawn from sample color and plasticity.

Nitrites most commonly result from rising damp in the walls. The samples were uniformly characterized by perceptible to present amounts of nitrites, expectable because the walls had no footings to separate them from the soil on which they were built. That the nitrite levels were not higher may relate to the high sand content of the soil and the walls, which may have facilitated water drainage away from the walls.

Carbonates showed the most variability among the samples. They were uniformly present and variation occurred in the strength of their presence. Like chlorides, however, carbonates were most strongly present in samples from Rooms 1 and 2 in the east wing of the house, including bricks (Samples 2 and 12) and plaster (Samples 13 and 15). They were also notably present in Sample 11 from the trash-pit floor. Again, this demonstrates that Sample 11 was adobe rather than natural soil, and suggests a relationship between Sample 11 and the east-wing samples.

Plaster Layers

In addition to the materials analyses, the plaster samples were visually inspected to determine the number and thickness of plaster layers and number of jaspe layers. These data are presented in Table 17-3.

Two samples (both were from Room 2) had only one plaster layer. The average thickness of six fragments from the west wall was 13.6 mm, whereas the fragment from the north wall was 22 to 24 mm thick. One jaspe fragment from the west wall had six layers, each less than 0.25 mm thick.

Plaster samples from Rooms 3 and 5 show two plastering episodes, although three fragments suggest the presence of a third plaster layer. The evidence from Room 3 consisted of possible remnants of jaspe on the interior surface of one fragment; the evidence from Room 5 consisted of a thin discontinuous plaster layer on the exterior of one fragment from the south wall, and a third exterior layer on a fragment from the west wall. However, six other fragments from the south and west walls of Room 5 contained only two plaster layers. Consequently, evidence of a third plaster layer is not substantial and may point to incomplete replasterings of those rooms.

Two fragments from Room 7 suggested three plastering episodes. One fragment had three distinct layers; the second had two layers with a remnant of jaspe on the interior surface. The jaspe fragment with six layers from Room 2 was the thickest sample. Most of the plaster samples had no jaspe or only remnants. The remaining jaspe samples had two or three layers.

Interpreting the Results

The potential of adobe materials analysis in archaeological research rests in its ability to provide data relevant to research issues. The adobe material from the Trujillo House has yielded information useful in addressing at least three research questions.

Where Was The Adobe Made?

Comparison of the samples taken from the side and bottom of the trash pit reveals that the samples were very different. This is most obvious in Figs. 17-3 and 17-4, where it can be seen that the trash-pit floor sample was quite similar to adobe samples from the structure. This was also clear from color, particle size, and soluble-salt data. In contrast, the sample taken from the side of the trash pit was a different color than the adobe samples (Table 17-1), had a different distribution of particle sizes (Table 17-1, Fig. 17-2), and a higher plasticity index than both the adobe samples and the trash-pit floor sample (Figs. 17-3 and 17-4). This shows that the control sample from the side of the trash pit was natural soil, while the trash-pit floor sample was actually adobe rather than natural soil.

This is significant for several reasons. First, it identifies the trash pit as an adobe borrow or mixing pit. It seems clear that this feature was initially excavated in order to provide adobe for the house, and that the large hole was subsequently filled with domestic trash. While

Table 17-3. Summary of data for Trujillo House adobe plaster layers.

Sample No.	Layer No.	Thickness (mm)	Jaspe Layers	Comments
8a	1	30-32	-	-
	2	2-3	-	-
	3	3-4	remnant	-
8b	1	3.5-4	remnant	evidence of inner layer of jaspe between layers 1 and 2
	2	2	2	-
9	1	22-24	none	thin layer of oxidation on exterior surface
10a	1	9-14	remnant	evidence of inner jaspe layer
	2	12.5-13	remnants	-
10b	1	14-16	-	-
	2	10-13	none	-
10c	1	10-11	-	-
	2	10-14	-	-
	3?	2-3	none	-
10d	1	16	-	-
	2	16	none	-
12a	1	12-17	-	-
12b	1	7-11	-	-
12c	1	10.5-20	-	-
12d	1	16-25	-	-
12e	1	9.5-11.5	-	-
12f	1	12	-	-
12g	1 (jaspe)	-	6	each jaspe layer less than 0.25 mm thick
13a	1	5-7	remnant	evidence of inner jaspe layer
	2	4-5	3	-
13b	1	5-9	-	-
	2	4-5	2	-
14a	1	25-26	-	-
	2	6-10	none	-
14b	1	6-12	-	-
	2	18-25	remnant	-
14c	1	9-19	-	-
	2	6	-	-
	3	5.5-7.5	2+	-
14d	1	7-10.5	remnant	evidence of inner jaspe layer
	2	4-8	2+	-
			2+	-
			3+	-
			3+	-
			3+	-

this was suspected to be the case, it could not be demonstrated until completion of the adobe analyses.

Second, identification of the borrow pit demonstrates that the Trujillo House adobe was made of local, on-site materials. While this may seem an obvious conclusion, it is significant in that an oral tradition from the Taos area maintains that, while adobe was sometimes made on-site, there are deposits of clay and sand that were and still are considered to be optimal for adobe manufacture. Further, tradition maintains that this "good dirt" was sought by adobe-makers throughout the Taos Valley, indicating a preference for non-local materials and for regional use of materials from specific locations. This kind of regional use is still practiced by those in the Taos area who plaster their interior walls with *tierra blanca*, a micaceous kaolin soil found in a deposit in the foothills south of Taos. However, the "good dirt" deposits are said to be located on the Taos Pueblo Indian Reservation and on private lands, including a land grant, and are no longer widely or generally available. Begrudgingly, Taoseños are now forced to make adobe on-site. It is not currently clear how accurate the tradition is in showing regional use of specific resources, or whether it actually reflects popular dissatisfaction over splitting up of land and the reluctance of landowners to allow access to their lands. It is important to note, however, that analyses of adobe materials from two prehistoric Anasazi pithouses near Taos show the adobe to be different from the soil found on each site (Boyer et al. 1994). This suggests that some material, in this case silt and clay, was transported to the sites. The source of the silt and clay is not currently known. On the other hand, Boyer's (1992) data from the historic Vigíl-Torres site near Taos show that adobe was made from different on-site soil deposits. These data point out the need for a regional approach to collection and analysis in order to assess the use of local versus regional material sources.

How Was The Adobe Made?

Comparison of the adobe samples with the control sample shows that the primary difference between adobe and the natural soil at the Trujillo House was a higher coarse sand content and a lower clay content in the adobe (Fig. 17-2). This suggests that the adobe was made by adding coarse sand to the natural soil. While this served to add larger particles to the mix that might have acted like temper in pottery, its effect was to decrease the relative content of clay, the actual binder in the adobe. This resulted in adobe that was actually weaker than the natural soil due to its high sand and low clay content. This weakness is reflected in the plasticity of the samples (Table 17-2; Figs. 17-3 and 17-4). Whereas the natural soil (Sample 1) had a positive albeit low plasticity index, the plasticity of the adobe was consistently lower and even negative, demonstrating that the adobe from the site was essentially nonplastic. Interestingly, in each case where plaster and brick samples from the same room were analyzed, the plaster had a higher plasticity index than the brick, the result of higher fine-particle content. This suggests that the plaster was slightly stronger than the bricks.

The exception to the procedure of adding coarse sand to the adobe was found in the hearth sample from Room 3. In this case, the amount of coarse sand in the adobe was actually lower than that found in the natural soil, whereas the amount of fine sand was higher. This suggests that the adobe used to replaster the hearth was made by adding fine sand to the mix. While this probably contributed to a finer, smoother plaster, it still decreased the clay content.

There is evidence of historical continuity in making weak adobe in the Abiquiú area. In 1982, the New Mexico Bureau of Mines and Mineral Resources published the results of a survey of modern commercial *adoberos* (adobe-makers) in New Mexico (Smith 1982). The survey included several tests of sample bricks. Among the traditional adoberos, whose bricks were tested for compressive strength, modulus of rupture, water absorption, and moisture content, was one adobe yard in Abiquiú. While the Uniform Building Code (New Mexico State Building Code) requires an average compressive strength of 300 psi, the adobes from Abiquiú averaged only 196 psi. Of the 47 other adobe-makers whose bricks were tested, only three provided samples with lower compressive strength, and two of those samples had been damaged en route to the testing facility. Clearly, the sandy soils of the Abiquiú area are not conducive to making strong adobes.

What Was The Construction Sequence Of The Trujillo House?

Wall thicknesses indicate that, rather than being constructed as a single building, the Trujillo House grew as a series of units over a period of time. Rooms 1 and 2 constitute one unit. The wall separating these rooms was made of bricks laid end to end so that it was narrower than the exterior walls, which were made of bricks laid side to side. Further, the wall between the rooms directly abuts the exterior walls rather than being bonded into them.

Rooms 3, 4, and 8 also constitute a single unit. The walls surrounding these rooms were thick exterior walls, including the wall separating Room 3 from Room 2. As with Rooms 1 and 2, it appears that a large room was built, and then subsequently divided by narrow interior walls. In this way, Rooms 3 and 8 were separated from Room 4. This is supported by wall abutment patterns, in which plaster on the south wall of Rooms 3, 4, and 8 continued behind the abutments of walls separating the rooms. In addition, the adobe floor continued under the two dividing walls.

Room 5 was added to the west end of the Room 3, 4, and 8 block as a single unit. The wall between Rooms 8 and 5 was a thick exterior wall and there was no continuity of plaster or floor between the rooms as there was in Rooms 3, 4, and 8. Rooms 6 and 7 were apparently built as a single unit and subsequently subdivided, as there was no continuity between Rooms 5 and 6 and the Room 6 floor was significantly lower than the floor of Room 5. However, plaster on the west walls of Rooms 6 and 7 was continuous behind the abutting wall separating them, and the dividing wall was narrower than the surrounding exterior walls.

Though it is clear that the structure grew by accretion, the actual sequence was difficult to discern because natural deterioration of the adobe meant that some wall abutments, particularly those on the outside of the structure, were obscured. For instance, it was clear that a thick exterior wall separated the Room 1 and 2 unit from the Room 3, 4, and 8 unit, but whether it was first the east wall of Room 3 or the west wall of Room 2 was not clear.

In order to address the issue of the construction sequence, the results of adobe analyses were subjected to statistical manipulation to search for significant associations of material characteristics and proveniences. Four variables were included for each sample: sample number (which was tied to specific provenience), liquid limit, plastic limit, and percent of total sample passing given millimeter increments (particle size distribution). A major obstacle to quantitative analysis was the fact that the ranges of data values were so small that standard approaches to statistical analysis utilizing linear relationships failed to reveal significant associations. Because we were looking for any correlation of material characteristic to sample number and thereby to provenience, we employed a commercial machine-learning program called IXL. Using an artificial intelligence algorithm that recognizes fuzzy, or inexact, non-linear relationships, the program builds rules that describe data relationships using correlation coefficients. Not surprisingly, many of the rules that were generated concerned rather obvious correlations such as "Sample=3 IF Liquid Limit >16.25 and <16.3." These types of rules simply describe the samples. We expected the strongest correlation to be between sample provenience and particle size distribution, because we assumed that particle sizes would most uniquely describe each sample. Instead, however, liquid and plastic limits were much more strongly associated with sample number and provenience. The reason for this appears to lie in the differing relative frequencies of smaller particles (silt and clay) in the samples. Figure 17-5 shows that the sand profiles of the samples are strikingly similar. There is little variation in the sand content of the samples. The silt and clay profiles (Fig. 17-6), on the other hand, show definite variation between samples. Since plasticity is largely determined by the content of smaller particles that bind together relative to the content of larger particles (sands and gravel), variation in silt and clay particles relative to sand content probably accounts for differences in plasticity seen in Fig. 17-4.

Generation of rules of correlation involving liquid and plastic limits and sample number-provenience resulted in the scatter plot in Fig. 17-4, in which four clusters of samples were defined. One included plaster samples from Rooms 2, 5, and 7. In fact, plaster samples from Rooms 2 and 5 were virtually identical, even though they were from opposite ends of the house. Sample 13, which was plaster from Room 1, can be included in this cluster because it was within the acceptable margin of error for plastic limits. Another cluster included brick samples from the wall separating Rooms 1 and 2, and from Rooms 5 and 7, again showing an association between these rooms at either end of the house. A third cluster included bricks from Rooms 2 and 4 in the center of the house; the fourth included plaster from the fireplace in Room 3, bricks from Rooms 2, 4, and 8, and the sample from the bottom of the trash pit. In fact, the trash-pit floor sample and the brick sample from the wall separating Rooms 4 and 8 were almost identical. Samples 3 and 12 were included by virtue of their being within the margin of error for plastic limits. Samples 1 and 9 did not fall within the four clusters or groups and, therefore, constitute separate groups.

Table 17-4 compares the six groups defined by plasticity with those defined by examinations of color, particle size, and soluble salts. A group containing Samples 2 and 4 was suggested by plasticity, color, and particle size data. A group consisting of Samples 5 and 6 was suggested by plasticity, color, particle size, and soluble salts data. Adding Sample 14 to this group was justified on the basis of plasticity and particle size data. Soluble salts placed Sample 14 in a different group, but it was actually very similar to Sample 6. Although it was also in a different color group, Sample 14 should be grouped with Samples 5 and 6.

A group containing Samples 7 and 11 was suggested by plasticity, color, and particle size data. The addition of Sample 12 to this group can be justified by plasticity and particle size data. Adding Sample 3 to this group can be justified by plasticity and color data. Therefore, a group containing Samples 3, 7, 11, and 12 is supported by plasticity, color, particle size, and soluble salts data. Only Sample 7 differed in soluble salts, which may be

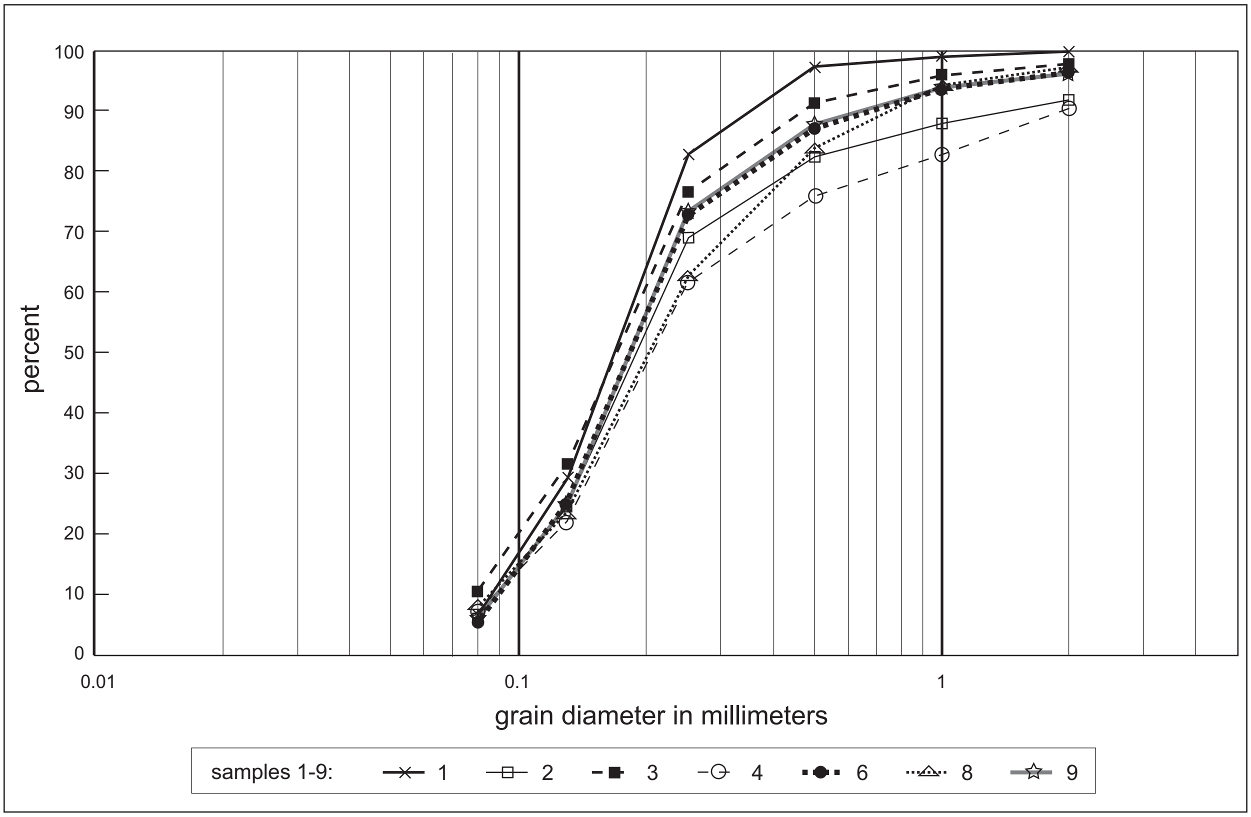

Figure 17-5a. Trujillo House adobe sand profiles: samples 1-4, 6, 8, 9.

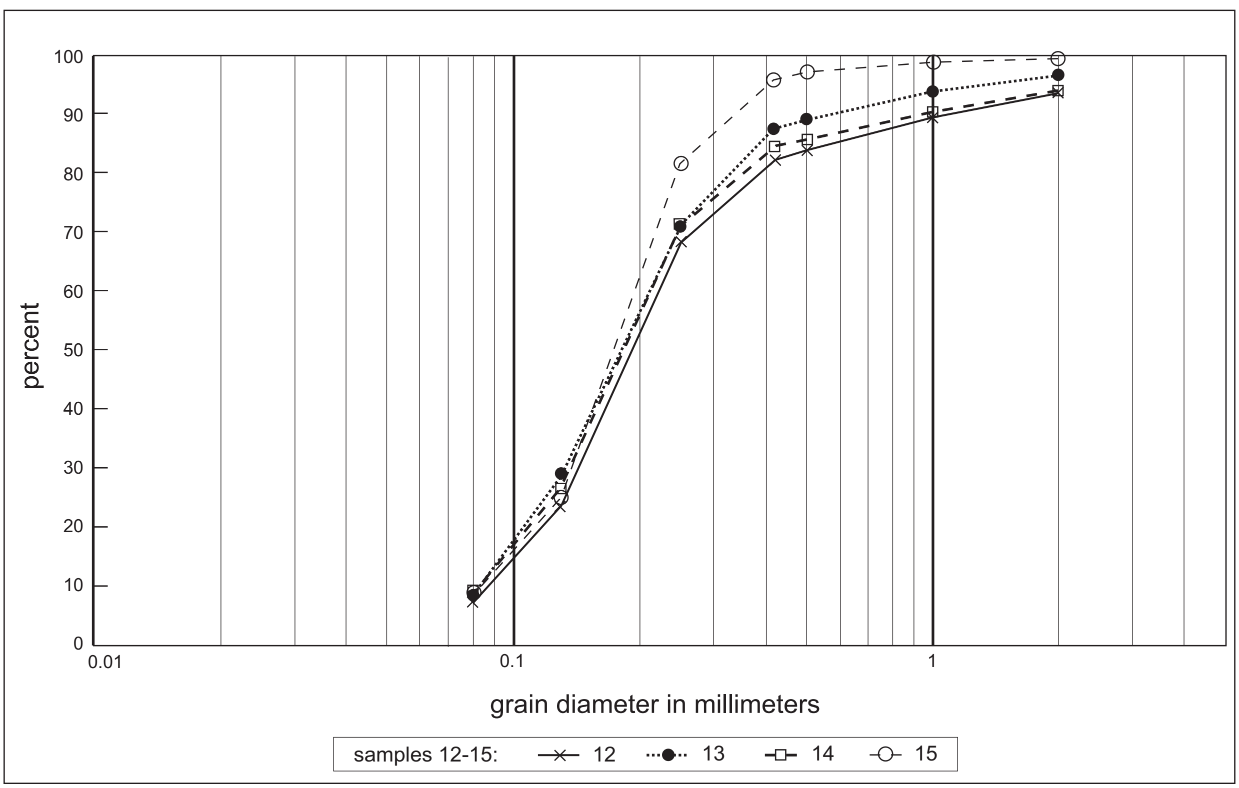

Figure 17-5b. Trujillo House adobe sand profiles: samples 12-15.

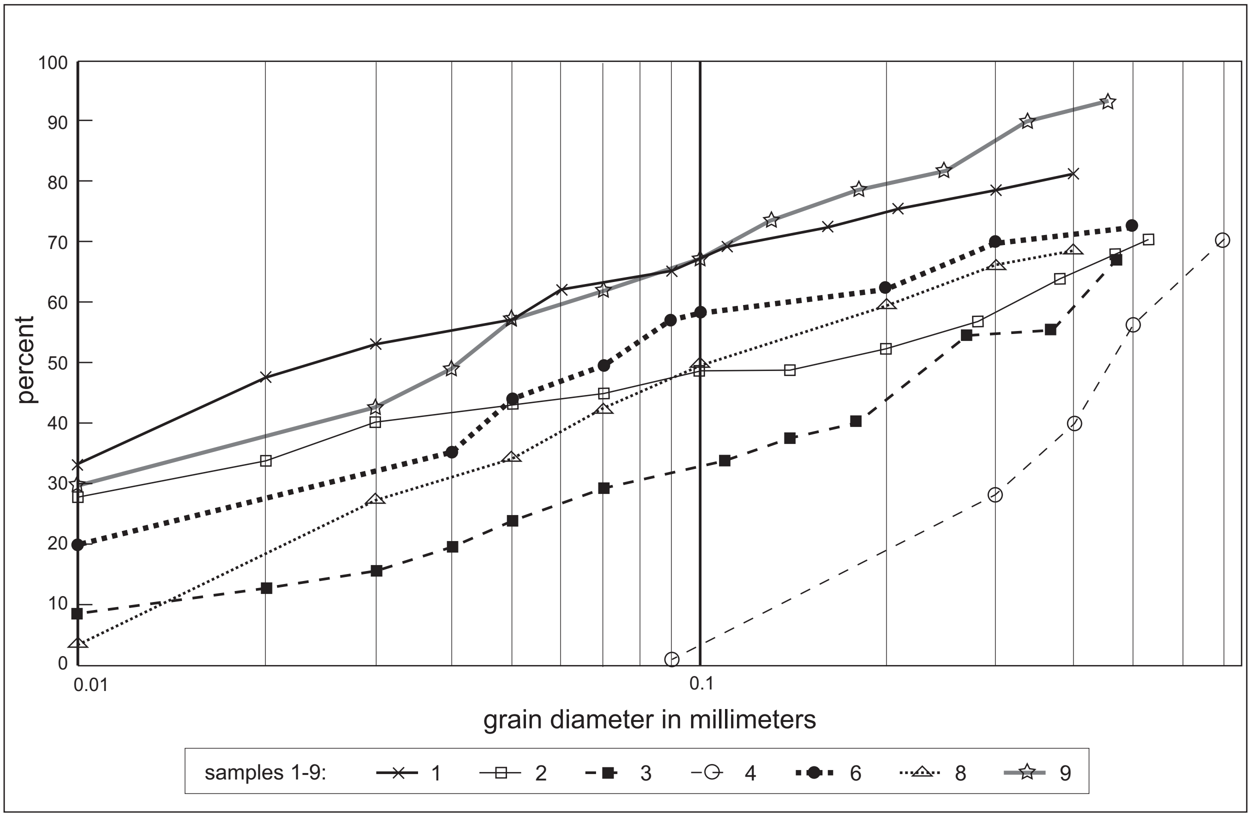

Figure 17-6a. Trujillo House adobe silt/clay profiles: samples 1-4, 6, 8, 9.

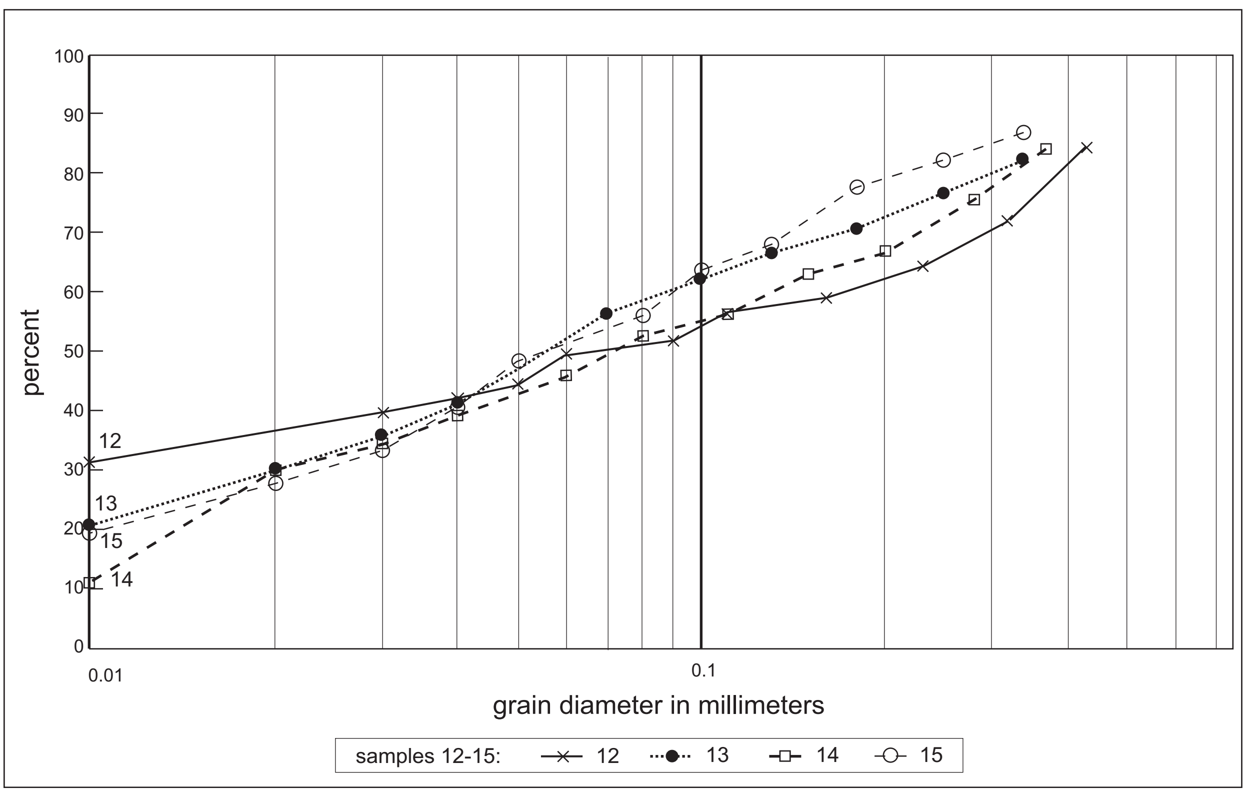

Figure 17-6b. Trujillo House adobe silt/clay profiles: samples 12-15.

Table 17-4. Trujillo House adobe groups as defined by different analytical techniques.

Sample No.[1]	Group No. by Analytical Technique			
	Plasticity	Color	Particle Size	Soluble Salts
1	1	3	3	-
2	2	3	2	1
4	2	3	2	2
9	3	2	2	-
5	4	1	2	2
6	4	1	2	2
14	4	2	2	1
3	5	2	1	1
7	5	2	2	2
11	5	2	2	1
12	5	3	2	1
8	6	2	2	2
10	6	2	2	-
13	6	2	2	1
15	6	1	1	1

[1]Sample numbers are arranged according to group numbers as defined by plasticity.

the result of its being from an interior wall built on a floor rather than on the natural soil. A group containing Samples 8, 10, and 13 is suggested by plasticity, color, and particle size data. Variation in soluble salts might result from samples being plaster rather than brick; plaster is more variably susceptible to groundwater percolation. Adding Sample 15 to this group can be justified by its similarity to Sample 13 in plasticity and soluble salts. Samples 1 and 9 remained separate from these groups and from each other.

We can see, then, that the groups defined by statistical analysis of plasticity data are supported by the other analytical results. Using wall thickness and abutment data and the results of material analysis, we can postulate the following sequence for construction of the Trujillo House. Rooms 3 and 4 were the original house, and were subdivided at an unknown time. Later, Rooms 1 and 2 were built as a single room on the east end of the house. This is in keeping with traditional Hispanic building methods and house construction (Bunting 1964:4-5). The room was not connected to the original house by a doorway, suggesting that it was meant to be a separate addition, perhaps used by a married son as a home for his family. The dismantled banco in Room 1 and a dismantled fireplace on the west wall of what is now Room 2 (not shown in Fig. 17-1) may have been original features of this large room. Next, Rooms 5, 6, and 7 were built on the west end of the house. Again, since they were not connected by door to the original house, they were a separate unit, perhaps representing another family. Rooms 6 and 7 were built as one room that was later subdivided (exactly when is unknown). Rooms 1 and 2 were divided at the same time that the west unit was built, as demonstrated by Sample 14, which is similar in composition to bricks from Rooms 5 and 7. Perhaps it was at this time that the banco in Room 1 was dismantled and a new fireplace was built in that room. A final building episode is represented by Samples 3, 7, 11, and 12. At this time, Room 4 was divided into Rooms 4 and 8, the first fireplace in Room 2 was dismantled, the wall repaired and a new fireplace built, and the fireplace in Room 3 was remodeled or at least replastered. Because this episode included adobe from the trash pit, it may be possible to date it. As discussed in the description of Euroamerican artifacts from this site (see Chapter 11), materials discarded in the trash pit probably date after 1880. This implies that the pit was dug not long before this time, as it is unlikely that a pit 1.6 m deep would be left open for long. It can, therefore, be postulated that the final building episode dated to the last 15 to 20 years of the site's occupation.

This was not, however, the last work to be done on the house. Room 1 was again remodeled when the corner fireplace was dismantled and a new, large fireplace was built. Also, a cluster of plaster samples (8, 10, 13, and 15) suggests a general replastering of the structure.

CONCLUSIONS

Analyses of adobe building materials have yielded significant information on construction processes at the Trujillo House. The analyses demonstrate that adobe was made on-site using local materials. Suspicions that a large trash-filled pit was originally an adobe borrow or mixing pit were confirmed, clarifying the identification of the feature and providing information on processes of site formation.

The natural soil at the Trujillo House is not well suited to making adobe, though it falls within modern construction standards. If the Trujillos had used the natural soil alone, the adobe would have been stronger. By adding sand, however, probably as a binding material like temper in pottery, they actually decreased the relative clay content of the soil, making it weaker and nonplastic.

Finally, these analyses revealed the construction sequence of the house by providing data that, when linked with artifact studies, allow dates to be assigned to construction episodes and to portions of the structure. As a consequence, the growth of the house from its original one or two rooms to its final eight is better understood.

These data are important in themselves with specific reference to the Trujillo House, but they raise questions about material use and site formation processes that require a regional perspective. What were the quarry sources for jaspe? If the use of jaspe represented regional use of a specific material, why did the adobe reflect use of on-site materials? Were there no regional sources for better adobe soil, or was adobe—perhaps because of the large amount needed for construction, and labor and transport costs—made on-site, whereas decorative materials such as jaspe or tierra blanca were collected selectively? What was the average size of a family dwelling from the nineteenth century? Were there differences between town dwellings and those on farms or ranches? How did dwelling size reflect length of occupation? What was the relationship between dwellings and other features at a site? Analyses of adobe materials have shown their potential for resolving site-specific issues. A body of regional data will show their utility in addressing regional issues.

CHAPTER 18

HISPANIC HOMESTEADS AND VILLAGES
EUROAMERICAN ARTIFACTS FROM THE TRUJILLO HOUSE AND LA PUENTE

JEFFREY L. BOYER

INTRODUCTION

Analysis of Euroamerican artifacts from the Trujillo House and La Puente focused on two goals: determining the dates of sites and site features, and studying variation in artifact function within and between sites. Euroamerican artifacts are particularly suitable for dating sites and site features because changes in physical characteristics resulting from changing design styles or manufacturing technologies are often well dated. This means they can be used to establish assemblage dates with relatively great precision and accuracy and, thus, to establish dates for sites and site features. No chronometric samples were collected from the Trujillo House and, although the site can be roughly dated from historic documents, accurate dating relies on the Euroamerican artifacts. Analyses yielded interesting and unexpected results, suggesting significant time lag in artifact availability or deposition. Radiocarbon samples from La Puente revealed that the site has Spanish Colonial and later deposits, confirming information from historic documents. However, radiocarbon dates were not accurate enough to date individual features with certainty. When radiocarbon dates are combined with chronological data from the Euroamerican artifacts, features can be dated much more accurately. The results show that four features date to the late Spanish Colonial period. Two other features and scattered subsurface deposits date to the late Mexican Territorial period, while four features date to the American Territorial period. Using these data, we can describe and compare assemblages from each period at the site, an exercise that would be impossible without the chronological accuracy available from Euroamerican artifacts.

The study of artifact functions is important both for describing assemblages in behavioral terms and for investigating relationships between intra- and intersite functional variation and issues of economic scaling and market access. Different approaches are taken in this discussion. Both Hardesty (1980-81) and F. Levine (1992) are adamant in asserting that the household is the most appropriate unit for studying economic and social change in frontier settings. For the Trujillo House, we describe the Euroamerican assemblage in some detail and compare it with other late American Territorial household assemblages, both by itself and in combination with native artifacts. These data show that there are significant differences between roughly contemporaneous assemblages from various parts of New Mexico. While this should come as no surprise, it raises questions of economic scaling, market access, and ethnic or cultural variability in selection, use, and discard of native and Euroamerican items. La Puente was a village site, and the excavated deposits reflected community trash disposal. While households were obviously involved in this activity, it was not possible to distinguish individual household trash in the features. Therefore, we cannot appropriately compare the Euroamerican assemblage from this site with those of households. However, because we can distinguish features by time period, we can define and compare assemblages through time.

THE TRUJILLO HOUSE: A HISPANIC HOMESTEAD

Artifact and Site Chronology

Of 1741 Euroamerican artifacts recovered from the Trujillo House, 864 (49.6 percent) were datable. These artifacts come from two contexts, the house and the trash pit, and yielded dates ranging from 1750 to the present. The history of the site demonstrated, however, that this range was far too broad to accurately reflect its occupation. As discussed in the history of the site, exact dates for construction and abandonment of the house were not available. Tentative construction and abandonment dates of ca. 1840 and 1894 have been assigned based on historical information. These dates provided a median historic date (South 1977:220) of 1867 for the site. South's (1977:217) Mean Ceramic Date formula was used to determine mean dates for all datable artifacts, both as an assemblage and by material groups. The 864 datable artifacts provided a mean artifact date of 1879.3, which is 12.3 years after the median historic date. The minimum range within which all datable artifacts could fall was 1840 to 1930. If 61 post-1930 glass fragments, which were road trash and clearly post-abandonment, are removed from the datable sample, the minimum date range is 1840 to 1920, and a mean artifact date of 1873.7 is obtained. The difference between this date and the median historic date is 6.7 years, one-half the previous difference. This is comparable to differences observed by South (1977:260), though 6.7 years is larger than most of his figures. In part, this may be due to the use of a wide variety of artifacts to obtain the mean artifact date, while South relied on ceramics. The ceramic artifacts from the Trujillo House had the earliest dates and the longest periods of availability. In fact, the mean ceramic date is 1860.1, which is 6.9 years earlier than the median historic date. The mean dates of other material groups are later than the median historic date, and change the mean artifact date by making it earlier than the median historic date. Figure 18-1 is a graph showing the percentage of datable artifacts from each period after removing the post-1930 glass fragments. The mean artifact date of 1873.7 and the minimum date range of 1840 to 1920 are also shown.

Figure 18-1 indicates that the artifact dates span the second, third, and fourth quarters of the nineteenth century. While these are the years of occupation for the Trujillo House, the artifact dates do not pinpoint the time of construction. In fact, the artifact dates appear to be more directly related to historical events than the occupation of the site. The graphs show increases in datable artifacts at about 1820, the year before the opening of trade with the United States, and 1880, the year that the AT & SF railroad was opened to Lamy and Albuquerque. The probable construction date around 1840 is masked by the presence of artifacts that could date to any time after 1820. However, 1840 is the earliest date of the minimum range.

Concerning the abandonment date of the site, the graphs are more consistent with historical information in that there is a significant decrease in the percentage of datable artifacts at 1900. Numerous temporally diagnostic changes in several kinds of Euroamerican items occurred around the turn of the twentieth century. The graphs show that those changes were not represented in significant quantities in the Trujillo House assemblage, indicating abandonment before 1900. Consequently, Fig. 18-1 shows the abandonment situation clearly. Most of the post-1900 dates in Fig. 18-1 were from artifacts that could also date before 1900. In fact, only five post-1900 dates were from artifacts definitely made after 1900, and were “honey” or “amber” selenium glass fragments dating to the 1920s. If they are deleted from the sample, the minimum date range narrows from 1840 to 1920 down to 1840 to 1885, and the mean artifact date drops to 1873.2. The significant decrease in datable artifacts at 1900 does not change, however.

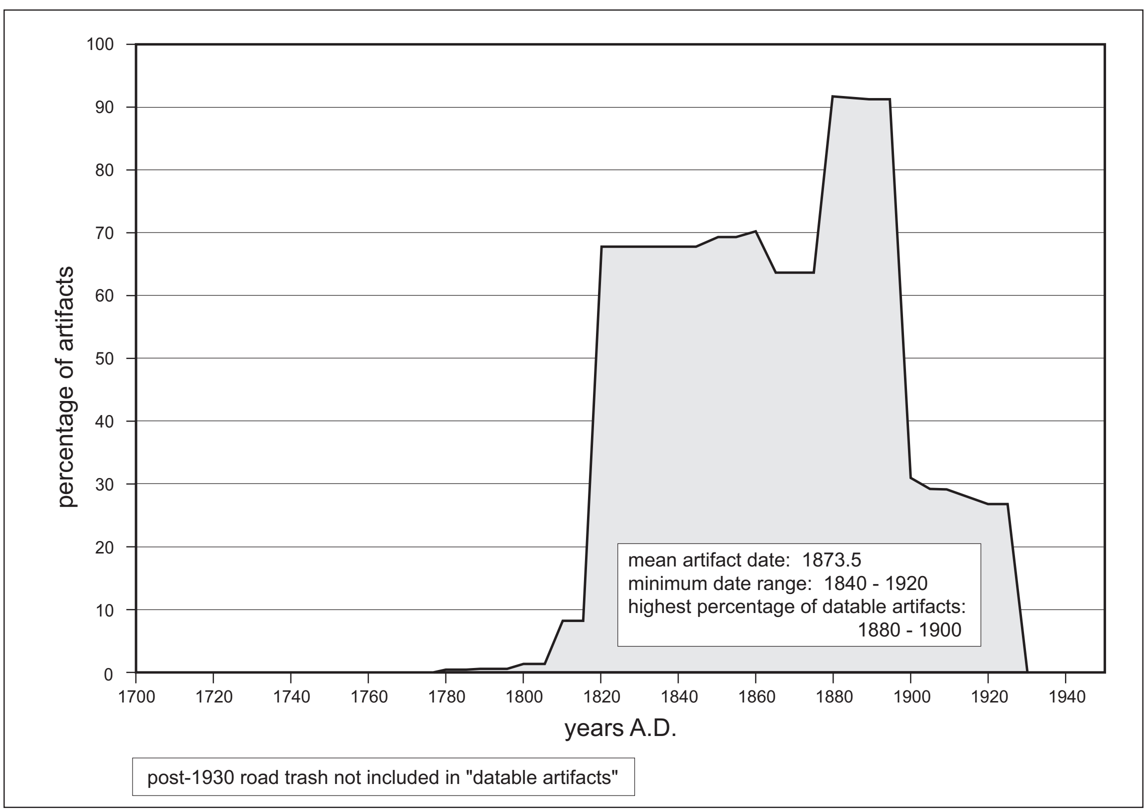

Figure 18-1. Percentage of datable artifacts from the Trujillo House for each 5-year period between 1700 and 1950, post-1930 road trash artifacts eliminated.

Structure 1, the house, appeared to have been cleaned out at or after abandonment. The datable artifacts from the house were primarily from the surface and from natural, post-abandonment strata in the rooms. The midden, on the other hand, yielded artifacts from strata of definite cultural origin. Table 18-1 lists mean artifact dates for each of the six strata in the midden. The average of the six mean artifact dates is 1866.15, which is 0.85 years or 10.2 months earlier than the median historic date. Mean artifact dates for Strata 11 through 15 are clustered between 1862 and 1865, two to five years before the median historic date.

Stratum 16, on the other hand, has a mean artifact date much later than the median historic date. To investigate this, the composition of the strata was studied by calculating the number of artifacts in each material group for each stratum. That information in presented in Table 18-2. Strata 12 and 15 were similar to the overall pattern in that ceramic artifacts are most numerous, followed by metal, glass, and miscellaneous. Ceramic artifacts were also most numerous in Strata 11 and 14, but in these strata are followed by glass, miscellaneous, and metal. Ceramic artifacts were the second most common category for Stratum 13. Stratum 16 differed significantly from the others, with glass being the most common artifact type, followed by miscellaneous, metal, and ceramics. Because the ceramic artifacts have the earliest dates (see discussion below), strata with lower ceramic counts will have later dates.

If the mean artifact date for Stratum 16 is removed from Table 18-1, the mean artifact date becomes 1863.3, and the difference between this date and the median historical date becomes 3.7 years. This shows a tight cluster of mean artifact dates for the five upper midden strata.

Figures 18-2 through 18-7 show artifact date graphs for the six midden strata. Like the site graph (Fig. 18-1), the midden graphs show significant changes that appear to be associated with opening of the Santa Fe Trail, the completion of the railroad, and abandonment of the site. Strata 11, 12, 14, and 15 most resemble each other in showing few significant changes between 1820 and 1880. Stratum 13 shows a series of smaller changes in those intervening years.

Stratum 16 is unlike the others in that is shows a series of step-like changes in artifact percentages starting in 1795. Unlike the other strata, the largest single change in Stratum 16 comes not at 1820 but at 1880, suggesting that earlier historical events had considerably less influence on the assemblage from Stratum 16 than did completion of the railroad.

This implies that Stratum 16 may date to around or after completion of the railroad between 1880 and 1881. This is consistent with the stratum's mean artifact date of 1880.3. If so, then Strata 11 through 15 should be even younger. In order to check this, mean artifact dates for these strata were revised by removing the ceramic dates, since the ceramic artifacts were consistently older than those from other material groups (see below). Table 18-3 shows the revised mean artifact dates for each stratum in the midden. While ascending dates are not evident in the strata, it is apparent that without the sherds the mean artifact dates are all post-1880. If Stratum 16 dates to around 1880, then the midden dates to after 1880 and is one of the youngest features of the site. Note that the lat-

Table 18-1. Mean artifact dates for the Trujillo House midden strata, and differences between mean artifact date and median historic date.

Stratum	Mean Artifact Date	Relative Difference of Median Historic Date to Mean Artifact Date
11	1862.0	-5.0 years
12	1863.2	-3.8 years
13	1865.1	-1.9 years
14	1862.0	-5.0 years
15	1864.3	-2.7 years
16	1880.3	+13.3 years
Average	1866.2	
Total difference		-5.1 years
Mean of difference		0.85 years

Table 18-2. Artifacts per midden stratum by material groups for the Trujillo House.

Stratum	Ceramic	Glass	Metal	Misc.	Total - Row %
11	186 62.6% 45.9%	55 18.5% 33.3%	26 8.8% 13.1%	30 10.1% 24.0%	297 - 33.2%
12	41 33.1% 10.1%	31 25.0% 18.8%	35 28.2% 17.6%	17 13.7% 13.6%	124 - 13.9%
13	64 28.2% 15.8%	29 12.8% 17.6%	93 41.0% 46.7%	41 18.1% 32.8%	227 - 25.4%
14	80 55.9% 19.8%	23 16.1% 13.9%	13 9.1% 6.5%	27 18.9% 21.6%	143 - 16.0%
15	31 41.3% 7.7%	16 21.3% 9.7%	26 34.7% 13.1%	2 2.7% 1.6%	75 - 8.4%
16	3 10.7% 0.7%	11 39.3% 6.7%	6 21.4% 3.0%	8 28.6% 6.4%	28 - 3.1%
Total Column %	405 45.3%	165 18.5%	199 22.3%	125 14.0%	894 100.0%

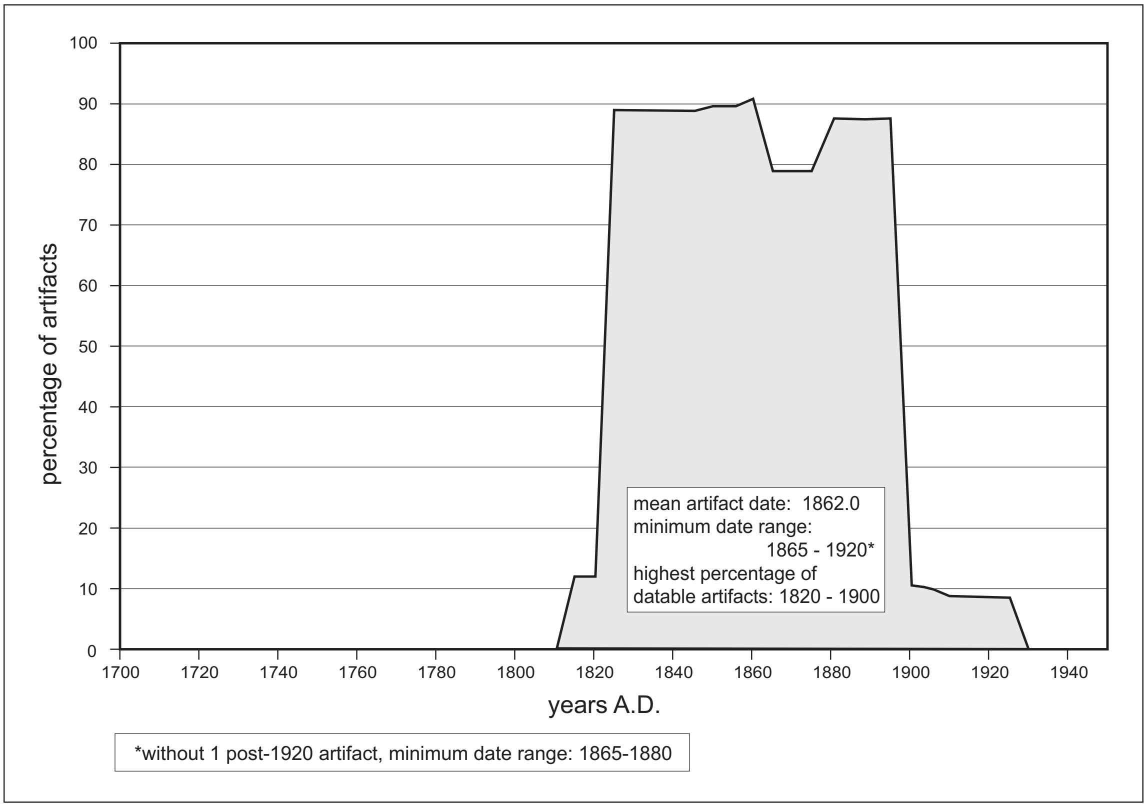

Figure 18-2. Percentage of datable artifacts from midden Stratum 11 at the Trujillo House for each 5-year period between 1700 and 1950.

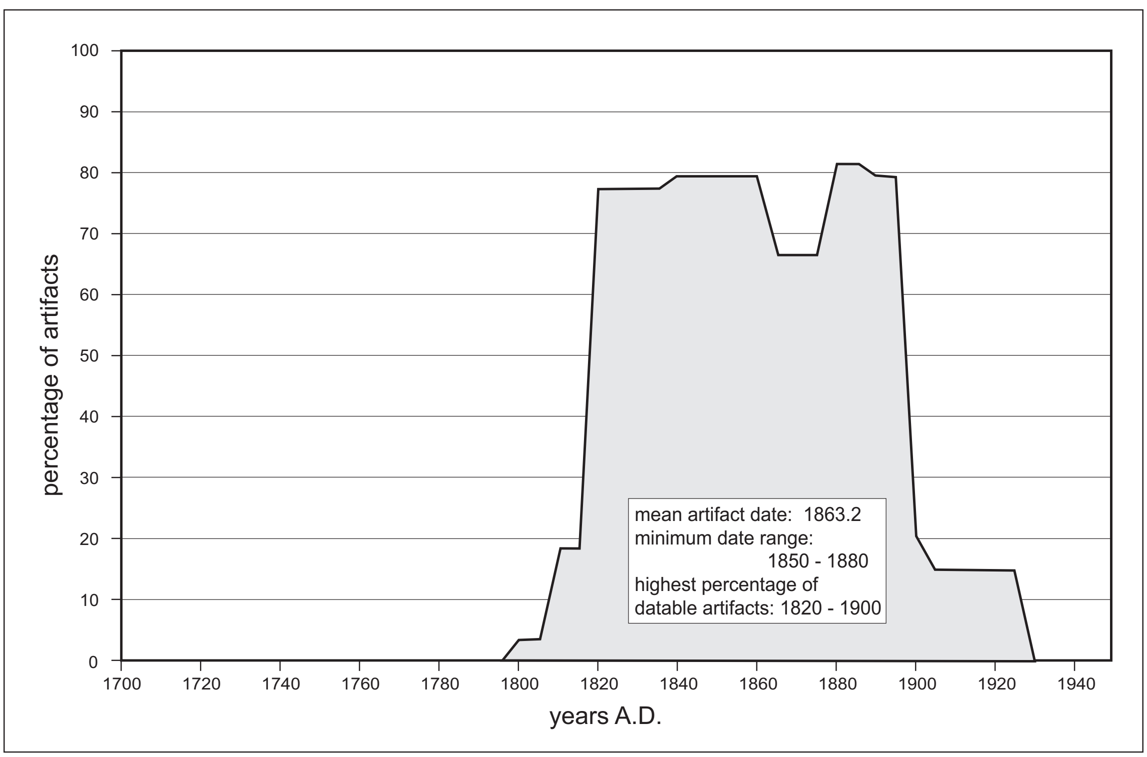

Figure 18-3. Percentage of datable artifacts from midden Stratum 12 at the Trujillo House for each 5-year period between 1700 and 1950.

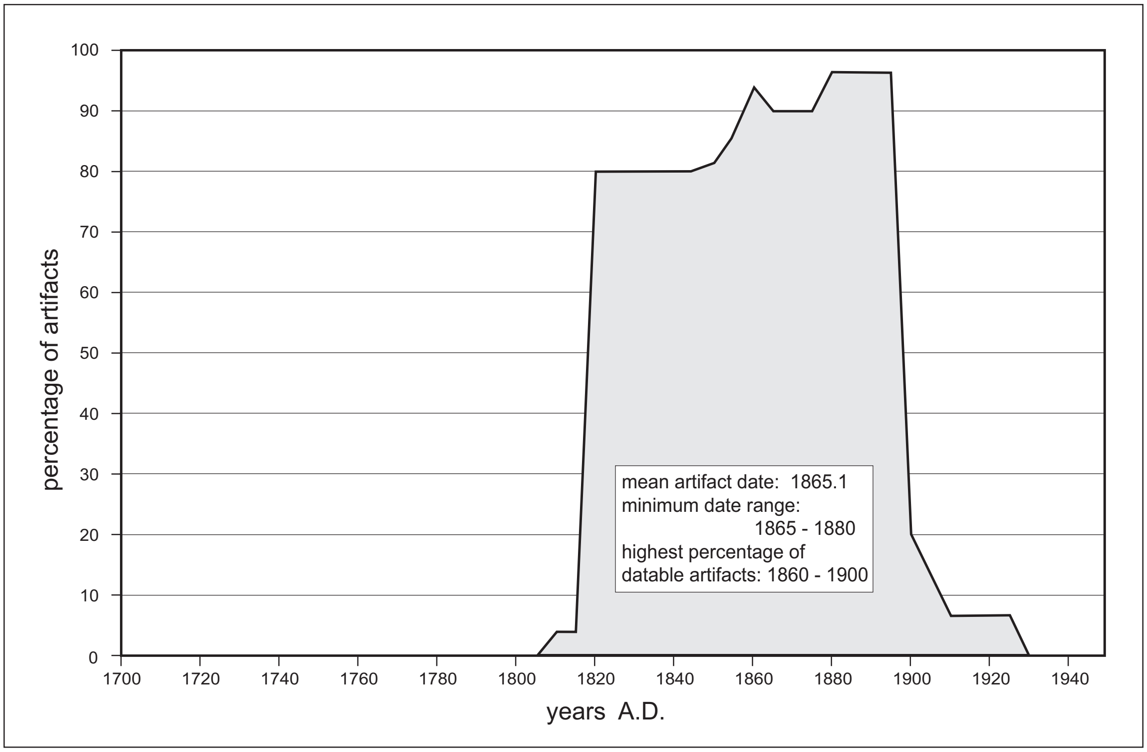

Figure 18-4. Percentage of datable artifacts from midden Stratum 13 at the Trujillo House for each 5-year period between 1700 and 1950.

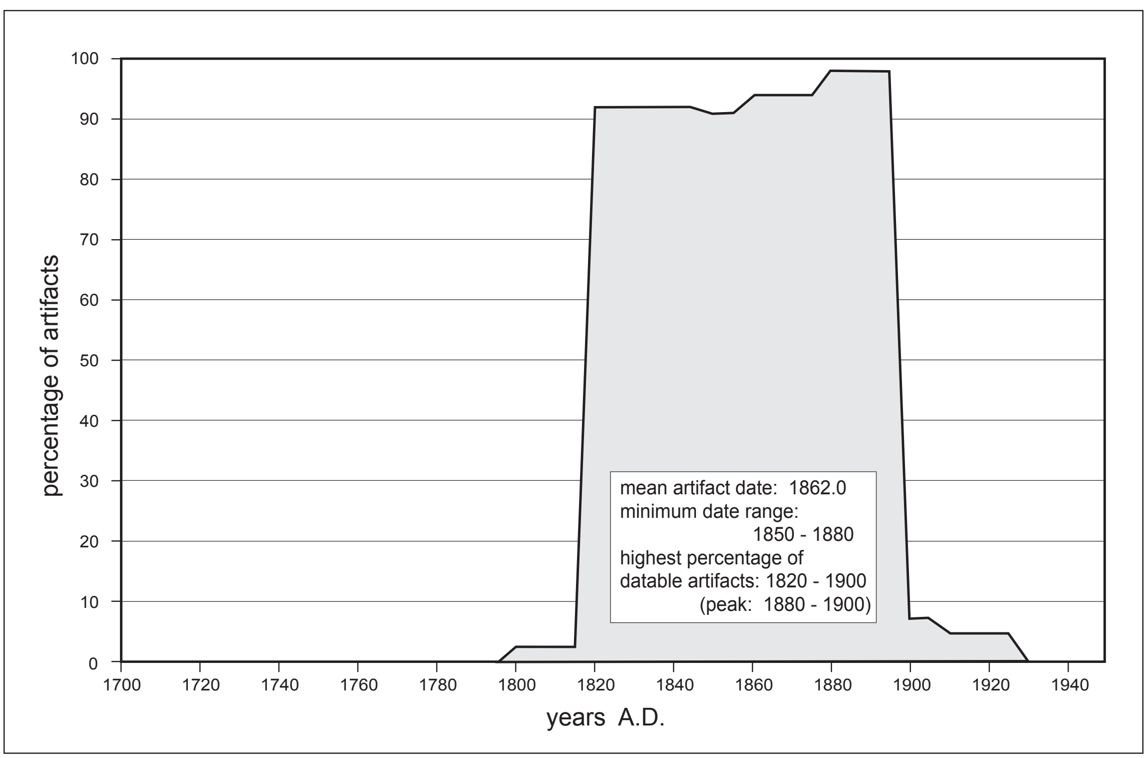

Figure 18-5. Percentage of datable artifacts from midden Stratum 14 at the Trujillo House for each 5-year period between 1700 and 1950.

Figure 18-6. Percentage of datable artifacts from midden Stratum 15 at the Trujillo House for each 5-year period between 1700 and 1950.

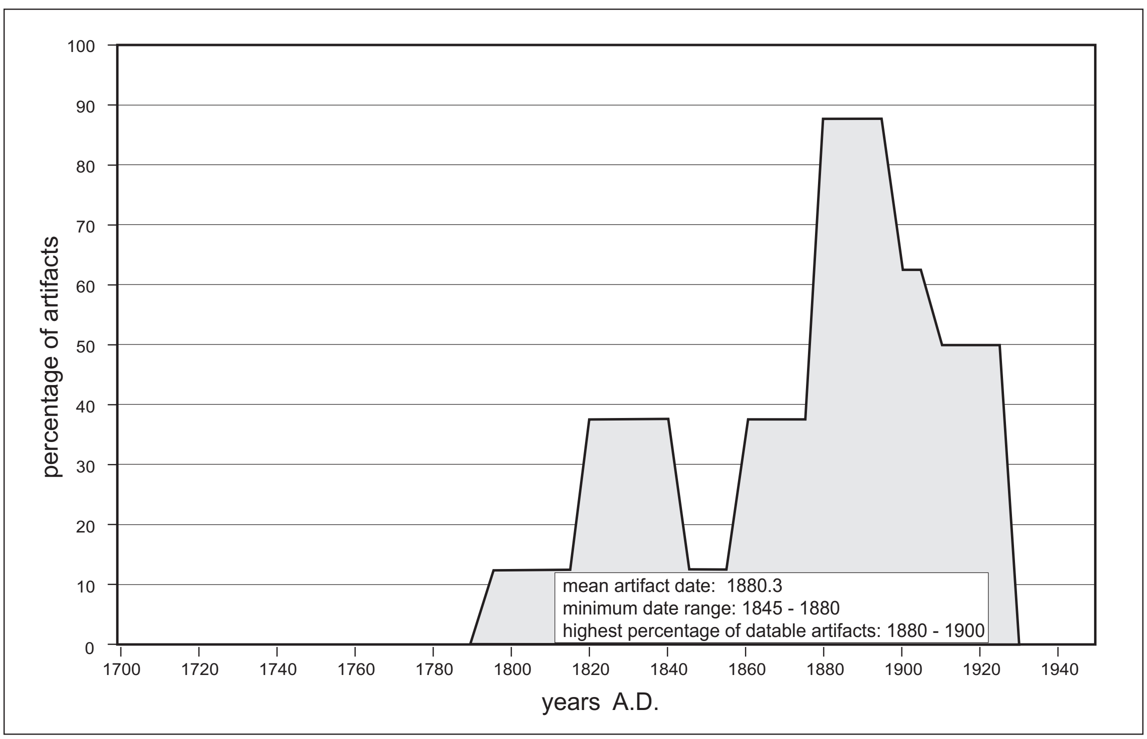

Figure 18-7. Percentage of datable artifacts from midden Stratum 16 at the Trujillo House for each 5-year period between 1700 and 1950.

est revised artifact date is 1902, supporting the abandonment date of ca. 1900. Since the site was apparently abandoned just before 1900, the midden strata must have been deposited in a short amount of time. The location of earlier trash disposal areas is not known, but other midden areas must have existed if the site dated from the 1840s.

This has significant implications for dating the beginning of the site occupation. It was stated earlier that the Euroamerican artifacts dated to the second, third, and fourth quarters of the 1800s and that, though the historical construction date of around 1840 is masked by artifacts available after 1820, the earliest date in the minimum date range is 1840. However, most of the datable artifacts from the site are actually from the midden. Therefore, our site dates are based on artifacts from a feature that probably dates to the last 15 to 20 years of the site's occupation. Consequently, we cannot conclude from Fig. 18-2 that the Euroamerican artifacts point to construction in the second quarter of the nineteenth century. It is important in this light to observe that the highest percentage of artifacts in Fig. 18-2 could date to the two decades between 1880 and 1900, while considerably fewer could date to after 1920. This supports our contention that the midden dates to between 1880 and 1900. As we discuss below, this also has important implications for assessing time lag in market access. Therefore, on the basis of the datable Euroamerican artifacts, we can actually say only that the site was occupied between 1880 and 1900.

Figure 18-8 shows differences in the number of artifacts from each material group in the midden strata, expressed as percentages of the artifacts from each group. Two trends are evident. One is a general increase in the number of artifacts in each stratum from the bottom to the top of the midden. There are minor increases and decreases within material groups, but the trend is

Table 18-3. Revised mean artifact dates from the Trujillo House midden strata, ceramic dates deleted.

Stratum	Mean Artifact Date
11	1902.0
12	1884.7
13	1889.8
14	1895.4
15	1900.2
16	1901.4

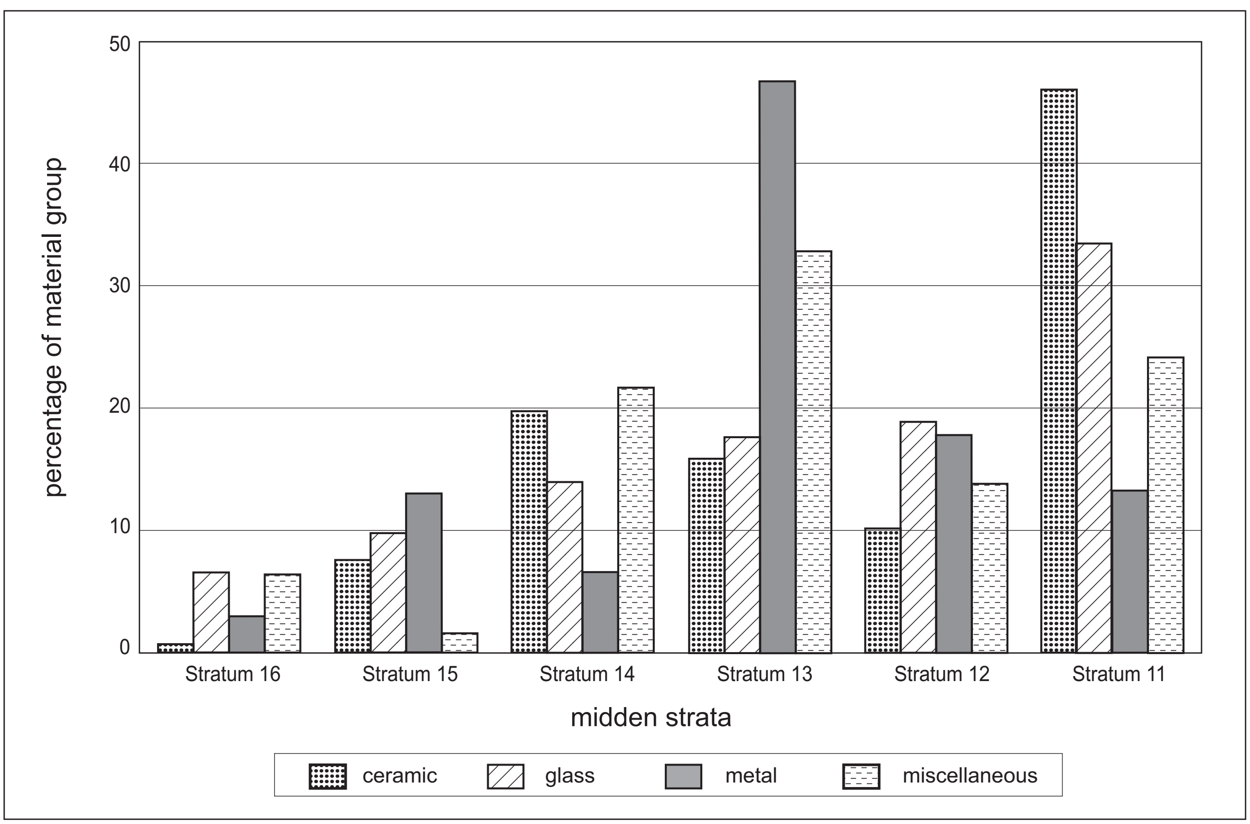

Figure 18-8. Distribution of artifact material groups in the Trujillo House midden strata.

toward increase. In Strata 16, 15, and 14 the percentages in each material group are fairly tightly clustered. The same may be said of Stratum 12. Strata 11 and 13, in contrast, show considerable differences in percentages. In Stratum 13, the percentages of glass and ceramic artifacts remain clustered. The percentages of metal and miscellaneous material artifacts, however, show dramatic increases over the lower strata. The reason for this is unclear. Initially, we thought that, because the material group date graphs (Figs. 18-9 through 18-12) indicated that these artifacts dated to after 1850, the sharp rise in both groups might mean that Stratum 13 was the first American Territorial period (post-1847) stratum. However, in Tables 18-1 and 18-3, the original and revised mean artifact dates from the six strata are all post-1850. Being mean dates, they imply a range of actual dates and do not preclude the possibility that the actual dates were before the American occupation. Nonetheless, interpreting Stratum 13 as the first post-1850 layer appears to contradict the other stratum dates. This means that the sharp increase in metal and miscellaneous material artifacts in Stratum 13 was probably due to some factor other than chronology. Although we cannot specify what that factor was, possibilities include the use-lives of particular items or on-site activities.

Stratum 11 shows a different pattern in that the percentages from each material group are more widely dispersed than in the lower strata. There is a relatively sharp increase in the presence of glass artifacts in this stratum. Because the glass artifacts appear to date after 1880, it was initially thought that Stratum 11 might have been the first post-1880 layer. However, while the mean ceramic date and the ceramic date graph (Fig. 18-9) show that ceramic artifacts have the earliest dates (suggesting availability after about 1820), the percentage of sherds increased dramatically from Stratum 12 to Stratum 11 (Fig. 18-8), which is certainly post-1880. In fact, ceramic artifacts have the lowest frequencies in three of the lower strata. This suggests that the presence of ceramic artifacts was relatively consistent until the break between Strata 12 and 11. During the deposition of Stratum 11, the quantity of ceramic artifacts increased substantially. There may be several reasons for this. It may represent time lag in the actual availability of Euroamerican items. Perhaps there was increased disposal of ceramic items associated with abandonment of the site. Alternatively, since Stratum 11 was uppermost, its artifacts may have been subjected to post-depositional impacts such as trampling that would have increased artifact counts through breakage.

There are significant differences in artifact dates between the four material groups. Table 18-4 presents mean artifact dates for the groups after deleting the post-1930 artifacts. The ceramic artifacts show the earliest dates, followed by metal, miscellaneous materials, and glass. If the five post-1920 glass fragments are also removed from the sample, the mean glass date is 1904.6, with a difference from the median historic date of 37.6 years.

Table 18-4. Mean artifact dates for material groups from the Trujillo House, and differences between mean artifact and median historic dates.

Material	Mean Artifact Date	Relative Difference of Median Historic Date to Mean Artifact Date
Ceramic	1860.1	-6.9 years
Metal	1877.4	+10.4 years
Miscellaneous	1885.4	+18.4 years
Glass	1905.1	+38.1 years

Figures 18-9 through 18-12 show the percentage of datable artifacts within each material group that could have originated during each five-year period between 1700 and 1950. The graphs echo the pattern seen in the mean artifact dates. They also suggest the influence of major historic events on items in each group. There is a major peak in ceramic dates between 1820 and 1860, suggesting that most Euroamerican ceramic artifacts were not available before the opening of the Santa Fe Trail, and that the opening of the trail may have allowed access to these goods. The datable metal artifacts all originated after 1850, with a peak in dates between 1870 and 1890. This suggests that a different event, the American occupation of New Mexico in 1847, provided access to mass-produced metal items. At the Trujillo House, these items included 12 machine-cut square nails, a percussion cap, a rim-fire cartridge made in 1884, and a .45 caliber pistol cartridge. These account for only 3.6 percent of the 415 metal artifacts, many of which were functionally identifiable but not datable. The datable artifacts of miscellaneous materials mostly originated after 1855, with a broad peak in dates between 1860 and 1905, possibly showing availability after the American occupation. The datable glass artifacts seem to show a distinct association with a specific event, the completion of the AT & SF railroad in 1881. Clearly, most of the datable glass artifacts were not available to the residents of the Trujillo House until after 1881.

Mean artifact dates for the four material groups appear to demonstrate the association of availability with major historic events. These associations, however, may not be as definite as they appear, given the information provided by the graphs from the midden strata (see Figs. 18-2 through 18-7). As discussed earlier, Stratum 16 showed the least influence by pre-1880 events. Since Stratum 16 was the oldest unit, if it does indeed demon-

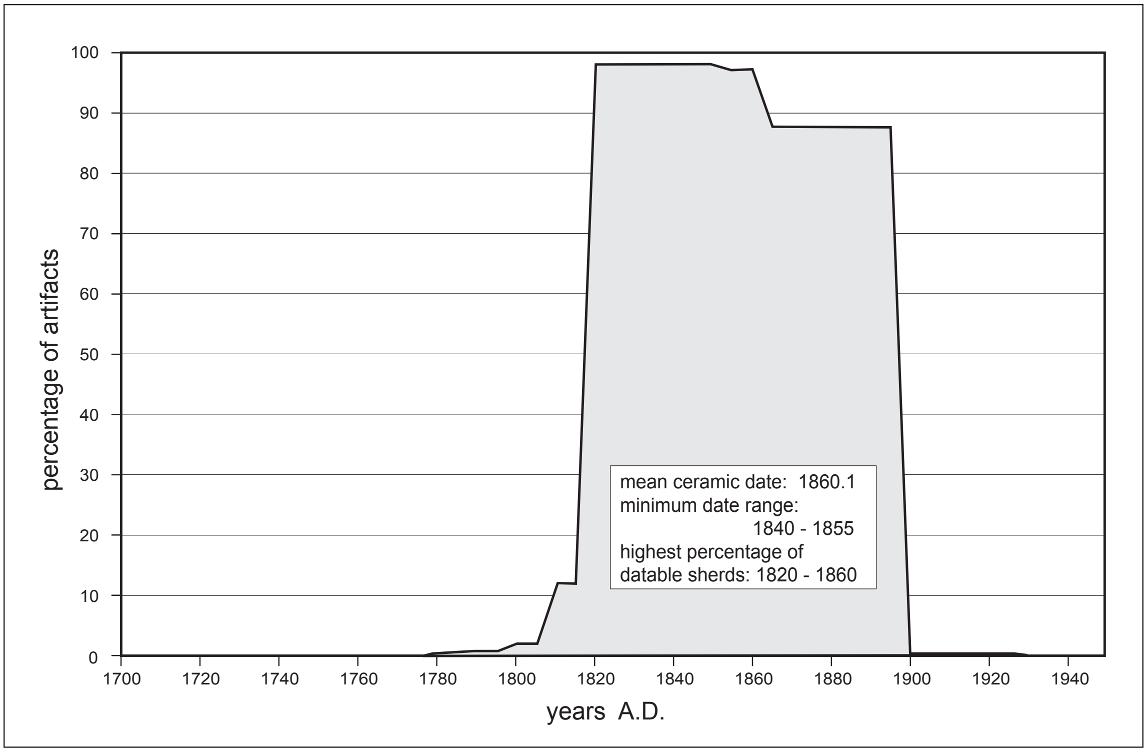

Figure 18-9. Percent of datable ceramic artifacts from the Trujillo House for each 5-year period between 1700 and 1950.

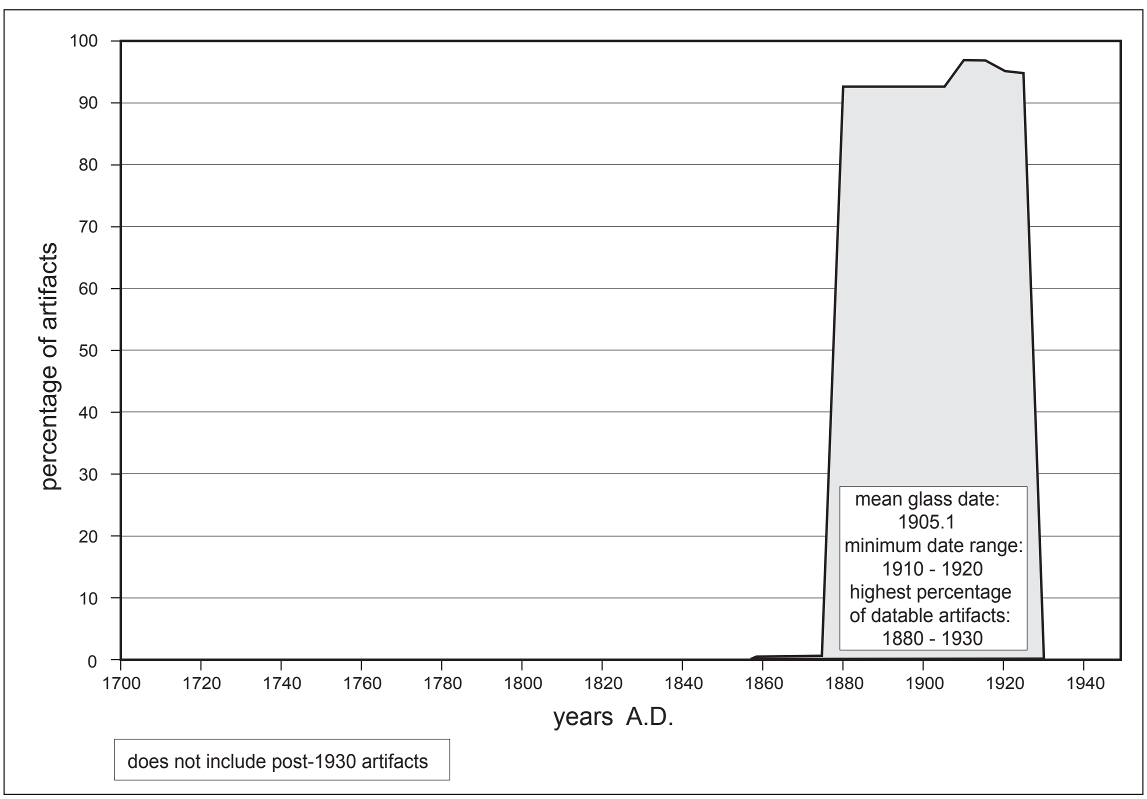

Figure 18-10. Percent of datable glass artifacts from the Trujillo House for each 5-year period between 1700 and 1950.

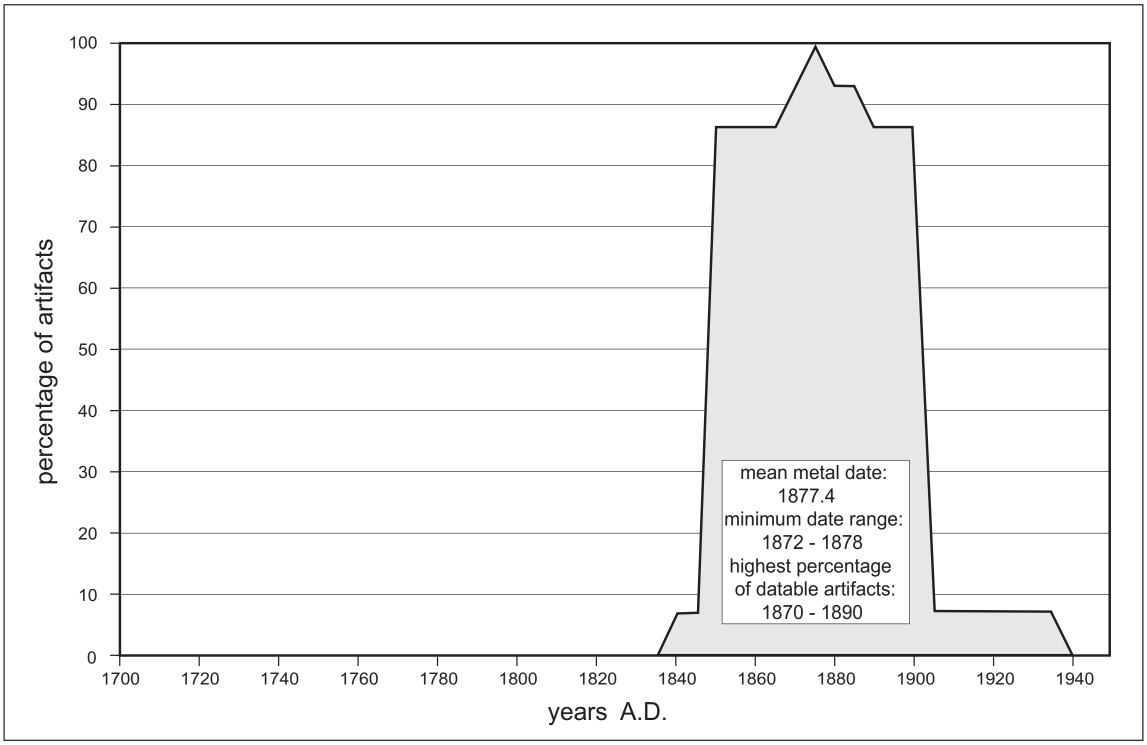

Figure 18-11. Percent of datable metal artifacts from the Trujillo House for each 5-year period between 1700 and 1950.

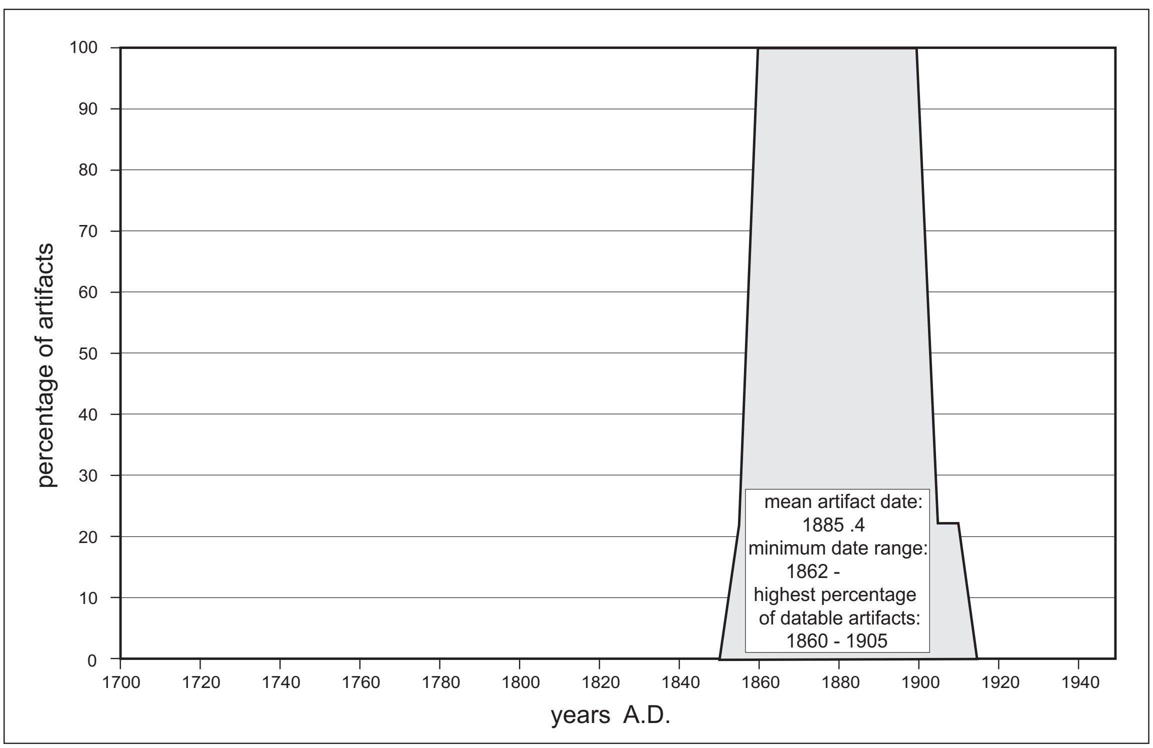

Figure 18-12. Percent of datable miscellaneous artifacts from the Trujillo House for each 5-year period between 1700 and 1950.

strate less influence by the opening of the Santa Fe Trail and the American occupation than by completion of the railroad, then data suggesting significant associations between artifacts in the upper five strata and the events of 1821 and 1847 are suspect. The conclusion that better fits the data is that the assemblages from Strata 11 through 15 were not available until completion of the railroad. This suggests that, while the ceramic dates point to manufacture after 1820, and metal and miscellaneous material dates suggest post-1850 manufacture, there was a 30 to 60 year time lag in actual access to these items in the Abiquiú area. Figure 18-8 shows that pre-1880 artifacts were rarer in Stratum 16 than they were in Strata 11 through 15. This may indicate that these items were actually less accessible before deposition of Stratum 15.

Artifact Function

Of the 1741 artifacts recovered, 822 (47.2 percent) were identifiable by function. Table 18-5 shows a revised ranking of functional data after removing unidentifiable artifacts from each category (compare with Table 11-1). In this table the category with the largest number of artifacts is Construction/Maintenance. The figures for this category do not include adobe brick and plaster samples

Table 18-5. Revised ranking of functional categories, types, and functions for the Trujillo House; excluding unidentifiable artifacts.

Category / *type* / function	No.	Percent of Category	Percent of Assemblage
Domestic Routine	97	100.0%	11.8%
dishes, serving and eating	89	91.8%	10.8%
cup or mug	36	37.1%	4.4%
plate	28	28.9%	3.4%
bowl	25	25.8%	3.0%
cutlery	7	7.2%	0.9%
kitchen knife	5	5.2%	0.6%
spoon or fork handle	2	2.1%	0.2%
glassware	1	1.0%	0.1%
drinking glass	1	1.0%	0.1%
Construction or Maintenance	531	100.0%	64.6%
building materials	417	78.5%	50.7%
window glass	417	78.5%	50.7%
hardware	114	21.5%	13.9%
common nail	87	16.4%	10.6%
finish nail	23	4.3%	2.8%
screw	2	0.4%	0.2%
bolt	1	0.2%	0.1%
staple	1	0.2%	0.1%
Personal Effects	89	100.0%	10.8%
boots or shoes	56	62.9%	6.8%
outer sole, heel	24	27.0%	2.9%
heel	12	13.5%	1.5%
inner sole fragment	9	10.1%	1.1%
outer sole fragment	5	5.6%	0.6%
toe	5	5.6%	0.6%
heel fragment	1	1.1%	0.1%
clothing	22	24.7%	2.7%
button, 4-hole, shirt or dress	11	12.4%	1.3%
button, shank, coat or jacket	4	4.5%	0.5%
belt buckle	2	2.2%	0.2%
button, 3-hole, shirt or dress	1	1.1%	0.1%
button, 2-hole, shirt or dress	1	1.1%	0.1%
button, shank, shirt or dress	1	1.1%	0.1%
button, type unidentified	1	1.1%	0.1%
brass hook	1	1.1%	0.1%
jewelry	3	3.4%	0.4%
bead	1	1.1%	0.1%
shell ornament	1	1.1%	0.1%
ring	1	1.1%	0.1%
grooming items	3	3.4%	0.4%
rubber comb	1	1.1%	0.1%
grooming items (continued)			
lice comb, wood	1	1.1%	0.1%
razor	1	1.1%	0.1%
medicine	3	3.4%	0.4%
patent or extract bottle	3	3.4%	0.4%
personal items	1	1.1%	0.1%
pocket knife	1	1.1%	0.1%
military clothing	1	1.1%	0.1%
sword belt buckle	1	1.1%	0.1%
Indulgences	81	100.0%	9.9%
alcohol, wine	78	96.3%	9.5%
bottle fragments	78	96.3%	9.5%
tobacco	3	3.7%	0.4%
pipe	3	3.7%	0.4%
Food	11	100.0%	1.3%
storage	6	54.5%	0.7%
olive jar	6	54.5%	0.7%
canned goods	5	45.5%	0.6%
can lid	5	45.5%	0.6%
Economy-Production	10	100.0%	1.2%
hunting or shooting	6	60.0%	0.7%
cartridge, center-fire	2	20.0%	0.2%
cartridge, rim-fire	1	10.0%	0.1%
percussion cap	1	10.0%	0.1%
cartridge, pistol, .45 cal.	1	10.0%	0.1%
bullet, .45 cal.(?)	1	10.0%	0.1%
stock supplies	4	40.0%	0.5%
carding comb	1	10.0%	0.1%
sheep shears	1	10.0%	0.1%
horseshoe nail	1	10.0%	0.1%
spur rowel	1	10.0%	0.1%
Entertainment	2	100.0%	0.2%
music	2	100.0%	0.2%
mouth harp	2	100.0%	0.2%
Household Equipment	1	100.0%	0.1%
lighting-lamps	1	100.0%	0.1%
chandelier crystal	1	100.0%	0.1%
Total	822		100.0%

collected from the structure (see Chapter 17). The most common artifact in this category is window glass, in the Building Materials type. However, the relative importance of the window fragments may be less than is indicated by the actual numbers, since only 114 (21.5 percent) of the artifacts from that category are **not** window glass. In order to assess this, an attempt was made to determine the number of window panes represented in the assemblage. Modern window glass comes in two thicknesses, 1/16 inch (single glaze) and 1/8 inch (double glaze). Although manufacturing techniques have changed considerably since the late nineteenth century, window glass from the Trujillo House came in the same thicknesses. Comparing the weights of the window fragments with weights of modern panes provides estimates of the number of panes in the Trujillo House assemblage.

Table 18-6. Estimated number of window panes of different sizes by thickness for the Trujillo House.

Pane size (inches)	No. of 1/16-inch Panes	No. of 1/8-inch Panes
6 by 8	19.9	8.6
8 by 10	11.9	5.1
10 by 12	7.9	3.4
11 by 16	5.4	2.3

Table 18-6 shows the estimated number of different size panes in each thickness, and suggests that between six and twenty 1/16th-inch panes and between three and nine 1/8th-inch panes were represented. It is unlikely that 10 by 12 inch or 11 by 16 inch panes were commonly available before site abandonment in the late 1890s. Therefore, we estimate that twelve to twenty 1/16-inch panes and five to nine 1/8-inch panes were represented in the assemblage.

The next most common Construction/Maintenance artifacts were in the Hardware type, with nails being most frequent. All identifiable nails were square and machine-cut. Figure 18-13 shows that the nails range in size from small tacks to 20-penny nails.

The second largest category was Domestic Routine. This category included items associated with food preparation and serving and household chores. The most common items were sherds from serving and eating dishes. Vessel forms include cups or mugs, plates, and bowls (Fig. 18-14). Table 11-1 showed that many sherds were not functionally identifiable, primarily due to their small sizes. However, the predominance of three vessel forms among the identifiable sherds suggests that most others probably came from similar vessels and that other forms, such as vases or pitchers, were not common at the site. Other artifacts in this category included kitchen knives and spoon or fork handles (Fig. 18-15).

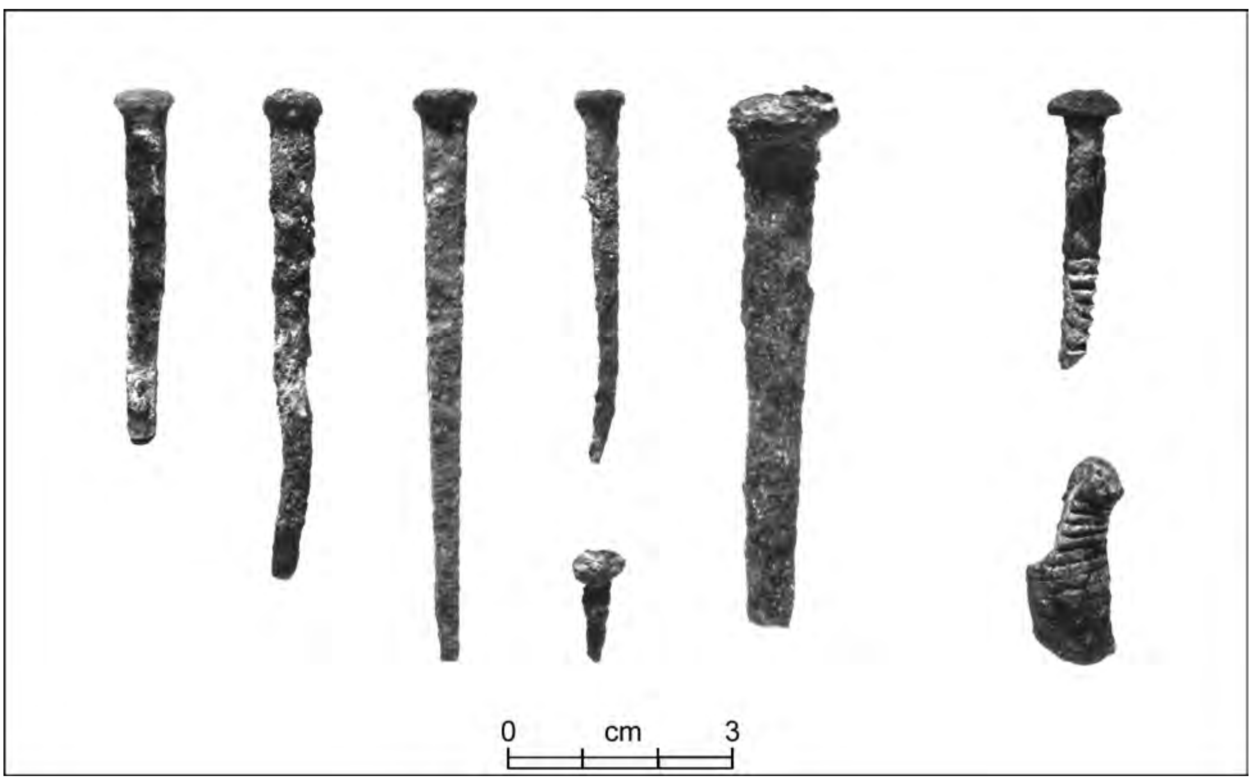

Figure 18-13. Construction and Maintenance category artifacts from the Trujillo House: nails and screws.

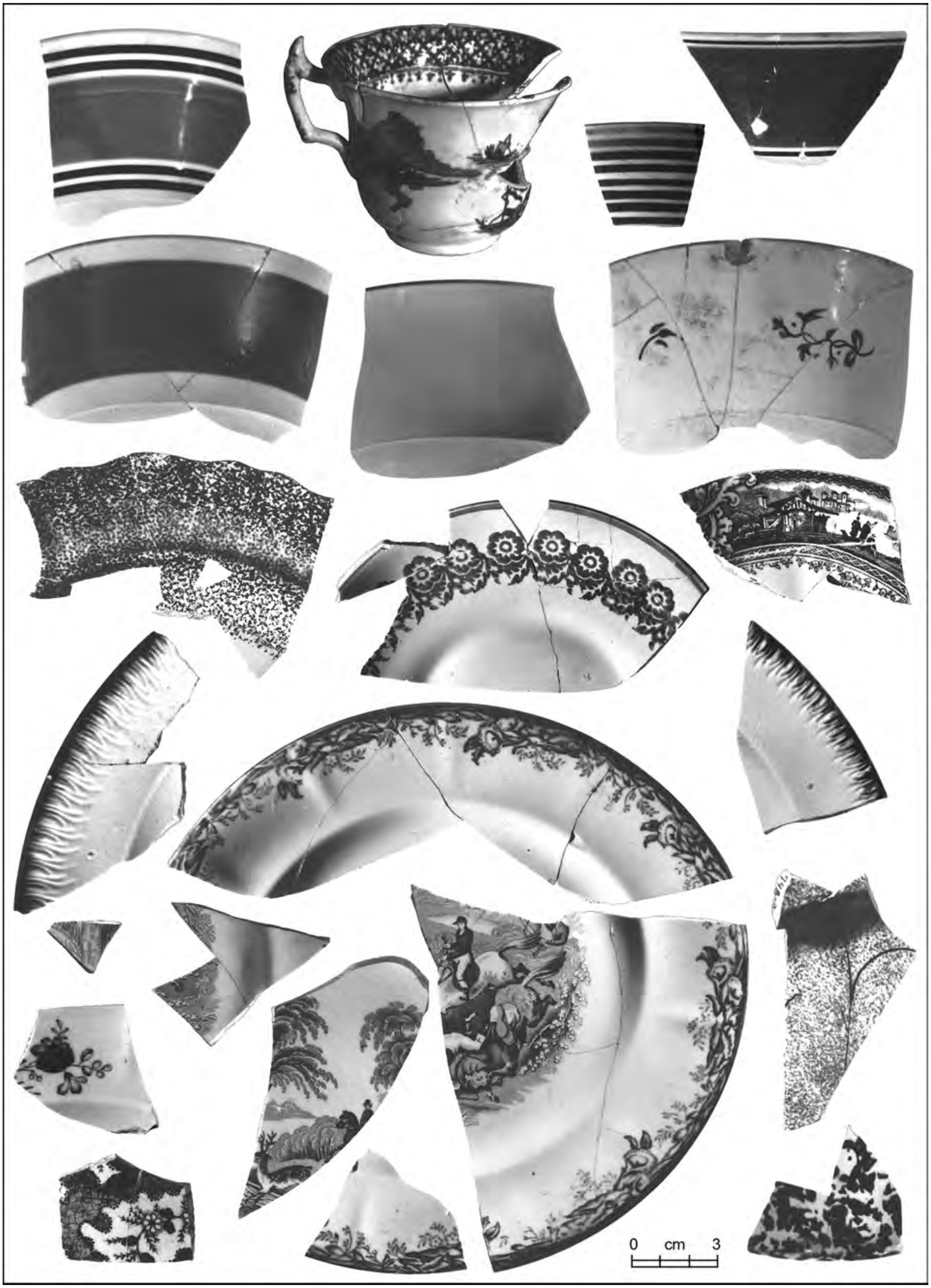

Figure 18-14. Domestic Routine category artifacts from the Trujillo House: porcelain cup, plate, and bowl sherds.

Figure 18-15. Domestic Routine category artifacts from the Trujillo House: cutlery items.

Personal Effects was the third largest category and the most diverse, with six types and 22 functions represented (see Table 18-5). Shoe and boot parts were the most common items, followed by buttons, particularly from shirts or dresses (Fig. 18-16). Jewelry items included a hand-carved mother-of-pearl flower ornament and a ring (Fig. 18-16). Grooming items (Fig. 18-16) included two combs, one of hard rubber, and a wooden lice comb, and a razor fragment. Three medicine-bottle fragments were included in this category, as was a pocket knife (Fig. 18-16). One of the most unique artifacts was a United States military clothing item, a belt plate from a two-piece sword belt buckle (Fig. 18-17). The plate was brass, but was probably originally filled with lead. It resembled a buckle illustrated by Kerksis (1987:216), who notes that the five-pointed star was a common military decorative device. This style was typical of the period between the Mexican and Civil Wars, and makes the buckle roughly contemporaneous with a military coat button from La Puente. The presence of two 1850s military uniform items at these sites points to interaction with American occupation troops stationed at Abiquiú. An army post opened there in 1849 and was abandoned by the Army in 1855, bracketing the years represented by the La Puente button and the Trujillo House belt buckle.

The Indulgences category included almost as many artifacts as did Personal Effects, but only two artifact types were represented: fragments of alcohol bottles, and tobacco pipes (Fig. 18-18). The absence of distilled liquor bottle fragments is interesting, but whether it relates to personal tastes, market access, or another factor is not known.

At the Ontiberos homestead, which was occupied between 1903 and 1904, Indulgences comprised 6.75 percent of the assemblage (Oakes 1983). Of that, over 65 percent were alcohol bottle fragments, with about half from beer bottles and the rest from wine and distilled liquors. At the Cavanaugh homestead, occupied ca. 1888 to 1895, Indulgences made up only 1.13 percent of the assemblage (Maxwell 1983). Of that, 3.9 percent was from wine bottles, 2.2 percent from whiskey bottles, 0.2 percent from beer bottles, and 42.7 percent from beverage bottles that might have contained beer, whiskey, or soda. At both these sites, which are located on the eastern New Mexico plains, Indulgence artifacts made up smaller portions of the Euroamerican assemblages than at the Trujillo House, but included more variety in the kinds of artifacts, including more tobacco-related items. While bottle fragments from the Trujillo House were only from wine and beer bottles, fragments of beer and distilled liquor bottles were more common in the Cavanaugh and Ontiberos assemblages. Further, indulgence artifacts comprised a larger portion of the Trujillo House Euroamerican assemblage than they did the Cavanaugh and Ontiberos assemblages. It is very important to note, however, that Euroamerican artifacts from the Trujillo House made up only a fraction of the total assemblage, while they comprised most or all of the Cavanaugh and Ontiberos assemblages. When this is considered, Indulgence artifacts were actually very rare at the Trujillo House.

The Food category was represented by five can lids and six olive jar sherds. Figure 18-19 shows an olive jar rim and body sherd. The rim is Late Style, dating after

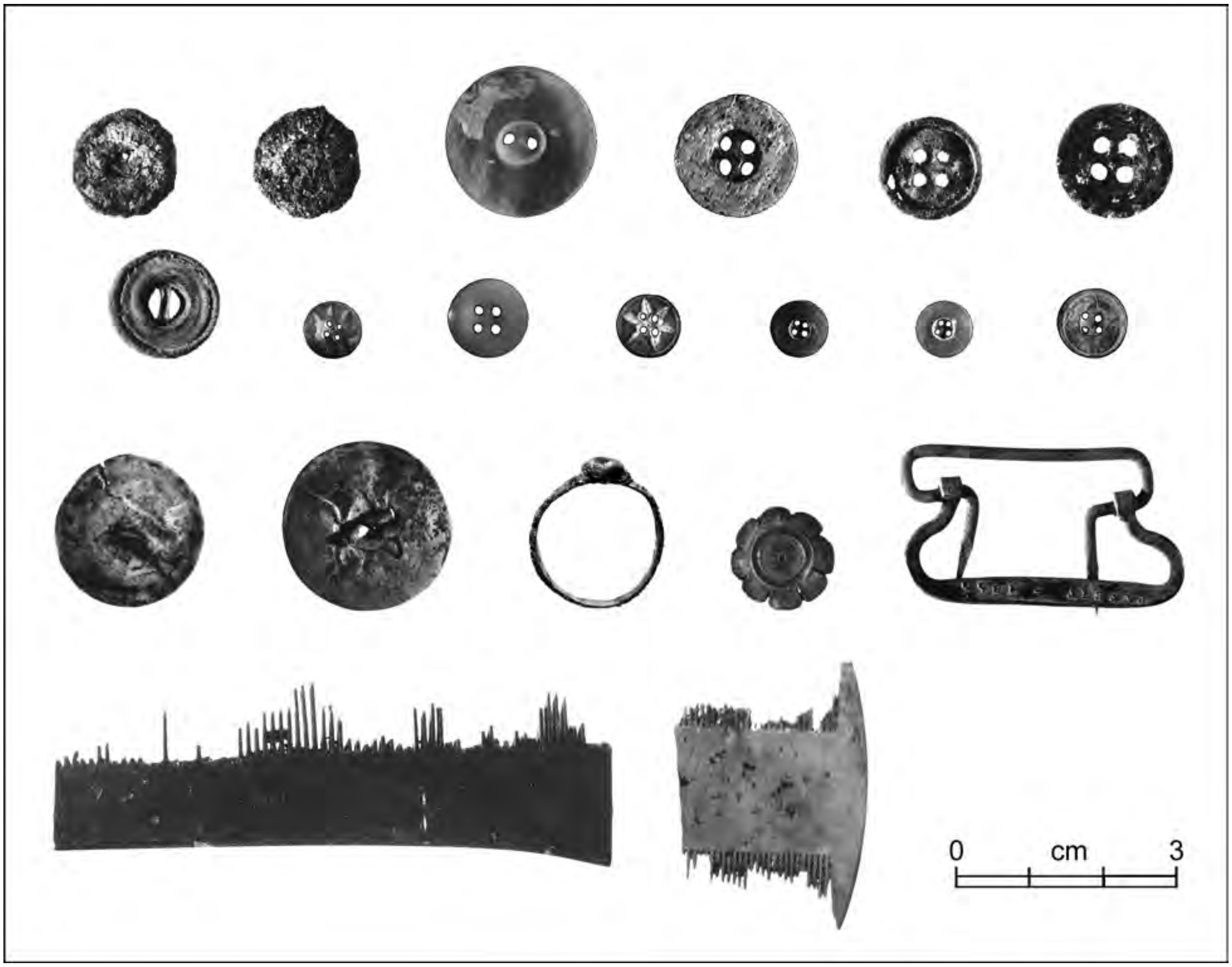

Figure 18-16. Personal Effects category artifacts from the Trujillo House: buttons, jewelry, buckle, and grooming items (left comb is hard rubber, right comb is wooden lice comb).

Figure 18-17. Personal Effects category artifacts from the Trujillo House: pocket knife, and U.S. Army sword belt buckle plate.

1800 (Goggins 1964:277, 284). The faunal assemblage and macrobotanical samples are not included in this table.

The Economy/Production category included only two types of items: hunting/shooting and stock supplies. Three cartridge types were represented: center-fire rifle, rim-fire rifle, and center-fire pistol (Fig. 18-20). The single rim-fire cartridge was made by the Frankford Arsenal, and the .45 caliber pistol cartridge was made by Winchester Repeating Arms. No other manufacturer's marks were present. A .45 caliber bullet was also recovered, as were a possible bullet (recorded as unidentifiable in Tables 11-1 and 18-15), and a brass percussion cap. Four stock supply items were recovered. Two, a pair of shears and a carding comb (Fig. 18-21), were used in processing wool. They represent the only evidence we have of economic activities carried out by the Trujillo family and suggest that, like most of the residents of the Rio Chama Valley, the Trujillos were involved in sheepherding. The other two artifacts in this category suggest the presence of horses at the site: a horseshoe nail and a spur rowel (Fig. 18-21). The Entertainment category was represented by two Jew's harps (Fig. 18-22). Finally, a glass chandelier crystal was the only item in the Household Equipment category.

Table 18-7 summarizes information on the artifacts according to use life in the cultural system and sexual division of labor or use. It shows that 66 percent of the artifacts were from categories and types that may have had medium to long use lives. They included items from the Construction/Maintenance, Personal Effects (jewelry and personal items), Subsistence/Production (stock supplies), Food (storage), and Household Equipment categories. Most of these artifacts were, however, window glass fragments. When window glass is removed from the assemblage (Table 18-7), the number artifacts with

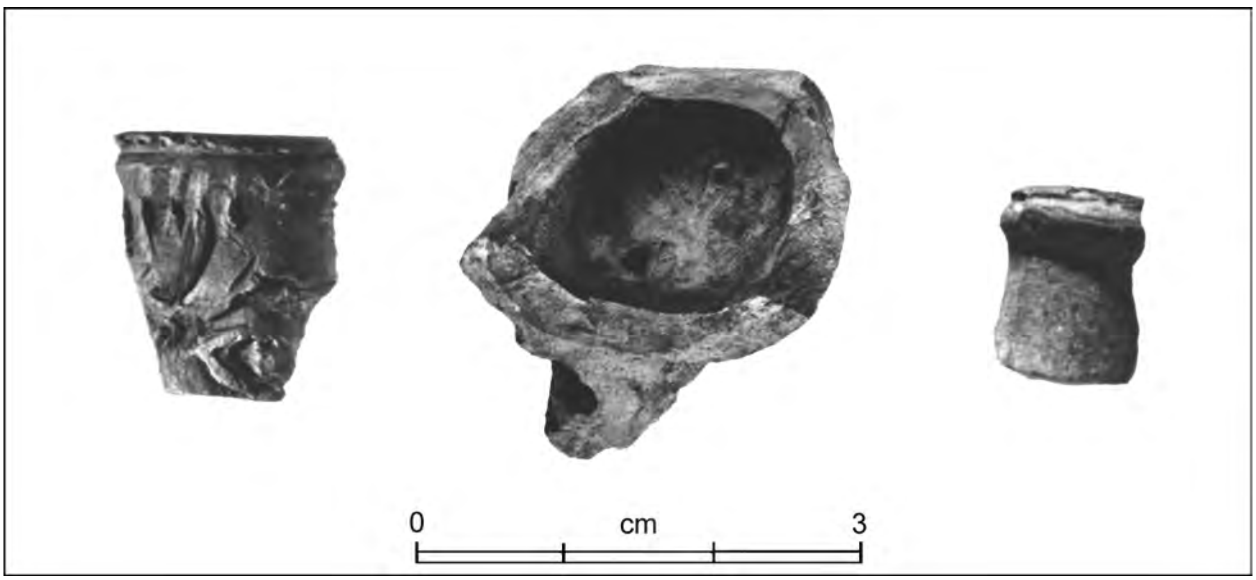

Figure 18-18. Indulgences category artifacts from the Trujillo House: clay pipe bowl fragments.

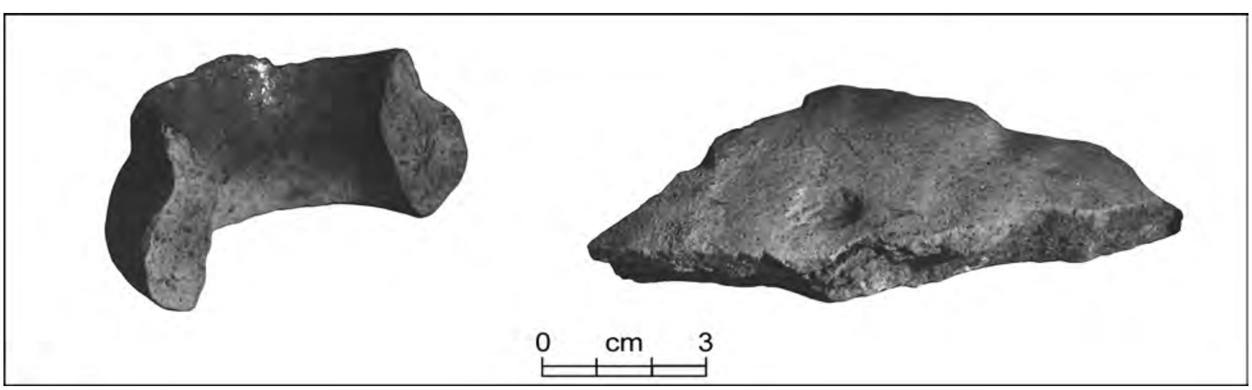

Figure 18-19. Food category artifacts (storage) from the Trujillo House: olive jar sherds.

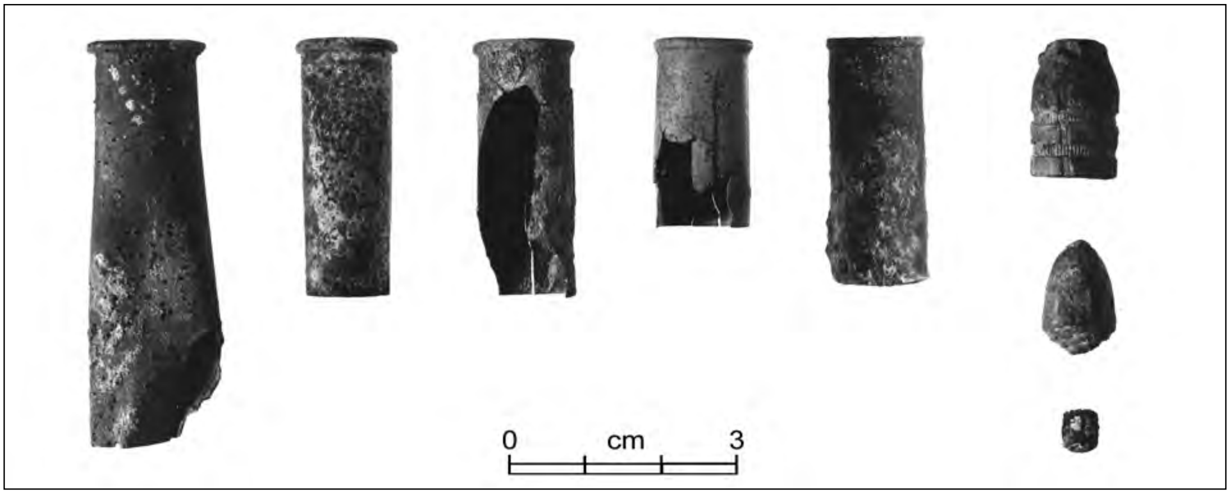

Figure 18-20. Economy and Production category artifacts from the Trujillo House: cartridges, bullet, and percussion cap.

Figure 18-22 (above). Entertainment category artifacts from the Trujillo House: Jew's harps

Figure 18-21 (left). Economy and Production category artifacts from the Trujillo House: carding comb fragment, horseshoe nail, and spur rowel.

Table 18-7. Use-lives and division of labor or use of artifacts for the Trujillo House.

	Percent of Artifacts	
	All Artifacts	Excluding Window Glass
Use life		
Short	1.8	3.8
Medium	6.9	14.1
Long	0.0	0.0
Short to medium	25.1	51.5
Medium to long	66.1	30.5
Gender		
Male	66.8	31.8
Female	12.0	24.7
Male and female	21.2	43.4

Table 18-8. Paste and ware composition of the Euroamerican ceramic assemblage at the Trujillo House.

Paste		Percent	
Ware	No.	Of Paste	Of Assemblage
Fine earthenware	531	100.0%	94.7%
Whiteware	456	85.9%	81.3%
Ironstone	54	10.2%	9.6%
Pearlware	10	1.9%	1.8%
Semi-porcelain	8	1.5%	1.4%
Lusterware	2	0.4%	0.4%
Creamware	1	0.2%	0.2%
Porcelain	20	100.0%	3.6%
Coarse earthenware	8	100.0%	1.4%
Olive jar	6	75.0%	1.1%
Unidentifiable	1	12.5%	0.2%
Majolica, Puebla Blue-on-white	1	12.5%	0.2%
Unidentifiable	2	100.0%	0.4%
Total	561		100.0%

Table 18-9. Euroamerican ceramic decoration techniques; Trujillo House.

Decoration	No.	Percent
None	289	51.5%
Paint under glaze	72	12.8%
Transfer	67	11.9%
Sponge	39	7.0%
Paint under glaze (annular)	29	5.2%
Transfer and paint	19	3.4%
Painted	16	2.9%
Molded design with paint under glaze (shell-edged)	10	1.8%
Molded	9	1.6%
Unidentifiable	7	1.2%
Metal film under glaze	2	0.4%
Decalcomania	1	0.2%
Glaze on enamel (majolica)	1	0.2%
Total	561	100.0%

medium to long use lives decreases by about half, and the number of artifacts with short to medium use lives is doubled. Because it is possible to determine only a range of the number of panes represented, this figure is more accurate than one obtained by reducing the number of fragments to actual panes. After revising the figures, it is apparent that 69 percent of the artifacts are from categories and types having short to medium use lives. These include Domestic Routine artifacts (mostly ceramic items), most of the items in Personal Effects and Indulgences, hunting and shooting items in the Subsistence/Production category, and Food artifacts. This can be expected in a residential setting where the use of such items over the period of occupation would result in relatively higher frequencies of artifacts with short to medium use lives.

Table 18-7 also shows that, after removing window glass, 43 percent of the artifacts were from categories and types that could have been used by either men or women at the site. These include most of the items in the Personal Effects, Indulgences, Food, and Household Equipment categories. Artifacts probably associated with men made up about 32 percent of the assemblage, whereas those probably associated with women made up the remaining 25 percent. It is important to note that the figures for use life and gender are from the Euroamerican assemblage only. More accurate assessments of artifact use life and division of labor might be obtained from the entire assemblage, including lithic and native ceramic artifacts.

Tables 18-8 through 18-18 present manufacturing and functional data for each of the four material groups. Tables 18-8 through 18-11 summarize the ceramic artifacts. Of the 561 Euroamerican sherds, only 30 (5.3 percent) were not fine earthenwares (Table 18-8). Twenty of these are from a single porcelain cup (Fig. 18-14). Of the remaining 531 sherds, about 83 percent were whiteware, the most common ware of the last half of the nineteenth century (G. Miller 1980). About half of the sherds were undecorated (Table 18-9) and fit into the first or least expensive level of G. Miller's (1980) economic scale for assessing market access (Table 18-10). The remaining artifacts are divided between levels 3, 4, and 2, in descending order. There are three times as many artifacts from levels 3 and 4 (the most expensive) as from level 2. This suggests that the residents of the site used mostly inexpensive, undecorated dishes, with a secondary preference for nicer decorated items, but little use of medium-priced wares.

Table 18-9 indicates considerable diversity in decoration techniques in the 49.5 percent of the sherds that were decorated. Several examples are illustrated in Fig. 18-14. These examples represent the range of decoration techniques and design styles by vessel form in the assemblage. Several facts are evident. The plates and bowls from the Trujillo House had very different decoration techniques and design styles. Decorated plates were characterized by monochrome and polychrome transfer prints and by sponge-printed designs (see Fig. 18-14). Two kinds of shell-edged pearlware plates were found, representing both late eighteenth and early nineteenth century varieties (see Fig. 18-14). These may have been heirloom pieces, and perhaps three or four shell-edged plates were represented in the assemblage. With these exceptions, each plate illustrated in Fig. 18-14 is the only example of its design style found in the assemblage. This fact and the variety of decoration techniques and design styles strongly suggest that plates were acquired as single items rather than as parts of sets. This conclusion is supported by the fact that the bowls, as illustrated in Fig. 18-14, are very different from the plates. No bowl sherds were found to match the plates (see Fig. 18-14). Annular ware varieties were common and bowls tended to have high, steep sides. Although we could not reconstruct a bowl from available sherds, most appear to have had distinctive, flaring foot ring pedestals. Again, the illustrated sherds generally represent the only vessel of each specific design style. This pattern is representative of low commodity flow in an economically isolated frontier setting (G. Miller and Hurry 1983:89). As we would expect, most ceramic artifacts are from serving and eating dishes (over 98 percent). Storage vessels and tobacco pipes are minimally represented (Table 18-11; and see Fig. 18-19).

Tables 18-12 through 18-14 summarize the glass artifacts. Window glass fragments (Construction/Maintenance category) were the most common, followed by unidentifiable items, mostly bottle fragments (Table 18-12). The next largest category is Indulgences, composed of wine and beer bottle fragments. The thirteen beer bottle fragments are from a single brown bottle. A maker's mark on the bottom (Fig. 18-23a) identifies the manufacturer as the Louisville Kentucky Glass Co. This company was in business from 1873 to about 1886, and Toulouse (1971:323) identifies this mark as present on beer bottles dating around 1880. Indulgences were followed by Personal Effects items, dominated by three fragments from a single aqua-green medicine bottle. A maker's mark (Fig. 18-23b) shows that the manufacturer was the Millgrove Glass Co. of Millgrove, Indiana (Toulouse 1971:359). This company made proprietary medicine bottles between 1898 and 1911. The brand name was partially present but could not be identified. Because the glass assemblage was dominated by window glass and unidentifiable bottle fragments, it is not surprising that most glass fragments were undecorated (Table 18-13) and were characterized by clear or variations of natural aqua ("flint") colors (Table 18-14).

Table 18-10. Economic classification of Euroamerican ceramic artifacts for the Trujillo House.

Cost Level[1]	No.	Percent of Assemblage
1 Undecorated	289	51.5
3 Painted	113	20.1
4 Transfer	86	15.3
2 Minimal decoration	58	10.3

[1]After Miller (1980).

Table 18-11. Euroamerican ceramic functions for the Trujillo House.

Category / *type* / function	No.	Percent of Category	Percent of Assemblage
Domestic Routine	553	100.0%	98.6%
unidentified	1	0.2%	0.2%
unidentifiable	1	0.2%	0.2%
dishes, serving and eating	552	99.8%	98.4%
unidentifiable	464	83.9%	82.7%
cup or mug	35	6.3%	6.2%
plate	28	5.1%	5.0%
bowl	25	4.5%	4.5%
Food	6	100.0%	1.1%
storage	6	100.0%	1.1%
olive jar	6	100.0%	1.1%
Indulgences	2	100.0%	
tobacco	2	100.0%	0.4%
pipe	2	100.0%	0.4%
Total	561		100.0%

Tables 18-15 and 18-16 summarize the metal artifacts. This group was the most diverse in function, with five categories and ten types represented (Table 18-15). Of these, most are hardware from the Construction/Maintenance category. Also represented are items from the Personal Effects, Economy/Production, Food, Domestic Routine, and Entertainment categories. The materials from which two artifacts were made could not be identified. One was a possible bullet, but did not appear to be lead. Four other types of metal were present, of which 89 percent were iron (Table 18-16). These include the nails as well as numerous bits of scrap iron. One steel staple and a lead bullet were found. The other 40 artifacts were brass and included 31 unidentifiable items, 5 cartridges and 1 percussion cap, 1 button, 1 clothing hook, 1 ring, and a piece of a pocket knife.

The artifacts made from miscellaneous materials are summarized in Tables 18-17 and 18-18. They included items from four categories, but most were clothing, boot, and shoe fragments (Personal Effects category) (Table 18-17). Eleven materials were represented, the most common of which was leather (Table 18-18).

Comparison with Other Household Assemblages

Comparison of Euroamerican assemblages from several sites in eastern New Mexico led Maxwell (1983) and Oakes (1983a) to perceive a pattern of assemblage composition that they call the New Mexico Pattern. This pattern consists of ranges of percentages for each functional category within which an assemblage should fall if it fits the pattern. The ranges include mean percent of the total assemblage, standard deviation, range of acceptable percentages, and coefficient of variation. They were calculated by combining the percent of each site assemblage represented by each category. Maxwell (1983) began this process with the Cavanaugh, Butcher, and Wyatt site assemblages. Oakes (1983a) expanded the pattern with figures from the Howell and Ontiberos sites. In 1990, Oakes (1990) expanded the pattern again using data from the Wilson and Colfax sites. Oakes (1990:41) describes

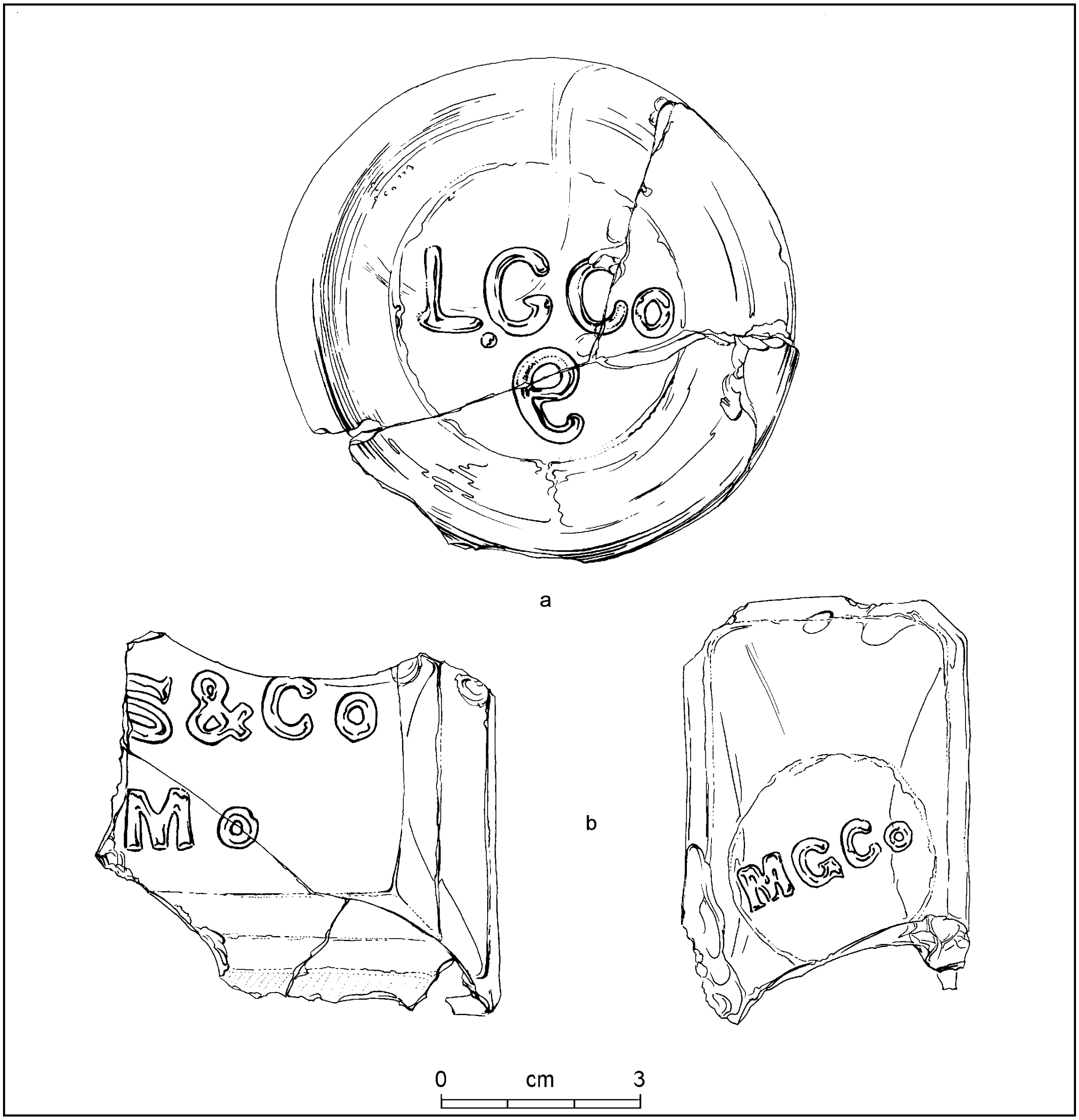

Figure 18-23. Bottle-makers' marks from the Trujillo House: (a) Louisville Kentucky Glass Co., Louisville, Kentucky, (b) Millgrove Glass Co., Millgrove, Indiana.

the process by saying: "As each new site is added to the data base, an expanded New Mexico artifact pattern for New Mexico frontier sites is produced."

While looking for patterning in the archaeological record is clearly a justifiable activity, the process by which the New Mexico pattern has been derived and expanded is actually tautological in nature (Timothy D. Maxwell, personal communication, 1991). By simply adding new site information into the data base and using this expanded data base to recalculate the figures for the pattern, variation is continually added with no accounting for its nature or causes. An example is Oakes' (1990) inclusion of the Colfax data. In contrast with the other sites used for deriving the pattern, which were individual homesteads, Colfax was a railroad and mining community (Oakes 1983b). Including the Colfax assemblage in the data base introduces potential variation in access to manufactured goods because of the railroad that ran through town, the immediate presence of stores, and the availability of cash from wage labor employment. In addition, there is the issue of depositional context and whether artifact use and deposition can be assigned to individual households in a community setting (see discussion of La Puente, below). These factors introduce variation in the data base that is not accounted for before the pattern is expanded.

Even within the universe of individual households, there may be considerable variation. Maxwell (1983:85, 89) observes that the Howell site assemblage differs considerably from that of other sites on the eastern Plains (Table 18-19). For that reason, he does not include its assemblage in calculating figures for the New Mexico pattern (Maxwell 1983:89). Oakes (1983a, 1990) does include the Howell assemblage in her revisions of the pattern, noting only that its differences may be due to the limited nature of excavations at the site (Oakes 1983a:102). It is interesting that both Maxwell and Oakes include the Wyatt site when calculating and revising the pattern even though it, like the Howell site, saw only limited excavation (Maxwell 1983:85). Its assem-

Table 18-12. Euroamerican glass functions; Trujillo House.

Category / *type* / function	No.	Percent of Category	Percent of Assemblage
Construction or Maintenance	417	100.0%	67.0%
building materials	417	100.0%	67.0%
window glass	417	100.0%	67.0%
Unassignable	116	100.0%	18.6%
unidentified	116	100.0%	18.6%
unidentifiable	59	50.9%	9.5%
bottle fragment	57	49.1%	9.2%
Indulgences	78	100.0%	12.5%
alcohol, wine	65	83.3%	10.5%
bottle fragments	65	83.3%	10.5%
alcohol, beer	13	16.7%	2.1%
bottle fragments	13	16.7%	2.1%
Personal Effects	5	100.0%	0.8%
medicine	3	60.0%	0.5%
patent or extract bottle	3	60.0%	0.5%
clothing	1	20.0%	0.2%
button, 4-hole, shirt or dress	1	20.0%	0.2%
jewelry	1	20.0%	0.2%
bead	1	20.0%	0.2%
Domestic Routine	5	100.0%	0.8%
glassware	4	80.0%	0.6%
unidentifiable	3	60.0%	0.5%
drinking glass	1	20.0%	0.2%
dishes, serving and eating	1	20.0%	0.2%
cup or mug	1	20.0%	0.2%
Household Equipment	1	100.0%	0.2%
lighting, lamps	1	100.0%	0.2%
chandelier crystal	1	100.0%	0.2%
Total	622		100.0%

Table 18-13. Euroamerican glass decoration techniques; Trujillo House.

Decoration	No.	Percent of Assemblage
Unidentified or not applicable	331	53.2%
None	275	44.2%
Pressed	10	1.6%
Ribbed	5	0.8%
"Applied color"	1	0.2%
Total	622	100.0%

Table 18-14. Euroamerican glass colors; Trujillo House.

Color	No.	Percent of Assemblage
Clear	172	27.7%
Aqua, green	164	26.4%
Green	119	19.1%
Aqua, blue	116	18.6%
Brown	26	4.2%
Amethyst	13	2.1%
Amber	5	0.8%
Black-olive	5	0.8%
White	1	0.2%
Blue	1	0.2%
Total	622	100.0%

Table 18-15. Euroamerican metal functions for the Trujillo House.

Category / *type* / function	No.	Percent of Category	Percent of Assemblage
Unassignable	256	100.0%	61.8%
unidentified	256	100.0%	61.8%
unidentifiable	256	100.0%	61.8%
Construction or Maintenance	119	100.0%	28.7%
hardware	119	100.0%	28.7%
common nail	87	73.1%	21.0%
finish nail	23	19.3%	5.6%
unidentifiable	5	4.2%	1.2%
screw	2	1.7%	0.5%
bolt	1	0.8%	0.2%
staple	1	0.8%	0.2%
Personal Effects	15	100.0%	3.6%
clothing	10	66.7%	2.4%
button, shank, coat or jacket	4	26.7%	1.0%
belt buckle	2	13.3%	0.5%
button, 4-hole, shirt or dress	1	6.7%	0.2%
button, shank, shirt or dress	1	6.7%	0.2%
button, type unidentified	1	6.7%	0.2%
brass hook	1	6.7%	0.2%
boots or shoes	1	6.7%	0.2%
toe	1	6.7%	0.2%
jewelry	1	6.7%	0.2%
ring	1	6.7%	0.2%
grooming items	1	6.7%	0.2%
razor	1	6.7%	0.2%
personal items	1	6.7%	0.2%
pocket knife	1	6.7%	0.2%
military clothing	1	6.7%	0.2%
sword belt buckle	1	6.7%	0.2%
Economy-Production	10	100.0%	2.4%
hunting or shooting	7	70.0%	1.7%
cartridge, center-fire	2	20.0%	0.5%
unidentifiable	1	10.0%	0.2%
cartridge, rim-fire	1	10.0%	0.2%
percussion cap	1	10.0%	0.2%
cartridge, pistol, .45 cal.	1	10.0%	0.2%
bullet, .45 cal.(?)	1	10.0%	0.2%
stock supplies	3	30.0%	0.7%
sheep shears	1	10.0%	0.2%
horseshoe nail	1	10.0%	0.2%
spur rowel	1	10.0%	0.2%
Domestic Routine	7	100.0%	1.7%
cutlery	7	100.0%	1.7%
kitchen knife	5	71.4%	1.2%
spoon or fork handle	2	28.6%	0.5%
Food	5	100.0%	1.2%
canned goods	5	100.0%	1.2%
can lid	5	100.0%	1.2%
Entertainment	2	100.0%	0.5%
music	2	100.0%	0.5%
mouth harp	2	100.0%	0.5%
Total	414		100.0%

Table 18-16. Euroamerican metal artifacts from the Trujillo House.

Material	No.	Percent of Assemblage
Iron	371	89.4%
Brass	40	9.6%
Unidentifiable	2	0.5%
Steel	1	0.2%
Lead	1	0.2%
Total	415	100.0%

Table 18-17. Euroamerican artifacts of miscellaneous functions from the Trujillo House.

Category / *type* / function	No.	Percent of Category	Percent of Assemblage
Personal Effects	119	100.0%	94.4%
boots or shoes	97	81.5%	77.0%
unidentifiable	42	35.3%	33.3%
outer sole, heel	24	20.2%	19.0%
heel	12	10.1%	9.5%
inner sole fragment	9	7.6%	7.1%
outer sole fragment	5	4.2%	4.0%
toe	4	3.4%	3.2%
heel fragment	1	0.8%	0.8%
clothing	19	16.0%	15.1%
button, 4-hole, shirt or dress	9	7.6%	7.1%
unidentifiable	8	6.7%	6.3%
button, 3-hole, shirt or dress	1	0.8%	0.8%
button, 2-hole, shirt or dress	1	0.8%	0.8%
grooming items	2	1.7%	1.6%
rubber comb	1	0.8%	0.8%
lice comb, wood	1	0.8%	0.8%
jewelry	1	0.8%	0.8%
shell ornament	1	0.8%	0.8%
Unassignable	5	100.0%	4.0%
unidentified	5	100.0%	4.0%
leather fragment	2	40.0%	1.6%
leather strap	1	20.0%	0.8%
awl	1	20.0%	0.8%
unidentifiable	1	20.0%	0.8%
Economy-Production	1	100.0%	0.8%
stock supplies	1	100.0%	0.8%
carding comb	1	100.0%	0.8%
Indulgences	1	100.0%	0.8%
tobacco	1	100.0%	0.8%
pipe bowl	1	100.0%	0.8%
Total	126		100.0%

Table 18-18. Miscellaneous Euroamerican materials from the Trujillo House.

Material	No.	Percent of Assemblage
Leather	122	81.9%
Cloth	8	5.4%
Shell (mother of pearl)	6	4.0%
Glass	4	2.7%
Wood	2	1.3%
Bone	2	1.3%
Unknown	1	0.7%
Clay	1	0.7%
Vulcanized rubber	1	0.7%
Leather and wire	1	0.7%
Shell	1	0.7%
Total	149	100.0%

blage, however, fits more closely the empirical pattern of the other sites; for this reason, its excavational history was apparently not considered as a source of potential variation between the collected and total assemblages.

To understand the degree of variation introduced by using the Howell data, we can recalculate the mean figures for the eastern Plains sites (Table 18-19). The Howell assemblage is most different from the others in three categories: Indulgences, Domestic Routine, and Construction/Maintenance. When the means for these three categories are recalculated using the Howell data, the Indulgences mean climbs from 1.9 to 4.5 percent, and its standard deviation climbs from 2.4 to 6.2. The Domestic Routine mean climbs from 9.4 to 15.4 percent, and its standard deviation climbs from 4.8 to 14.1. Finally, the Construction/Maintenance mean drops from 45.8 to 39.4, but its standard deviation climbs from 10.6 to 17.2. The effect of these changes is to widen the acceptable ranges of figures within which an assemblage could fall and still fit the pattern. This confirms Maxwell's (personal communication, 1991) concern that deriving the pattern by continually adding assemblages will eventually widen the pattern so that it can accommodate all variability. The result is that the pattern becomes meaningless, and neither it or the variation within it are explained. Thus, it appears that Oakes (1990:41) is incorrect in asserting that, after adding her Colfax and Wilson data, decreased coefficients of variation show that "our ability to predict mean percentages of the various artifact categories on a New Mexico site is improving with each site added." It is more likely that decreasing coefficients of variation show that the ranges of figures are becoming wider so as to be able to accept more variable assemblages.

Time does not permit the extensive review of site and assemblage structure and excavation history needed to explain variation between the assemblages used by Maxwell and Oakes to derive the New Mexico pattern. Therefore, we will not attempt to correlate or compare the Trujillo House assemblage with the New Mexico pattern. We will, however, briefly compare the assemblage with those of other American Territorial period sites. To provide a basis for comparison, Table 18-19 lists several sites whose excavated Euroamerican assemblages have

Table 18-19. Comparison of late American Territorial period Euroamerican artifact assemblages by functional category (%).

	Functional Categories[1] (Percentages)									
Sites	UN	E+P	FD	IND	DR	HE	C+M	PE	ENT	TRN
Eastern Plains sites										
Cavanaugh	39.6	0.7	1.1	1.1	4.1	-	52.3	1.6	0.0	0.0
Butcher	31.8	0.3	2.8	0.1	4.6	-	59.3	1.0	0.1	0.0
Wyatt	32.8	0.3	3.9	0.3	10.5	-	50.2	1.8	0.2	0.0
Ontiberos	36.1	1.4	4.9	6.7	17.4	-	30.3	1.9	1.7	0.0
Wilson	43.6	1.3	5.2	1.4	10.4	-	36.7	1.5	0.0	0.0
Howell	18.7	1.1	9.1	17.5	45.3	-	7.7	0.4	0.4	0.0
Mean[2]	36.8	0.8	3.6	1.9	9.4	-	45.8	1.6	0.3	0.0
Standard deviation	4.4	0.5	1.5	2.4	4.8	-	10.6	0.3	0.4	0.0
Rio Chama sites										
LA 48671	60.4	0.3	6.6	1.2	22.2	-	8.0	1.2	0.1	0.0
LA 48672	46.7	0.2	5.0	2.5	19.7	-	23.2	2.7	0.0	0.0
LA 48673	51.6	0.5	17.6	1.7	16.2	-	5.0	6.5	0.9	0.0
LA 48674	45.9	0.9	33.0	4.6	2.8	-	11.9	0.9	0.0	0.0
LA 59658 (Trujillo)	21.8	0.6	0.6	4.7	32.4	0.05	30.8	8.8	0.1	0.0
Mean	45.3	0.5	12.6	2.9	18.7	-	15.8	4.0	0.2	0.0
Standard deviation	12.8	0.2	11.6	1.5	9.6	-	9.7	3.1	0.3	0.0

[1]**Abbreviations**

UN	Unassignable	HE	Household Equipment
E+P	Economy and Production	C+M	Construction and Maintenance
FD	Food	PE	Personal Effects
IND	Indulgences	ENT	Entertainment
DR	Domestic-Routine	TRN	Transportation

[2]Calculated without the figures for the Howell site.

Table 18-20. Comparison of standard deviation ranges for American Territorial period Euroamerican artifact assemblage functional categories, eastern plains sites and Rio Chama sites.

	Functional Categories[1]									
Sites	UN	E+P	FD	IND	DR	HE	C+M	PE	ENT	TRN
Eastern Plains	32.4-41.2	0.3-1.3	2.1-5.1	-0.5-4.3	4.6-14.2	-	35.2-56.4	1.3-1.9	-0.1-0.7	-
Rio Chama	32.5-58.1	0.3-0.8	1.0-24.2	1.4-4.4	9.1-28.3	-	6.1-25.5	0.9-7.1	-0.1-0.5	-

[1]**Abbreviations**

UN	Unassignable	HE	Household Equipment
E+P	Economy and Production	C+M	Construction and Maintenance
FD	Food	PE	Personal Effects
IND	Indulgences	ENT	Entertainment
DR	Domestic-Routine	TRN	Transportation

been analyzed with a comparable analytic format. Six sites are in the eastern New Mexico plains; these data are from Maxwell (1983) and Oakes (1983a, 1990). Five sites, including the Trujillo house, are in the Rio Chama Valley; these data are from Anschuetz et al. (1985) and this project.

Table 18-19 shows that there are both differences and similarities between the eastern Plains and Rio Chama sites. The primary differences are in the relative percentages of artifacts in the Unassignable, Food, Domestic Routine, and Construction/Maintenance categories. In particular, Table 18-19 shows that the eastern Plains assemblages averaged almost three times as many Construction/Maintenance artifacts as the Rio Chama sites. Conversely, the Rio Chama assemblages averaged twice as many Domestic Routine artifacts, almost four times as many Food artifacts, 2.5 times as many Personal Effects artifacts, and are 19 percent higher in functionally unidentifiable artifacts (Unassignable) as the eastern Plains sites. The last figure also suggests that, while more artifacts were functionally unidentifiable in the Rio Chama assemblages, the identifiable artifacts were more evenly distributed among categories than in the eastern Plains assemblages, where Construction/Maintenance artifacts were dominant. These differences are illustrated in Fig. 18-24, where the dominance of Construction/Maintenance and Unassignable artifacts is evident in the eastern Plains assemblages. This confirms that functionally identifiable artifacts were generally more evenly distributed among categories in the Rio Chama assemblages. Personal Effects artifacts were slightly more common in the Rio Chama assemblages, while artifacts in the Economy/Production, Indulgences, Household Equipment, Entertainment, and Transportation categories were uncommon in both groups.

Table 18-19 and Fig. 18-24 also show that there was generally less variation between assemblages in the eastern Plains groups than in the Rio Chama group. Standard deviations show that, with the exception of the Howell site, variation between eastern Plains assemblages was relatively minimal. On the other hand, there was much more variability between Rio Chama assemblages. The reason(s) for this variation is unknown, but may be related to excavation strategies or assemblage sizes.

This variation aside, there are clearly differences between American Territorial period sites on the eastern Plains and in the Rio Chama Valley. Table 18-20 compares standard deviation ranges for functional categories from the two areas. The higher mean standard deviation figures for the Rio Chama sites are reflected in wider ranges for these sites. Thus, while the Rio Chama sites had a higher mean percent of functionally unidentifiable artifacts (see Table 18-19), the range of variation in both groups was very similar. Ranges were also very similar for the Economy/Production, Indulgences, and Entertainment categories. Table 18-20 shows that the major differences between assemblages in the two groups of sites were in the Personal Effects, Food, Domestic Routine, and Construction/Maintenance categories. The differences in the Personal Effects category were due to two Rio Chama sites, LA 48673 and the Trujillo House, which both had high percentages in this category. If they are not included in calculating the Rio Chama figures, the Personal Effects mean percent is 1.6 with a standard deviation of 0.8. These figures and their range (0.8 to 2.4) are very similar to those from the eastern Plains sites, suggesting that variation between the Rio Chama sites has to do with personal choices in access to or use of such items.

In both groups, Food artifacts were most likely to be containers such as cans or jars. However, the Rio Chama sites were more likely to include such items. In fact, were it not for the Trujillo House assemblage, which is lower in this category than the other Rio Chama sites, the two ranges would not overlap at all. The same is true of Domestic Routine artifacts, which are most commonly sherds from plates, bowls, and the like. Without the LA

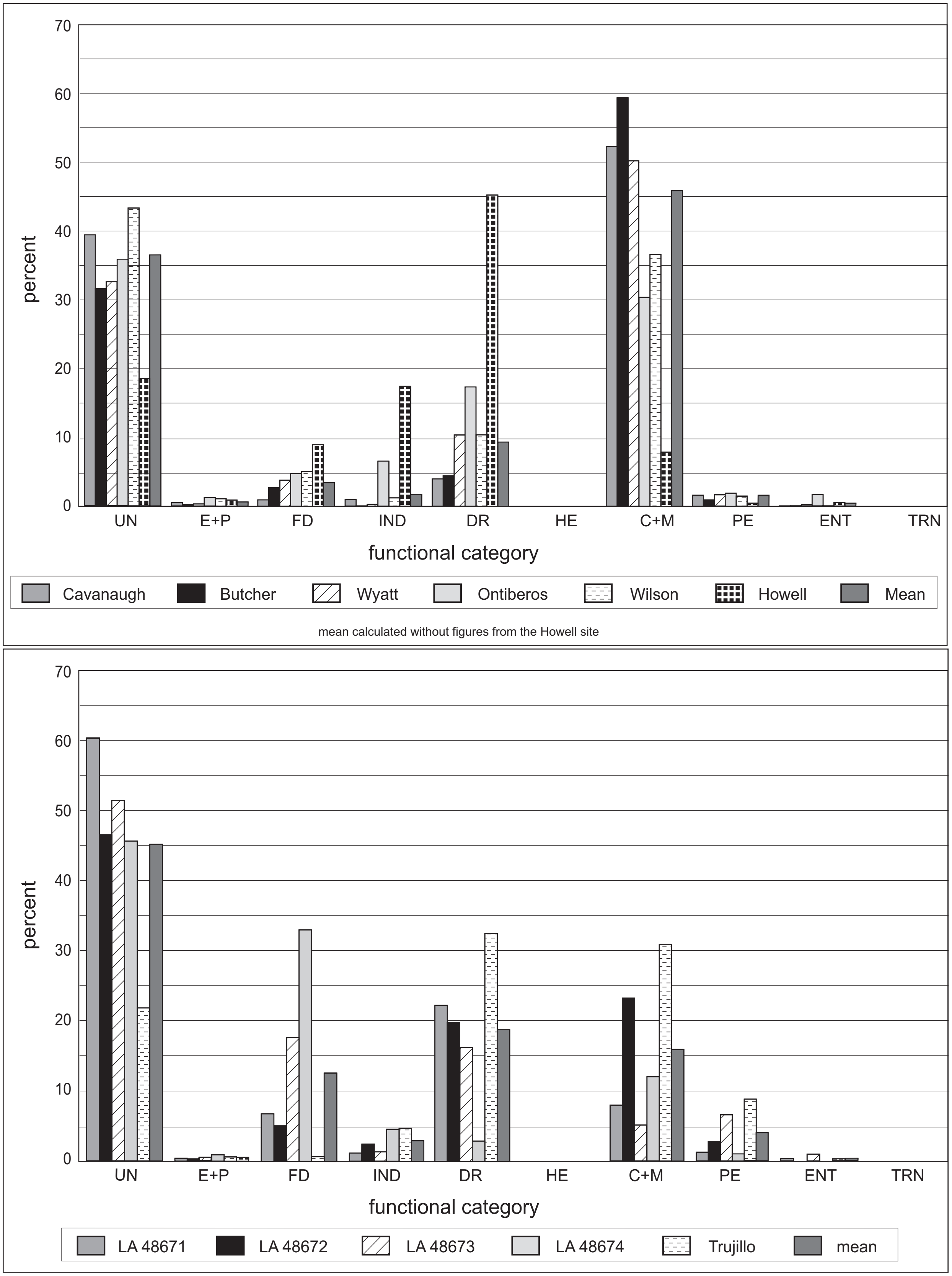

Figure 18-24. Comparison of American Territorial period Euroamerican artifact assemblages by functional category: (top) Eastern Plains sites, (bottom) Rio Chama sites.

48674 assemblage, the higher percentage of such items in the Rio Chama assemblages is even clearer: the mean is 22.6 percent and the standard deviation is 6.0. These figures yield a range of 16.6 to 28.6, which does not overlap with the eastern Plains range, and shows that the Rio Chama assemblages did indeed contain more Domestic Routine artifacts. Finally, the Construction/Maintenance figures show that the two groups of assemblages do not overlap in their standard deviation ranges. The eastern Plains assemblages were characterized by much higher percentages of artifacts in this category.

The primary differences between sites in these areas were in the Food, Domestic Routine, and Construction/Maintenance categories. It is interesting to note that South's (1977) Carolina and Frontier patterns are defined and differentiated on the basis of his Kitchen and Architecture artifact categories. These categories are analogous if not directly comparable to our Food, Domestic Routine, and Construction/Maintenance categories. While this does not necessarily lend support to South's patterns (see Maxwell 1983:85), it does suggest that, if such patterns are to be defined, they will be derived from differences in these categories. Figure 18-24 shows that the eastern Plains sites were clearly characterized by higher percentages of Construction/Maintenance artifacts and lower percentages of Domestic Routine and Food artifacts than the Rio Chama sites. The reasons for this are not clear but one possible explanation may have to do with differing construction techniques. This is suggested by comparing the Trujillo House assemblage with the Cavanaugh and Ontiberos assemblages (Maxwell 1983; Oakes 1983a). In the Trujillo house assemblage, the most common Construction/Maintenance artifacts were window glass fragments (Building Materials), which comprised 24.1 percent of the entire assemblage. Nails (Hardware) made up only 6.3 percent. In the Cavanaugh assemblage, window glass fragments made up 11.5 percent, while nails comprised 22.4 percent (Maxwell 1983:Appendix). Similarly, window glass fragments made up 12 percent of the Ontiberos assemblage; nails accounted for 13.4 percent. These figures indicate that construction hardware, particularly nails, was much more common at the Cavanaugh and Ontiberos sites than at the Trujillo House, pointing to more frequent use of wood in construction at the former sites than at the latter. Additionally, the fact that far fewer window panes than fragments are actually represented in the Trujillo House assemblage confirms the conclusion that Construction/Maintenance artifacts were less numerous there than at the eastern Plains sites.

Differences between relative frequencies of window glass fragments and nails, the most common Construction/Maintenance artifacts, do not, however, entirely account for differences in this category between the areas. For instance, the Trujillo House assemblage included only seven kinds of artifacts in this category (Table 18-5). In the Cavanaugh assemblage, the Construction/Maintenance category contained 109 kinds of artifacts (Maxwell 1983:Appendix), whereas the Ontiberos assemblage included 55 different kinds of Construction/Maintenance artifacts (Oakes 1983a:Appendix). These data show the use of a much greater variety of Construction/Maintenance items at the eastern Plains sites than at the Trujillo House. The differences may still reflect variation in construction techniques, or they may indicate access to a greater variety of Construction/Maintenance items, particularly hardware, on the eastern Plains.

Native Artifacts

This discussion has so far focused only on the Euroamerican artifacts from the Trujillo House. This is appropriate for discussion of differences in the Euroamerican assemblages that are perhaps reflective of varying access to and use of Euroamerican items. It is not the whole picture, however, because the artifact assemblages from the Rio Chama sites, including the Trujillo House, also included native ceramic and lithic artifacts. An accurate description of the assemblages must, therefore, include these artifacts. The analytical format used for the Euroamerican artifacts can accommodate these native artifacts, allowing them to be included in functional categories when their function is known or can be assumed. For these purposes, most native sherds were included in the Domestic Routine category on the assumption that the vessels functioned in much the same ways as Euroamerican ceramic vessels: primarily as food preparation, serving, and eating dishes. Jar sherds were included in the Food category on the assumption that they were most often used for storage, though this was probably not always the case. In those instances where it was not true, however, the jars would still belong in the Domestic Routine category. Projectile points were included in the Economy/Production category. Scrapers, strike-a-light flints, other utilized debitage, and ground stone artifacts were included as Domestic Routine artifacts. Unutilized debitage was included in the Unassignable category.

Table 18-21 and Fig. 18-25 show percentages of each Rio Chama site assemblage that are represented by each functional category, including the native artifacts. Table 18-21 shows that 2.8 to 55.1 percent of the assemblages were composed of native artifacts. Clearly, the assemblages from LA 48673 and LA 48674 were less affected by the addition of the native artifacts than were those of the other sites. Comparisons of Tables 18-19 and 18-21 and Figs. 18-25 and 18-26, however, show that adding native artifacts heightens the differences between the eastern Plains and Rio Chama sites. It does not change the fact that the primary differences were in the Domestic Routine, Food, and Construction/Maintenance categories. This is clearly seen in Table 18-22, where the

Table 18-21. American Territorial period assemblages from the Rio Chama sites by functional categories, including native ceramic and lithic artifacts (percentages).

	Functional Categories[1] (Percentages)										Native Ceramic and Lithic Artifacts
Sites	UN	E+P	FD	IND	DR	HE	C+M	PE	ENT	TRN	
LA 48671	45.6	0.3	4.9	0.9	41.3	0	5.9	0.9	0.1	0	25.6
LA 48672	25	0.1	2.5	1.2	58	0	11.7	1.4	0	0	49.3
LA 48673	50.9	0.4	17.1	1.7	17.8	0	4.8	6.4	0.8	0	2.8
LA 48674	45.1	0.9	31.8	4.4	5.3	0	11.5	0.9	0	0	3.5
LA 59658 (Trujillo)	12.1	0.3	13	2.6	49.9	0.03	17.1	4.9	0.1	0	55.1
Mean	35.7	0.4	13.9	2.2	34.5	0	10.2	2.9	0.2	0	27.3
Standard deviation	10.5	0.3	10.4	1.3	19.8	0	4.4	2.3	0.3	0	-

[1]**Abbreviations**

UN	Unassignable	HE	Household Equipment
E+P	Economy and Production	C+M	Construction and Maintenance
FD	Food	PE	Personal Effects
IND	Indulgences	ENT	Entertainment
DR	Domestic-Routine	TRN	Transportation

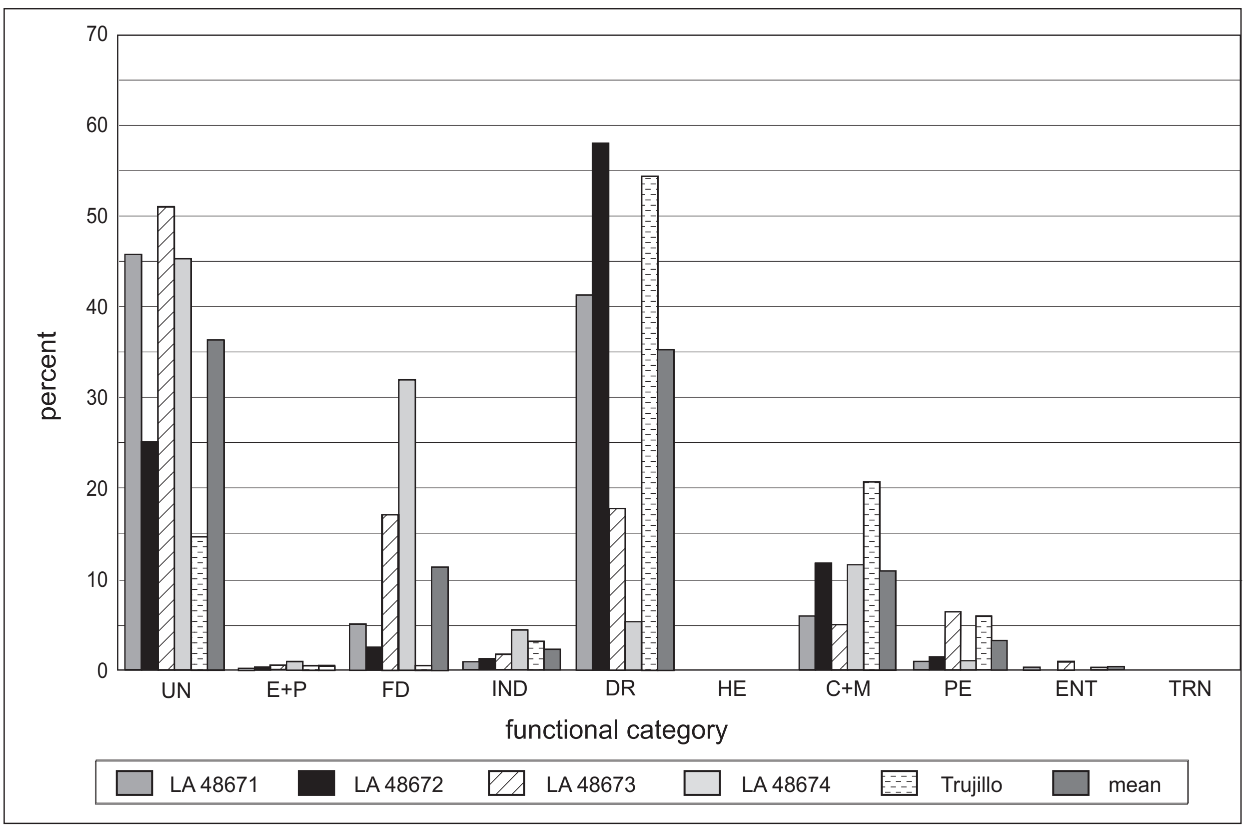

Figure 18-25. American Territorial period assemblages from the Rio Chama sites by functional category, including native artifacts.

Table 18-22. Comparison of standard deviation ranges for American Territorial period assemblage functional categories, eastern plains sites and Rio Chama sites.

	Functional Categories[1]									
Sites	UN	E+P	FD	IND	DR	HE	C+M	PE	ENT	TRN
Eastern Plains	32.4-41.2	0.3-1.3	2.1-5.1	-0.5-4.3	4.6-14.2	-	35.2-56.4	1.3-1.9	-0.1-0.7	-
Rio Chama	25.2-46.2	0.1-0.7	3.5-24.3	0.9-3.5	14.7-54.3	-	5.8-14.6	0.6-5.2	-0.1-0.5	-

[1]Abbreviations

UN	Unassignable	HE	Household Equipment
E+P	Economy and Production	C+M	Construction and Maintenance
FD	Food	PE	Personal Effects
IND	Indulgences	ENT	Entertainment
DR	Domestic-Routine	TRN	Transportation

standard deviation ranges are compared. Figure 18-26 shows that the differences between the two groups as defined by percentages of Domestic Routine, Food, and Construction/Maintenance artifacts, which were obvious in the Euroamerican assemblages, are even more substantial when the native artifacts were included. Two facts are evident. First, native artifacts were significant parts of the Rio Chama assemblages. This in itself sets these assemblages apart from the contemporaneous eastern Plains site assemblages, which only contained Euroamerican artifacts. Second, the differences in assemblages from the two groups of sites, as defined by Domestic Routine, Food, and Construction/Maintenance artifacts, were actually clarified by comparing complete assemblages rather just Euroamerican assemblages. This demonstrates that there were significant differences in selection, use, and disposal patterns between the two areas.

An adequate explanation of these differences awaits extensive study of market conditions in the two areas. For instance, the eastern Plains sites were located closer to major trade and transportation routes into New Mexico from the east, including the Santa Fe Trail, several railroad lines, and stage lines. The Rio Chama sites were located near trade and transportation routes that were economically important during the Spanish Colonial and Mexican Territorial periods, the *Camino Reál* and the California trail. These routes were largely eclipsed by eastern routes when New Mexico's economic focus shifted to the United States in the Mexican Territorial period. North-central New Mexico gained a direct tie to the United States market economy in the 1880s when the Denver and Rio Grande Western Railroad opened its line from Antonito, Colorado to Española. However, unlike Las Vegas on the state's eastern side (Maxwell 1983), no major railroad town formed in the region, and settlements in the many valleys of north-central New Mexico remained relatively isolated when compared to the metropolitan areas around Santa Fe and Albuquerque and the rapidly growing towns on the eastern Plains. This may be why the differences between the Rio Chama and eastern Plains sites appear to reflect the last half of Riordan and Adams' (1985:8) statement that, "when located in different geographic zones, sites having the same access to the national market will show greater similarity to each other than to sites having different access, even when located in the same region." Interestingly, Riordan and Adams' (1985:7) map shows both north-central New Mexico and the eastern Plains in the same market access area characterized by low commodity flow from the American Manufacturing Belt in the northeastern United States. Their statement above notwithstanding, Riordan and Adams do not actually consider intraregional variability in market access, particularly in the Southwest where long-established cultural and economic ties to Spain and Mexico, and geographical factors encouraging local isolation, apparently resulted in different market access.

On the other hand, differences between the two groups of assemblages do appear to reflect Miller and Hurry's (1983:80) statement that "recognition of the difference between economically isolated frontiers and those that have a cash flow is essential for understanding artifact assemblages." They go on to state that "there seems to be a gradation ranging from economic isolation to economically isolated communities with limited cash flows to frontier communities with access to cheap transportation" (Miller and Hurry 1983:80). Their model states that, with increasing ease of and access to transportation to national markets, there will be increased inflow of manufactured goods, changes in crops from those grown for subsistence to those grown for market, decreased self-sufficiency with increased reliance on market goods, fewer home industries as increased market access makes manufactured goods more available and less expensive and decreased economic interaction with neighboring native peoples. While Miller and Hurry (1983) are primarily concerned with changing economic isolation through time, their model also has implications

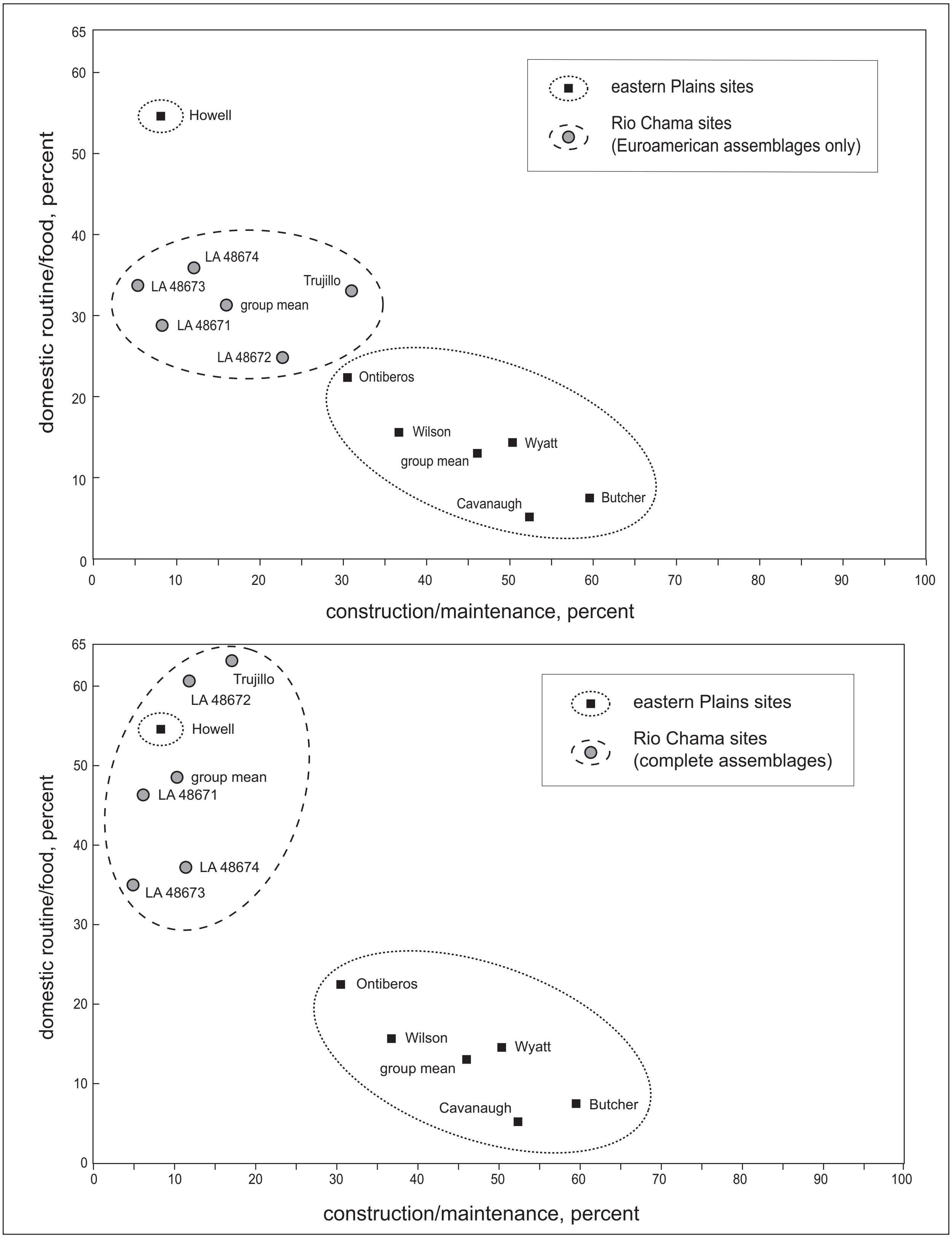

Figure 18-26. Comparison of Domestic Routine and Food versus Construction and Maintenance artifacts from the Eastern Plains and Rio Chama site assemblages: (top) assemblages without native artifacts, (bottom) assemblages with native artifacts.

for spatial differences. It appears to describe the differences between our two groups of sites, particularly when complete assemblages are compared. It may explain, for instance, why the Trujillo House Euroamerican artifact assemblage had considerably less diversity than those from the eastern Plains sites, and why native artifacts continued to be important components of the Rio Chama assemblages even after the opening of trade and transportation routes to the United States.

Economics may not, however, be the only cause of differences between these groups of sites. It is possible that ethnicity and culture were also important factors, although the sample is not large enough to confirm this potential pattern. The eastern Plains sites were, with one exception, occupied by Anglo-Americans while the Rio Chama sites were occupied by Hispanics. Interestingly, the single Hispanic site in the eastern Plains group, Ontiberos, was very similar to the Rio Chama sites in its ratio of Domestic Routine and Food artifacts to Construction/Maintenance artifacts (Table 18-19; Fig. 18-26), though native artifacts were not part of the assemblage. In a similar pattern, Assemblages I and II from Paraje de Fra Cristobal (LA 1124) in south-central New Mexico were characterized by higher frequencies of artifacts that would be classified as Domestic Routine and Food items than by Construction/Maintenance artifacts (D. Boyd 1986). Assemblage I came from a two-room, late American Territorial period house while Assemblage II came from a large, mid-American Territorial period house. Both were apparently occupied by Hispanics. Assemblage I contained about 51 percent Domestic Routine and Food artifacts, and 33 percent Construction/Maintenance artifacts; Assemblage II contained about 38 percent Domestic Routine and Food artifacts, and 40 percent Construction/Maintenance artifacts (D. Boyd 1986:229-230). However, D. Boyd (1986:231) notes that most of the latter were window glass fragments, decreasing the relative importance of Construction/Maintenance artifacts. These figures did not include "Indian-made pottery" that was found at the site (D. Boyd 1986:234). D. Boyd does not specify the number or types of "Indian-made" sherds collected. While these figures do not place the assemblages within the group defined by the Rio Chama sites, the Paraje assemblages more closely resembled those assemblages than they did those from the eastern Plains sites. This is potentially significant since D. Boyd's (1986:27) research goals were to determine "...to what degree was...Paraje culturally Hispanic?" and "...is there any Hispanic distinctiveness reflected in the archaeological record?" In the end, he concludes (D. Boyd 1986:235):

> The individual artifacts and the artifact patterns from LA 1124 do not reflect ethnicity to any discernable extent. With the exception of the pipe fragment found in the midden, which may be indicative of Anglo culture, no other material culture at the site can be said to be ethnically distinctive. The main reason for the lack of ethnicity in the artifacts seems to be the widespread availability of mass produced goods throughout the Territorial Period.

Douglas Boyd was apparently looking for Hispanic artifacts like majolica sherds rather than for patterns in assemblage composition. In this light, it is important to see that his data are actually more similar to Hispanic sites in the Rio Chama than to contemporaneous homesteads on the eastern Plains. While this does not demonstrate an ethnic connection, the possibility is supported by Deagan's (1987:25) statement that "One of the most distinctive characteristics of Spanish colonial site assemblages in the circum-Caribbean area is the overwhelming dominance of ceramic artifacts. Such predominance reflects, among other trends, the vigorous ceramic-making and -using traditions that have been characteristic of Spain from Muslim times until today."

This statement describes the Spanish Colonial, Mexican Territorial, and American Territorial period assemblages from La Puente, the Trujillo House, and the other Rio Chama sites, suggesting ethnic continuity in ceramic vessel use. Therefore, while other factors cannot be discounted, we should not ignore the possibility that ethnicity is discernable in these assemblages. Future study will determine whether ethnicity affected selection, use, or disposal patterns and how it was affected by market access.

LA 54313, La Puente — A Hispanic Village

Artifact and Site Chronology

Of 1128 Euroamerican artifacts collected from La Puente, 468 (41.5 percent) were datable, with manufacturing dates ranging from 1700 to the present. Figure 18-27 shows the percentage of artifacts that could date to each five-year period. The minimum date range was 1750 to 1930, and the mean artifact date was 1856.8. Forty-five artifacts were post-1930 road trash, consisting of bottle fragments. If they are deleted from the assemblage, the minimum date range is 1750 to 1903, and the mean artifact date is 1846.1. The minimum range is much wider than the range for native ceramics, and the mean date is 55 to 90 years later than those of the native ceramics and radiocarbon samples. Further, while the native ceramic and radiocarbon dates showed peaks in datable artifacts and samples before 1820, the

Euroamerican artifacts peaked between 1820 and 1900, with most of the artifacts (about 80 percent) potentially dating between 1820 and 1850. Thus, we see in the Euroamerican assemblage what is not as clearly visible in the native ceramics or the radiocarbon samples—a component dating to the Mexican Territorial period (1821 to 1846). At 1850, there was a drop in the number of datable artifacts, after which the figures fluctuated between 65 and 69 percent until 1900. Interestingly, of the 468 datable artifacts, only 87 (18.6 percent) were not available before 1850. This may suggest that the American Territorial period component is even less important than it appears in Fig. 18-27. Less than 30 percent of the artifacts could date after 1900. The Euroamerican artifacts support the native sherds and radiocarbon dates in pointing to abandonment or disuse of the midden area in the late 1800s.

We do not suggest, however, that the Spanish Colonial component represented by the native sherds and radiocarbon samples is not visible in the Euroamerican assemblage. On the contrary, while the pre-1820 artifacts were not strongly represented in the Euroamerican assemblage, Fig. 18-27 shows that up to 40 percent of the artifacts could date before 1820. While this percentage is not nearly as large as that for the post-1820 artifacts, its significance can be seen in Fig. 18-28, which compares the Euroamerican assemblages from La Puente and the Trujillo House. No Spanish Colonial Period occupation was evident in the Trujillo House assemblage, which is dominated by late nineteenth century artifacts. In contrast, the Spanish Colonial Period component was clearly visible in the La Puente assemblage. Since the graph in Fig. 18-27 accounts for the relative weights of the numbers of artifacts in each date range, the Spanish Colonial component is partly masked by the much greater numbers of post-1820 artifacts, but is clearly present.

With this in mind, we can state that La Puente, as represented in the features excavated during this project, was first occupied in the 1700s, probably after 1770, and was largely abandoned by 1900. Euroamerican artifact, native sherd, and radiocarbon dates in the last quarter of the 1700s and first half of the 1800s may indicate that this was the period of most intense occupation of La Puente, perhaps as the plaza seen by Hibben. This is consistent with Simmons (1979:106), who states that in the last half of the eighteenth century, the rural New

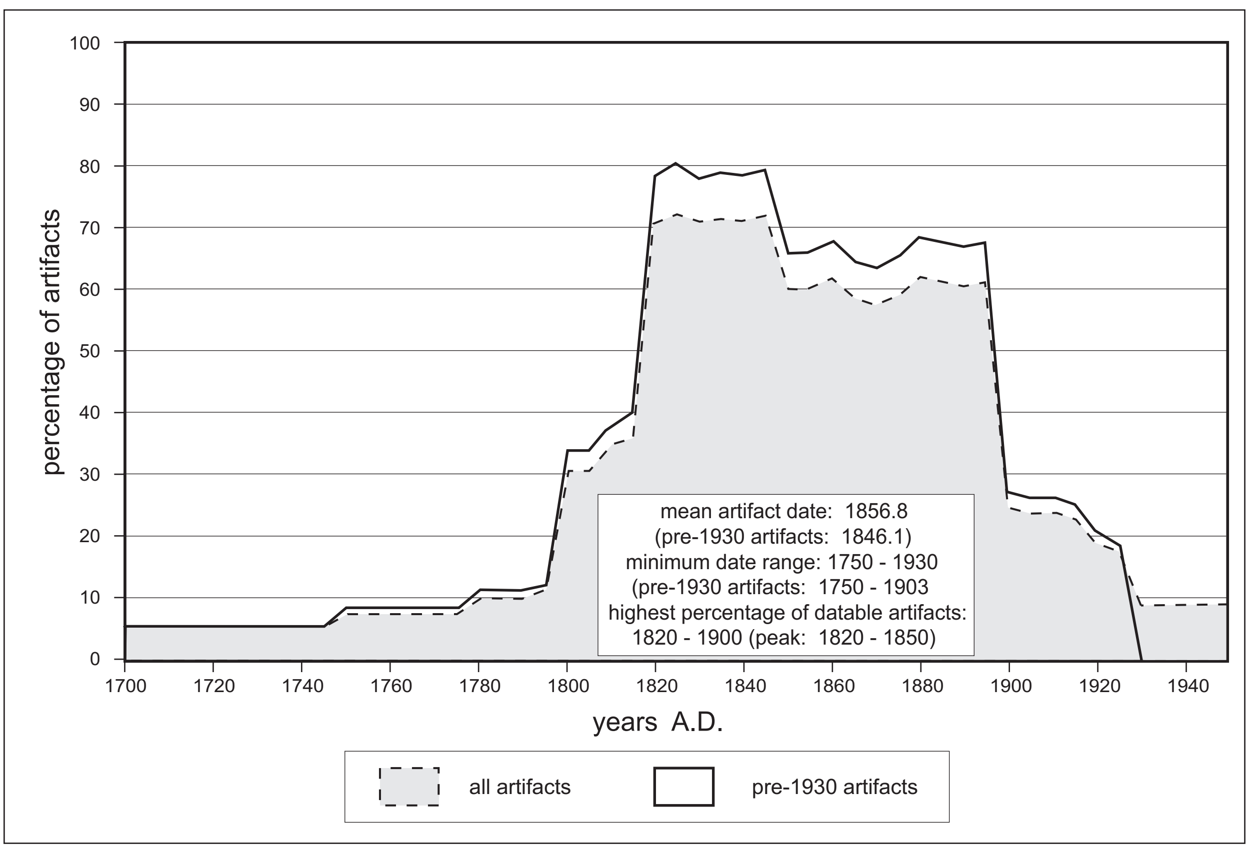

Figure 18-27. Percentage of datable Euroamerican artifacts from La Puente that could date to each 5-year period between 1700 and 1950.

Mexican population "increasingly forsook their isolated *ranchos* and congregated in small fortified towns or *plazas*." The impetus for this settlement change was a period of intense hostility by mobile Indian groups including Apaches, Navajos, Utes, and particularly Comanches. As a consequence, D. Snow (1979b:50) argues that "Rural Hispano villages in New Mexico are a product, for the most part, of the last quarter of the 18th century and of the 19th century. If we examine destructive pressures since 1848, we are looking at village or community structures which, in most cases, were less than 75 years in existence prior to that date—a space of only two generations or so."

Perhaps after about the middle of the nineteenth century, the community at La Puente began to disperse, resulting in less intensive use of the site area, and reflected in the archaeological record as decreasing frequencies of datable artifacts. Wroth (1979:18) contends that population growth coupled with relative peace with the Indians, beginning with de Anza's 1786 treaty with the Comanche and reaching fruition in the early 1800s, encouraged a return to dispersed settlement. Unlike the earlier dispersed pattern, however, nineteenth century dispersed settlement was plaza-centered. Farms and ranches were scattered around small plazas that gave settlers a community focus and identity. This community focus often seems to have led to establishing a capilla at the plaza, as the community began to identify itself as separate from the nearest pueblo with a mission. It may have been these factors that encouraged growth of the plaza at the capilla de Santa Rosa de Lima, and allowed that plaza to usurp the name and prominence of the earlier community at La Puente. If so, we may postulate that, by about 1850, the community at La Puente had largely dispersed and was composed of scattered farms and ranches.

Dating the Site: Trash Area 1

Having established the presence of Spanish Colonial, Mexican Territorial, and American Territorial period components at La Puente, we must determine whether the excavated features can be assigned to those components. Chronometric dates from the features are listed in Table 10-1.

Feature 2. Two radiocarbon samples were submitted from Feature 2. One sample taken from Level 6

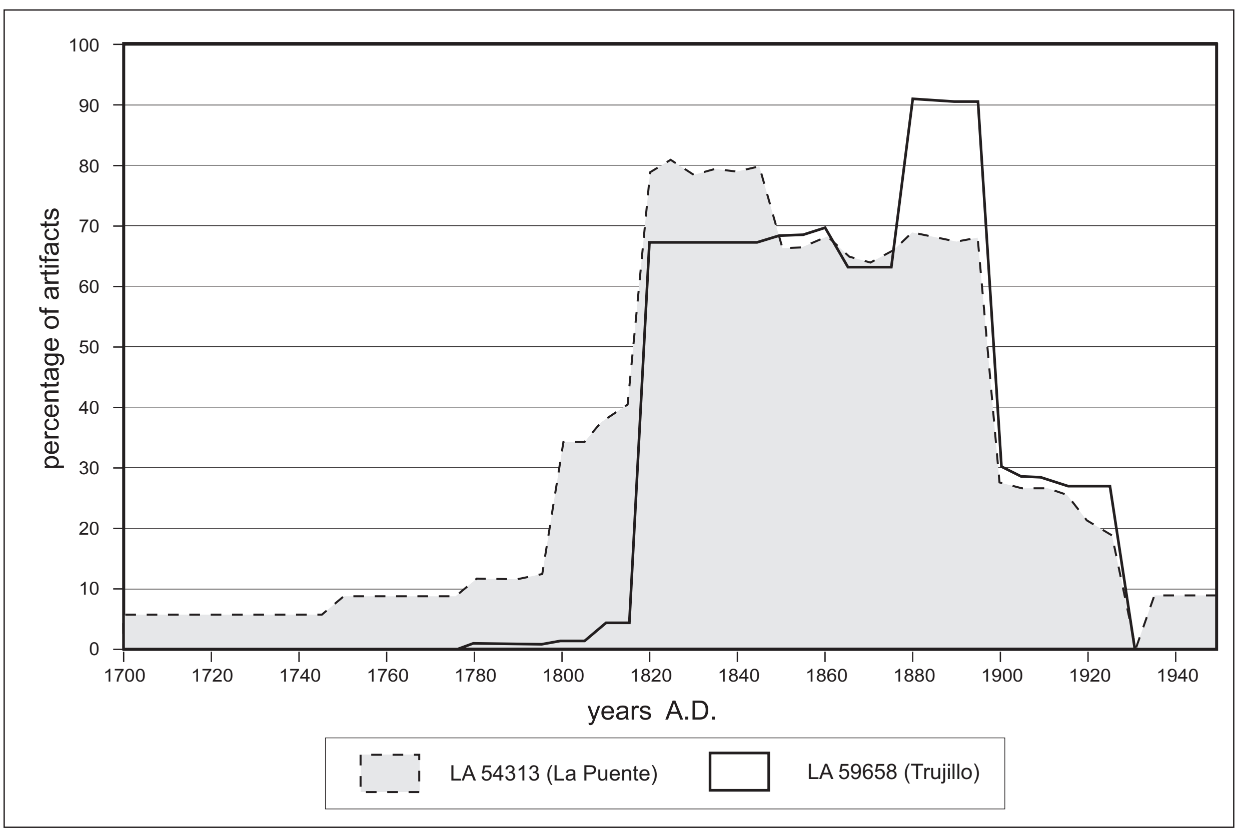

Figure 18-28. Comparison of datable Euroamerican artifacts from La Puente and the Trujillo House for each 5-year period between 1700 and 1950.

yielded a date of 1760 ± 60. With four calibrated dates between 1751 and 1796, it appeared to date to the Spanish Colonial period. The other sample, taken from Level 4, yielded a date of 1850 ± 50, about 90 years after the first. Its calibrated dates were not clustered like the first sample; they ranged from 1711 to 1955. These results could imply that a 90-year span separates Levels 4 and 6 in Feature 2. However, the fill in this feature consisted of a single stratum with only minor internal lensing. Therefore, the difference in dates is not the result of a long use-life.

Fifty datable Euroamerican artifacts were collected from Feature 2. They yielded artifact dates ranging from 1700 to 1930, with a minimum date range of 1750 to 1875. However, only one artifact, a majolica sherd, dated before 1750. If that sherd is deleted from the datable artifact assemblage, the minimum date range becomes 1830 to 1875. The mean date for all artifacts is 1862.9, which is 50.4 years after the midpoint of the 1750 to 1875 range. Without the majolica sherd, it is 1865.7, which is 13.2 years after the midpoint of the 1830 to 1875 range, suggesting that this is more accurate than the 1750 to 1875 range. Figure 18-29 shows the percentage of artifacts that could date to each five-year period from 1700 to 1950. Unlike the site graph (Fig. 18-27), the highest percentage of artifacts from Feature 2 could date between 1860 and 1900 (84+ percent) and 92 percent could date between 1875 and 1900. However, only four artifacts (8 percent) were not available before 1875. If they are not included in Fig. 18-29, the 1875 to 1900 peak is not present and the highest percentage of artifacts date between 1860 and 1900. Taken together, these data suggest that Feature 2 dated to the 1860s or 1870s. This correlates well with the later radiocarbon date. It appears that the early radiocarbon date represents old wood. A small peak in datable artifacts between 1820 and 1830 suggests that, although the feature dates much later, a significant number of artifacts were potentially available after 1820.

Feature 3. Two radiocarbon samples were submitted from Feature 3. One sample from Level 6 yielded a date of 1680 ± 60, with a calibrated age of 1645. This sample clearly represents old wood. The second sample, taken from level 4, yielded a date of 1800 ± 60, with a wide range of calibrated dates from 1681 to 1955. However, two dates were in the 1900s whereas the other three were between 1681 and 1806.

Forty-two datable Euroamerican artifacts were collected from Feature 3, with dates ranging between 1780 and 1930. The minimum date range is 1800 to 1875, which is dependent on a single button made between 1785 and 1800. If that button is not included with the

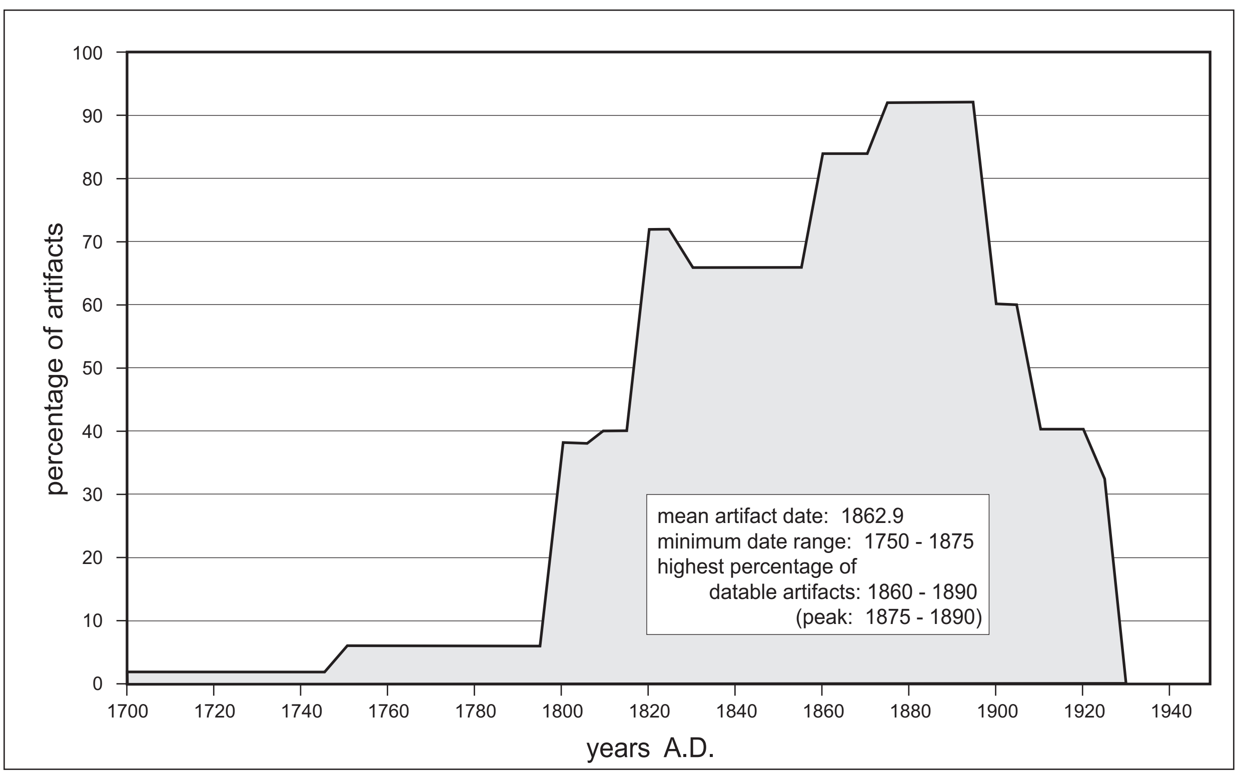

Figure 18-29. Percentage of datable Euroamerican artifacts from Feature 2 at La Puente that could date to each 5-year period between 1700 and 1950.

other datable artifacts, the minimum range narrows to 1850 to 1875. The mean artifact date for all artifacts is 1863.8, which is 26.3 years after the midpoint of the 1800 to 1875 range. Without the button, it is 1865.5, three years after the midpoint of the 1850 to 1875 range, indicating that this is more accurate than the 1800 to 1875 range. Figure 18-30 shows that the highest percentage of artifacts could date between 1880 and 1900, with a small peak in the early 1860s. However, only seven artifacts (16.7 percent) were not available before 1875. If they are not included in the graph, two peaks are evident: one between 1820 and 1850, and another between 1860 and 1865. The latter five-year period is the center of the 1850 to 1875 range, fits with the mean artifact dates, and is at the edge of the radiocarbon range. Together, these data suggest that Feature 3 dates to the early 1860s, making it roughly contemporaneous with Feature 2. Like Feature 2, the peak in dated artifacts between 1820 and 1850 represents a significant number of artifacts that could have come from that period. Similar data from the Trujillo House appear to be indicative of time lag in market access.

Feature 4. Radiocarbon samples were not submitted from Feature 4. This shallow pit yielded only one datable Euroamerican artifact, a small glass fragment dating before 1930. No date can be determined for this feature on the basis of its artifact assemblage.

Feature 7. A single radiocarbon sample from Feature 7 yielded a date of 1710 ± 70 with a calibrated age of 1653. While the calibrated age is too old for the site, the radiocarbon range extends into the late 1700s when the site was occupied. Only two datable Euroamerican artifacts were recovered from this feature: a glass fragment dating between 1800 and 1930, and a sherd dating after 1700. The mean date of these artifacts is 1795. Together, the data may indicate that Feature 7 was a Spanish Colonial period deposit. Feature 3 and possibly Feature 2 cut through Feature 7, and this may support a Spanish Colonial date because it is clearly older than those features. In turn, Feature 7 apparently disturbed Feature 4, indicating that the latter is even older. If Feature 7 dates to the late Spanish Colonial Period, Feature 4 must also have been used during that period.

Feature 9. Seven radiocarbon samples were submitted from Feature 9, and yielded dates from the 1600s to the present. Three samples yielded modern dates of 1920 ± 70, 1949 ± 70, and 1949 ± 90, all with calibrated ages of 1955. One sample provided a date of 1670 ± 70 with a calibrated date of 1642. This sample represents old

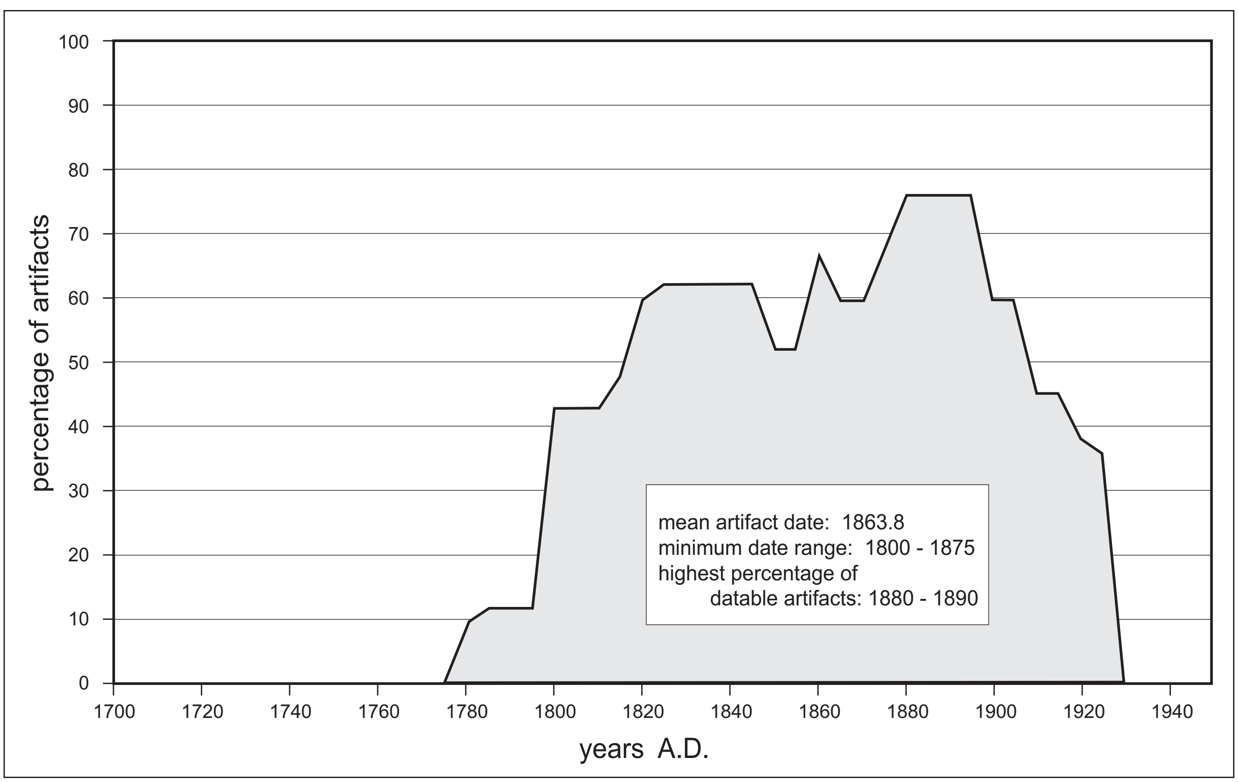

Figure 18-30. Percentage of datable Euroamerican artifacts from Feature 3 at La Puente that could date to each 5-year period between 1700 and 1950.

wood. Another sample provided a date of 1720 ± 90, with a calibrated date of 1656. This date is also too old for the site, but its range extends to near the end of the Spanish Colonial period. The two remaining samples dated to the late Spanish Colonial period, with dates of 1750 ± 70 and 1810 ± 70. Calibrated dates for these two samples included 1784, 1788, and 1808, in addition to dates that are too old or too young for the site. After deleting the modern and old-wood dates, radiocarbon dates suggest that Feature 9 dates to the late 1700s.

Seventy-four datable Euroamerican artifacts were recovered from Feature 9, with dates ranging from 1700 to the present. The minimum date range was 1800 to 1903, and the mean artifact date was 1877.7. These figures were dependent on the presence of 35 post-1930 road trash glass fragments. If they are deleted from the datable artifact assemblages, the minimum date range narrows to 1800 to 1880, and the mean artifact date drops to 1808.3. Although the 1877.7 date is 12.7 years after the midpoint of the 1800 to 1930 range, 1808.3 is 31.7 years before the midpoint of the 1800 to 1880 range, indicating that one of these figures is very inaccurate. The 1800 to 1880 range is dependent on two artifacts that were not available until about 1880. Without these artifacts, the minimum date range narrows to 1800 to 1820, and the mean artifact date drops to 1803.4.

Figure 18-31 shows the percentage of datable artifacts for each five-year period. The graph contrasts distinctly with Figs. 18-29 and 18-30 in that it shows two peaks: between 1780 and 1800, and between 1820 and 1830. The 20-year hiatus between peaks is the result of an assigned end date of 1800 for a group of unidentifiable majolica sherds. These sherds might well have dated from the early 1800s, but they could not be typed and thus assigned end dates. If they do date after 1800, the hiatus between 1800 and 1820 is not present, and the highest percentage of artifacts dates between 1780 and 1830. The 1803.4 mean artifact date is 1.6 years earlier than the midpoint of this range. After 1830, the number of datable artifacts dropped rapidly.

Taken together, these data suggest that Feature 9 was used during the Spanish Colonial period, with the best artifact dates between 1780 and 1830. The decrease in datable artifacts after 1830 suggests that the feature was used early in the Mexican Territorial period. To check this, the artifacts available before 1820 were factored out of the datable assemblage in order to determine whether most were available long before or only immediately before 1820. Figure 18-32 shows that most pre-1820 artifacts could date between 1780 and 1800. Of the 37 datable artifacts (after deleting the post-1880 materials), 25 (67.6 percent) were available before 1820. Most of the

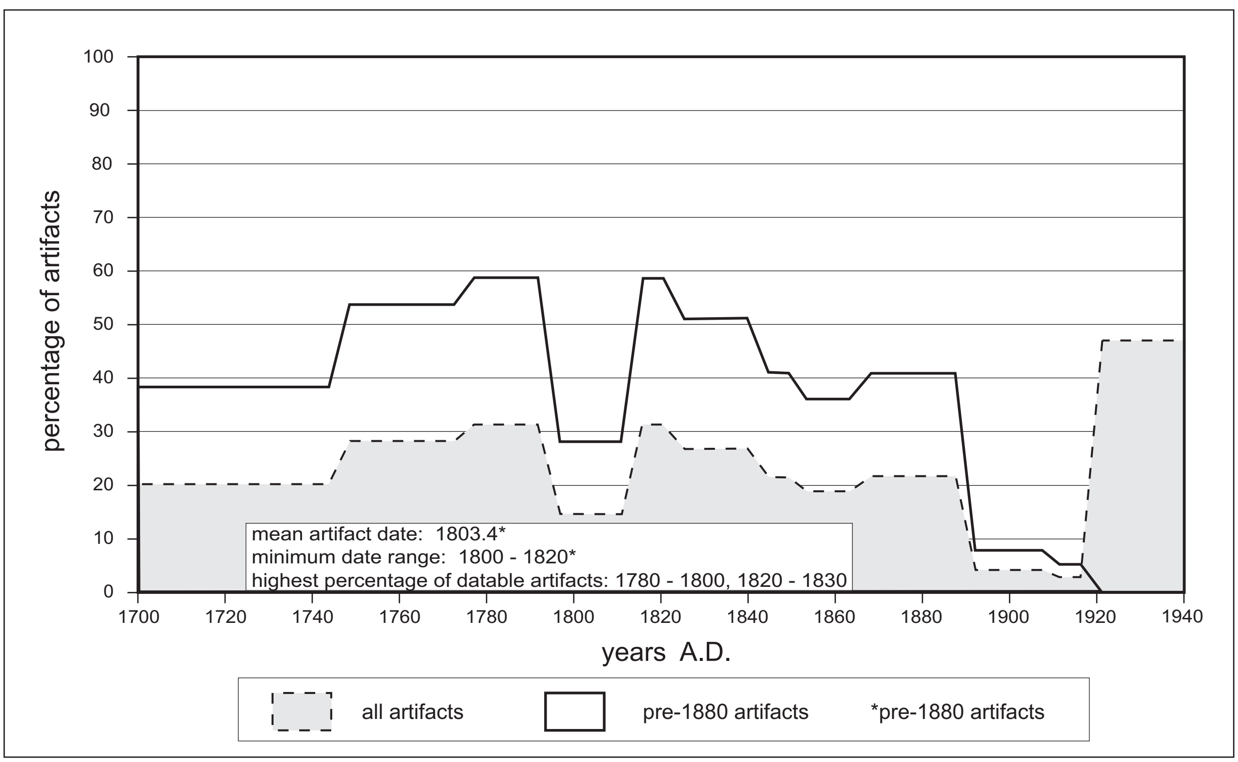

Figure 18-31. Percentage of datable Euroamerican artifacts from Feature 9 at La Puente that could date to each 5-year period between 1700 and 1950.

latter (n=23) were also available before 1800. After 1800, there is a dramatic drop in the percentage of datable artifacts. This shows that the Spanish Colonial assemblage from Feature 9 dated between 1780 and 1800.

Summary. In Trash Area 1, radiocarbon and Euroamerican artifact dates show that Feature 9 was used during the late Spanish Colonial period, and that Features 2 and 3 were used in the 1860s or 1870s during the American Territorial period. Feature 7 may have dated to the late Spanish Colonial period, though the small number of dates precludes a definite conclusion. If Feature 7 does date to the late 1700s or early 1800s, Feature 4 must also date to the Spanish Colonial period, since stratigraphy shows that it was older than Feature 7.

Dating the Site: Trash Area 2

Feature 1. Two radiocarbon samples were submitted from Feature 1. One yielded an old-wood date of 1690 ± 50 with a calibrated date of 1648. The other yielded a modern date of 1910 ± 60, with a calibrated age of 1955. Twenty-three datable artifacts yielded dates between 1700 and 1930. The minimum date range was 1750 to 1875, and the mean artifact date was 1855.1. This date is 42.6 years after the midpoint of the minimum range, and suggests that the range is too wide. In fact, only seven artifacts could date before 1820. The remaining 16 artifacts (69.6 percent) were not available before 1820. Their mean date was 1868.8. Figure 18-33 shows that most artifacts could date between 1860 and 1900, with the highest percentage (87) possibly dating between 1875 and 1890. This suggests that the feature dates to the last half and perhaps the last quarter of the nineteenth century, which is within the range of the later radiocarbon date (1850 to 1970).

Feature 5. A single radiocarbon sample from Feature 5 yielded a modern date of 1890 ± 60, with a calibrated date of 1955. Seven Euroamerican artifacts had a minimum date range of 1750 to 1820, and a mean artifact date of 1799.3. These dates suggest a Spanish Colonial date for the feature. Only three artifacts could date before 1820, however, whereas the highest percentage could date between 1820 and 1850, suggesting a Mexican Territorial period date. This is within the range of the radiocarbon date (1830 to 1950).

The stratigraphy of Feature 5 shows, however, that it post-dates Feature 1. If Feature 1 dates after 1850 and perhaps after 1875, then Feature 5 must be younger, indicating that the radiocarbon date at 1890 is probably accurate. It is obvious that the seven artifacts are insufficient to establish a date for Feature 5.

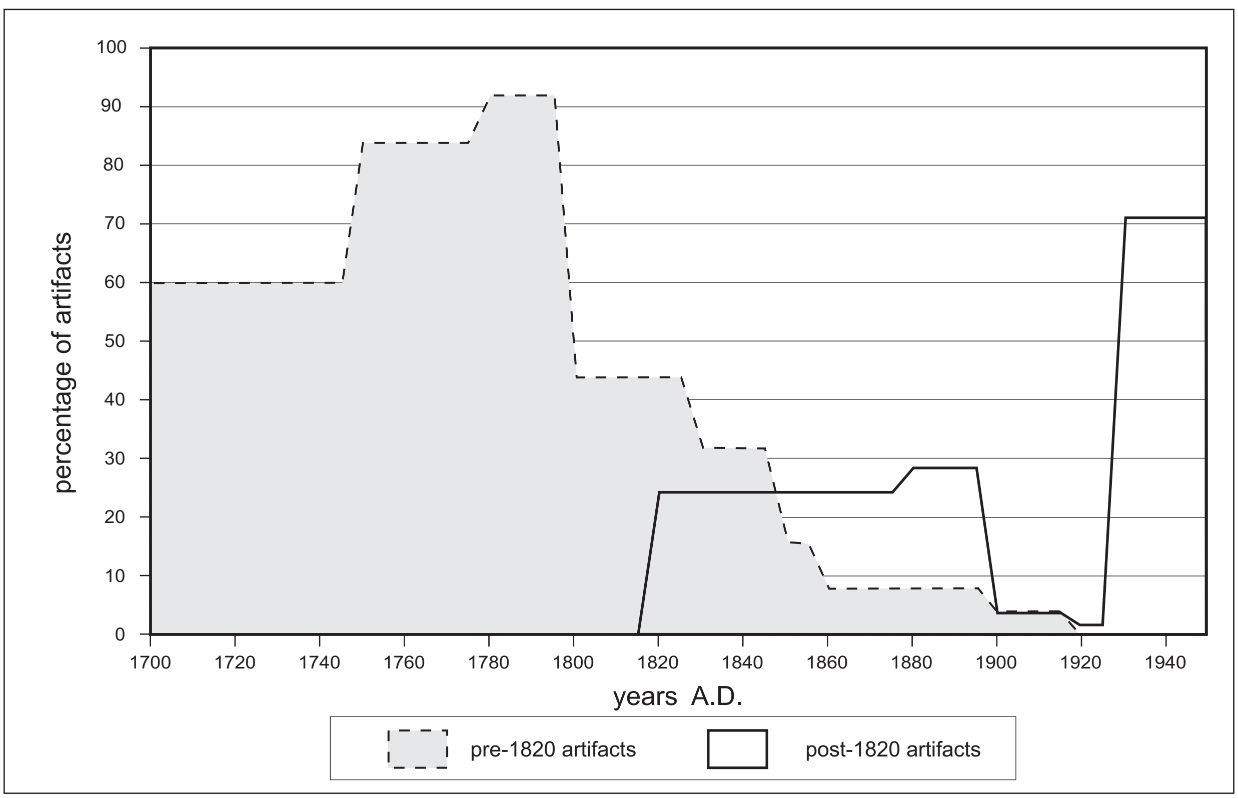

Figure 18-32. Percentage of pre-1820 and post-1820 Euroamerican artifacts from Feature 9 at La Puente that could date to each 5-year period between 1700 and 1950.

Feature 6. Two radiocarbon samples from Feature 6 yielded an old-wood date of 1590 ± 60 with a calibrated date of 1490, and a date of 1840 ± 70 with a series of calibrated ages in the early 1700s, the middle and late 1800s, and the 1900s. A single glass fragment from the feature dated between 1800 and 1903.

Stratigraphy demonstrated that Feature 6 was older than Features 1 and 5, because Feature 1 covered at least part of Feature 6 and Feature 5 was dug through both Features 1 and 6. If Feature 1 dated between 1860 and 1900 and Feature 5 dated to the last years of the 1900s, Feature 6 must be older, perhaps indicating that the 1840 radiocarbon date is accurate.

Feature 8. One radiocarbon sample from Feature 8 yielded an old wood date of 1550 ± 70, with a calibrated date of 1450. Fifty-seven datable Euroamerican artifacts were collected from this feature. Their minimum date range was 1800 to 1880, and their mean date was 1857. Figure 18-34 shows that the highest percentage of diagnostic artifacts could date between 1820 and 1850, the approximate range of the Mexican Territorial period, with a peak between 1835 and 1840. There is a second, lower peak between 1880 and 1900, which results from only three artifacts (5.2 percent) that were probably not available before 1880. Without them, the 1820 to 1850 peak is clearly dominant, and over 96 percent of the artifacts could date to the last half of the 1830s. The minimum date range narrows to 1800 to 1837, and the mean artifact date is 1854.5.

These dates indicate that Feature 8 is younger than Features 1 and 5, and is perhaps contemporaneous with Feature 6. In the description of this feature we suggested that the strata beneath Feature 8 corresponded to the probable topsoil layer through which Feature 6 was excavated, and to the topsoil over Feature 1 that was also the fill in Feature 5. The presence of Feature 8 above these strata suggests that it post-dates Feature 5, which may date to about 1890. There are at least two explanations for this discrepancy. The strata beneath Feature 8 may not actually be the same as those identified in Features 1, 5, and 6. The strata descriptions and proximity of features, however, indicate that this is not the case. Alternatively, the fill in Feature 8 may have been redeposited. This could account for the thinness of the deposit, and for the fact that it contained metal slag and scrap iron mixed with numerous glass and ceramic sherds. The latter artifacts might not be expected if the deposit was only a blacksmith's dump. It would also explain the presence of later artifacts in the lower strata.

Feature 10. A single radiocarbon date of 1790 ± 90, with a range of five calibrated dates from the late 1600s to 1975, was obtained from Feature 10. Four of the five

Figure 18-33. Percentage of datable Euroamerican artifacts from Feature 1 at La Puente that could date to each 5-year period between 1700 and 1950.

dates were too early or too late for the site. A calibrated date of 1804 is the only one that approaches the actual occupation period. Five datable Euroamerican artifacts were recovered from this feature. Their minimum date range was 1750 to 1820, and their mean artifact date was 1794. While five artifacts and a single radiocarbon date are not a large body of chronometric evidence, they cluster in the 1790s, and suggest a late eighteenth century Spanish Colonial date for this feature.

Summary. In Trash Area 2, radiocarbon and Euroamerican artifact dates show that Feature 10 was used during the late Spanish Colonial period. Features 6 and 8 may date to the Mexican Territorial period, though Feature 8 may have been redeposited, thereby confusing its date. Features 1 and 5 were deposited during the American Territorial period, with Feature 1 perhaps dating to the last quarter of the nineteenth century, and Feature 5 perhaps to the 1890s.

Dating the Site: Trash Area 3

Twenty-three datable artifacts were recovered from the five test pits excavated in Trash Area 3. Their dates ranged from 1700 to the present, with a minimum date range of 1750 to 1930, and a mean artifact date of 1862. These figures are dependent on a glass bottle fragment dating to between 1903 and 1930, and three post-1930 glass fragments from along the road. Without these items, the minimum date range is 1750 to 1880, and the mean date is 1848. Figure 18-35 shows that the highest percentage of artifacts could date between 1820 and 1850. Taken together, these dates indicate that the shallow deposits in Trash Area 3 were discarded during the Mexican Territorial period, perhaps near the transition from the Mexican to the American Territorial period.

Dating the Site: Other Areas

In addition to those from definable features and trash areas, artifacts were collected from the surface and from grids excavated between and around the trash areas. Forty-seven datable Euroamerican artifacts came from these contexts. Their mean artifact date was 1848.5. The minimum date range was 1750 to 1930, with a midpoint of 1840, which is 8.5 years before the mean artifact date. That date was dependent on two post-1930 glass fragments from along the road, and a single post-1902 glass fragment. Without them, the mean artifact date was 1841.9, less than two years after the midpoint of the minimum date range. This suggests that the artifacts recover-

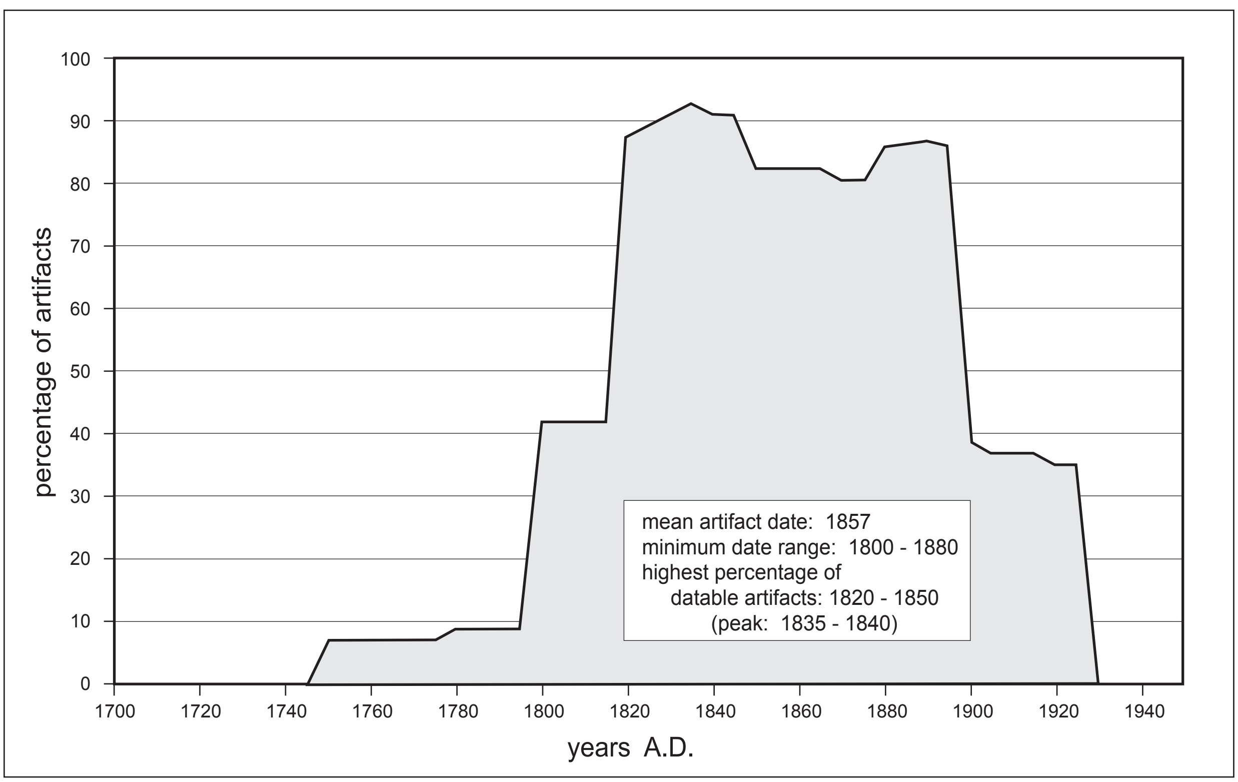

Figure 18-34. Percentage of datable Euroamerican artifacts from Feature 8 at La Puente that could date to each 5-year period between 1700 and 1950.

ed from surface collection and excavation outside trash areas largely dated to the early 1840s. The highest percentage of artifacts could date between 1835 and 1850, with a small peak between 1845 and 1850. That peak is the result of a single post-1848 sherd. The midpoint of the 1835 to 1850 range is 1842.5, supporting an early 1840s date for the assemblage.

Summary

Radiocarbon and Euroamerican artifact dates (Table 18-23) from the 10 features in the three trash areas at LA 54313 show that two—Feature 9 in Trash Area 1, and Feature 10 in Trash Area 2—dated to the Spanish Colonial period. Feature 9 dated to between 1780 and 1800, and Feature 10 was from the 1790s. Features 4 and 7 in Trash Area 1 may also date to this period, but conclusive evidence of this could not be derived. Features 6 and 8 in Trash Area 2 and the shallow deposit comprising Trash Area 3 dated to the 1840s, and were Mexican Territorial period in age. These features may be roughly contemporaneous with artifacts from surface collections and scattered excavation units between trash areas. Features 2 and 3 in Trash Area 1 apparently dated to the third quarter of the 1800s. Finally, Features 1 and 5 in Trash Area 2 dated to the late 1800s, Feature 1 from the last quarter of the century, and Feature 5 perhaps from the 1890s.

Table 18-23. Feature dates from Euroamerican artifacts and radiocarbon dates for La Puente.

Feature	Provenience	Date
Spanish Colonial period		
9	122-128N/189-199W	1780-1800
10	124-127N/164-165W, Levels 7-9	1790s
4?	130N/194W, Stratum 16/Levels 5-6	?
7?	130N/193W, Strata 14-15/Levels 2-4	?
Mexican Territorial period		
6	120-121N/155-156W, Stratum 3/Levels 2-15	1840s
8?	122-125N/162-166W, Level 1	1840s?
Trash Area 3	100-116N/112-138W	1840s
Scattered deposits		1840s
American Territorial period		
2	128-130N/192-193W	1860-1900
1	117-121N/154W, Strata 1-2/Levels 2-9	1875-1900
3	130-131N/192-194W	1875-1900
5	120-121N/156W, Stratum 1a/Levels 2-10	1890s

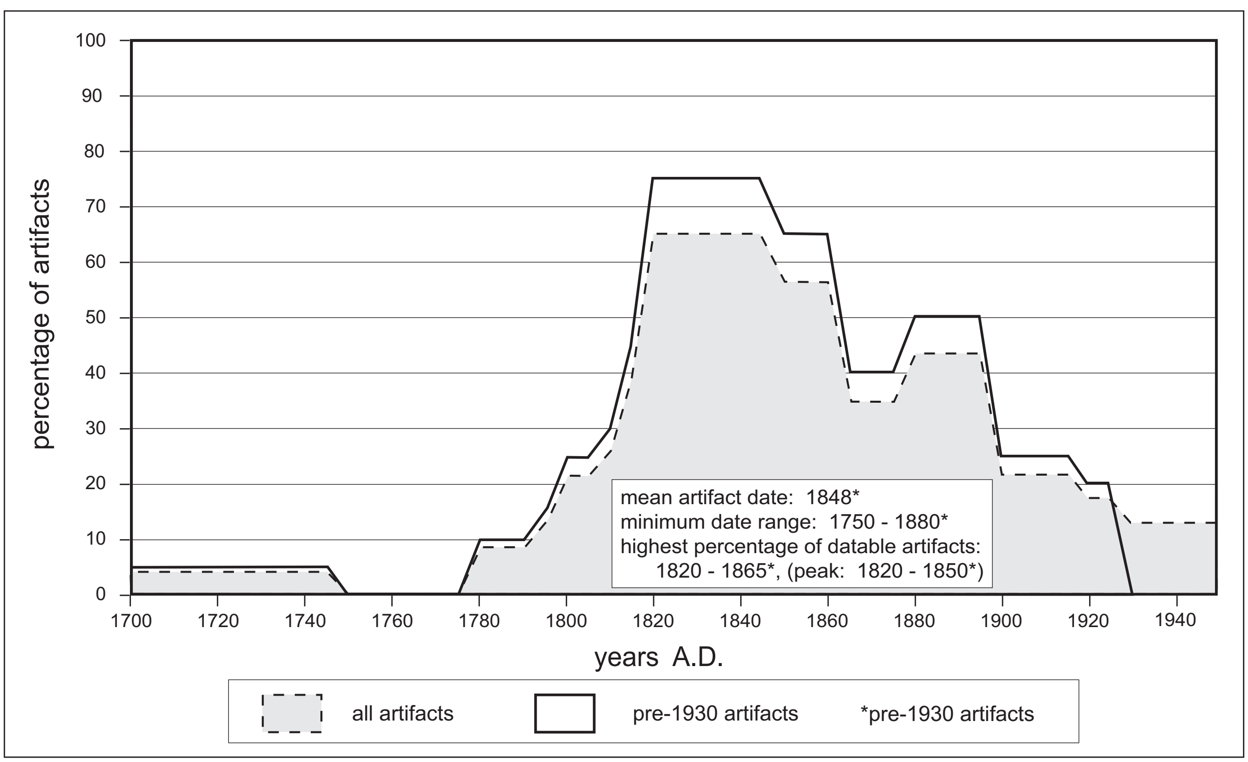

Figure 18-35. Percentage of datable Euroamerican artifacts from Trash Area 3 at La Puente that could date to each 5-year period between 1700 and 1950.

Artifact Function

Spanish Colonial features. One hundred and twenty-four Euroamerican artifacts were collected from Spanish Colonial features at La Puente. Table 18-24 lists these artifacts by functional category. The Domestic Routine category contained the largest number of artifacts, including 45 sherds, one pot or pan fragment, and one drinking glass fragment. Most of the sherds were very small and could not be identified by vessel form. The next largest category consisted of 40 Unassignable artifacts, including 25 otherwise unidentifiable bottle fragments (23 of which are post-1930 road trash), 14 small pieces of rusted metal, and a ceramic figurine fragment. The figurine was high-fired with a semivitreous paste; the paste and surface color were gray-tan, and the surface was decorated with a red-orange paint of unknown composition.

The Construction/Maintenance category included 19 artifacts, mostly Hardware items and Building Materials. The nut, washer, and several wire fragments are from the first level of Feature 9, and are probably not Spanish Colonial period artifacts. The window glass was also probably not from the Spanish Colonial period. Interestingly, several possible mica or selenite window pane fragments were collected, but none came from Spanish Colonial features. This category does not include numerous pieces of natural and processed gypsum (jaspe) recovered from the site. A total of 122.6 g of gypsum was collected from the Spanish Colonial features (66.4 g of unprocessed gypsum, 56.2 g of jaspe).

The Personal Effects category also contained several items that were probably not from the Spanish Colonial period. They included 11 fragments of a post-1930 ointment or petroleum jelly jar, a suspender buckle, and a two-hole, vulcanized rubber shirt or dress button dating to between 1849 and 1890. Present from the Spanish Colonial Period were a silver ring, a shank button, and a bead. A single bottle fragment in the Indulgences category may date to the Spanish Colonial period.

Some 46 artifacts (37.1 percent) from the Spanish Colonial deposits were probably intrusive. Most (36) represent road trash and were recovered from the surface or Level 1 of Feature 9. The others probably reached their locations in Feature 9 by processes such as bioturbation. Table 18-25 lists the remaining 78 artifacts by functional category. The sherds in the Domestic Routine category now make up over half the assemblage. Table 18-26 lists them by paste and ware, showing that coarse earthenwares made up over half of the Euroamerican ceramic artifacts. At least six majolica types were represented, though the unknown category may include sherds from more than one type. Most of the unknown majolica sherds had little or no decoration or were too small for accurate identification. Figure 18-36 shows three San Elizario Polychrome sherds and an unidentified majolica sherd.

Table 18-24. Euroamerican artifacts from Spanish Colonial period features at La Puente; simple ranking of functional categories, types, and functions.

Category *type* function	No.	Percent of Category	Percent of Assemblage
Domestic Routine	47	100.0%	37.9%
dishes, serving and eating	45	95.7%	36.3%
unidentifiable	43	91.5%	34.7%
plate	1	2.1%	0.8%
cup or mug	1	2.1%	0.8%
pots and pans	1	2.1%	0.8%
pot or pan	1	2.1%	0.8%
glassware	1	2.1%	0.8%
drinking glass	1	2.1%	0.8%
Unassignable	40	100.0%	32.3%
unidentified	40	100.0%	32.3%
bottle fragment	25	62.5%	20.2%
unidentifiable	14	35.0%	11.3%
figurine fragment	1	2.5%	0.8%
Construction or Maintenance	19	100.0%	15.3%
hardware	16	84.2%	12.9%
common nail	5	26.3%	4.0%
unidentifiable	4	21.1%	3.2%
wire	3	15.8%	2.4%
finish nail	2	10.5%	1.6%
nut	1	5.3%	0.8%
washer	1	5.3%	0.8%
building material	3	15.8%	2.4%
window glass	3	15.8%	2.4%
Personal Effects	16	100.0%	12.9%
medicine	11	68.8%	8.9%
ointment or petroleum jelly jar	11	68.8%	8.9%
clothing	3	18.8%	2.4%
button, shirt or dress	2	12.5%	1.6%
suspender buckle	1	6.3%	0.8%
jewelry	2	12.5%	1.6%
ring	1	6.3%	0.8%
bead	1	6.3%	0.8%
Economy-Production	1	100.0%	0.8%
hunting or shooting	1	100.0%	0.8%
unidentifiable	1	100.0%	0.8%
Indulgences	1	100.0%	0.8%
alcohol, other	1	100.0%	0.8%
bottle fragment	1	100.0%	0.8%
Total	124		100.0%

Fine earthenwares made up less than half the assemblage and were largely identified as whiteware sherds. The unidentifiable fine earthenware artifact was the figurine fragment discussed above. Only two sherds were identified as pearlware, but most sherds identified as whiteware were small body sherds that may have come from pearlware vessels. Only one sherd, a San Elizario Polychrome fragment, was from a plate. The single cup or mug fragment was a whiteware.

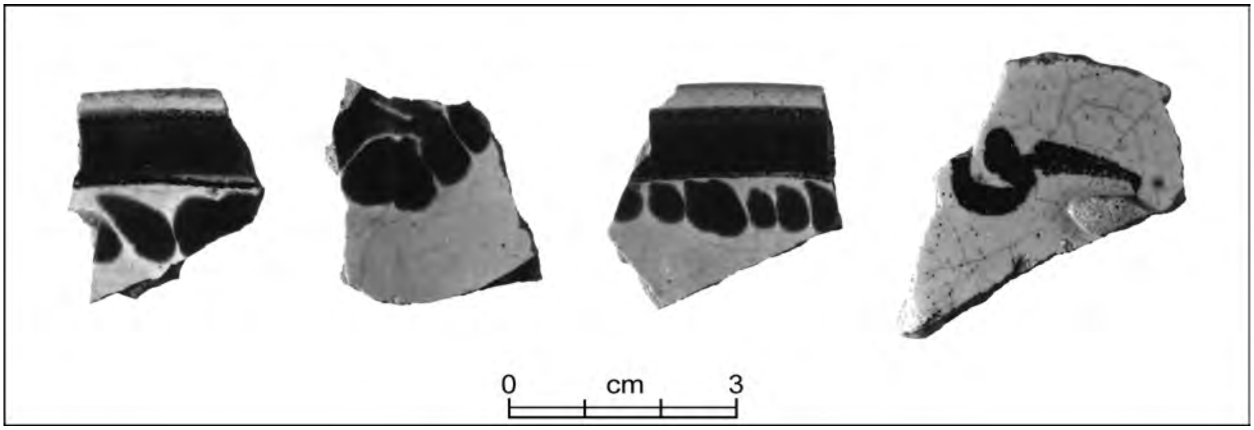

Figure 18-36. Spanish Colonial period Domestic Routine artifacts from La Puente: three San Elizario polychrome sherds, and (right) an unidentified sherd.

Table 18-25. Euroamerican artifacts from Spanish Colonial period features at La Puente; revised ranking of functional categories, types, and functions.

Category / *type* / function	No.	Percent of Category	Percent of Assemblage
Domestic Routine	46	100.0%	59.0%
dishes, serving and eating	45	97.8%	57.7%
unidentifiable	43	93.5%	55.1%
plate	1	2.2%	1.3%
cup or mug	1	2.2%	1.3%
pots and pans	1	2.2%	1.3%
pot or pan	1	2.2%	1.3%
Unassignable	17	100.0%	21.8%
unidentified	17	100.0%	21.8%
unidentifiable	14	82.4%	17.9%
bottle fragment	2	11.8%	2.6%
figurine fragment	1	5.9%	1.3%
Construction or Maintenance	11	100.0%	14.1%
hardware	11	100.0%	14.1%
common nail	5	45.5%	6.4%
unidentifiable	4	36.4%	5.1%
finish nail	2	18.2%	2.6%
Personal Effects	3	100.0%	3.8%
jewelry	2	66.7%	2.6%
ring	1	33.3%	1.3%
bead	1	33.3%	1.3%
clothing	1	33.3%	1.3%
button, shirt or dress	1	33.3%	1.3%
Indulgences	1	100.0%	1.3%
alcohol, other	1	100.0%	1.3%
bottle fragment	1	100.0%	1.3%
Total	78		100.0%

Table 18-26. Spanish Colonial period Euroamerican ceramics from La Puente; paste and ware.

Paste / Ware	No.	Percent Of Paste	Percent Of Assemblage
Fine earthenware	20	100.0%	44.4%
Whiteware	17	85.0%	37.8%
Pearlware	2	10.0%	4.4%
Unidentifiable	1	5.0%	2.2%
Coarse earthenware	25	100.0%	55.6%
Majolica, unknown	10	40.0%	22.2%
Majolica, unknown blue-on-white	5	20.0%	11.1%
Majolica, Aranama tradition	5	20.0%	11.1%
Majolica, Huejotzingo Blue-on-white	2	8.0%	4.4%
Majolica, San Elizaro Polychrome	2	8.0%	4.4%
Majolica, Tumacacori Polychrome	1	4.0%	2.2%
Total	45		100.0%

Table 18-27 lists decoration techniques for the Euroamerican sherds, and Table 18-28 presents these data in terms of Miller's (1980) levels of expense and access. Miller's classification is intended for use with late nineteenth century ceramics, and some modification is necessary if it is to be applied to an older assemblage. In this case, the decorated majolica sherds are included with painted sherds in level 3. In G. Miller's classification, level 1, or undecorated vessels, are the least expensive; level 4, or transfer-printed vessels, are the most expensive. Level 1 sherds should be most common in frontier settings (Miller 1980). However, Table 18-28 shows that level 3 painted sherds, which should be from relatively expensive vessels, were slightly more frequent than undecorated sherds. The level 3 sherds were all majolicas, whereas all but two of the level 1 sherds were fine earthenwares. Several factors may have contributed to this situation, including personal preference, which was impossible to factor out due to the small number of village assemblages from New Mexico, and the nature of the deposits, which were probably community rather than family trash areas. It is also possible that, while undecorated fine earthenwares were relatively inexpensive for people with more direct access to European manufacturers, this was not the case on the Colonial New Mexican frontier. In fact, it is probable that undecorated Euroamerican fine earthenware vessels were actually more expensive in New Mexico than were hand-painted Mexican majolica vessels. Simmons (1983:84) indicates that this situation resulted from Spanish laws prohibiting commerce between the frontier settlers and non-Spanish traders (brackets ours): "... [the] tight monopolistic policy forced New Mexicans to purchase all their manufactured goods in Chihuahua and its neighboring provinces where prices were high owing to transportation costs from the principal seaports." Items manufactured in Europe would, therefore, be more expensive for the frontier settlers than those made in Mexico.

In the revised functional ranking (see Table 18-25), the next largest category was Unassignable, which was dominated by metal fragments. This was followed by the Construction/Maintenance category, which consisted of hardware items. Figure 18-37 shows a hand-wrought nail with an interesting coiled head, and an item resembling a hinge pin (listed among the unidentifiable artifacts in Table 18-24). Other items in this category were recorded as nail fragments, though they were often difficult to identify.

The Personal Effects category included a small metal shank button for a shirt or dress, a silver ring, and a glass bead (Fig. 18-38). Finally, a single glass bottle

Table 18-27. Spanish Colonial period Euroamerican ceramics from La Puente; decoration.

Decoration	No.	Percent
None	21	46.7%
Glaze on enamel (majolica)	16	35.6%
Paint under glaze	5	11.1%
Transfer	1	2.2%
Metal film, glaze, paint, glaze	1	2.2%
Painted	1	2.2%
Total	45	100.0%

Table 18-28. Spanish Colonial period Euroamerican ceramics from La Puente; economic classification.

Cost Level[1]		No.	Percent of Assemblage
3	Painted	23	51.1%
1	Undecorated	21	46.7%
4	Transfer	1	2.2%
2	Minimal decoration	0	0.0%

[1]After Miller (1980).

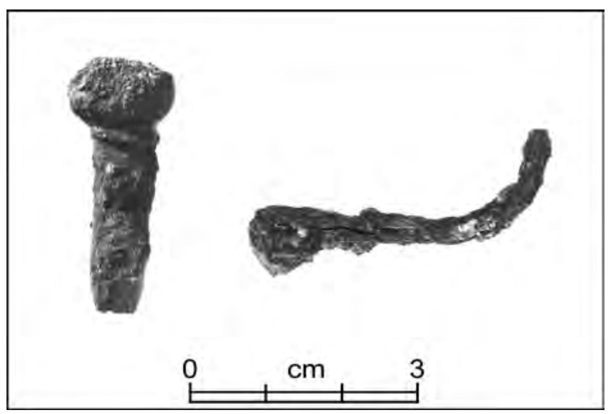

Figure 18-37. Spanish Colonial period Construction and Maintenance artifacts from La Puente: (right) hand-wrought nail, (left) possible hinge pin.

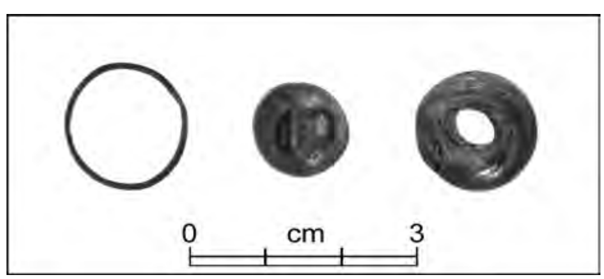

Figure 18-38. Spanish Colonial period Personal Effects artifacts from La Puente: ring, button, and bead.

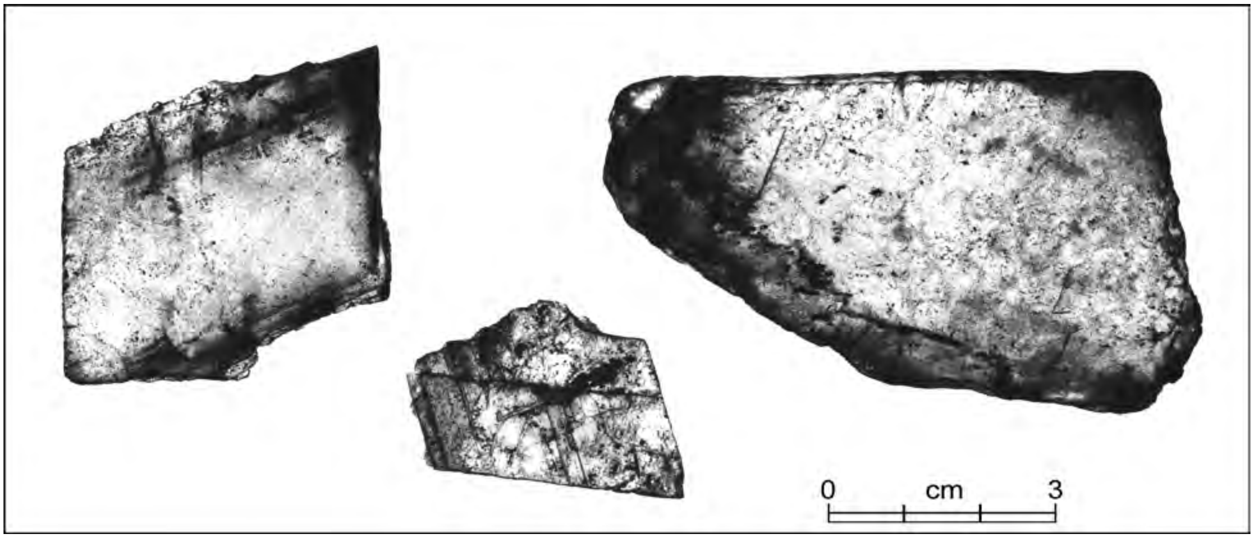

Figure 18-39. Spanish Colonial period artifacts from La Puente: possible selenite lantern glass fragments, (right) window pane fragment.

fragment, possibly from a wine bottle in the Indulgences category, was recovered from a Spanish Colonial feature.

Four thin pieces of selenite were not assigned to a category. They may have been fragments of lantern glass (Fig. 18-39), which would place them in the Household Equipment category (Lighting and Lamps). However, they may also have been byproducts from the mining and processing of jaspe.

Mexican Territorial period features. A total of 376 Euroamerican artifacts were collected from features dating to the Mexican Territorial period. Of these, 17 (4.6 percent) were not from that period: six post-1930 road trash items (window glass and bottle fragments); a drinking glass fragment dated 1800 to 1920; two window glass fragments dated 1880 to 1930; and eight bottle fragments—one dated to between 1860 and 1915, one dated to between 1880 and 1913, four dated to between 1880 and 1920, one dated to between 1903 and 1930, and one dated to between 1895 and 1930.

Table 18-29 lists the artifacts by functional category. Domestic Routine was the largest category, containing 154 artifacts (41.0 percent of the assemblage). Most of these (98.1 percent) were sherds from serving and eating dishes. Next in abundance were Unassignable artifacts, which consisted of 118 unidentifiable metal fragments, 24 bottle fragments (11 dating after 1880), and 2 bowl fragments. Functionally unidentifiable metal fragments comprised 30 percent of the Mexican Territorial period assemblage, compared to 11.2 percent of the Spanish Colonial period assemblage. This may reflect increased availability of metal goods following the beginning of the Mexican Territorial period in 1821.

The Construction/Maintenance category contained 62 artifacts, just over half of which were window glass fragments. Taken together, they represent less than a single pane, though several different panes may actually be represented. Because the window glass fragments were consistently small, it was difficult to accurately date them relative to changing manufacturing technology and resultant physical characteristics. Consequently, most were simply dated between 1800 and 1930. Since rodent disturbance appears to have introduced window glass fragments into Spanish Colonial features, we cannot be certain that the glass from Mexican Territorial features actually dates to that period. The figures for this category do not include natural or processed gypsum. Mexican Territorial period features yielded 11.4 g of unprocessed gypsum fragments, and 11.9 g of jaspe.

Artifacts in the Personal Effects category could date to the Mexican Territorial period. The same may be said of artifacts in the Economy/Production category. Of the two artifacts in the Indulgences category, one beer bottle fragment dated between 1895 and 1930.

Table 18-30 lists artifacts from Mexican Territorial period features by functional category without the late artifacts. The order of categories is not changed from Table 18-29 and the relative proportions of the assemblage made up by each category are changed only slightly.

The sherds comprising most of the Domestic Routine category are listed by paste and ware in Table 18-31. Whereas coarse earthenwares made up over half of the Spanish Colonial ceramic assemblage, they comprised less than 8 percent of the Mexican Territorial period assemblage. Coarse earthenwares were represented by a few sherds of yellowware and at least five majolica types, though the unknown majolica sherds may represent other types. The types represented were similar to

Table 18-29. Euroamerican artifacts from Mexican Territorial period features at La Puente; simple ranking of functional categories, types, and functions.

Category / *type* / function	No.	Percent of Category	Percent of Assemblage
Domestic Routine	154	100.0%	41.0%
dishes, serving and eating	151	98.1%	40.2%
unidentifiable	145	94.2%	38.6%
cup or mug	3	1.9%	0.8%
plate	1	0.6%	0.3%
saucer	1	0.6%	0.3%
bowl	1	0.6%	0.3%
cutlery	1	0.6%	0.3%
spoon, eating	1	0.6%	0.3%
glassware	1	0.6%	0.3%
drinking glass	1	0.6%	0.3%
sewing	1	0.6%	0.3%
thimble	1	0.6%	0.3%
Unassignable	144	100.0%	38.3%
unidentified	144	100.0%	38.3%
unidentifiable	118	81.9%	31.4%
bottle fragment	24	16.7%	6.4%
bowl fragment	2	1.4%	0.5%
Construction or Maintenance	62	100.0%	16.5%
building materials	33	53.2%	8.8%
window glass	33	53.2%	8.8%
hardware	28	45.2%	7.4%
common nail	17	27.4%	4.5%
unidentifiable	3	4.8%	0.8%
finish nail	2	3.2%	0.5%
hook	2	3.2%	0.5%
washer	2	3.2%	0.5%
chain link	1	1.6%	0.3%
spike	1	1.6%	0.3%
tools	1	1.6%	0.3%
unidentifiable	1	1.6%	0.3%
Personal Effects	12	100.0%	3.2%
jewelry	6	50.0%	1.6%
bead	4	33.3%	1.1%
ring	1	8.3%	0.3%
clothing ornament	1	8.3%	0.3%
clothing	2	16.7%	0.5%
button, shank, shirt or dress	1	8.3%	0.3%
suspender buckle	1	8.3%	0.3%
boots or shoes	1	8.3%	0.3%
outer sole, heel	1	8.3%	0.3%
grooming items	1	8.3%	0.3%
lice comb, ivory	1	8.3%	0.3%
medicine	1	8.3%	0.3%
pill bottle fragment	1	8.3%	0.3%
military clothing	1	8.3%	0.3%
button, coat	1	8.3%	0.3%
Economy-Production	2	100.0%	0.5%
hunting or shooting	2	100.0%	0.5%
cartridge, rim-fire	1	50.0%	0.3%
percussion cap	1	50.0%	0.3%
Indulgences	2	100.0%	0.5%
alcohol, beer	1	50.0%	0.3%
bottle fragment	1	50.0%	0.3%
alcohol, other	1	50.0%	0.3%
bottle fragment	1	50.0%	0.3%
Total	376		100.0%

Table 18-30. Euroamerican artifacts from Mexican Territorial period features at La Puente; revised ranking of functional categories, types, and functions.

Category / *type* / function	No.	Percent of Category	Percent of Assemblage
Domestic Routine	153	100.0%	42.6%
dishes, serving and eating	151	98.7%	42.1%
unidentifiable	145	94.8%	40.4%
cup or mug	3	2.0%	0.8%
plate	1	0.7%	0.3%
saucer	1	0.7%	0.3%
bowl	1	0.7%	0.3%
cutlery	1	0.7%	0.3%
spoon, eating	1	0.7%	0.3%
sewing	1	0.7%	0.3%
thimble	1	0.7%	0.3%
Unassignable	132	100.0%	36.8%
unidentified	132	100.0%	36.8%
unidentifiable	118	89.4%	32.9%
bottle fragment	12	9.1%	3.3%
bowl fragment	2	1.5%	0.6%
Construction or Maintenance	59	100.0%	16.4%
building materials	30	50.8%	8.4%
window glass	30	50.8%	8.4%
hardware	28	47.5%	7.8%
common nail	17	28.8%	4.7%
unidentifiable	3	5.1%	0.8%
finish nail	2	3.4%	0.6%
hook	2	3.4%	0.6%
washer	2	3.4%	0.6%
chain link	1	1.7%	0.3%
spike	1	1.7%	0.3%
tools	1	1.7%	0.3%
unidentifiable	1	1.7%	0.3%
Personal Effects	12	100.0%	3.3%
jewelry	6	50.0%	1.7%
bead	4	33.3%	1.1%
ring	1	8.3%	0.3%
clothing ornament	1	8.3%	0.3%
clothing	2	16.7%	0.6%
button, shank, shirt or dress	1	8.3%	0.3%
suspender buckle	1	8.3%	0.3%
boots or shoes	1	8.3%	0.3%
outer sole, heel	1	8.3%	0.3%
grooming items	1	8.3%	0.3%
lice comb, ivory	1	8.3%	0.3%
medicine	1	8.3%	0.3%
pill bottle fragment	1	8.3%	0.3%
military clothing	1	8.3%	0.3%
button, coat	1	8.3%	0.3%
Economy-Production	2	100.0%	0.6%
hunting or shooting	2	100.0%	0.6%
cartridge, rim-fire	1	50.0%	0.3%
percussion cap	1	50.0%	0.3%
Indulgences	1	100.0%	0.3%
alcohol, other	1	100.0%	0.3%
bottle fragment	1	100.0%	0.3%
Total	359		100.0%

Table 18-31. Mexican Territorial period Euroamerican ceramics from La Puente; paste and ware.

Paste Ware	No.	Percent Of Paste	 Of Assemblage
Porcelain	1	100.0%	0.7%
Soft paste	1	100.0%	0.7%
Fine earthenware	138	100.0%	91.4%
Whiteware	108	78.3%	71.5%
Ironstone	18	13.0%	11.9%
Pearlware	11	8.0%	7.3%
Lusterware	1	0.7%	0.7%
Coarse earthenware	12	100.0%	7.9%
Majolica, Aranama tradition	3	25.0%	2.0%
Majolica, unknown	2	16.7%	1.3%
Majolica, unknown blue-on-white	2	16.7%	1.3%
Yellowware	2	16.7%	1.3%
Majolica, Puebla Blue-on-white	1	8.3%	0.7%
Majolica, Huejotzingo Blue-on-white	1	8.3%	0.7%
Majolica, Mexican Polychrome	1	8.3%	0.7%
Total	151		100.0%

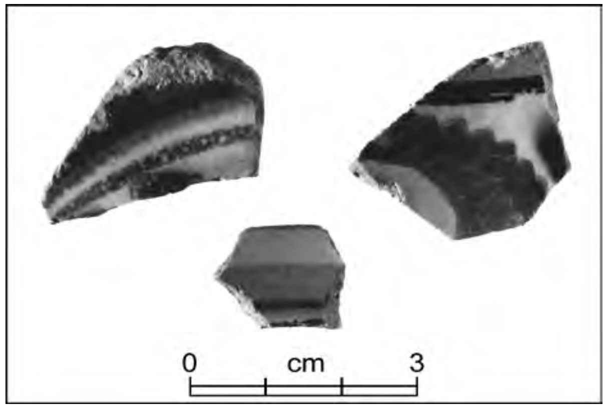

Figure 18-40. Mexican Territorial period Domestic Routine artifacts from La Puente: Aranama polychrome sherds.

those in the Spanish Colonial assemblage except that Tumacacori Polychrome was absent and late Mexican Polychrome was present. Figure 18-40 shows Aranama Polychrome sherds from the Mexican Territorial period assemblage.

The remaining 92 percent of the assemblage consisted of a single soft-paste porcelain sherd and 138 fine earthenware sherds. The fine earthenware sherds were dominated by early nineteenth century Euroamerican types, mostly whiteware. As with the Spanish Colonial assemblage, the sherds were very small and many pearlware sherds may have been identified as whiteware. The dramatic increase in Euroamerican over Mexican sherds from the Spanish Colonial to the Mexican Territorial period assemblages is strongly indicative of the changing policy of the Mexican government toward economic interaction between its citizens and people from other countries. This policy opened the Mexican market to goods manufactured in Europe and the United States, and also opened the door to direct commerce with the United States. The immediate result was the well-known Santa Fe Trail linking New Mexico with the United States. In northern New Mexico, the direction of economic interaction shifted dramatically at this time from south toward Mexico to east toward the United States and, thereby, to Europe. This shift is clearly seen in the differing proportions of coarse and fine earthenwares between the Spanish Colonial and Mexican Territorial period assemblages.

Increased access to Euroamerican ceramics was also reflected in the range of decoration techniques recorded in the Mexican Territorial period assemblage (Table 18-32). Whereas Table 18-27 lists six decoration techniques in the Spanish Colonial assemblage, Table 18-32 lists 12 techniques for the Mexican Territorial assemblage. However, most sherds were not decorated. The majolica sherds, which comprised half of the Spanish Colonial assemblage, were painted, while slightly fewer, mostly fine earthenwares, were undecorated. In the Mexican Period assemblage, almost 60 percent of the sherds are undecorated (Table 18-33). Painted sherds, including majolicas but mostly hand-painted Euroamerican wares, made up about a third of the Mexican Territorial assemblage. The latter were probably mostly peasantware sherds, although small sizes often precluded accurate identification. These data show that as the economic

Table 18-32. Mexican Territorial period Euroamerican ceramics from La Puente; decoration.

Decoration	No.	Percent
None	82	54.3%
Paint under glaze	29	19.2%
Transfer	9	6.0%
Paint under glaze (annular)	8	5.3%
Unidentifiable	7	4.6%
Glaze on enamel (majolica)	7	4.6%
Spongeware	3	2.0%
Flow blue	2	1.3%
Lusterware	1	0.7%
Molded with paint under glaze	1	0.7%
Decalcomania	1	0.7%
Metal film, glaze, paint, glaze	1	0.7%
Total	151	100.0%

Table 18-33. Mexican Terrtorial period Euroamerican ceramics from La Puente; economic classification.

Cost Level[1]		No.	Percent of Assemblage
1	Undecorated	89	58.9%
3	Painted	51	33.8%
4	Transfer	11	7.3%
2	Minimal decoration	0	0.0%

[1]After Miller (1980).

focus shifted from south to east, access to different material goods changed and once expensive items became more common and less expensive. Still, while acquisition favored Euroamerican fine earthenwares over Mexican majolica vessels, the cost of the former was such that New Mexicans concentrated on the least expensive undecorated vessels. Interestingly, while the types of painted vessels changed in the Mexican Territorial period, they remained a significant part of the assemblage. In fact, sherds from Miller's (1980) two most expensive levels, painted and transfer-printed, made up just over 41 percent of the assemblage (Table 18-33). This suggests that, although the route of access and the type may have changed, the settlers still showed a strong preference for decorated vessels.

Two other artifacts from Mexican Territorial period features fell into the Domestic Routine category: a spoon (Cutlery and Silverware) and a thimble (Sewing) (Fig. 18-41). The Unassignable category was dominated by unidentifiable metal fragments. Most of these were from Feature 8, the presumed blacksmith's dump. As such, they could have been reassigned to the Economy/Production category as debris from the smithing process. Other unidentifiable artifacts included four leather and two glass fragments. Otherwise unidentifiable bottle and bowl fragments were also present.

The Construction/Maintenance category was dominated by window glass fragments (Building Materials) and hardware, primarily cut nails. During analysis, these artifacts were dated to the last half of the nineteenth century based on dates from Gillio et al. (1980). Because 1850, the beginning date given by Gillio et al. (1980), is four years after the end of the Mexican Territorial period, these artifacts could only be marginally related to that period. However, cut nails actually date to after about 1790, though it is unlikely that they were on the New Mexican frontier at that early date. Still, this date means that their presence in Mexican Territorial period deposits is appropriate. Figure 18-42 shows three nails from Mexican Territorial period features.

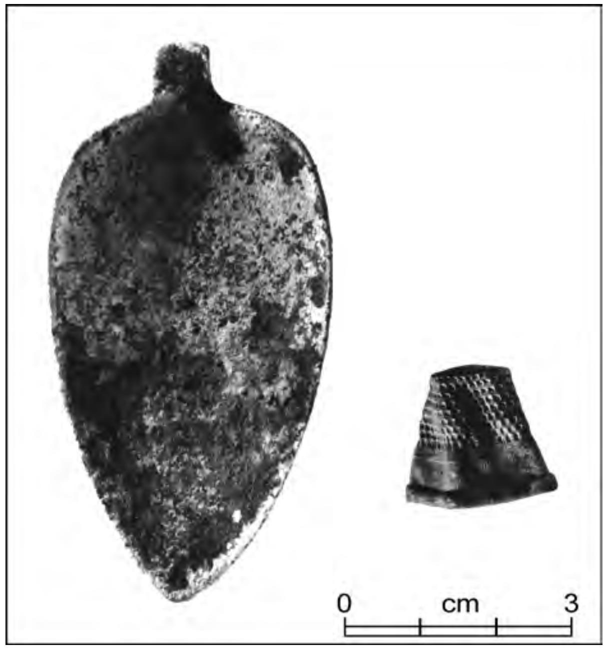

Figure 18-41. Mexican Territorial period Domestic Routine artifacts from La Puente: spoon and thimble.

Figure 18-42. Mexican Territorial period Construction and Maintenance artifacts from La Puente: nails.

Jewelry items were the most common artifacts in the Personal Effects category. They included several beads, a ring, and a small brass filigree ornament probably once sewn to a piece of clothing (Fig. 18-43). Three of the four beads were hand-faceted and resemble two beads found in American Territorial period features. Clothing items consisted of a metal shank button for a shirt or dress, and a buckle used on a cloth strap, perhaps on suspenders or some similar piece of clothing. Related to the

Personal Effects artifacts but not included with them in Table 18-30 were several pieces of shell. Figure 18-44 shows a large abalone fragment, and two large and four small freshwater shell fragments. The small fragments were quite thin. All fragments had straight cut edges, showing that the shells were reduced by cutting them into smaller pieces. The purpose of this cannot be reliably defined, but we suggest that these artifacts represent button manufacturing at La Puente (Linda Mick-O'Hara, personal communication, 1992). No hand-made shell buttons were found at this site but several were collected at the Trujillo House.

Although numerous leather fragments were collected from Mexican Territorial period features, only one could be identified as part of a shoe. Grooming items were represented by a bone or ivory lice comb (Fig. 18-45). Medicinal items were represented by the base of a small hand-blown bottle that closely resembled a Chinese pill bottle identified at Fort Bowie (Herskovitz 1978:10) and Fort Union (Wilson 1981:50, no. 140). Finally, the military clothing item was a unique coat or jacket button (Fig. 18-45). The design shows a bird with a crown and outstretched, upswept wings. Beneath the bird, whose feet are not visible, giving the impression that it is sitting, is the raised inscription "No. 2." Circling the bird are the raised words "JE RENAIS DE MES CENDRES" ("I am reborn from my ashes"). The button was once on the coat or jacket of a soldier in the army of King Christophe of Haiti. The bird is a Phoenix rising from a nest of flames, identified by Strong (1960) as Design Style 1. The "No. 2" signifies the Queen's regiment, but Strong (1960:418) states that he knows of no Style 1 buttons from the Queen's regiment. The button was made by a British manufacturer sometime before 1820, the year that King Christophe was deposed. According to Strong (1960), similar Haitian military buttons are plentiful in Indian village sites along the Columbia and nearby rivers in Oregon. They were apparently acquired before 1835 from a trader and would-be fish packer who may have purchased the uniforms as a kind of "army surplus" to trade with the Indians for fish. How this button got from Haiti to La Puente can only be guessed, but a similar process of exchange may have brought it up the Rio Grande from Mexico. Strong (1960) notes that Haitian buttons have been found in small quantities at California missions and other village sites in the Southwest.

Economy/Production artifacts included a fragmentary rim-fire cartridge and a percussion cap. Related to this category were numerous pieces of fused sand and iron slag collected from Feature 8. A total of 1635.5 g of fused sand slag was collected, 1463.9 g (89.5 percent) of which were from Feature 8 or nearby strata. Also, 1441.3 g of iron slag were collected, 1437.3 g (99.7 percent)

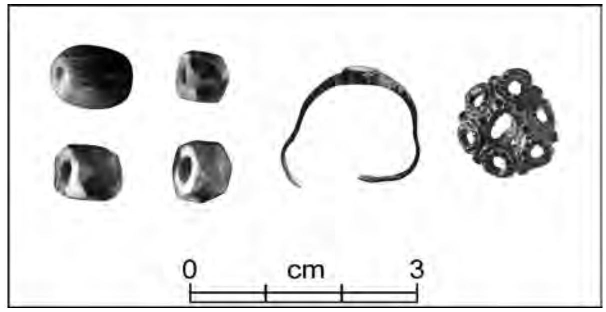

Figure 18-43. Mexican Territorial period Personal Effects artifacts from La Puente: beads, ring, and clothing ornament.

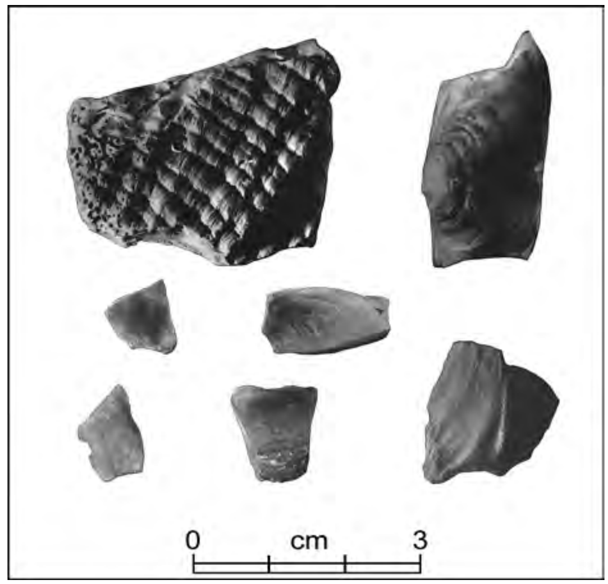

Figure 18-44. Abalone and freshwater shell fragments from La Puente, probably representing hand-made button manufacture at the site.

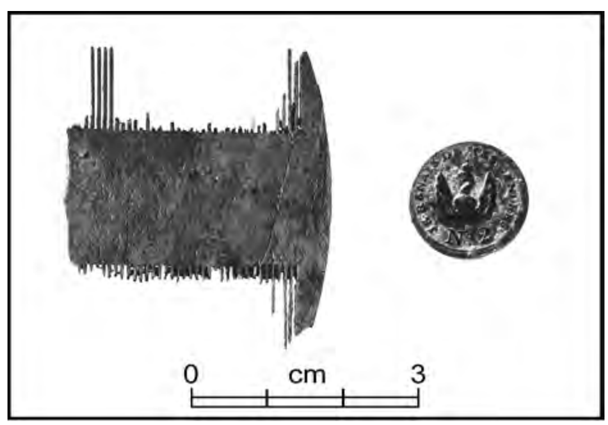

Figure 18-45. Mexican Territorial period Personal Effects artifacts from La Puente: bone or ivory lice comb, and Haitian military coat button.

from Feature 8. Four samples were sent for identification to Dr. Robert Weber of the New Mexico Bureau of Mines and Mineral Resources. Two pieces were sandy soil fused by high temperatures, one with hydrated iron oxide spheroids embedded in the surface. The other two pieces were characterized by high specific gravities and were strongly magnetic. These properties indicate iron-rich slag with inclusions of metallic iron or magnetic iron oxide. Weber (1988) concluded that the iron-rich samples "clearly reflect some sort of high temperature iron working," and that the deposit was probably a forge dump location. The absence of sponge iron or iron ore shows that iron was not being smelted at the site (see Simmons and Turley 1980). The Indulgences category consists of a glass fragment, perhaps from a wine bottle.

American Territorial period features. Some 630 Euroamerican artifacts were collected from features dating to the American Territorial period. Only one, a fragment of clear window glass, was identified as possible road trash. Many artifacts, particularly glass artifacts, could date as late as 1930 and, thus, post-date the features. However, all could also date to the second half of the nineteenth century, so cannot be excluded from the assemblage.

Table 18-34 lists these artifacts by functional category. Because less that one percent were road trash items clearly post-dating the American Territorial features, the table was not revised by excluding the late artifacts. Unlike the earlier assemblages, the American Territorial assemblage was dominated by functionally unidentifiable artifacts in the Unassignable category. Most of these were small pieces of leather and metal, although otherwise unidentifiable bottle, can, and bowl fragments were also present.

In the American Territorial assemblage, the second largest category was Personal Effects. There was a dramatic increase in artifact diversity in this category compared to earlier assemblages. Artifacts represented five types: Boots and Shoes, Clothing, Jewelry, Grooming Items, and Military Clothing. Twenty-three identifiable functions were recorded. The largest type was Boots and Shoes, comprising 82 percent of this category, and including leather fragments identifiable as parts of shoes. Most common were outer sole and heel fragments, which is to be expected because these portions were made of multiple layers of thick leather, which can withstand post-depositional decay better than uppers, which were usually single or double layers of thin leather. Importantly, preservation was good enough to allow identification of several portions of women's shoes and one fragment from a child's shoe. This is significant since, in the earlier assemblages, gender in Personal Effects artifacts was largely restricted to jewelry items, and the presence of children was not seen at all.

Table 18-34. Euroamerican artifacts from American Territorial period features at La Puente.

Category / *type* / function	No.	Percent of Category	Percent of Assemblage
Unassignable	331	100.0%	52.6%
unidentified	331	100.0%	52.6%
unidentifiable	295	89.1%	46.9%
bottle fragment	22	6.6%	3.5%
can fragment	11	3.3%	1.7%
leather with brass brad	2	0.6%	0.3%
bowl fragment	1	0.3%	0.2%
Personal Effects	120	100.0%	19.1%
boots or shoes	98	81.7%	15.6%
inner sole fragment	54	45.0%	8.6%
heel fragment	10	8.3%	1.6%
outer sole, lady's shoe	9	7.5%	1.4%
outer sole fragment	9	7.5%	1.4%
unidentifiable	6	5.0%	1.0%
outer sole, heel fragment	3	2.5%	0.5%
heel	3	2.5%	0.5%
lady's shoe fragment	1	0.8%	0.2%
outer sole, toe portion	1	0.8%	0.2%
sole and upper fragment	1	0.8%	0.2%
outer sole, child's shoe	1	0.8%	0.2%
clothing	9	7.5%	1.4%
button, 4-hole, shirt or dress	2	1.7%	0.3%
button, shank, coat or jacket	2	1.7%	0.3%
button, type unidentified	2	1.7%	0.3%
belt buckle	2	1.7%	0.3%
button, 3-hole, shirt or dress	1	0.8%	0.2%
jewelry	9	7.5%	1.4%
bead	6	5.0%	1.0%
ring	2	1.7%	0.3%
seed bead	1	0.8%	0.2%
grooming items	3	2.5%	0.5%
razor fragments	2	1.7%	0.3%
lice comb, wood	1	0.8%	0.2%
military clothing	1	0.8%	0.2%
button, coat or jacket	1	0.8%	0.2%
Domestic Routine	79	100.0%	12.6%
dishes, serving and eating	74	93.7%	11.8%
unidentifiable	62	78.5%	9.9%
cup or mug	9	11.4%	1.4%
plate	2	2.5%	0.3%
bowl	1	1.3%	0.2%
cutlery	3	3.8%	0.5%
unidentifiable	1	1.3%	0.2%
kitchen knife	1	1.3%	0.2%
spoon, eating	1	1.3%	0.2%
pots and pans	2	2.5%	0.3%
pot or pan	1	1.3%	0.2%
pot or pan lid	1	1.3%	0.2%
Construction or Maintenance	78	100.0%	12.4%
hardware	41	52.6%	6.5%
common nail	18	23.1%	2.9%
finish nail	9	11.5%	1.4%
unidentifiable	6	7.7%	1.0%
hook	4	5.1%	0.6%
box nail	1	1.3%	0.2%
wire	1	1.3%	0.2%
spike	1	1.3%	0.2%
hinge	1	1.3%	0.2%
building materials	37	47.4%	5.9%
window glass	37	47.4%	5.9%
Economy-Production	14	100.0%	2.2%
stock supplies	14	100.0%	2.2%
carding comb fragment	11	78.6%	1.7%
horseshoe	2	14.3%	0.3%
cinch strap fragment	1	7.1%	0.2%
Indulgences	4	100.0%	0.6%
alcohol, wine	2	50.0%	0.3%
bottle fragment	2	50.0%	0.3%
alcohol, other	2	50.0%	0.3%
unidentifiable	2	50.0%	0.3%
Food	3	100.0%	0.5%
canned goods	3	100.0%	0.5%
can fragments	3	100.0%	0.5%
Total	629		100.0%

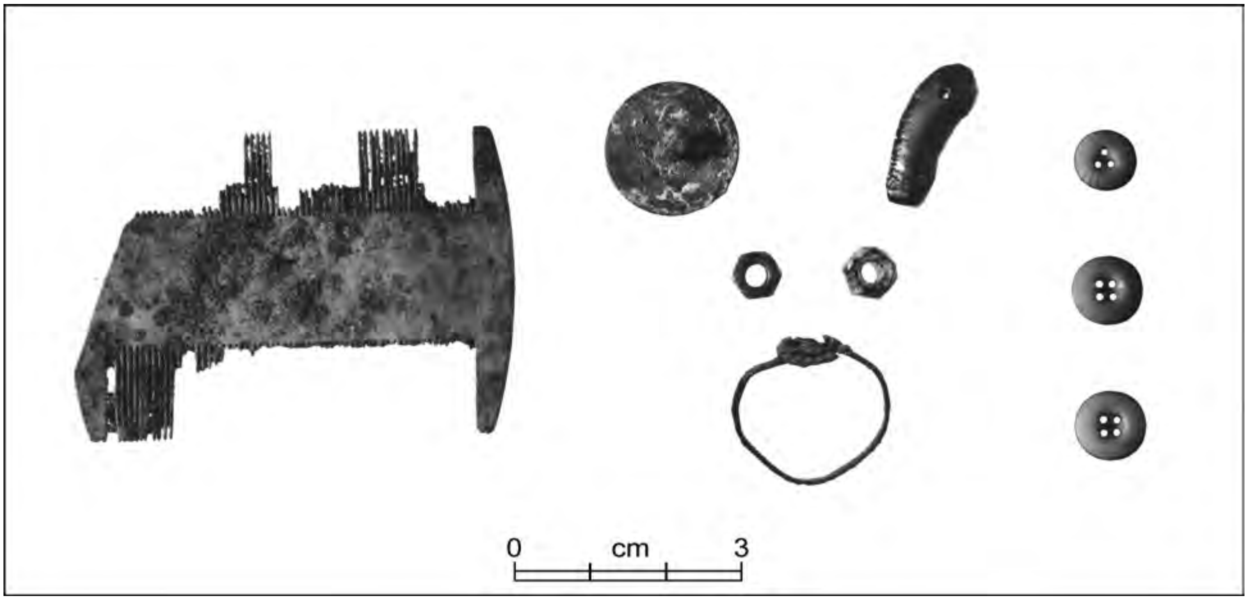

Figure 18-46. American Territorial period Personal Effects artifacts from La Puente: wooden lice comb, metal shank coat button, faceted glass beads, ring, and shirt or dress buttons.

Clothing items were largely manufactured buttons, including three- and four-hole glass shirt or dress buttons and metal shank coat buttons (Fig. 18-46). Unlike the late American Territorial assemblage from the Trujillo House, no shell buttons were found. Jewelry items included five glass beads, one seed bead, and a ring. The five glass beads were hand-faceted and, though found in different features, may be from a single necklace (Fig. 18-46). The sixth bead was round. The silver ring had a small unidentified stone in a floral setting (Fig. 18-46). In addition, an ornament that was recorded as a bead was hand-made from a soft black stone. This bead (Fig. 18-46) was roughly cylindrical but slightly flattened at the upper end where a hole was drilled for a string; striations encircled the bead.

Among the Grooming Items were two possible razor fragments and a wooden lice comb (Fig. 18-46). The Military Clothing artifact was a button (Fig. 18-47) from a U.S. Army uniform jacket. The maker's stamp on the back showed that the button was made by Scovills and Co. between 1840 and 1850, making it approximately contemporaneous with the sword belt buckle plate found at the Trujillo House. The button was found on the surface of Feature 5, which dated to the 1890s. It probably came from the uniform of a soldier in the U.S. Army staying at Abiquiú in the late 1840s and early 1850s.

Domestic Routine artifacts were primarily sherds from serving and eating dishes, though most could not be identified by vessel form. The sherds are listed in Table 18-35 by paste and ware. Interestingly, coarse earthenwares, primarily majolicas, made up a greater percentage

Figure 18-47. American Territorial period Personal Effects artifact from La Puente: U.S. Army coat button.

Table 18-35. American Territorial period Euroamerican ceramics from La Puente; paste and ware.

Paste Ware	No.	Percent Of Paste	Of Assemblage
Fine earthenware	52	100.0%	70.3%
Whiteware	44	84.6%	59.5%
Pearlware	7	13.5%	9.5%
Ironstone	1	1.9%	1.4%
Stoneware	1	100.0%	1.4%
Grayware	1	100.0%	1.4%
Coarse earthenware	21	100.0%	28.4%
Majolica, Aranama tradition	6	28.6%	8.1%
Majolica, unknown	6	28.6%	8.1%
Majolica, San Elizario Polychrome	3	14.3%	4.1%
Majolica, unknown blue-on-white	1	4.8%	1.4%
Majolica, Huejotzingo?	1	4.8%	1.4%
Majolica, Huejotzingo Blue-on-white	1	4.8%	1.4%
Majolica, Mexican Polychrome	1	4.8%	1.4%
Yellowware	1	4.8%	1.4%
Unidentifiable	1	4.8%	1.4%
Total	74		100.0%

Table 18-36. American Territorial period Euroamerican ceramics from La Puente; decoration.

Decoration	No.	Percent
None	36	48.6%
Glaze on enamel (majolica)	12	16.2%
Paint under glaze	11	14.9%
Transfer	9	12.2%
Transfer and paint	2	2.7%
Painted	2	2.7%
Decalcomania	1	1.4%
Paint under glaze (annular)	1	1.4%
Total	74	100.0%

Table 18-37. American Territorial period Euroamerican ceramics from La Puente; economic classification.

Cost Level[1]	No.	Percent of Assemblage
1 Undecorated	36	48.6%
3 Painted	27	36.5%
4 Transfer	11	14.9%
2 Minimal decoration	0	0.0%

[1]After Miller (1980).

Figure 18-48. American Territorial period Domestic Routine artifact from La Puente: steel pan lid.

of this assemblage than they did the Mexican Territorial period assemblage. Whether this was related to disposal of heirloom items or to the presence of intrusive sherds is unknown. The former seems likely because few other pre-American period artifacts were found in these features. Fine earthenwares still comprised the majority of the sherds, as would be expected given the trend seen in the earlier assemblages. Unlike the Mexican Territorial period assemblage, where several types of fine earthenwares were present, the American Territorial assemblage was strongly dominated by whiteware sherds. The presence of some pearlware sherds suggests that, like the earlier assemblages, other pearlware sherds may have been misidentified. However, the predominance of whiteware sherds was expected given that whiteware was the most common fine earthenware of the late nineteenth century (Miller 1980).

This situation was mirrored by the decrease in the number of decoration techniques (Table 18-36) from the previous period. Most sherds were undecorated, and the greatest number of decorated sherds were majolicas. Only six other decoration techniques were observed. If the 12 decorated majolica sherds are excluded, undecorated sherds comprised 58 percent of the assemblage. We can justify this exclusion because the American Territorial period features postdate manufacturing dates for most of the majolica types. Table 18-37 shows that undecorated sherds (level 1) made up almost half the assemblage, followed by sherds from more expensive painted and transfer-printed vessels. Together, levels 3 and 4 sherds made up over half the assemblage, surpassing undecorated sherds. However, if majolica sherds are excluded from this table, levels 3 and 4 sherds made up about 42 percent of the assemblage. These figures are comparable to those from the Mexican Territorial period assemblage, and suggest that selection preferences for decorated versus undecorated vessels remained relatively unchanged through time, even though available types changed. Other Domestic Routine artifacts include cutlery items, a cast iron pan, and a steel pan lid (Fig. 18-48).

The Construction/Maintenance category consists of Hardware items (mostly cut nails) and Building Materials (window glass fragments). The 37 window glass fragments were small and represent less than one pane in total size, though more than one may actually be represented. Figure 18-49 shows some of the common nails found in American Territorial period features.

Economy/Production artifacts included 11 fragments of carding combs, a cinch strap fragment, and two hand-made donkey or burro shoes (Fig. 18-50). The smaller shoe was 10.5 cm (4.1 inches) long from toe to heel, and 9.0 cm (3.5 inches) wide from branch to branch. Calks were present on both heels, and the left

Figure 18-49. American Territorial period Construction and Maintenance artifacts from La Puente: nails.

calk was well worn. No toe calk was present and the toe was worn thin just left of center. Four nails were present in the right branch. The larger shoe was 11.2 cm (4.5 inches) long and 9.0 cm (3.5 inches) wide. Neither toe nor heel calks were present, and the toe was worn just right of center. Each branch has three nails. Rick Morris (personal communication, 1992) examined the shoes and observed that donkeys, being less expensive than horses, were historically less well cared for than horses. Therefore, a shod donkey was probably involved in regular heavy work and was not merely used to carry firewood from the nearby hills. Morris also observes that because donkeys were not normally shod, most blacksmiths would not have had a supply of machined donkey shoes, even after the advent of machine-made shoes in the mid-1800s. The artifacts in this category are all stock-related supplies, showing that the residents of La Puente kept sheep and processed their wool, and that they kept donkeys or burros.

The Indulgences category was represented by four alcohol bottle fragments, while the Food category was represented by three fragments of a can such as that used to package sardines.

As in the Spanish Colonial assemblage, several pieces of selenite were recovered from American Territorial period features in Trash Area 2: one from Feature 1, four from Feature 5. Unlike the Spanish

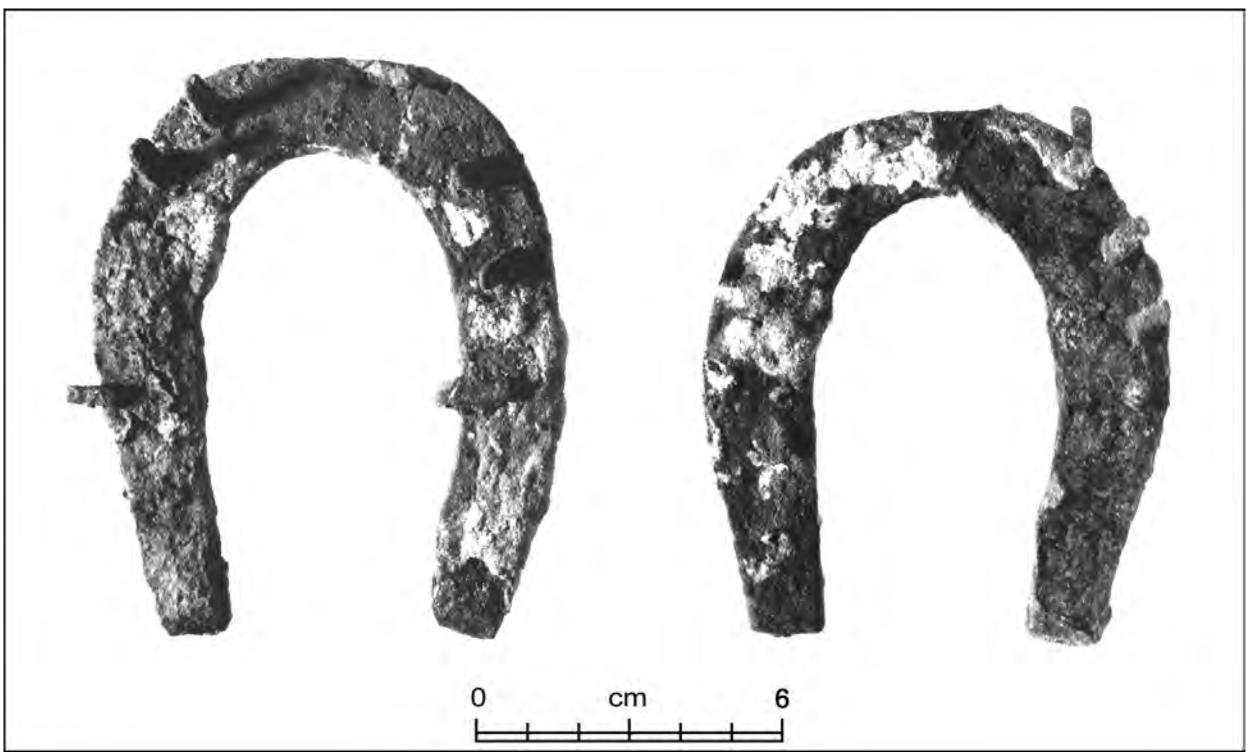

Figure 18-50. American Territorial period Economy and Production artifacts from La Puente: donkey or burro shoes.

Table 18-38. Comparison of Euroamerican artifact assemblages from Spanish Colonial, Mexican Territorial, and American Territorial period features at La Puente; percentages from revised ranking tables.

	Functional Categories[1] (Percentages)									
Period Assemblage	UN	E+P	FD	IND	DR	HE	C+M	PE	ENT	TRN
Spanish Colonial	21.8	0.0	0.0	1.3	59.0	0.0	14.1	3.8	0.0	0.0
Mexican Territorial	36.7	0.6	0.0	0.3	42.5	0.0	16.7	3.3	0.0	0.0
American Territorial	52.6	2.2	0.5	0.6	12.4	0.0	12.4	19.0	0.0	0.0

[1]**Abbreviations**

UN	Unassignable	HE	Household Equipment
E+P	Economy and Production	C+M	Construction and Maintenance
FD	Food	PE	Personal Effects
IND	Indulgences	ENT	Entertainment
DR	Domestic-Routine	TRN	Transportation

Colonial items, however, these selenite pieces were thick. The piece from Feature 1 appeared to have been ground on one edge; a piece from Feature 5 was perhaps ground on two edges to form a corner. While we cannot reliably identify these items, they appear to be fragments of selenite window panes. They were not included in Table 18-34 because they were not definite artifacts, but may have been debris from jaspe processing. Even if they were artifacts, their presumed window glass function cannot be verified. If they were from window panes they belong in the Construction/Maintenance category (Building Materials). That they were found in two features dating to the last quarter of the 1800s suggests that they were replaced by glass panes.

Comparison of the Assemblages

The excavated features at La Puente represent, as far as we know, village rather than household trash disposal. That is, unlike the Trujillo House, we cannot define the households responsible for the features and artifacts in the excavated area. Therefore, we must assume that the assemblages from La Puente represent a variety of factors, including market access to goods, selection and use of goods by several households, changing trash disposal patterns at the village, and the vagaries of preservation. Because our excavations were limited to what appears to have been only a portion of the site's trash disposal area, we cannot control for any of these factors. We are not able, therefore, to know the degree to which patterns seen in and between the assemblages accurately reflect trends in access and use of Euroamerican goods by the villagers. Further, because comparable data from other Spanish villages are not available, the significance of these changes through time cannot be accurately assessed in the same way that the Trujillo House assemblage can be compared to other contemporaneous household assemblages. Nonetheless, differences between the assemblages provide a starting point for describing and understanding assemblage changes through time.

Table 18-38 lists the assemblage percentages of each period's Euroamerican artifacts by category. Several patterns are evident. First, it is clear that there was an increased diversity in Euroamerican items through time. The Spanish Colonial assemblage was strongly dominated by Domestic Routine artifacts, which, with one exception, were sherds from serving and eating dishes. While artifacts in other categories were present, it is clear that the most common Euroamerican artifacts in the Spanish Colonial assemblage were fragments of ceramic vessels. This reflects Deagan's (1987:25) statement that a predominance of sherds is characteristic of Spanish Colonial assemblages. Only two sherds (4.4 percent) could be identified by vessel form, one from a plate and the other from a cup or mug. Relatively few artifacts were functionally unidentifiable.

The Mexican Territorial assemblage was also dominated by sherds in the Domestic Routine category, but this category comprised almost 20 percent less of the assemblage than it did in Spanish Colonial deposits. Although the percentage of sherds identifiable by vessel form was similar to that of the earlier assemblage (five sherds, 3.7 percent), four vessel forms were identified: cup or mug, plate, saucer, and bowl. The difference in the percentage of Domestic Routine artifacts was made up by increased numbers of artifacts in the Construction/Maintenance and Unassignable categories, and by the presence of artifacts from an additional category: Economy/Production. Most of the Unassignable artifacts were metal fragments from Feature 8. Consequently, the increase in Unassignable artifacts over the earlier assemblage may not be as significant as is indicated by the numbers. Nonetheless, six categories were represented in the Mexican Territorial assemblage, an increase over the five in the Spanish Colonial assemblage.

The American Territorial assemblage pointedly showed increased diversity, with seven categories represented. Further, Domestic Routine was no longer the largest category. Indeed, the frequency of Domestic Routine artifacts decreased by 70 percent between the Mexican and American Territorial assemblages. Given the composition of assemblages from the Trujillo House and other Rio Chama sites, this was not expected. It serves, however, to point out the hazards of including village or community assemblages in defining patterns of assemblage composition. At the same time that the frequency of sherds decreased, however, the frequency of sherds identifiable by vessel form increased to 15.4 percent, with cup or mug sherds being most commonly identified.

In the American Territorial assemblage, the Unassignable category increased 1.4 times over the Mexican Territorial assemblage to become the largest category. There were 2.4 times as many functionally unidentifiable artifacts in the American Territorial assemblage as in the Spanish Colonial assemblage. In part, this may reflect preservation, since many Unassignable artifacts in the latest assemblage were leather fragments. Still, the number of other such artifacts, mostly small metal fragments, is significant.

Because the Spanish Colonial and Mexican Territorial period assemblages were dominated by pottery, comparison of these assemblages will focus on the ceramic artifacts. Table 18-39 shows the differences between sherds in the different assemblages. As expected, the table shows increased diversity through time. What was not expected is that this diversity includes coarse earthenwares, which were primarily majolicas. That is, there were more majolica types in the American Territorial assemblage than in the two earlier assemblages. This may represent the eventual disposal of heirloom items, perhaps supported by the fact that, among the fine earthenwares, pearlware sherds comprised a greater percentage of the American Territorial assemblage than of the other assemblages, even though the American Territorial features postdated the production of pearlware. The fact that coarse earthenwares made up such a large part of the American Territorial assemblage reduces the relative percentage of fine earthenwares.

Table 18-39. Comparison of paste and ware of Euroamerican ceramics from Spanish Colonial, Mexican Territorial, and American Territorial period features at La Puente; percentages.

Paste Ware	Period Assemblage (Percentages)		
	Spanish Colonial	Mexican Territorial	American Territorial
Porcelain	0.0%	0.7%	0.0%
Soft paste	0.0%	0.7%	0.0%
Fine earthenware	44.4%	91.4%	70.3%
Whiteware	37.8%	71.5%	59.5%
Pearlware	4.4%	7.3%	9.5%
Unidentifiable	2.2%	0.0%	0.0%
Ironstone	0.0%	11.9%	1.4%
Lusterware	0.0%	0.7%	0.0%
Stoneware	0.0%	0.0%	1.4%
Grayware	0.0%	0.0%	1.4%
Coarse earthenware	55.6%	7.9%	28.4%
Majolica, unknown	22.2%	1.3%	8.1%
Majolica, unknown blue-on-white	11.1%	1.3%	1.4%
Majolica, Aranama tradition	11.1%	2.0%	8.1%
Majolica, Huejotzingo Blue-on-white	4.4%	0.7%	1.4%
Majolica, San Elizaro Polychrome	4.4%	0.0%	4.1%
Majolica, Tumacacori Polychrome	2.2%	0.0%	0.0%
Yellowware	0.0%	1.3%	1.4%
Majolica, Puebla Blue-on-white	0.0%	0.7%	0.0%
Majolica, Mexican Polychrome	0.0%	0.7%	1.4%
Majolica, Huejotzingo?	0.0%	0.0%	1.4%
Unidentifiable	0.0%	0.0%	1.4%

Table 18-40. Comparison of decoration on Euroamerican ceramics from Spanish Colonial, Mexican Territorial, and American Territorial period features at La Puente; percentages.

	Period Assemblage (Percentages)		
Decoration	Spanish Colonial	Mexican Territorial	American Territorial
None	46.7%	54.3%	48.6%
Glaze on enamel (majolica)	35.6%	4.6%	16.2%
Paint under glaze	11.4%	19.2%	14.9%
Transfer	2.2%	6.0%	12.2%
Metal film, glaze, paint, glaze	2.2%	0.7%	0.0%
Painted	2.2%	0.0%	2.7%
Paint under glaze (annular)	0.0%	5.3%	1.4%
Unidentifiable	0.0%	4.6%	0.0%
Spongeware	0.0%	2.0%	0.0%
Flow blue	0.0%	1.3%	0.0%
Lusterware	0.0%	0.7%	0.0%
Molded with paint under glaze	0.0%	0.7%	0.0%
Decalcomania	0.0%	0.7%	1.4%
Transfer and paint	0.0%	0.0%	2.7%

Nonetheless, we see an expected trend of increased frequency of fine earthenwares through time. The most dramatic change occurred between the Spanish Colonial and Mexican Territorial assemblages, where the frequency of fine earthenwares more than doubled, while coarse earthenwares decreased by 86 percent. This suggests that the opening of the Santa Fe Trail resulted in more access to European and American ceramic vessels.

This dramatic change is also seen in Table 18-40, which compares ceramic decoration techniques. Again, the presence of majolica sherds affected the figures by increasing the glaze-on-enamel percentage in the last assemblage. The Mexican Territorial assemblage had the most diversity in decoration techniques. This diversity included a drop in majolica decoration, primarily because of the increased frequency of non-Mexican sherds. We see, then, that the influx of fine earthenware vessels in the Mexican Territorial period brought considerable diversity in decoration. Table 18-39 shows that majolica sherds comprised only 4.6 percent of the Mexican Territorial assemblage. Therefore, the increase in undecorated sherds was actually an increase in undecorated fine earthenware sherds. Just over half the Mexican Territorial ceramic assemblage consisted of undecorated fine earthenware sherds. This was approximately twice the percentage of undecorated fine earthenware sherds in the Spanish Colonial ceramic assemblage. Nevertheless, it follows a trend in which about half of each assemblage consisted of undecorated sherds. In contrast to the Spanish Colonial assemblage, most Mexican Territorial period decorated sherds were from fine earthenware vessels. The majority were hand-painted, followed by transfer-printed. In the American Territorial assemblage, the unexpectedly high frequency of majolica sherds is evident in Table 18-40. Discounting these sherds, most of the decorated pottery was still painted fine earthenwares, followed by transfer-printed. Together, these figures suggest a selection pattern dominated by undecorated and painted vessels. Transfer-printed vessels were much less common.

This pattern is shown in Table 18-41, which shows differences in economic classification of the sherds in each assemblage. As in Tables 18-39 and 18-40, the presence of a relatively high number of majolica sherds in the last assemblage is reflected in the high percentage of painted sherds. Nonetheless, the trends are clear. Assuming Miller's (1980) classification scheme is applicable to all three assemblages, Table 18-41 shows an interesting pattern. The three assemblages were dominated by undecorated and painted sherds. The former were, in Miller's classification, the least expensive whereas the latter were much more costly. This lends economic significance to the selection pattern observed above. While the relative dominance of painted and undecorated sherds was reversed between the Spanish Colonial and Mexican Territorial periods, the assemblages were all dominated by sherds from vessels that were either relatively inexpensive or relatively expensive. Further, the

Table 18-41. Comparison of economic classification of Euroamerican ceramics from Spanish Colonial, Mexican Territorial and American Territorial period features at La Puente.

Cost Level[1]	Period Assemblage (Percentages)		
	Spanish Colonial	Mexican Territorial	American Territorial
3 Painted	51.1%	33.8%	36.5%
1 Undecorated	46.7%	58.9%	48.6%
4 Transfer	2.2%	7.3%	14.9%
2 Minimal decoration	0.0%	0.0%	0.0%

[1]After Miller (1980).

most expensive transfer-printed vessels, although increasingly present through time, never comprised more than one-sixth of any assemblage. This pattern shows that, through time, selection of decorated vessels continued to focus on those that were painted, even after transfer printing became relatively common and less costly. Minimally decorated vessels, such as shell-edged, were not represented in the assemblages, perhaps because in their lack of decoration they too closely resembled undecorated vessels to be of selective value. A similar pattern was seen in the ceramics from the Trujillo House. Whether this reflects the conditions of local market access or an ethnic selection pattern cannot be determined without extensive analysis of local and regional markets and ceramic availability. However, the fact that this pattern occurred in all three assemblages while there were significant changes occurring in the use of fine and coarse earthenwares argues that the pattern may be ethnic in origin rather than determined strictly by market conditions.

Native Ceramics

Because the Euroamerican ceramic vessels were used along with native ceramic vessels, the entire pottery assemblage must be examined in order to understand trends in the use of Euroamerican ceramics. In the earlier discussion of the locally produced ceramics, Levine provided detailed descriptions of the native ceramics. For purposes of this discussion, native sherds are classified as Tewa painted, Hispanic painted, and undecorated. The latter includes Tewa polished black or red, Hispanic polished black or red, micaceous, and unknown types. Table 18-42 lists the complete ceramic assemblages by period. It shows that the Euroamerican sherds actually comprised only a small part of each assemblage. Only in the Mexican Territorial period assemblage did Euroamerican sherds comprise more than 5 percent of the total. Undecorated sherds made up the majority of each assemblage, ranging from 48 to 69 percent. Tewa painted sherds made up over one quarter of the Spanish Colonial assemblage, but were much less prevalent in succeeding periods. Percentages of Hispanic painted sherds remained relatively constant through time.

Figure 18-51 shows that, as Tewa painted sherds decreased between the Spanish Colonial and Mexican Territorial period assemblages, they were replaced by Euroamerican sherds. This suggests that, with the open-

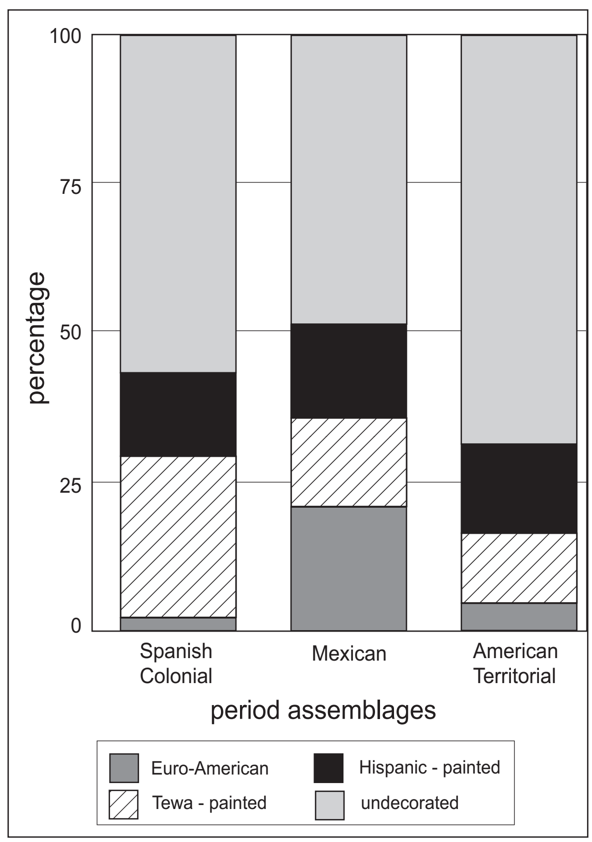

Figure 18-51. Composition of ceramic assemblages from La Puente.

Table 18-42. Composition of ceramic assemblages by period for La Puente; percentages of each period assemblage.

Ceramic Ware	Period Assemblage (Percentages)		
	Spanish Colonial	Mexican Territorial	American Territorial
Euroamerican wares	2.1%	21.1%	4.9%
Porcelain	0.0%	0.1%	0.0%
Fine earthenware	0.9%	19.3%	3.4%
Stoneware	0.0%	0.0%	0.1%
Coarse earthenware	1.2%	1.7%	1.4%
Tewa painted wares	26.7%	14.4%	11.6%
Polychromes	23.4%	13.7%	10.9%
San Juan Red-on-tan	3.3%	0.7%	0.7%
Hispanic painted wares	14.1%	15.9%	14.9%
Casitas Red-on-brown	14.1%	15.9%	14.9%
Undecorated	57.1%	48.5%	68.7%
Tewa black or red	20.2%	17.2%	24.7%
Hispanic black or red	9.5%	15.4%	11.5%
Micaceous	24.0%	14.4%	31.6%
Unknown	3.4%	1.5%	0.9%
Total	100.0%	99.9%	100.1%

ing of the Santa Fe Trail, the increasingly available Euroamerican vessels tended to replace painted Tewa vessels. This is the same effect that access to Euroamerican vessels had on majolica vessels. However, in the American Territorial assemblage, Tewa painted sherds continued to decrease while Euroamerican sherds decreased significantly. These differences were made up by micaceous sherds. The significant decrease in Euroamerican sherds relative to native sherds in the American Territorial assemblage suggests a major change in access to Euroamerican vessels. The nature of that change cannot be specified at this time, but factors might include rising prices of Euroamerican vessels, changes in exchange form that affected purchasing ability (for instance from barter to cash), or changing location of access (if, for instance, a local merchant moved or went out of business).

Replacement of painted Tewa and majolica vessels by Euroamerican fine earthenware vessels, and of the latter by micaceous vessels should also be seen in replacement of vessel forms. For instance, overall, Tewa polychrome vessels were largely jars. If they were replaced by Euroamerican vessels, we might expect to see jar or pitcher forms in the Euroamerican sherds. We cannot accurately assess vessel form replacement, however, because so many Euroamerican sherds were not identifiable by vessel form. Levine discussed in some detail changing native vessel forms through time. Unfortunately, the same detail was not available from the Euroamerican ceramic assemblages.

Conclusions

In this chapter, we have shown that Euroamerican artifacts, because of the relative accuracy with which they can often be dated, are of significant value in dating sites and site features. The ability to date the midden pit at the Trujillo House to the last 15 or 20 years of the site's occupation has important implications for the midden's contents, suggesting time lag in artifact availability. In the chapter on adobe analysis, dating the midden pit was used in conjunction with analysis of adobe brick and plaster to define the construction sequence of the house. At La Puente, the Euroamerican artifacts were instrumental in determining that various midden features dated to different historic periods. In turn, these data provided the basis for defining period assemblages, both of the Euroamerican artifacts and of the native sherds. Because the chipped stone assemblage was small, it was not discussed in terms of the three periods. Nonetheless, dating the Euroamerican artifacts enabled the chipped stone artifacts to be distinguished as being from Spanish Colonial and mixed Mexican and American Territorial contexts (pre- and post-Santa Fe Trail). Because archaeologists are familiar with using general trends in artifact styles and technologies to date sites and site components to broad time periods, Euroamerican artifact dates, and the temporal resolution they provide, have not always been used. We have shown that, when necessary, they can provide dates with high degrees of resolution. At the same time, they also provide information on time lag and availability, factors that are important for assessing dating accuracy and for addressing questions of market access and patterns of selection, use, and disposal.

It is clear that an accurate description of the assemblages from La Puente relies on the inclusion of the native artifacts, mirroring the conclusion drawn from the study of the Trujillo House assemblage. With the Trujillo House assemblage, we included the native chipped stone and ceramic artifacts to describe the complete assemblage for comparison with other homesteads. Patterns drawn from studies of frontier homesteads must take into account ethnic differences and differing selection and use of native items. Because of the nature of the La Puente assemblage, we have not included the chipped stone artifacts in this discussion. Because the Spanish Colonial and Mexican Territorial period assemblages were dominated by sherds, this discussion has concentrated on the ceramic assemblages. Primarily, this is because we are less interested in definitive descriptions of the assemblages than in defining differences between them that are perhaps indicative of changing access, selection, and use of Euroamerican items on the Rio Chama frontier. As data become available on other New Mexican frontier villages, the patterns seen in the La Puente assemblages can be examined for their accuracy in reflecting frontier trends.

CHAPTER 19

CONCLUSIONS

JAMES L. MOORE AND JEFFREY L. BOYER

This project focused on two aspects of human occupation in the lower Rio Chama Valley: use of this area during the Anasazi Classic period for farming, and economic aspects of life on the frontier during the historic Spanish occupation. In essence, both were frontier studies. The study area lacked a permanently resident farming population until the Coalition period. Small villages were founded during that phase, eventually giving way to the large villages of the Classic period. Though the valley was probably occupied by farmers for 200 years or more by the time LA 6599 and LA 59659 were used, residence and land-use patterns were shaped by the process of occupying and learning about this frontier. Through most of the historic period this region was also on the frontier. Not until the American Territorial period can the Rio Chama Valley be considered part of the core area. Hostile nomadic Indians, difficulties in transportation, and distance from mercantile centers all contributed to this phenomenon.

Though the residents of the Rio Chama Valley were on the frontier during both the prehistoric and historic periods, different processes led to the establishment of settlements in the area during these periods. There is plenty of evidence for Anasazi use of the valley, but permanent farming villages seem to have been lacking until rather late. Pueblo farmers began colonizing the valley during the Coalition period, and apparently initially lived in pit structures rather than above-ground room blocks. This is suggested by the presence of pithouses beneath the small Coalition period Riana and Palisade Ruins, and by the recovery of Coalition period ceramics from beneath Classic period remains at five of the large villages. As suggested in an earlier chapter, there is no evidence that these peoples moved directly into the Rio Chama Valley from the San Juan district where they are thought to have originated. Rather, it is likely that initial movement was into the Rio Grande Valley, eventually displacing part of the population who moved up the Rio Chama Valley.

This is similar to the process of colonizing internal frontiers in Africa (Kopytoff 1987; Nyerges 1992), which has recently been applied to the Hopi (Schlegel 1992). In these cases, parts of populations split off and occupy internal frontiers, which are "...zones of weak political control between established societies" (Nyerges 1992:861). Depending upon internal politics, a colony could be reclaimed by the dominant group, or might be ignored. In the latter case, other disaffected peoples can join the colonists, eventually forming a new, independent polity. This process was probably simpler in the Southwest than in Africa, since the groups studied in that area were hierarchically organized, but certain aspects of the process should still be applicable to the Pueblo Southwest. Small groups of disaffected people, whether for political or economic reasons, split from larger groups and moved into a part of the region that was exploited by the larger group, but was not occupied on a permanent basis. Initial occupation was by small groups living in pit structures, which are often used for such purposes by colonizing groups (Gilman 1987). A similar pattern has been defined for the Taos district (Boyer et al. 1994), where initial occupation was in scattered and short-lived pithouses, which were used while colonists were learning about their new homeland. At least two "communities" of relatively mobile pithouse-dwellers have been defined in the Taos district (Boyer et al. 1994). Subsequent shifts from pithouses to pueblos probably resulted from changing community structure and organization.

While such changes undoubtedly involved population growth, they cannot be ascribed simply to increased population and consequent decreased mobility. Rather, they seem to follow a settlement trajectory similar to that observed by Casagrande et al. (1964) as frontier occupations stabilized and communities were established. Similar trends seem to have occurred more quickly in the Rio Chama Valley than in the Taos district, with the transition to above-ground villages occurring rather soon after initial settlement of that region. This is suggested by the rarity of pithouses in the Rio Chama Valley when compared with the Taos district, where that form is quite common. This settlement pattern is probably the result of rapid frontier occupation, leaving only minimal evidence of the earliest settlers. If this thesis is correct, Anasazi settlers on the Rio Chama frontier may have progressed rapidly through an early phase of loose community structure to one dominated by large aggregated villages. Conversely, they could have retained the structure of the communities from which they had separated, and quickly incorporated into more formalized aggregated villages. In either case, the archaeological data argue for a relatively rapid establishment of the Anasazi frontier in the Rio Chama Valley.

While these concepts are very interesting and quite applicable to the prehistoric Southwest, a more detailed discussion is beyond the scope of this study. Two aspects of this type of frontier movement are important, however. The first is the idea that frontiers are not necessarily always at the edge of the territory occupied by a society. Internal zones that lack permanent settlements and are not regularly used can also be frontiers. The Rio Chama Valley was such an area until the Coalition period: it served as a hunting and gathering zone but lacked permanent occupants. This is a high-altitude area that suffers from cold air drainage, which affects its suitability for farming. Areas that were better suited to agriculture existed elsewhere in the northern Rio Grande, and were used for such purposes from an early date. As people began moving into the northern Rio Grande from the Four Corners area, good agricultural land became an important commodity. Eventually, overcrowding seems to have led to occupation of areas that were not previously considered suitable for farming or residence, resulting in the use of more marginal lands. Thus, colonists began occupying the Rio Chama Valley on a more permanent basis.

The second concept is that the occupation of new areas by farmers presents a new array of problems that must be overcome if the colony is to be successful. Knowledge of the problems encountered in previously occupied areas are part of the cultural baggage accompanying colonists, as are the solutions to those problems that were tried and were either successful or not. This brings us to LA 6599 and LA 59659, the small prehistoric sites examined by this study. By themselves they seem small and insignificant. However, when seen in the light of colonists occupying an internal frontier and meeting new obstacles to their effective use of the environment, as well as old problems they had faced before, sites like these show how farming methods are modified to meet the exigencies of a new environment.

The initial European colonization of New Mexico was largely economic in orientation. The colonists essentially came to the Southwest to get rich. When Oñate's colony failed to fulfill this purpose, the area was retained as a missionization zone, with emphasis placed on conversion of the Pueblos, often to the real or at least perceived detriment of the Spanish settlers. This phase of occupation came to an end with the Pueblo Revolt of 1680. After the Spanish Reconquest of 1692 to 1693, the function of the colony underwent an important reorientation. No longer focusing on religious conversion of the indigenous population, the New Mexican colony now served as a buffer between the rich internal provinces and hostile Plains Indians. It also served an economic purpose, becoming an area where settlers could move in search of financial improvement. This fits the more classic Turnerian definition (Billington 1963:25) of a frontier as "a geographic region adjacent to the unsettled portions of the continent in which a low man-land ratio and unusually abundant, unexploited, natural resources provide an exceptional opportunity for social and economic betterment to the small-propertied individual."

Billington (1963:25) also defines a frontier as "the process through which the socioeconomic-political experiences and standards of individuals were altered by an environment where a low man-land ratio and the presence of untapped natural resources provided an unusual opportunity for individual self-advancement." This definition views the frontier as an economic process. Movement into a new environment caused changes in the social, economic, and political systems of colonists (see Casagrande et al. 1964).

In his discussion of frontiers and boundaries, Kristof (1959:272) notes that "the frontier has, and always had, also a strategic meaning—the defensive line which keeps enemies out—and in this depends on support from the hinterland." Frontiers are also areas of integration, representing a transition from one way of life to another, where traits from both are assimilated (Kristof 1959:273). In reviewing historic sites in Cochiti Reservoir, Snow (1979:217) notes that "In such a frontier situation, adaptive responses are as frequently effected by the indigenous cultures in the area as by the newly arrived groups. This often produces a frontier culture that is a combination of both parent groups but which develops on its own."

As a place, New Mexico was a frontier that provided a chance for economic advancement while serving as a defensive buffer for the inner provinces. As a process, New Mexico was a frontier where the traditional lifestyles of New Spain and Southwestern Indians overlapped, producing a culture that was neither wholly one nor the other, but a combination of both.

Both of these situations were operative in the Abiquiú area. Initial movement into the region was for economic reasons. Settlements were founded, and the population grew until the massive Comanche raids of the mid-eighteenth century drove them out. When the area was resettled in 1750, the explicit purpose was defensive in nature. Settlers were needed on the frontier to protect the core towns and villages of the colony from the depredations of nomadic Plains Indians. This also led to establishment of the genízaro village of Santo Tomás de Abiquiú to supplement the defensive capability of the region. In this regard, it is difficult to view the area as only a frontier to New Spain. Rather, it would appear that the New Mexican frontier had itself developed into core area and frontier, with the zone around Santa Fe that contained the bulk of the population and economic power representing the former, and the rest of the settled zone the latter.

Although Bunting (1964:3) states that "all through the Colonial and Mexican periods, settlers were grouped closely in villages," other historians are adamant in denying the historical importance of the plaza community, insisting instead that the normal pattern of Hispanic settlement was one of dispersion. Snow (1979b:46) points out that this pattern of dispersion began at the first settlement of San Gabriel, at the mouth of the Rio Chama, and that "except for Santa Fe...the 17th century rural landscape lacked villages; community organization existed, if at all, only in a very limited fashion" (see also Simmons 1969).

Snow (1979b:47) contends that, after the Reconquest,

> The major thrust of 18th century settlement was toward the limits of effective military and administrative control and toward unoccupied agricultural lands, primarily in the narrow tributaries of the Rio Grande and the Chama River. Ranchos proliferated as individuals applied for and received minuscule *mercedes* for themselves, their relatives and friends in more and more marginal locations along such tributaries.

Simmons (1969) suggests two reasons for this situation: a decrease in the Indian population that resulted in a reduced labor force, and an increase in Hispanic immigration that resulted in population growth.

By the last half of the 18th century, however, the largely rural population increasingly left their isolated ranches and congregated in small fortified plazas (Simmons 1969). The impetus for this significant settlement change was a period of intense hostility on the part of mobile Indian groups such as the Apache, Navajo, Ute, and particularly Comanche. In 1772, Governor Mendinueta recommended to the Viceroy that the scattered settlers be made to form plaza communities. Four years later, Antonio de Bonilla described the New Mexican settlements as scattered and unable to defend themselves. Finally, in 1778, a council held in Chihuahua recommended swift action to unify the New Mexican population. As a result, Commandant Teodoro de Croix ordered Governor De Anza to "regularize" settlements by making the populace live in compact units. Although Simmons (1969) contends that considerable progress had been made toward that end by 1780, Father Morfi complained in 1782 that the settlers still preferred dispersed settlements, a preference that he blamed on moral depravity (Simmons 1977). Nonetheless, Josiah Gregg reported in 1830 that New Mexicans were congregated into villages because of Indian depredations (Snow 1979b:48). Thus, Snow argues: "Rural Hispano villages in New Mexico are a product, for the most part, of the last quarter of the 18th century and of the 19th century. If we examine destructive pressures since 1848, we are looking at village or community structures which, in most cases, were less than 75 years in existence prior to that date-a space of only two generations or so" (Snow 1979b:50).

A dispersed settlement pattern is characteristic of the furthest reaches of frontier expansion. Casagrande et al. (1964:311-315) discuss characteristic features of colonization settlement in what they call a "colonization gradient." This gradient consists of five kinds of settlement that have both temporal and spatial aspects. They include the "entrepot," the "frontier town," the "nucleated settlement," the "seminucleated settlement," and "dispersed settlement." The differences between these types and levels of settlement have to do with the strength of their direct ties to the core area from which colonization emanates and with their levels of internal integration. For instance, the nucleated settlement "consists of a cluster of households which are organized politically at least to the extent of having some form of municipal government. It is linked with the frontier town and to some extent with the higher level organized political bodies through its municipal government" (Casagrande et al. 1964:313).

In contrast, "seminucleated settlements have no formally constituted municipal governments. In fact, the seminucleated settlement is characterized more by its lack of integration and community facilities than by their presence" (Casagrande et al. 1964:313).

Finally, "there are many zones within an area of colonization characterized by the presence of scattered houses. This feature we have termed *dispersed settlement*. Although formally these individual households may be included in a larger corporate entity such as a municipality, they are but loosely integrated within it (Casagrande et al. 1964:314).

Taking a synchronic view, these levels of settlement on the frontier may characterize communities at a particular point in time. Thus, we can compare Casagrande's lower levels of settlement discussed above with Snow's (1979b:46) statement that "the seventeenth century rural landscape lacked villages; community organization existed, if at all, only in a very limited fashion," and his contention that this situation continued into the late 1700s, and see that Spanish Colonial settlement in north-central New Mexico reflected the far reaches of frontier expansion. As Casagrande et al. (1964:314-315) state: "As one proceeds away from the metropolitan area toward the frontier, settlements diverge more and more from those of the settled area." This is seen in the 1779

Miera y Pacheco map of the Interior Province of New Mexico (Adams and Chavez 1956:2-4), in which the *Alcaldía de la Villa de Santa Cruz de la Cañada* consisted of the *villa*, several *Pueblos de los Indios Christianos*, and numerous small communities characterized as *Poblaciónes dispersas de los Españoles*. One of the Pueblos de los Indios Christianos was the village of "Aviquiu" (sic), while scattered houses, a población dispersa de Españoles, stretched from east of Abiquiú down the Rio Chama to near the mouth of the Rito Colorado. In northern Spanish Colonial New Mexico, then, we may postulate that Santa Fe, as the territorial capital, was the frontier town, that Santa Cruz de la Cañada was a nucleated settlement, that the mission communities were seminucleated settlements, and that there were many dispersed settlements such as that on the Rio Chama until the late 1700s.

An economic surge associated with the establishment of peace with the Comanche, and alliances with that group and the Navajo against the Apache, occurred late in the Spanish Colonial period (Frank 1992). Additionally, Hispanic seminucleated settlements began to grow in response to the change to a plaza-centered settlement pattern (Wroth 1979; Boyer and Levine 1991). These economic and settlement shifts point to changing relations within the New Mexican frontier, as the Rio Chama settlements were drawn into stronger ties with the frontier town and the core area (Santa Fe). These processes are partly visible in the artifact assemblages from La Puente and the Trujillo House. The few late Spanish Colonial proveniences from La Puente contain mostly locally produced goods, with only a few artifacts of Euroamerican origin being recovered. Euroamerican goods comprise increasingly larger portions of the assemblages from both sites during the Mexican and American Territorial periods. Thus, as the area was drawn closer to the core, access to manufactured goods improved considerably.

It is important to note that the process of frontier acculturation also remains visible throughout the periods reflected by deposits at these sites. As Levine earlier pointed out in her synthesis of ceramic information from the historic sites, Hispanic production of pottery increased through time, while the use of Pueblo pottery declined. The initial production of Hispanic pottery may be seen as a response to frontier conditions, but this trend of increased Hispanic production is probably related to other factors because the region was being drawn closer to the core through these periods. It is possible that the increased Hispanic production of pottery is related to their loss of control over the economic system to American entrepreneurs. No longer the sole source of Euroamerican goods for the Pueblos, it is possible that Pueblo pottery simply became more expensive for the Hispanic population. This may have required domestic production of this commodity, or it could have simply made it economically viable for part of the Hispanic population to produce these goods. The information presented by Moore on Spanish use of chipped stone tools suggests the opposite as far as stone tools are concerned. While informal tool use increased in Territorial period assemblages, these were primarily strike-a-light flints, a specialized form. Use of other informal tools decreased with time. These trends could suggest opposing trajectories, with increased use of Hispanic-produced pottery and decreased use of informal chipped stone tools through time. However, we must also remember that as the use of Pueblo pottery decreased and the use of Hispanic pottery increased, the use of Euroamerican pottery also increased. Together, then, the native ceramic and chipped stone trends point to increased access to Euroamerican items as the region gained stronger ties to the core area.

While these issues are raised here, they cannot be addressed in detail because much more information is needed. Another important question that remains unanswered is: What portion of the Hispanic population actually produced pottery? By Hispanic, we mean a population of European, Indian, or combined origin that lived a Hispanic lifestyle, and were thus culturally if not always genetically Hispanic. This includes persons of pure Spanish descent as well as those of Indian ancestry that, for whatever reason, lived a Spanish lifestyle. Genízaros are also considered part of this population. Thus, the culturally Hispanic portion of the population is essentially those who were not members of Pueblo, Athabaskan, or Plains Indian groups. This broad definition tends to blur a number of important distinctions. Unfortunately, our study was unable to take these differences into account. Thus, while it is possible that all parts of the culturally Hispanic population were participating in the ceramic industry, particularly during the Territorial periods, it is equally likely that only a small part of the population was making pottery. In particular, it is feasible that only those on the fringe of Spanish society, such as the genízaros, were involved in this industry, while the more traditional Spanish population was not. If so, then we may be looking at economic specialization focusing on "fringe" populations. Thus, since this study took place in one of those fringe areas, trends of relative production and use of Hispanic, Pueblo, and Euroamerican ceramics may or may not represent the entire New Mexican frontier at any given time. This is an interesting issue, particularly in light of investigations at the late nineteenth to early twentieth century Vigil-Torres site near Taos (Boyer et al. n.d.), where most of the native ceramic vessels were of Pueblo origin rather than Hispanic. Boyer et al. (1995) have speculated that this may have to do with the relative affluence of the Vigil family. Future research will need to address the possibility that relative abundance of vessels of varying ethnic origin may be related to site location or economic affluence.

In conclusion, we have attempted to provide a basic framework for addressing certain questions related to the prehistory and history of the Rio Chama Valley. The development of prehistoric farming features seems to be related to the interaction between population size and local ecology, while settlement of the valley was probably a function of movement into internal frontiers. Certain aspects of the historic occupation were examined as a preliminary step in the development of a model of frontier settlement and subsistence in New Mexico. A number of ideas have been proposed that may be fruitful avenues of future research, but it was not possible to address them in any detail within the confines of this project. Indeed, some of the ideas developed in this study have already been used in preparing research designs for other projects that are, as yet, uncompleted. Thus, this study was able to provide data that were not only important in examining the prehistory and history of the Rio Chama Valley, but also contributed information that has been used to formulate more detailed models for other regions.

CHAPTER 20

MANAGEMENT SUMMARY

JAMES L. MOORE

Upon the completion of fieldwork, it was felt that this study had exhausted the potential of those parts of LA 6599, LA 54313, LA 59658, and LA 59659 that were excavated to provide information on the prehistory and history of the region. Part of LA 806 was also examined, and it was determined that there were no subsurface cultural features or deposits in that area, and no further work was recommended for that part of the site. It should be noted that none of these sites were completely excavated by this project. Portions of each site, at times very extensive in size and probable artifact content, were outside project limits and were not investigated in detail. Thus, further work may be necessary at each of these sites if future projects are planned for areas outside the limits of the current project.

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APPENDIX 1

DATA FROM X-RAY FLUORESCENCE ANALYSIS OF HISTORIC TEWA POTTERY FROM LA PUENTE AND THE TRUJILLO HOUSE

LA PUENTE, LA54313
COLONIAL-TERRITORIAL SITE OCCUPIED BY NON-INDIANS
DATES FROM 1750-1820
3 TO 4 MILES EAST OF ABIQUIU

OGA	OGAPOGE POLYCHROME, HARLOW
POW	POWHOGE POLYCHROME, HARLOW
POJ	POJOAQUE POLYCHROME, HARLOW
NAM	NAMBE POLYCHROME, HARLOW
TBK	TEWA (POLISHED) BLACK WARE, BART
TRB	TEWA RED-ON-BUFF (SAN JUAN), BART
TRD	TEWA RED (SHERD SHOWS ONLY RED SLIP), BART
TGY	TEWA GRAY (REDUCED TEWA RED OR BUFF), BART
MIC	MICACEOUS , BART
MIS	MICACEOUS SLIPPED, BART
ZIA	ZIA, PUNAME, HARLOW & BART
SAN	SANTA ANA, PUNAME, HARLOW & BART
C01	TEWA RED, LEVINE
C02	TEWA BLACK (SANTA CLARA, KAPO), LEVINE
C03	TEWA OTHER (BROWN, GRAY, BUFF)
C04	MICA SLIPPED, INDET. TYPE
C05	MICA PASTE, INDET. TYPE
C07	CASITAS RED-ON-BUFF, LEVINE
C11	OGAPOGE POLYCHROME, LEVINE
C12	POWHOGE POLYCHROME, LEVINE
C13	NAMBE RED WARE, LEVINE
C23	HISPANIC POLISHED BLACKWARE, LEVINE
C24	SAN JUAN RED-ON-TAN, LEVINE
C25	APACHE MICACEOUS, INDET. TYPE
C28	PUNAME PUEBLOS, ZIA AND SANTA ANA
C30	UNKNOWN POLYCHROMES (TEWA)
TA1	TRASH AREA 1
TA2	TRASH AREA 2

SHERD ID	TYPE	FE	ZR	SR	RB	NB	CA	Y	PB	PASTE/TEMPER	
54313-X001	C11	45.0	30.9	24.0	08.2	07.1	03.2	05.6	01.9	OGA	1750-1760
54313-X002	C11	49.0	28.0	23.0	11.9	08.6	05.1	04.5	01.5	OGA	1750-1760
54313-X003	C11	50.0	30.5	19.5	07.4	08.2	06.1	05.7	01.4	OGA	1750-1760
54313-X004	C11	51.2	30.5	18.4	13.4	05.4	03.9	06.8	00.7	OGA	1750-1760
54313-X005	C12	37.1	30.8	32.0	07.9	09.4	04.2	05.4	01.4	POW	1770-1830
54313-X006	C12	33.5	30.7	35.9	05.8	07.1	03.6	04.5	00.9	POW	1770-1830
54313-X007	C12	50.9	34.9	14.3	10.8	09.9	03.9	08.6	02.0	POW	1770-1830
54313-X008	C12	61.2	23.3	15.5	08.6	08.9	03.4	05.9	00.7	POW	1770-1830
54313-X009	C12	46.2	30.9	22.9	13.9	08.5	01.8	07.4	01.7	NAM	1760-1780
54313-X010	C12	46.2	28.0	25.8	08.6	05.4	02.6	04.0	01.2	POW	1770-1830
54313-X011	C12	52.3	22.9	24.8	08.3	04.4	03.5	04.0	00.6	POW	1760-1770
54313-X012	C12	44.0	31.2	24.8	07.7	07.3	03.7	04.5	01.4	NAM	1770-1790
54313-X013	C12	57.4	25.2	17.4	08.2	07.0	03.1	06.8	01.0	POW	1770-1830
54313-X014	C12	49.8	26.3	24.0	09.1	06.3	04.7	04.9	00.7	POJ	1750-1760
54313-X015	C12	48.3	27.7	24.0	08.3	06.5	05.0	05.1	00.8	POW	1770-1830
54313-X016	C12	46.1	27.5	26.4	08.9	06.4	03.8	05.4	01.3	POW	1770-1830
54313-X017	C12	48.2	27.4	24.3	09.5	06.6	03.6	03.1	00.8	POJ	1750-1760
54313-X018	C12	61.2	23.6	15.2	10.1	09.3	03.1	05.8	00.9	NAM	1760-1780
54313-X019	C12	48.0	35.1	16.9	09.1	09.3	03.1	06.5	01.3	POW	1770-1830
54313-X020	C12	49.9	34.6	15.6	09.9	10.3	05.8	07.6	01.2	POW	1760-1790
54313-X021	C12	46.0	35.2	18.8	10.6	09.8	07.2	07.2	01.0	POW	1770-1830
54313-X022	C12	58.9	28.3	12.8	11.5	09.7	02.3	03.1	01.9	POW	1770-1830

54313-X023	C12	49.3	28.0	22.7	07.9	09.2	05.7	03.9	01.9	POW	1770-1830
54313-X024	C12	46.7	35.4	17.9	09.9	09.8	03.0	08.9	00.9	POW	1770-1830
54313-X025	C12	37.1	47.6	15.3	06.5	05.2	02.2	05.1	00.7	POW	1770-1830
54313-X026	C12	48.9	36.1	15.0	09.7	10.4	03.7	08.5	00.8	POW	1770-1830
54313-X027	C12	55.4	29.8	14.7	11.3	08.1	04.5	06.2	01.6	POW	1770-1830
54313-X028	C12	43.4	29.9	26.7	07.7	08.1	04.8	05.5	01.9	POW	1760-1770
54313-X029	C12	56.6	29.0	14.4	11.7	08.1	03.3	05.1	01.1	POW	1770-1830
54313-X030	C12	50.8	27.8	21.3	08.9	07.6	05.4	04.6	00.8	POW	1760-1770
54313-X031	C12	43.5	29.0	27.5	08.6	07.5	03.6	04.8	01.1	POW	1760-1770
54313-X032	C12	44.6	30.5	24.9	08.7	07.6	03.2	03.5	01.0	POJ	1750-1760
54313-X033	C02	47.7	30.5	21.7	04.8	07.7	04.7	02.8	00.7	TBK	TA2
54313-X034	C02	38.8	42.5	18.6	05.7	05.5	03.7	03.9	00.5	TBK	TA2
54313-X035	C02	42.9	29.5	27.6	04.9	09.1	04.1	04.0	01.0	TBK	TA2
54313-X036	C02	39.6	40.4	20.0	06.4	04.7	03.7	03.1	00.8	TBK	TA2
54313-X037	C02	43.1	27.9	28.9	06.1	07.0	03.1	03.1	00.4	TBK	TA2
54313-X038	C02	40.6	30.9	28.5	08.0	07.6	05.6	05.5	01.2	TBK	TA2
54313-X039	C02	41.5	30.2	28.3	06.5	06.9	04.7	02.8	00.9	TBK	TA2
54313-X040	C02	42.1	32.5	25.4	05.3	07.7	06.1	03.4	00.7	TBK	TA2
54313-X041	C02	38.9	43.9	17.2	06.0	08.0	03.7	03.9	00.5	TBK	TA2
54313-X042	C02	22.7	27.9	49.4	05.2	08.5	19.3	03.6	01.4	TBK	TA2
54313-X043	C02	55.4	22.8	21.7	06.8	07.1	06.2	03.9	00.8	TBK	TA2
54313-X044	C02	43.4	30.8	25.8	05.7	06.9	05.9	05.8	01.2	TBK	TA2
54313-X045	C02	59.3	22.8	17.9	08.2	06.8	03.1	03.8	02.2	TBK	TA2
54313-X046	C02	44.8	26.6	28.6	06.5	07.1	04.4	03.7	01.6	TBK	TA2
54313-X047	C02	62.1	19.4	18.4	08.3	05.8	03.7	03.9	01.2	TBK	TA2
54313-X048	C02	40.7	33.9	25.4	06.0	07.0	04.3	03.7	01.4	TBK	TA2
54313-X049	C02	39.9	28.7	31.4	07.5	08.5	04.6	04.5	01.6	TBK	TA2
54313-X050	C02	47.5	27.5	25.0	04.8	05.1	05.0	02.0	01.1	TBK	TA2
54313-X051	C02	41.6	30.7	27.7	05.3	07.3	05.1	03.9	01.1	TBK	TA2
54313-X052	C02	59.7	22.2	18.1	07.6	08.6	03.0	05.7	00.7	TBK	TA2
54313-X053	C02	54.4	22.8	22.8	06.0	06.8	02.8	04.1	01.0	TBK	TA2
54313-X054	C02	61.4	23.0	15.6	07.0	10.7	02.9	04.7	00.6	TBK	TA2
54313-X055	C02	54.7	25.3	20.0	06.0	06.6	03.4	03.6	01.2	TBK	TA2
54313-X056	C02	42.3	37.6	20.1	06.0	05.3	03.8	05.2	00.8	TBK	TA2
54313-X057	C02	42.8	28.6	28.5	06.7	07.5	02.8	03.6	00.8	TBK	TA2
54313-X058	C02	41.0	32.5	26.5	08.2	09.5	03.4	05.6	01.2	TBK	TA2
54313-X059	C02	61.4	23.5	15.1	09.5	07.6	03.0	05.9	02.0	TBK	TA2
54313-X060	C02	42.8	30.2	27.0	04.2	07.1	05.6	03.6	01.6	TBK	TA2
54313-X061	C02	44.0	29.9	26.1	07.4	10.7	04.7	05.2	00.5	TBK	TA2
54313-X062	C02	41.9	28.8	29.3	05.6	06.4	03.3	04.0	00.8	TBK	TA2
54313-X063	C23	39.7	34.2	26.1	06.0	08.7	05.6	04.1	00.7	TBK	TA2
54313-X064	C23	42.5	30.1	27.4	06.5	06.0	07.4	04.2	01.6	TBK	TA2
54313-X065	C23	43.3	31.2	25.5	05.5	06.0	05.4	03.8	01.4	TBK	TA2
54313-X066	C23	44.8	31.0	24.2	05.5	07.3	04.9	04.4	00.9	TBK	TA2
54313-X067	C23	54.3	21.0	24.7	05.8	08.4	05.6	04.3	01.4	TBK	TA2
54313-X068	C23	40.3	36.3	23.4	05.9	06.0	05.7	03.6	01.5	TBK	TA2
54313-X069	C23	42.3	32.8	24.8	05.6	07.1	05.2	04.5	00.6	TBK	TA2
54313-X070	C23	46.7	30.8	22.4	05.0	06.7	06.6	03.8	01.9	TBK	TA2
54313-X071	C23	39.2	33.6	27.1	04.8	07.3	03.4	03.3	02.1	TBK	TA2
54313-X072	C23	60.6	23.6	15.8	06.1	09.0	05.1	04.7	01.1	TBK	TA2
54313-X073	C23	56.7	27.3	16.0	08.6	09.6	03.0	05.3	00.7	TBK	TA2
54313-X074	C23	37.5	31.4	31.1	09.2	11.6	04.7	06.1	01.0	TBK	TA2
54313-X075	C23	42.0	29.6	28.3	05.4	07.1	05.5	04.4	00.9	TBK	TA2
54313-X076	C23	41.0	38.6	20.4	07.6	07.6	03.8	05.5	01.5	TBK	TA2
54313-X077	C23	43.9	35.8	20.2	07.7	07.4	03.7	05.2	01.4	TBK	TA2

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54313-X078	C23	46.2	29.0	24.8	07.2	07.5	05.6	04.1	00.8	TBK	TA2
54313-X079	C23	53.1	26.4	20.4	06.6	05.2	05.9	04.2	01.4	TBK	TA2
54313-X080	C23	43.9	31.3	24.8	06.6	06.1	07.4	04.5	01.8	TBK	TA2
54313-X081	C23	43.6	27.0	29.4	05.1	06.7	05.7	02.8	01.0	TBK	TA2
54313-X082	C23	43.5	30.4	26.1	05.2	08.5	06.7	04.0	01.6	TBK	TA2
54313-X083	C23	40.8	29.1	30.2	04.2	08.2	06.3	05.1	00.9	TBK	TA2
54313-X084	C23	40.8	30.7	28.5	06.5	08.2	06.4	03.5	01.6	TBK	TA2
54313-X085	C23	41.0	31.0	28.0	05.1	06.8	04.9	03.9	01.7	TBK	TA2
54313-X086	C23	45.9	27.0	27.1	05.6	04.9	04.7	03.4	01.1	TBK	TA2
54313-X087	C23	54.8	26.0	19.2	10.3	10.7	04.8	05.9	00.8	TBK	TA2
54313-X088	C23	45.2	29.6	25.2	06.3	07.6	05.0	03.4	01.7	TBK	TA2
54313-X089	C23	42.9	33.0	24.1	06.2	05.2	06.8	03.3	02.0	TBK	TA2
54313-X090	C23	48.0	27.1	24.9	05.4	10.2	05.4	04.4	01.7	TBK	TA2
54313-X091	C23	44.6	29.2	26.2	06.5	07.4	04.4	03.9	02.4	TBK	TA2
54313-X092	C23	56.0	24.7	19.4	08.3	06.9	03.7	04.4	01.2	TBK	TA2
54313-X093	C02	60.9	22.0	17.1	09.3	07.0	03.3	04.4	01.1	TBK	TA1
54313-X094	C02	57.4	27.1	15.6	10.9	09.2	05.2	05.4	01.2	TBK	TA1
54313-X095	C02	59.6	23.4	17.0	07.7	06.8	03.1	06.2	00.9	TBK	TA1
54313-X096	C02	52.9	23.3	23.8	07.9	06.2	05.7	04.9	01.6	TBK	TA1
54313-X097	C02	47.1	25.3	27.6	08.3	08.3	10.0	04.2	01.5	TBK	TA1
54313-X098	C02	45.9	27.7	26.4	04.9	05.6	05.8	05.1	01.1	TBK	TA1
54313-X099	C02	46.0	28.0	26.0	07.1	06.2	04.3	04.0	01.5	TBK	TA1
54313-X100	C02	56.8	28.0	15.3	09.9	08.2	03.9	06.3	01.3	TBK	TA1
54313-X101	C02	58.1	27.1	14.8	10.3	09.6	04.9	06.5	00.7	TBK	TA1
54313-X102	C02	57.2	26.6	16.2	11.2	10.5	06.7	06.1	02.5	TBK	TA1
54313-X103	C02	52.7	27.6	19.7	10.7	09.1	05.6	06.4	01.8	TBK	TA1
54313-X104	C02	61.1	25.6	13.3	11.2	08.3	03.3	06.2	01.7	TBK	TA1
54313-X105	C02	47.8	23.5	28.7	07.0	07.0	07.4	05.7	01.5	TBK	TA1
54313-X106	C02	53.0	26.0	20.9	09.7	08.6	04.1	04.8	01.0	TBK	TA1
54313-X107	C02	40.7	37.7	21.6	06.5	08.2	09.0	04.5	01.2	TBK	TA1
54313-X108	C02	50.7	25.6	23.7	09.5	07.9	05.2	07.4	01.1	TBK	TA1
54313-X109	C02	64.4	23.7	11.9	09.4	07.9	03.8	05.7	01.1	TBK	TA1
54313-X110	C02	39.8	31.8	28.4	07.4	08.6	03.5	04.9	00.6	TBK	TA1
54313-X111	C02	62.4	22.2	15.4	09.3	07.7	03.7	05.3	01.4	TBK	TA1
54313-X112	C02	48.1	28.0	23.9	11.8	10.4	05.7	04.7	00.5	TBK	TA1
54313-X113	C02	41.3	31.2	27.5	06.2	08.0	06.6	03.5	01.2	TBK	TA1
54313-X114	C02	49.3	28.2	22.5	06.1	09.2	06.6	03.9	01.2	TBK	TA1
54313-X115	C02	63.8	19.7	16.6	07.9	07.3	04.2	05.7	01.5	TBK	TA1
54313-X116	C02	52.2	23.8	24.0	08.2	07.9	05.6	04.3	01.3	TBK	TA1
54313-X117	C02	45.8	31.8	22.4	04.3	07.3	06.1	02.4	00.9	TBK	TA1
54313-X118	C02	63.4	23.8	12.8	09.5	06.1	02.6	05.9	01.5	TBK	TA1
54313-X119	C02	65.0	22.5	12.6	11.1	09.4	03.2	05.2	01.1	TBK	TA1
54313-X120	C02	63.2	24.0	12.8	08.7	08.1	01.6	04.7	00.7	TBK	TA1
54313-X121	C02	66.6	20.8	12.6	07.9	08.2	02.8	04.7	02.1	TBK	TA1
54313-X122	C02	38.3	29.8	31.9	05.4	05.2	10.8	04.0	00.7	TBK	TA1
54313-X123	C23	44.9	32.0	23.2	04.8	07.3	07.8	04.1	00.5	TBK	TA1
54313-X124	C23	43.6	32.1	24.3	04.7	06.7	07.5	03.3	00.8	TBK	TA1
54313-X125	C23	55.0	27.2	17.8	05.6	06.7	05.2	04.4	00.6	TBK	TA1
54313-X126	C23	44.4	29.5	26.1	05.4	05.5	06.1	04.6	01.0	TBK	TA1
54313-X127	C23	42.5	32.7	24.8	05.4	06.5	05.4	03.4	00.6	TBK	TA1
54313-X128	C23	46.5	30.1	23.4	04.9	05.8	06.2	02.5	00.3	TBK	TA1
54313-X129	C23	36.0	38.3	25.6	04.6	05.9	05.0	05.2	01.0	TBK	TA1
54313-X130	C23	46.8	29.3	23.9	06.7	07.3	05.6	04.3	00.8	TBK	TA1
54313-X131	C23	49.4	24.0	26.6	08.4	08.7	05.8	04.3	00.9	TBK	TA1
54313-X132	C23	40.1	30.4	29.5	03.5	08.1	04.0	03.7	00.5	TBK	TA1

54313-X133	C23	34.4	44.7	20.9	04.7	07.0	03.4	06.4	00.7	TBK	TA1
54313-X134	C23	44.9	29.8	25.3	04.8	06.8	05.3	02.6	00.9	TBK	TA1
54313-X135	C23	45.3	29.2	25.5	04.8	07.6	05.9	03.4	01.3	TBK	TA1
54313-X136	C23	45.2	31.2	23.6	06.4	05.0	05.4	03.9	00.8	TBK	TA1
54313-X137	C23	43.8	27.3	28.9	05.9	04.5	06.7	02.6	01.1	TBK	TA1
54313-X138	C23	40.8	33.7	25.5	08.1	07.6	03.9	03.7	01.4	TBK	TA1
54313-X139	C23	46.9	28.8	24.3	05.2	07.1	08.4	01.3	00.8	TBK	TA1
54313-X140	C23	46.5	29.2	24.3	03.7	05.2	06.9	02.5	02.0	TBK	TA1
54313-X141	C23	60.2	21.8	18.0	06.7	06.0	01.2	02.7	01.1	TBK	TA1
54313-X142	C23	47.3	26.4	26.3	06.4	06.8	08.9	04.4	00.6	TBK	TA1
54313-X143	C23	45.3	26.9	27.8	06.3	06.7	09.7	03.5	01.0	TBK	TA1
54313-X144	C23	42.4	31.3	26.3	04.5	09.8	06.6	03.8	00.7	TBK	TA1
54313-X145	C23	45.3	38.6	16.1	05.1	05.9	03.6	03.2	01.3	TBK	TA1
54313-X146	C23	58.2	23.6	18.2	08.3	06.4	03.3	04.8	00.9	TBK	TA1
54313-X147	C23	42.5	32.8	24.6	05.1	05.9	05.0	02.8	00.9	TBK	TA1
54313-X148	C23	38.7	45.4	16.0	06.5	05.0	03.6	04.5	00.2	TBK	TA1
54313-X149	C23	43.9	34.1	22.0	06.6	07.3	06.1	03.5	01.0	TBK	TA1
54313-X150	C23	41.6	31.6	26.8	05.0	05.7	04.1	04.0	00.4	TBK	TA1
54313-X151	C07	47.1	29.7	23.2	07.4	11.0	06.5	04.3	01.1	TRB	TA1
54313-X152	C07	44.1	30.5	25.3	09.0	07.2	05.8	03.4	00.7	TRB	TA1
54313-X153	C07	37.7	31.2	31.1	04.3	09.1	07.3	03.3	00.6	TRB	TA1
54313-X154	C07	42.1	32.0	25.9	06.2	05.6	05.8	03.7	01.2	TRB	TA1
54313-X155	C07	44.3	32.2	23.5	07.4	10.0	04.1	03.1	01.3	TRB	TA1
54313-X156	C07	43.0	29.6	27.4	05.7	09.0	06.1	03.8	00.8	TRB	TA1
54313-X157	C07	45.6	35.9	18.5	06.0	09.8	06.9	02.7	01.6	TRB	TA1
54313-X158	C07	39.8	31.0	29.1	05.3	06.3	07.3	02.2	01.1	TRB	TA1
54313-X159	C07	44.1	31.8	24.1	06.0	07.4	06.5	03.3	00.7	TRB	TA1
54313-X160	C07	47.6	29.4	23.0	05.6	09.4	05.6	03.0	00.6	TRB	TA1
54313-X161	C07	43.1	30.0	26.9	05.0	05.7	05.1	02.1	00.7	TRB	TA1
54313-X162	C07	41.0	32.9	26.1	05.4	08.4	05.0	03.4	00.6	TRB	TA1
54313-X163	C07	48.1	28.4	23.5	06.1	05.8	06.5	03.8	00.7	TRB	TA1
54313-X164	C07	47.5	30.4	22.1	05.1	07.5	03.9	02.4	00.6	TRB	TA1
54313-X165	C07	47.0	28.7	24.3	06.0	08.4	06.7	04.2	01.1	TRB	TA1
54313-X166	C07	43.0	30.0	27.0	05.9	05.7	05.2	01.9	00.6	TRB	TA1
54313-X167	C07	40.8	32.3	26.9	06.8	06.6	06.7	04.0	00.4	TRB	TA1
54313-X168	C07	43.7	29.0	27.4	06.3	05.8	05.7	04.0	01.3	TRB	TA1
54313-X169	C07	43.8	29.5	26.7	04.7	05.8	05.5	05.2	01.0	TRB	TA1
54313-X170	C07	42.9	30.4	26.7	05.8	06.0	05.3	04.8	01.2	TRB	TA1
54313-X171	C07	45.3	30.4	24.4	04.2	07.1	04.8	04.6	00.8	TRB	TA1
54313-X172	C07	45.1	28.5	26.4	04.5	07.8	06.5	04.0	01.0	TRB	TA1
54313-X173	C07	44.2	32.5	23.2	05.8	08.1	06.0	02.8	01.5	TRB	TA1
54313-X174	C07	44.0	31.1	24.9	05.5	06.9	04.3	04.3	01.2	TRB	TA1
54313-X175	C07	46.4	28.7	24.9	05.9	07.4	05.1	05.0	01.8	TRB	TA1
54313-X176	C07	48.6	28.5	22.9	06.7	08.0	04.4	02.9	01.8	TRB	TA1
54313-X177	C07	45.8	28.8	25.4	05.0	07.3	05.7	04.4	02.2	TRB	TA1
54313-X178	C07	45.0	33.1	21.9	05.4	05.5	04.5	04.2	01.0	TRB	TA1
SANJUANPOT	SJP	39.3	29.5	31.2	06.6	05.3	04.5	04.7	01.0	TRB	
54313-X179	C07	43.8	31.7	24.5	05.5	08.7	06.1	03.0	01.6	TRB	TA1
54313-X180	C07	47.2	28.8	24.1	05.1	07.1	05.6	03.5	01.8	TRB	TA1
54313-X181	C24	46.9	30.5	22.6	04.8	09.2	05.8	04.3	01.6	TRB	TA12
54313-X182	C24	38.7	30.1	31.2	06.6	08.8	03.3	04.8	00.8	TRB	TA12
54313-X183	C24	57.8	28.4	13.9	10.5	06.8	04.0	04.8	01.2	TRB	TA12
54313-X184	C24	34.8	30.4	34.8	06.5	08.3	06.2	03.8	00.7	TRB	TA12
54313-X185	C24	50.9	28.0	21.1	07.2	08.0	05.3	04.9	01.7	TRB	TA12
54313-X186	C24	58.8	24.7	16.5	09.2	07.5	02.9	04.2	00.9	TRB	TA12

54313-X187	C24	37.8	31.6	30.6	07.1	07.4	02.8	05.1	01.1	TRB	TA12
54313-X188	C24	48.1	27.9	24.0	04.2	07.3	05.9	04.2	00.9	TRB	TA12
54313-X189	C24	37.2	42.9	19.9	06.6	12.4	05.0	08.8	01.8	TRB	TA12
54313-X190	C24	53.9	24.8	21.3	06.8	07.6	06.3	05.0	00.7	TRB	TA12
54313-X191	C24	43.0	29.3	27.7	05.4	10.7	07.7	04.1	01.5	TRB	TA12
54313-X192	C24	47.3	30.6	22.1	06.5	06.1	05.7	03.5	01.5	TRB	TA12
54313-X193	C24	42.8	31.6	25.6	05.7	07.1	05.8	03.5	00.9	TRB	TA12
54313-X194	C24	52.3	22.9	24.7	08.7	06.7	03.8	04.6	01.9	TRB	TA12
54313-X195	C24	39.6	32.2	28.2	05.0	07.4	06.0	04.4	00.9	TRB	TA12
54313-X196	C24	48.4	28.1	23.5	05.8	07.1	07.0	05.0	01.4	TRB	TA12
54313-X197	C24	34.0	35.3	30.7	07.0	06.3	02.9	05.2	00.8	TRB	TA12
54313-X198	C24	55.4	23.8	20.8	06.0	07.4	08.2	03.2	01.1	TRB	TA12
54313-X199	C24	51.6	29.2	19.2	09.1	07.8	04.3	05.8	01.0	TRB	TA12
54313-X200	C24	44.0	29.8	26.2	04.8	05.9	06.7	03.6	01.6	TRB	TA12
54313-X201	C24	43.8	33.1	23.1	05.1	08.1	07.1	05.0	01.4	TRB	TA12
54313-X202	C24	41.7	31.1	27.3	05.4	05.7	04.3	02.9	01.6	TRB	TA12
54313-X203	C24	39.1	30.2	30.7	07.1	09.2	06.5	05.2	01.4	TRB	TA12
54313-X204	C24	50.2	29.3	20.5	06.1	07.2	05.5	02.3	00.8	TRB	TA12
54313-X205	C24	36.4	31.2	32.4	05.8	05.9	03.7	03.1	01.6	TRB	TA12
54313-X206	C24	39.3	32.9	27.8	07.2	06.0	05.4	05.6	00.7	TRB	TA12
54313-X207	C24	44.4	31.9	23.7	05.3	06.9	06.8	04.2	01.0	TRB	TA12
54313-X208	C24	41.5	32.5	26.0	05.5	08.7	05.7	04.3	01.7	TRB	TA12
54313-X209	C24	46.0	29.4	24.6	05.4	10.2	04.7	04.7	00.9	TRB	TA12
54313-X210	C24	45.5	33.2	21.3	05.9	07.7	06.2	05.4	00.8	TRB	TA12
54313-X214	C01	41.6	32.0	26.4	04.2	07.9	08.3	04.3	00.9	TRD	TA12
54313-X215	C01	38.9	32.4	28.7	06.6	07.2	04.7	04.9	01.2	TRD	TA12
54313-X216	C01	38.7	34.9	26.4	05.9	09.4	04.8	04.4	00.3	TRD	TA12
54313-X217	C01	47.1	27.0	25.9	07.6	07.6	04.7	04.0	01.1	TRD	TA12
54313-X218	C01	42.7	32.9	24.4	04.9	08.5	05.6	04.6	01.3	TRD	TA12
54313-X219	C01	46.1	32.4	21.5	06.1	09.0	03.8	05.2	00.6	TRD	TA12
54313-X220	C01	44.8	31.1	24.1	10.4	10.1	05.1	06.0	00.8	TRD	TA12
54313-X221	C01	63.2	25.3	11.5	08.0	12.6	06.9	05.2	00.5	TRD	TA12
54313-X222	C01	52.2	25.8	21.9	03.9	06.2	04.4	04.0	00.4	TRD	TA12
54313-X223	C01	49.3	27.4	23.3	07.8	11.1	07.2	07.6	00.8	TRD	TA12
54313-X224	C01	42.9	38.8	18.3	04.4	09.2	05.2	06.3	00.8	TRD	TA12
54313-X225	C01	39.7	33.4	26.9	04.2	07.4	05.0	05.5	01.1	TRD	TA12
54313-X226	C01	39.9	27.9	32.2	05.5	09.0	05.3	04.7	00.4	TRD	TA12
54313-X227	C01	39.9	35.2	24.9	05.5	07.4	07.1	03.5	01.0	TRD	TA12
54313-X228	C01	41.9	30.2	27.8	06.9	07.9	05.3	04.4	01.3	TRD	TA12
54313-X229	C01	43.1	30.8	26.2	05.9	07.9	05.2	05.9	00.7	TRD	TA12
54313-X230	C01	39.3	45.2	15.5	04.9	05.7	03.8	03.8	00.8	TRD	TA12
54313-X231	C07	46.8	28.5	24.7	03.1	06.4	06.6	03.6	01.6	TRB	TA2
54313-X232	C07	41.2	34.9	23.9	04.8	10.7	06.6	02.8	01.4	TRB	TA2
54313-X233	C07	50.2	27.4	22.4	06.9	07.9	06.8	04.7	00.7	TRB	TA2
54313-X234	C07	44.8	31.2	24.1	05.3	05.9	07.1	04.5	01.3	TRB	TA2
54313-X235	C07	42.4	29.9	27.7	05.5	09.4	04.4	04.8	00.5	TRB	TA2
54313-X236	C07	55.0	27.8	17.2	02.3	09.1	05.8	05.0	00.7	TRB	TA2
54313-X237	C07	31.7	46.8	21.6	04.0	11.6	05.0	06.6	00.9	TRB	TA2
54313-X238	C07	44.7	31.9	23.3	05.2	10.9	06.5	05.5	01.1	TRB	TA2
54313-X239	C07	40.6	35.5	23.9	05.0	08.5	04.7	05.4	01.1	TRB	TA2
54313-X240	C07	45.0	34.4	20.6	05.2	11.7	07.3	07.4	00.7	TRB	TA2
54313-X241	C07	42.2	35.0	22.8	03.5	12.6	05.8	04.3	01.0	TRB	TA2
54313-X242	C07	41.5	32.9	25.6	04.8	08.7	06.0	06.3	01.5	TRB	TA2
54313-X243	C07	47.1	29.9	23.0	04.7	08.8	06.0	06.2	01.1	TRB	TA2
54313-X244	C07	43.7	32.5	23.9	06.0	08.5	05.6	04.9	00.6	TRB	TA2

54313-X245	C07	38.9	37.5	23.7	03.7	08.1	05.8	05.0	00.6	TRB	TA2
54313-X246	C07	39.0	30.4	30.7	03.1	07.0	03.8	05.7	00.7	TRB	TA2
54313-X247	C07	43.1	31.3	25.6	03.1	09.0	07.9	04.0	00.4	TRB	TA2
54313-X248	C07	45.7	30.2	24.1	03.5	08.3	06.4	04.9	00.8	TRB	TA2
54313-X249	C07	41.7	32.6	25.7	06.0	08.1	07.1	06.9	00.9	TRB	TA2
54313-X250	C07	42.9	32.7	24.3	03.0	08.3	04.7	04.1	00.5	TRB	TA2
54313-X251	C07	43.6	32.2	24.2	04.3	7.0	04.5	04.4	00.5	TRB	TA2
54313-X252	C07	42.4	32.5	25.1	03.8	09.4	06.2	04.8	00.7	TRB	TA2
54313-X253	C07	43.9	34.6	21.5	03.0	09.6	05.1	06.1	00.5	TRB	TA2
54313-X254	C07	49.9	30.5	19.6	03.5	10.2	05.6	04.1	00.6	TRB	TA2
54313-X255	C07	40.3	33.0	26.7	05.1	08.1	06.5	06.3	01.4	TRB	TA2
54313-X256	C07	43.8	32.8	23.4	04.9	12.4	07.2	05.1	01.3	TRB	TA2
54313-X257	C07	37.1	32.6	30.3	05.5	05.7	06.2	05.1	01.5	TRB	TA2
54313-X258	C07	41.5	30.7	27.8	03.9	08.4	05.3	03.9	00.4	TRB	TA2
54313-X259	C07	43.6	29.5	26.9	04.3	06.9	07.6	04.4	01.0	TRB	TA2
54313-X260	C07	46.4	32.7	20.9	04.3	10.0	06.7	04.8	02.2	TRB	TA2
54313-X261	C07	47.6	32.3	20.1	04.6	10.3	07.2	05.2	01.0	TRB	TA2
54313-X262	C07	35.7	34.3	30.0	04.1	08.1	06.4	04.2	00.6	TRB	TA2
54313-X263	C07	39.4	33.5	27.1	05.7	09.8	07.2	05.8	01.1	TRB	TA2
54313-X264	C07	41.2	32.3	26.5	05.2	08.2	05.6	04.6	00.8	TRB	TA2
54313-X265	C07	42.7	32.3	25.0	05.9	07.6	05.8	04.5	01.0	TRB	TA2
54313-X266	C07	41.8	32.4	25.8	04.2	08.2	08.0	03.4	01.3	TRB	TA2
54313-X267	C25	51.6	35.7	12.7	11.0	08.7	04.1	08.0	02.3	MIC	3.7MM
54313-X268	C25	59.8	33.2	07.0	08.8	09.4	01.9	07.2	02.2	MIC	3.7MM
54313-X269	C25	51.3	35.9	12.8	08.0	14.1	03.8	09.3	02.7	MIC	2.9MM
54313-X270	C25	64.6	24.3	11.1	07.7	05.0	02.3	04.7	01.4	MIC	5.1MM
54313-X271	C25	47.4	39.3	13.3	04.5	12.3	02.5	11.4	02.6	MIC	4.8MM
54313-X272	C25	56.2	37.3	06.5	10.0	11.6	02.6	12.5	01.3	MIC	4.4MM
54313-X273	C25	47.3	41.8	11.0	08.7	10.5	02.1	07.7	02.7	MIC	4.6MM
54313-X274	C25	55.2	35.8	09.0	11.4	08.8	03.5	08.5	02.3	MIC	5.0MM
54313-X275	C25	57.8	33.4	08.8	06.6	10.0	02.4	08.0	02.7	MIC	5.8MM
54313-X276	C25	62.1	30.6	07.4	06.2	06.0	01.7	06.7	00.7	MIC	5.6MM
54313-X277	C25	49.4	39.4	11.2	09.1	12.2	02.9	11.4	02.4	MIC	4.7MM
54313-X278	C25	49.8	36.1	14.0	04.1	09.4	01.9	08.1	02.0	MIC	4.0MM
54313-X279	C25	55.1	34.0	10.9	07.9	10.8	02.5	05.5	02.5	MIC	3.0MM
54313-X280	C25	52.6	39.3	08.1	10.1	12.2	02.5	08.5	03.1	MIC	5.0MM
54313-X281	C25	58.4	32.5	09.1	07.5	08.8	02.8	08.8	03.3	MIC	5.1MM
54313-X282	C25	52.7	37.7	09.5	09.1	10.1	02.1	10.1	02.8	MIC	3.9MM
54313-X283	C25	53.5	32.1	14.4	08.4	09.5	01.5	05.5	01.4	MIC	4.9MM
54313-X284	C25	56.9	32.8	10.3	10.8	08.9	01.5	06.9	01.9	MIC	4.2MM
54313-X285	C25	72.9	17.6	09.5	08.4	07.0	03.1	05.1	01.1	MIC	3.6MM
54313-X286	C25	43.9	40.7	15.5	03.2	09.6	04.8	06.5	02.1	MIC	4.6MM
54313-X287	C25	54.3	31.6	14.2	10.1	11.1	03.0	06.8	01.5	MIC	5.2MM
54313-X288	C25	51.7	37.1	11.2	11.3	06.9	03.2	13.4	01.5	MIC	4.8MM
54313-X289	C25	54.0	32.6	13.5	08.5	09.0	04.0	09.8	02.0	MIC	4.1MM
54313-X290	C25	55.2	33.0	11.8	08.9	09.3	03.1	07.7	02.3	MIC	4.9MM
54313-X291	C25	68.1	21.7	10.1	04.3	05.4	03.4	06.7	01.8	MIC	4.1MM
54313-X292	C25	48.2	42.6	09.2	08.0	12.2	03.0	16.9	01.4	MIC	5.0MM
54313-X293	C25	58.1	30.3	11.6	07.3	09.0	03.1	06.3	01.7	MIC	4.5MM
54313-X294	C25	56.4	30.4	13.3	04.8	05.9	03.0	07.0	01.7	MIC	6.1MM
54313-X295	C25	50.2	36.0	13.9	10.9	09.9	03.6	08.0	01.4	MIC	4.5MM
54313-X296	C25	50.3	45.0	04.7	10.2	06.9	02.3	09.1	02.7	MIC	4.2MM
54313-X297	C25	52.0	33.7	14.3	04.3	08.1	02.3	06.7	02.2	MIC	4.0MM
54313-X298	C05	46.6	42.2	11.2	07.5	10.5	02.2	10.3	02.0	MIC	4.5MM
54313-X299	C05	45.4	44.6	09.9	07.5	08.8	03.0	11.6	02.4	MIC	5.2MM

54313-X300	C05	40.3	47.6	12.1	08.8	07.4	02.7	05.0	00.6	MIC	4.7MM
54313-X301	C05	47.0	40.5	12.5	09.1	07.8	03.7	09.7	02.5	MIC	6.0MM
54313-X302	C05	65.7	26.5	07.8	07.3	07.7	03.9	04.3	01.8	MIC	3.9MM
54313-X303	C05	67.8	21.8	10.3	07.8	08.2	02.5	06.6	00.9	MIC	4.0MM
54313-X304	C05	56.2	32.9	10.9	10.3	12.8	06.4	09.4	01.4	MIC	4.3MM
54313-X305	C05	48.3	36.1	15.5	05.7	09.6	04.7	10.1	02.2	MIC	4.3MM
54313-X306	C05	68.3	23.4	08.4	05.9	06.0	02.5	03.1	00.8	MIC	4.2MM
54313-X307	C05	49.6	40.5	10.0	06.7	09.8	03.4	08.0	02.7	MIC	4.5MM
54313-X308	C05	54.0	39.3	06.6	09.8	13.0	03.8	12.4	01.5	MIC	4.4MM
54313-X309	C05	57.0	37.1	05.9	08.5	08.6	03.4	09.2	00.5	MIC	4.4MM
54313-X310	C05	67.0	21.6	11.2	06.2	06.8	02.8	04.4	01.2	MIC	5.0MM
54313-X311	C05	49.7	35.8	14.6	07.0	08.1	02.4	09.4	03.3	MIC	4.9MM
54313-X312	C05	75.4	16.5	08.1	05.9	07.4	01.9	04.6	02.1	MIC	4.7MM
54313-X313	C05	35.7	30.2	34.2	05.0	06.2	05.4	03.2	00.9	MIC	5.2MM
54313-X314	C05	49.2	41.4	09.3	05.6	06.0	02.6	07.6	00.8	MIC	5.3MM
54313-X315	C05	55.9	30.6	13.5	11.5	09.0	03.1	07.7	01.5	MIC	4.6MM
54313-X316	C05	68.4	18.9	12.7	07.2	06.3	03.3	03.8	01.0	MIC	5.3MM
54313-X317	C05	55.9	33.1	11.0	05.4	08.2	04.1	07.8	01.6	MIC	3.7MM
54313-X318	C05	56.6	35.6	07.8	08.6	09.4	04.5	10.0	01.8	MIC	4.9MM
54313-X319	C05	59.7	32.2	08.1	11.6	09.0	03.2	08.4	00.9	MIC	5.1MM
54313-X320	C05	50.4	35.2	14.4	08.5	09.5	03.2	07.3	01.6	MIC	4.3MM
54313-X321	C05	45.2	44.7	10.1	07.9	09.9	03.3	11.1	01.5	MIC	
54313-X322	C05	58.6	30.9	10.5	09.5	10.8	03.3	07.6	01.7	MIC	4.5MM
54313-X323	C05	50.1	33.5	16.4	06.3	08.8	03.8	09.0	03.1	MIC	5.0MM
54313-X324	C05	55.9	35.5	08.6	04.2	11.6	03.7	08.2	01.8	MIC	4.1MM
54313-X325	C05	46.1	27.9	26.0	08.7	07.4	03.5	05.2	01.6	MIS	
54313-X326	C05	58.6	32.7	08.7	09.4	12.4	04.1	08.6	01.4	MIC	4.5MM
54313-X327	C05	57.7	32.1	10.2	08.1	08.9	03.7	06.3	02.2	MIC	5.2MM
54313-X328	C05	55.8	34.8	09.4	10.6	10.4	03.3	08.1	02.6	MIC	4.1MM
54313-X329	C05	64.8	22.4	12.7	05.8	07.7	02.9	04.2	01.1	MIC	4.2MM
54313-X330	C05	54.9	32.9	12.1	06.3	06.6	05.4	06.0	00.8	MIC	3.4MM
54313-X331	C04	46.8	31.4	21.8	09.4	08.3	04.0	07.2	01.2	MIS	
54313-X332	C04	36.4	30.7	32.9	05.4	04.9	04.3	03.1	00.9	MIS	
54313-X333	C04	36.5	33.1	30.4	05.9	07.8	02.8	05.8	00.8	MIS	
54313-X334	C04	44.0	31.8	24.2	07.4	05.9	04.0	04.6	01.4	MIS	
54313-X335	C04	39.2	31.7	29.0	06.4	06.3	05.1	04.8	01.1	MIS	
54313-X336	C04	50.4	40.2	09.5	08.4	10.3	02.4	12.5	01.7	MIC	6.2MM
54313-X337	C04	37.6	29.8	32.6	04.7	05.7	04.8	03.4	01.6	MIS	
54313-X338	C04	36.1	32.7	31.3	07.0	04.6	03.5	03.9	01.9	MIS	
54313-X339	C04	39.2	28.3	32.5	05.7	04.9	03.6	02.7	01.1	MIS	
54313-X340	C04	46.4	29.3	24.2	08.2	06.9	03.9	04.2	01.5	MIS	
54313-X341	C04	41.3	30.7	28.0	07.9	05.0	03.7	03.3	01.0	MIS	
54313-X342	C04	48.3	30.3	21.3	07.7	05.3	04.2	04.3	00.9	MIS	
54313-X343	C04	41.9	30.3	27.8	08.0	04.5	05.1	04.5	01.4	MIS	
54313-X344	C04	38.1	31.7	30.3	08.1	06.5	03.8	05.5	00.5	MIS	
54313-X345	C04	43.4	30.6	26.0	07.5	07.7	05.6	05.0	01.7	MIS	
54313-X346	C04	49.2	32.4	18.5	09.7	08.6	03.7	06.4	00.7	MIS	
54313-X347	C04	51.9	28.4	19.8	07.8	08.7	05.6	04.0	01.6	MIS	
54313-X348	C04	34.4	32.2	33.2	06.7	05.3	04.6	03.8	01.5	MIS	
54313-X349	C04	43.5	31.4	25.1	07.7	04.6	03.8	05.6	00.6	MIS	
54313-X350	C04	49.8	27.9	22.3	06.8	06.5	04.7	04.9	00.8	MIS	
54313-X351	C04	50.3	30.7	19.0	06.5	06.2	04.0	06.2	01.9	MIS	
54313-X352	C04	49.0	27.3	23.7	08.6	07.1	05.2	05.1	01.8	MIS	
54313-X353	C04	42.1	31.9	26.0	07.0	05.3	05.2	05.7	01.4	MIS	
54313-X354	C04	44.6	28.5	26.9	04.8	05.1	04.8	03.7	00.9	MIS	

54313-X355	C04	53.6	35.4	11.0	08.3	09.1	02.9	17.7	00.8	MIC	
54313-X356	C04	39.7	32.9	27.4	06.0	08.3	03.5	05.7	01.0	MIS	
54313-X357	C04	46.2	28.6	25.3	05.5	07.0	06.2	03.6	00.5	MIS	
54313-X358	C04	53.4	25.7	20.9	05.7	06.9	04.8	02.9	00.9	MIS	
54313-X359	C04	49.3	27.2	23.5	06.6	06.3	05.1	04.0	01.0	MIS	
54313-X360	C03	40.2	32.0	27.8	06.5	05.4	03.9	04.8	00.9	TGY	TA12
54313-X361	C03	51.1	27.5	21.5	08.6	05.4	05.2	04.0	01.3	TGY	TA12
54313-X362	C03	35.6	41.6	22.8	06.1	06.4	02.9	06.2	00.5	TGY	TA12
54313-X363	C03	49.5	26.3	24.1	08.4	05.4	05.3	04.0	01.4	TGY	TA12
54313-X364	C03	55.5	24.2	20.3	10.1	07.2	05.4	04.8	01.0	TGY	TA12
54313-X365	C03	43.2	29.9	26.8	06.0	06.9	08.4	03.2	00.8	TGY	TA12
54313-X366	C03	39.8	28.6	31.6	06.9	07.1	03.0	04.0	01.6	TGY	TA12
54313-X367	C03	47.1	26.7	26.2	08.0	06.0	05.9	05.7	00.7	TGY	TA12
54313-X368	C03	37.4	34.2	28.4	07.1	08.4	03.7	06.1	00.5	TGY	TA12
54313-X369	C03	42.3	31.4	26.3	06.2	05.0	04.7	03.6	01.0	TGY	TA12
54313-X370	C03	46.1	28.6	25.3	08.9	07.8	04.1	05.5	01.7	TGY	TA12
54313-X371	C03	47.2	31.5	21.3	08.4	07.5	04.9	05.4	00.8	TGY	TA12
54313-X372	C03	42.4	33.1	24.5	05.8	06.6	04.4	05.3	01.3	TGY	TA12
54313-X373	C03	47.2	29.2	23.6	09.4	07.1	07.4	04.4	01.2	TGY	TA12
54313-X374	C03	55.7	23.9	20.5	08.2	05.8	03.9	04.4	01.0	TGY	TA12
54313-X375	C03	57.6	24.3	18.0	09.1	06.1	06.6	05.6	01.2	TGY	TA12
54313-X376	C03	47.7	29.4	22.9	06.1	06.4	03.4	04.0	01.2	TGY	TA12
54313-X377	C03	37.2	29.6	33.2	06.4	06.0	04.5	04.9	01.3	TGY	TA12
54313-X378	C03	49.0	29.8	21.2	08.0	07.1	06.3	04.9	01.0	TGY	TA12
54313-X379	C03	49.4	29.5	21.1	07.8	06.3	05.5	05.5	00.7	TGY	TA12
54313-X380	C03	42.5	29.1	28.4	05.9	09.2	03.7	04.4	01.4	TGY	TA12
54313-X381	C03	47.2	33.8	19.0	05.5	06.3	05.7	03.8	00.9	TGY	TA12
54313-X382	C03	46.2	30.0	23.8	08.5	10.4	03.4	05.7	02.1	TGY	TA12
54313-X383	C03	37.4	44.7	17.9	06.2	04.9	04.1	03.7	01.3	TGY	TA12
54313-X384	C03	39.4	30.6	30.0	06.4	07.7	03.5	03.7	00.6	TGY	TA12
54313-X385	C03	36.9	40.7	22.4	04.8	08.1	04.3	06.9	00.8	TGY	TA12
54313-X386	C03	42.7	29.1	28.2	07.6	09.3	03.3	05.6	01.6	TGY	TA12
54313-X387	C03	63.0	22.0	14.9	09.8	08.0	04.9	05.6	01.4	TGY	TA12
54313-X388	C03	44.9	29.4	25.7	06.6	08.8	03.2	05.9	01.1	TGY	TA12
54313-X389	C03	45.2	29.0	25.9	05.7	08.1	04.6	04.6	02.1	TGY	TA12
54313-X390	C03	40.2	29.9	29.9	05.8	07.1	03.3	05.0	00.5	TGY	TA12
54313-X391	C28	52.1	30.4	17.6	08.8	06.6	03.9	06.6	01.1	PUN4	TA12
54313-X392	C28	49.3	28.0	22.6	07.3	06.1	04.9	06.5	02.1	SAN	1760-1800
54313-X393	C28	51.2	26.9	22.0	07.2	07.2	04.9	05.1	01.5	SAN	1760-1800
54313-X394	C28	45.1	31.2	23.7	07.0	08.0	05.8	06.5	01.2	SAN	1760-1800
54313-X395	C28	57.7	18.4	23.9	03.5	03.9	04.2	02.6	00.8	ZIA	1760-1800
54313-X396	C28	52.2	24.2	23.6	08.0	06.0	06.8	03.8	00.9	SAN	1760-1800
54313-X397	C28	60.0	18.5	21.5	02.4	03.9	05.3	02.8	01.0	ZIA	1760-1800
54313-X398	C28	53.4	26.3	20.2	07.7	06.6	05.3	03.9	01.5	SAN	1760-1800
54313-X399	C28	50.4	32.7	16.9	11.4	09.4	02.9	07.6	00.8	PUN4	TA12
54313-X400	C28	62.4	14.3	23.2	02.5	03.2	03.7	01.9	00.8	ZIA	1760-1800
54313-X401	C28	37.9	32.7	29.5	10.6	09.5	04.4	06.7	01.5	TEWA	
54313-X402	C28	62.4	25.5	12.1	10.3	10.1	04.3	06.7	01.4	SAN	1760-1800
54313-X403	C28	56.9	24.9	18.2	07.1	06.0	05.1	04.0	01.2	PUN3	TA12
54313-X404	C28	50.2	29.5	20.4	08.7	06.3	05.8	06.2	00.8	SAN	1760-1800
54313-X405	C28	58.1	24.6	17.4	11.5	09.6	07.6	07.6	00.8	PUN3	TA12
54313-X406	C28	47.0	31.2	21.7	08.7	07.2	04.3	04.6	01.4	SAN	1760-1800
54313-X407	C28	61.2	16.1	22.7	03.9	04.2	05.1	02.2	00.6	ZIA	1760-1800
54313-X408	C28	51.2	27.6	20.9	06.8	06.3	04.8	04.8	01.7	SAN	1760-1800
54313-X409	C28	51.0	27.9	21.1	06.3	06.9	05.1	04.6	01.4	SAN	1760-1800

54313-X410	C28	48.9	29.1	22.0	07.5	06.1	05.4	05.8	01.5	SAN	1760-1800
54313-X411	C28	57.3	26.3	16.5	09.9	06.2	03.3	06.3	01.0	PUN3	TA12
54313-X412	C28	59.5	18.6	21.9	04.7	06.6	06.0	03.9	02.8	ZIA	1760-1800
54313-X413	C28	57.3	25.9	16.7	06.6	08.1	04.7	04.8	02.2	PUN3	TA12
54313-X414	C28	50.7	28.2	21.2	07.3	10.0	06.7	06.0	01.0	SAN	1760-1800
54313-X415	C28	43.8	32.2	24.0	07.6	09.8	05.4	04.3	02.4	SAN	1760-1800

TRUJILLO HOUSE, LA59658
TERRITORIAL SITE OCCUPIED BY NON-INDIANS
DATES FROM 1850-1900
1/4 MILE SW OF SANTA ROSA DE LIMA, ALONG HIGHWAY

OGA	OGAPOGE POLYCHROME, HARLOW
POW	POWHOGE POLYCHROME, HARLOW
POJ	POJOAQUE POLYCHROME, HARLOW
NAM	NAMBE POLYCHROME, HARLOW
TBK	TEWA (POLISHED) BLACK WARE, BART
TRB	TEWA RED-ON-BUFF (SAN JUAN), BART
TRD	TEWA RED (SHERD SHOWS ONLY RED SLIP), BART
TGY	TEWA GRAY (REDUCED TEWA RED OR BUFF), BART
MIC	MICACEOUS , BART
MIS	MICACEOUS SLIPPED, BART
C01	TEWA RED, LEVINE
C02	TEWA BLACK (SANTA CLARA, KAPO), LEVINE
C03	TEWA OTHER (BROWN, GRAY, BUFF)
C04	MICA SLIPPED, INDET. TYPE
C05	MICA PASTE, INDET. TYPE
C07	CASITAS RED-ON-BUFF, LEVINE
C11	OGAPOGE POLYCHROME, LEVINE
C12	POWHOGE POLYCHROME, LEVINE
C13	NAMBE RED WARE, LEVINE
C23	HISPANIC POLISHED BLACKWARE, LEVINE
C24	SAN JUAN RED-ON-TAN, LEVINE
C25	APACHE MICACEOUS, INDET. TYPE

SHERD ID	TYPE	FE	ZR	SR	RB	NB	CA	Y	PB	PASTE/TEMPER
59658-X001	C02	63.5	23.3	13.1	07.0	08.4	03.7	05.1	00.8	TBK
59658-X002	C02	43.0	33.6	23.4	05.5	06.3	05.0	04.6	00.8	TBK
59658-X003	C02	65.3	25.1	09.6	09.1	09.6	05.0	07.4	01.7	TBK
59658-X004	C02	59.6	25.8	14.6	08.1	09.1	03.4	05.8	01.1	TBK
59658-X005	C02	43.3	30.5	26.1	03.6	08.8	05.7	03.9	00.6	TBK
59658-X006	C02	43.0	30.2	26.7	05.7	07.5	04.2	03.7	00.7	TBK
59658-X007	C02	45.9	33.3	20.8	05.6	07.5	04.7	04.5	00.3	TBK
59658-X008	C02	60.3	26.8	12.8	06.7	10.6	04.4	05.2	01.2	TBK
59658-X009	C02	56.6	27.4	15.9	07.7	08.4	03.7	06.4	00.5	TBK
59658-X010	C02	40.6	33.7	25.7	06.9	07.7	04.8	04.5	01.4	TBK
59658-X011	C02	58.2	27.6	14.2	07.3	07.7	02.6	06.6	00.9	TBK
59658-X012	C02	43.1	30.2	26.7	04.2	05.1	05.5	04.4	00.6	TBK
59658-X013	C02	58.8	28.6	12.6	07.8	10.5	04.0	07.3	01.2	TBK
59658-X014	C02	44.0	30.0	26.1	04.9	06.8	03.9	04.2	00.9	TBK
59658-X015	C02	65.5	23.3	11.2	09.3	08.3	03.1	05.7	00.9	TBK
59658-X016	C02	43.9	33.7	22.4	05.7	06.2	05.1	04.7	01.0	TBK
59658-X017	C02	41.0	30.9	28.1	06.5	08.4	04.8	04.8	01.0	TBK
59658-X018	C02	41.9	33.8	24.3	05.7	05.4	05.4	04.6	01.1	TBK
59658-X019	C02	60.8	24.9	14.3	07.1	08.3	03.8	06.5	00.5	TBK
59658-X020	C02	60.5	25.2	14.3	08.0	08.5	03.6	06.0	00.5	TBK
59658-X021	C02	47.1	30.1	22.8	04.8	05.7	06.3	03.7	00.6	TBK
59658-X022	C02	56.2	30.2	13.6	07.8	14.1	04.2	07.7	01.2	TBK
59658-X023	C02	42.4	31.8	25.8	04.5	05.8	04.5	03.8	00.7	TBK
59658-X024	C02	62.9	23.4	13.7	06.3	08.1	04.9	04.7	01.0	TBK
59658-X025	C02	37.6	32.5	29.8	06.5	09.4	04.1	06.1	00.8	TBK
59658-X026	C02	42.9	31.7	25.3	04.5	07.4	06.3	04.7	01.3	TBK

59658-X027	C02	64.0	24.7	11.3	10.3	11.2	04.5	07.6	01.4	TBK
59658-X028	C02	39.5	33.2	27.3	04.9	10.2	06.8	06.1	00.9	TBK
59658-X029	C02	63.2	20.8	16.1	07.2	07.6	05.0	04.9	00.5	TBK
59658-X030	C02	40.1	33.6	26.4	04.1	05.7	04.8	04.4	00.7	TBK
59658-X031	C23	61.2	27.0	11.9	06.8	10.6	04.8	05.4	00.9	TBK
59658-X032	C23	41.9	34.4	23.7	04.8	06.8	04.3	02.1	01.2	TBK
59658-X033	C23	43.8	31.6	24.6	05.5	09.8	05.5	05.5	01.5	TBK
59658-X034	C23	40.7	31.0	28.3	05.5	06.9	04.7	05.5	01.1	TBK
59658-X035	C23	44.4	32.0	23.6	04.4	05.4	04.8	04.2	01.1	TBK
59658-X036	C23	46.5	29.1	24.5	044.	07.1	05.8	04.3	00.6	TBK
59658-X037	C23	45.7	29.6	24.7	05.0	09.7	05.6	05.6	01.6	TBK
59658-X038	C23	45.0	31.7	23.4	06.5	07.0	04.2	03.9	01.0	TBK
59658-X039	C23	41.8	32.7	25.5	06.0	08.1	05.0	05.4	01.1	TBK
59658-X040	C23	43.8	30.0	26.2	04.9	04.7	04.8	03.5	00.8	TBK
59658-X041	C23	41.2	35.2	23.6	07.1	07.2	05.8	04.8	00.9	TBK
59658-X042	C23	40.2	32.0	27.9	07.7	06.9	05.5	07.3	01.4	TBK
59658-X043	C23	43.0	34.7	22.4	06.1	06.4	04.2	07.8	01.9	TBK
59658-X044	C23	46.6	29.7	23.7	06.9	05.0	04.3	05.3	01.9	TBK
59658-X045	C23	46.0	30.5	23.5	06.9	06.2	06.3	05.5	01.2	TBK
59658-X046	C23	46.8	30.4	22.7	05.7	06.3	03.3	05.8	01.0	TBK
59658-X047	C23	46.7	31.3	22.0	06.2	08.3	04.8	05.3	01.2	TBK
59658-X048	C23	43.0	30.7	26.3	05.7	06.9	03.5	05.5	01.8	TBK
59658-X049	C23	44.2	33.1	22.7	06.3	07.4	05.6	05.3	01.3	TBK
59658-X050	C23	45.6	30.1	24.3	07.0	06.3	04.0	05.3	01.1	TBK
59658-X051	C23	41.8	29.2	29.0	05.1	06.2	04.5	04.9	00.8	TBK
59658-X052	C23	41.2	31.5	27.3	05.6	06.5	05.5	03.5	01.4	TBK
59658-X053	C23	38.8	36.2	25.0	05.4	04.4	04.0	04.2	01.2	TBK
59658-X054	C23	43.0	30.7	26.3	05.8	06.2	07.4	05.6	01.8	TBK
59658-X055	C23	42.2	33.4	24.4	07.1	04.4	06.7	07.4	01.5	TBK
59658-X056	C23	40.9	31.5	27.6	05.6	04.3	04.8	06.2	01.1	TBK
59658-X057	C23	42.4	31.1	26.5	06.7	06.3	06.2	07.2	01.2	TBK
59658-X058	C23	47.4	31.3	21.3	05.0	04.2	05.5	04.9	01.8	TBK
59658-X059	C23	42.0	33.2	24.8	04.3	06.9	05.4	05.2	00.9	TBK
59658-X060	C23	36.9	34.6	28.5	03.5	06.3	05.2	05.1	01.1	TBK
59658-X061	C23	45.0	28.9	26.1	05.1	05.8	05.3	04.2	01.2	TBK
59658-X062	C23	44.5	32.6	22.9	07.2	05.4	07.2	05.3	01.5	TBK
59658-X063	C23	39.3	35.1	25.6	05.3	05.6	04.1	05.3	01.3	TBK
59658-X064	7&8	46.0	31.2	22.9	05.3	07.5	03.5	05.0	01.0	TRB
59658-X065	7&8	40.8	31.7	27.5	05.6	07.6	04.5	05.6	00.6	TRB
59658-X066	7&8	39.6	32.0	28.4	06.4	07.3	04.2	05.5	01.2	TRB
59658-X067	7&8	40.5	32.4	27.1	06.2	05.4	04.7	05.3	00.9	TRB
59658-X068	7&8	39.5	35.4	25.1	06.8	06.9	05.2	05.1	01.8	TRB
59658-X069	7&8	43.7	32.1	24.2	06.0	06.6	05.4	06.2	00.9	TRB
59658-X070	7&8	41.7	32.4	25.9	05.9	07.2	04.3	06.0	01.1	TRB
59658-X071	7&8	39.1	35.4	25.4	07.3	04.5	04.6	05.7	00.8	TRB
59658-X072	7&8	44.0	30.6	25.4	05.3	06.1	05.9	05.6	01.4	TRB
59658-X073	7&8	40.8	41.9	17.3	13.4	13.6	03.4	11.3	00.8	TRB
59658-X074	7&8	42.1	30.7	27.2	05.7	04.5	03.5	04.2	01.4	TRB
59658-X075	7&8	43.3	30.4	26.3	05.1	06.3	05.0	05.4	01.3	TRB
59658-X076	7&8	45.6	28.4	26.0	05.1	04.8	04.1	03.8	01.6	TRB
59658-X077	7&8	43.9	31.3	24.8	06.1	07.3	05.9	05.5	02.3	TRB
59658-X078	7&8	44.0	33.3	22.7	06.4	07.0	04.9	03.6	01.3	TRB
59658-X079	7&8	42.1	31.9	26.1	06.6	07.6	05.1	05.0	00.6	TRB
59658-X080	7&8	41.4	35.3	23.3	05.3	07.8	05.7	04.2	00.6	TRB
59658-X081	7&8	44.3	31.0	24.6	05.4	06.6	06.8	03.7	01.3	TRB

59658-X082	7&8	47.0	31.9	21.1	05.4	05.5	04.3	04.6	00.9	TRB	
59658-X083	7&8	45.3	30.2	24.5	05.5	04.7	05.3	03.9	01.3	TRB	
59658-X084	7&8	38.4	29.9	30.7	06.3	04.4	03.7	04.0	00.9	TRB	
59658-X085	7&8	38.9	33.9	27.2	06.2	07.7	05.6	04.8	01.0	TRB	
59658-X086	7&8	43.6	30.7	25.8	06.5	07.3	05.3	04.5	01.3	TRB	
59658-X087	7&8	43.5	31.8	24.7	07.3	08.1	05.0	05.5	01.4	TRB	
59658-X088	7&8	42.1	31.3	26.6	06.1	07.7	06.1	04.7	01.3	TRB	
59658-X089	7&8	46.4	29.7	23.9	05.1	07.3	04.3	04.3	01.8	TRB	
59658-X090	7&8	42.9	31.3	25.8	04.7	05.2	05.0	04.1	00.8	TRB	
59658-X091	7&8	43.7	30.7	25.6	04.4	04.2	04.8	03.0	01.3	TRB	
59658-X092	7&8	39.2	34.3	26.5	05.3	05.5	06.1	04.2	01.1	TRB	
59658-X093	7&8	43.3	30.0	26.7	04.6	08.1	05.2	04.8	01.5	TRB	
59658-X094	7&8	42.7	34.6	22.7	05.8	07.2	05.6	05.7	01.7	TRB	
59658-X095	7&8	42.8	30.4	26.8	06.7	07.7	05.2	05.6	01.1	TRB	
59658-X096	7&8	45.4	30.1	24.5	05.1	08.9	07.0	04.2	02.2	TRB	
59658-X097	C12	41.7	32.2	26.1	06.9	12.4	04.7	05.4	00.8	POW	
59658-X098	C12	46.0	30.5	23.5	07.1	11.0	04.4	05.4	00.8	POW	
59659-X099	C03	37.7	34.1	28.2	06.2	11.4	06.2	05.6	00.1	TGY	
59658-X100	C03	63.7	35.5	10.9	10.9	10.3	05.5	07.0	00.4	TGY	
59658-X101	C03	44.0	33.1	22.9	06.0	11.7	06.2	05.3	00.5	TGY	
59658-X102	C03	40.0	34.3	25.7	06.1	10.4	05.0	04.4	00.1	TGY	
59658-X103	C03	65.9	23.4	10.7	07.9	13.3	05.2	06.9	00.6	TGY	
59658-X104	C03	66.3	23.8	09.9	08.8	12.8	05.5	06.2	00.2	TGY	
59658-X105	C03	59.6	29.4	11.0	10.0	16.0	04.5	08.4	00.1	TGY	
59658-X106	C03	38.6	32.4	29.0	05.0	09.0	07.8	03.8	00.2	TGY	
59658-X107	C03	44.2	31.6	24.2	06.1	06.7	05.7	05.0	00.6	TGY	
59658-X108	C03	66.7	22.8	10.5	08.2	07.3	03.0	05.7	01.0	TGY	
59658-X109	C03	61.9	25.8	12.3	09.9	11.1	04.1	07.7	00.8	TGY	
59658-X110	C01	39.5	32.3	28.2	07.8	04.7	05.6	04.6	01.6	TRD	
59658-X111	C01	43.6	33.0	23.4	04.2	11.9	05.5	04.0	00.1	TRD	
59658-X112	C01	43.4	31.5	25.1	06.1	04.3	03.7	05.9	00.8	TRD	
59658-X113	C01	40.5	32.5	27.0	07.0	06.5	04.5	05.7	00.8	TRD	
59658-X114	C24	42.0	34.1	23.8	04.0	12.2	04.8	05.0	00.6	TRB	
59658-X115	C24	41.1	32.5	26.4	07.4	11.2	04.0	06.4	00.1	TRB	
59658-X116	C24	39.8	35.6	24.7	05.7	12.5	04.8	05.2	00.5	TRB	
59658-X117	C24	53.3	25.3	21.4	08.0	09.3	05.7	05.2	00.5	TRB	
59658-X118	C24	62.7	27.9	09.4	09.0	16.9	05.5	07.2	00.4	TRB	
59658-X119	C24	60.9	29.1	10.0	09.5	16.3	03.5	07.3	00.6	TRB	
59658-X120	C24	37.3	31.0	31.7	05.4	09.0	04.0	04.8	00.5	TRB	
59658-X121	C24	42.9	34.1	23.1	05.8	14.2	07.1	04.2	00.4	TRB	
59658-X122	C24	44.2	31.0	24.7	04.4	12.0	06.0	04.0	00.2	TRB	
59658-X123	C24	40.7	35.9	23.3	05.3	14.0	07.0	07.1	01.1	TRB	
59658-X124	C25	59.2	33.1	07.7	05.9	10.8	04.4	06.3	01.0	MIC	4.7MM
59658-X125	C25	51.2	41.7	07.1	04.5	10.8	02.7	07.4	00.5	MIC	5.0MM
59658-X126	C25	50.4	35.1	14.5	08.6	06.8	02.0	07.7	02.8	MIC	4.4MM
59658-X127	C25	58.8	33.0	08.2	07.7	06.7	02.1	05.4	02.0	MIC	4.5MM
59658-X128	C25	50.1	39.3	10.6	04.4	05.1	01.5	10.5	01.8	MIC	4.5MM
59658-X129	C25	52.2	36.9	10.9	06.2	07.6	02.1	09.4	01.3	MIC	4.2MM
59658-X130	C25	53.7	37.7	08.6	07.3	07.1	03.2	09.7	01.5	MIC	4.9MM
59658-X131	C25	45.9	45.2	08.9	07.5	06.8	01.7	07.1	01.4	MIC	4.6MM
59658-X132	C25	58.6	29.0	12.5	06.9	08.1	02.2	05.2	01.1	MIC	4.2MM
59658-X133	C25	53.6	39.3	07.1	04.9	07.3	01.8	07.2	01.1	MIC	5.4MM
59658-X134	C25	46.9	44.7	08.4	03.7	09.0	02.6	09.8	02.7	MIC	4.0MM
59658-X135	C25	55.9	35.1	09.0	06.5	11.2	02.6	07.8	03.2	MIC	3.7MM
59658-X136	C25	57.4	35.1	07.5	04.6	07.2	01.5	07.7	01.2	MIC	4.3MM

59658-X137	C25	57.5	34.5	07.9	06.5	07.4	02.7	08.7	00.6	MIC	3.6MM
59658-X138	C25	53.7	35.5	10.8	05.6	07.7	01.9	07.2	01.2	MIC	4.0MM
59658-X139	C25	71.2	23.7	05.1	05.1	04.2	02.6	04.5	00.5	MIC	6.2MM
59658-X140	C25	54.9	33.7	11.4	05.0	06.9	02.8	06.5	01.6	MIC	4.5MM
59658-X141	C25	55.0	33.8	11.2	06.0	08.5	01.0	07.5	01.2	MIC	4.2MM
59658-X142	C25	59.1	31.9	09.0	06.4	07.0	02.5	05.4	00.8	MIC	5.4MM
59658-X143	C25	52.9	39.8	07.3	13.2	09.2	02.5	10.3	00.9	MIC	4.4MM
59658-X144	C25	42.9	28.6	28.6	04.7	05.1	02.4	03.0	00.7	MIC	5.2MM
59658-X145	C25	48.4	45.7	05.9	07.6	06.9	02.8	08.8	00.8	MIC	4.1MM
59658-X146	C25	58.7	34.9	06.4	07.1	10.6	02.9	07.5	01.7	MIC	4.4MM
59658-X147	C25	52.8	39.5	07.6	06.5	09.5	03.7	07.6	01.5	MIC	3.8MM
59658-X148	C25	56.2	34.2	09.6	06.4	08.5	02.9	06.8	01.5	MIC	4.5MM
59658-X149	C25	53.6	39.4	06.9	10.7	09.6	02.9	10.5	01.7	MIC	4.7MM
59658-X150	C25	56.1	34.0	10.0	05.0	09.4	03.1	04.5	01.0	MIC	4.2MM
59658-X151	C25	56.8	34.6	08.6	06.4	07.5	01.3	06.7	01.8	MIC	4.6MM
59658-X152	C25	54.9	36.6	08.5	04.5	09.0	03.0	08.0	01.9	MIC	4.8MM
59658-X153	C25	55.3	36.3	08.5	05.2	13.1	04.6	10.0	01.4	MIC	4.5MM
59658-X154	C25	42.4	47.7	09.9	05.9	10.4	02.9	12.9	00.3	MIC	4.9MM
59658-X155	C04	52.9	39.3	07.9	07.0	12.1	03.4	09.0	01.2	MIC	5.5MM
59658-X156	C04	48.7	38.5	12.8	07.9	11.3	03.4	09.5	02.0	MIC	4.8MM
59658-X157	C04	56.4	31.1	12.5	07.8	11.7	03.3	10.9	03.1	MIC	3.4MM
59658-X158	C04	55.8	34.0	10.1	07.3	10.5	03.9	06.2	02.5	MIC	4.4MM
59658-X159	C04	61.0	30.2	08.8	06.1	09.6	03.3	06.1	02.2	MIC	4.6MM
59658-X160	C05	46.2	43.8	10.0	04.7	09.4	03.5	09.4	02.0	MIC	4.9MM
59658-X161	C05	44.9	44.0	10.7	03.7	09.8	02.2	08.5	00.6	MIC	4.6MM
59658-X162	C05	46.1	43.9	10.0	04.3	12.3	02.5	09.9	01.7	MIC	4.5MM
59658-X163	C05	50.1	39.8	10.2	07.0	15.0	03.9	09.6	03.6	MIC	3.7MM
59658-X164	C05	41.5	29.5	29.0	06.4	09.1	03.6	04.5	01.2	MIC	3.6MM
59658-X165	C05	54.9	40.4	04.7	05.5	11.3	04.6	08.9	02.8	MIC	4.7MM
59658-X166	C05	50.5	38.1	11.4	05.6	10.2	03.7	08.2	00.6	MIC	4.1MM
59658-X167	C05	48.3	41.8	09.9	07.4	13.6	04.3	07.8	00.7	MIC	4.7MM
59658-X168	C05	49.9	42.7	07.4	06.5	11.6	04.5	08.9	02.5	MIC	4.3MM
59658-X169	C05	49.3	43.6	07.2	10.8	13.9	03.9	13.4	01.5	MIC	4.9MM
59658-X170	C05	48.0	41.5	10.6	09.8	13.5	03.5	09.6	04.2	MIC	4.3MM
59658-X171	C05	42.6	49.1	08.3	06.3	10.2	02.6	11.1	00.3	MIC	4.5MM
59658-X172	C05	52.8	36.7	10.5	06.0	16.4	03.0	10.8	03.3	MIC	5.0MM
59658-X173	C05	40.5	48.7	10.8	07.0	09.8	02.4	08.5	01.6	MIC	6.1MM
59658-X174	C05	42.3	48.5	09.2	07.7	13.1	03.2	07.5	01.1	MIC	5.1MM
59658-X175	C05	51.5	43.4	05.0	06.5	09.3	02.7	09.4	00.9	MIC	5.0MM
59658-X176	C05	70.5	22.6	06.9	06.2	10.8	03.0	09.1	01.9	MIC	4.2MM
59658-X177	C05	45.1	44.9	10.0	08.7	08.7	02.6	10.4	01.6	MIC	5.3MM
59658-X178	C05	58.8	35.0	06.2	06.0	11.1	02.0	09.8	02.2	MIC	4.3MM
59658-X179	C05	50.7	39.0	10.3	06.2	10.7	02.3	09.1	01.6	MIC	3.9MM
59658-X180	C05	53.1	36.3	10.6	07.7	12.2	03.4	09.6	01.6	MIC	4.3MM

SAN JUAN PUEBLO, LA874
MATERIAL RECOVERED BY C. STEEN, JULY 1-2, 19,
IN AREA OF EIGHT NORTH. PUEBLO OFFICES.
MATERIAL RECOVERED BY SK/DK, 1/27 - 2/6/78,
FROM THROUGHOUT PLAZA AND CHURCH REGION
OF SAN JUAN.

TRB TEWA RED-ON-BUFF, BART
TBK TEWA BLACK AND BLACKENED RED-ON-BUFF, BART
TBF TEWA BUFF, BART
MCS MICACEOUS SLIPPED, BART
MIC MICACEOUS, BART
BIS BISCUIT WARE, B & C'S, BART

SHERD ID	TYPE	FE	ZR	SR	RB	NB	CA	Y	PB	PASTE/TEMPER
LA874-X001	TRB	52.6	36.8	10.5	08.2	10.2	06.9	08.2	00.9	
LA874-X002	TRB	46.0	28.8	25.2	07.4	10.6	05.4	05.4	01.3	
LA874-X003	TRB	48.6	27.6	23.8	07.8	08.6	04.5	04.5	01.1	
LA874-X004	TRB	45.3	28.5	26.2	06.7	09.7	04.6	04.0	01.0	
LA874-X005	TRB	52.7	25.8	21.5	06.4	07.1	03.9	03.8	01.3	
LA874-X006	TRB	44.2	27.2	28.6	08.3	08.1	02.6	03.9	00.9	
LA874-X007	TRB	41.9	31.4	26.8	08.9	07.7	03.1	05.9	00.9	
LA874-X008	TRB	40.9	30.9	28.2	06.9	08.6	03.9	04.9	01.6	
LA874-X009	TRB	43.1	30.3	26.6	07.1	09.7	03.2	06.3	02.1	
LA874-X010	TRB	46.9	28.3	24.8	06.5	08.6	04.5	04.8	01.4	
LA874-X011	TRB	36.8	31.4	31.6	06.1	08.2	03.7	04.5	01.2	
LA874-X012	TRB	42.3	29.8	27.8	08.1	09.6	02.9	05.4	01.9	
LA874-X013	TRB	38.3	32.3	29.4	06.8	07.4	03.8	04.5	01.1	
LA874-X014	TRB	46.2	27.8	26.0	07.1	06.7	05.7	04.3	01.0	
LA874-X015	TRB	40.7	32.3	27.0	07.5	08.5	02.9	06.9	00.6	
LA874-X016	TRB	44.0	32.1	24.0	08.5	08.8	05.1	05.1	00.9	
LA874-X017	TRB	53.5	31.7	14.5	07.6	08.5	06.1	06.3	01.4	
LA874-X018	TRB	43.9	29.3	26.8	06.9	09.2	02.9	06.7	00.5	
LA874-X019	TRB	46.7	27.1	26.2	06.7	07.5	04.4	05.3	01.3	
LA874-X020	TRB	39.9	30.9	29.2	07.3	07.2	03.0	04.3	01.5	
LA874-X021	TRB	44.6	31.0	24.4	08.8	09.0	03.9	05.6	01.4	
LA874-X022	TRB	39.9	30.4	29.7	07.6	07.0	03.3	05.2	00.9	
LA874-X023	TRB	40.1	32.5	27.4	08.4	06.0	03.1	05.3	00.7	
LA874-X024	TRB	38.7	33.7	27.6	08.3	09.9	04.7	06.1	01.4	
LA874-X025	TRB	45.8	29.6	24.5	06.9	08.4	02.9	05.2	00.8	
LA874-X026	TRB	44.5	28.5	27.0	06.4	07.9	04.0	04.1	01.1	
LA874-X027	TRB	46.3	31.3	22.4	08.0	10.8	03.7	06.5	01.6	
LA874-X028	TRB	43.3	29.1	27.6	06.2	07.3	03.5	04.0	00.4	
LA874-X029	TRB	40.7	32.9	26.4	07.6	08.1	04.2	05.9	01.6	
LA874-X030	TRB	45.0	28.9	26.1	05.8	08.5	03.3	04.0	01.5	
LA874-X031	TRB	41.1	31.4	27.5	07.7	08.7	03.1	04.5	00.9	
LA874-X061	TBK	43.7	28.4	27.9	06.3	07.4	04.5	04.6	01.4	
LA874-X062	TBK	38.0	31.5	30.5	11.0	08.1	04.3	04.7	01.4	
LA874-X063	TBK	48.8	26.1	25.1	05.8	09.7	04.4	05.7	00.7	
LA874-X064	TBK	43.8	28.7	27.5	07.1	05.9	03.0	03.4	00.8	
LA874-X065	TBK	38.7	31.0	30.3	08.4	06.7	03.7	05.7	00.9	
LA874-X066	TBK	61.3	23.3	15.4	08.6	07.7	02.4	05.8	00.8	
LA874-X067	TBK	44.6	27.9	27.5	04.0	05.5	04.1	04.1	01.0	
LA874-X068	TBK	40.3	31.3	29.3	07.6	08.9	03.6	06.5	00.8	
LA874-X069	TBK	56.9	26.6	16.4	07.6	06.9	04.6	0[B8	01.4	

LA874-X070	TBK	27.9	55.5	16.6	06.0	05.9	02.2	04.9	00.5
LA874-X071	TBK	46.3	30.2	23.5	10.8	12.1	05.2	08.7	02.4
LA874-X072	TBK	42.9	26.6	30.3	04.7	06.6	05.3	04.1	00.6
LA874-X073	TBK	42.6	32.5	24.9	08.7	09.7	04.0	06.7	00.5
LA874-X074	TBK	42.5	36.6	21.2	06.3	06.3	03.4	04.2	01.1
LA874-X075	TBK	42.5	29.2	28.3	07.1	09.0	02.8	04.6	00.8
LA874-X076	TBK	39.8	32.0	28.3	07.3	10.3	04.7	06.7	01.2
LA874-X077	TBK	42.3	31.8	25.9	08.4	11.6	04.5	06.8	01.2
LA874-X078	TBK	41.8	31.4	26.8	07.6	06.6	03.2	05.1	01.6
LA874-X079	TBK	40.1	38.2	21.7	07.6	07.2	03.7	04.6	00.7
LA874-X080	TBK	40.9	32.8	26.3	06.9	08.7	03.9	05.8	00.3
LA874-X081	TBK	48.5	27.4	24.1	07.0	09.0	05.1	06.0	01.1
LA874-X082	TBK	42.4	29.5	28.1	07.9	09.4	03.5	05.8	01.4
LA874-X083	TBK	53.1	31.7	15.2	07.8	08.1	04.3	07.3	00.7
LA874-X084	TBK	57.7	30.3	12.0	10.1	10.4	03.4	07.3	01.1
LA874-X085	TBK	44.9	29.5	25.6	07.3	07.9	03.7	03.1	00.8
LA874-X086	TBK	44.0	28.2	27.8	07.2	08.5	04.0	04.4	01.3
LA874-X091	TBF	43.0	32.3	24.7	08.3	09.7	03.1	06.6	00.8
LA874-X092	TBF	48.9	31.2	19.9	12.2	10.8	07.7	06.1	01.0
LA874-X093	TBF	43.3	26.6	30.1	06.1	07.1	03.2	03.6	00.5
LA874-X094	TBF	51.3	27.6	21.1	10.4	07.1	03.5	05.0	01.3
LA874-X095	TBF	44.1	29.8	26.1	08.1	08.3	03.6	04.2	00.8
LA874-X096	TBF	42.9	29.3	27.8	08.2	10.6	03.7	06.1	01.0
LA874-X097	TBF	42.5	27.8	29.7	07.9	06.9	03.7	05.4	00.9
LA874-X098	TBF	40.6	26.7	32.7	06.1	07.1	03.0	03.5	00.5
LA874-X099	TBF	42.6	29.6	27.7	08.5	08.1	03.1	05.1	01.0
LA874-X100	TBF	42.7	31.2	26.1	06.1	07.6	03.7	04.1	00.7
LA874-X101	TBF	42.2	27.3	30.6	07.3	07.4	04.1	05.0	01.1
LA874-X102	TBF	41.5	28.5	30.0	06.6	06.6	03.5	04.6	00.3
LA874-X103	TBF	41.5	29.4	29.0	07.2	11.6	03.4	07.7	01.3
LA874-X104	TBF	39.1	33.3	27.6	09.0	08.4	03.4	05.5	00.8
LA874-X105	TBF	51.5	26.6	21.8	10.1	08.0	06.0	05.0	01.6
LA874-X106	TBF	49.8	28.7	21.5	11.1	09.6	04.3	05.2	01.7
LA874-X107	TBF	37.7	35.8	26.5	09.2	08.0	03.5	07.2	00.8
LA874-X108	TBF	42.7	27.6	29.7	08.0	07.6	04.0	05.5	00.6
LA874-X109	TBF	54.7	29.8	15.6	08.6	04.7	03.9	04.3	01.4
LA874-X110	TBF	41.0	30.7	28.4	07.7	05.3	03.3	04.7	00.1
LA874-X111	TBF	48.6	30.6	20.7	15.1	12.8	04.6	08.0	00.9
LA874-X112	TBF	43.4	29.0	27.6	08.1	10.1	02.4	05.7	00.6
LA874-X113	TBF	39.2	34.3	26.5	07.4	08.0	03.3	06.0	01.3
LA874-X114	TBF	41.5	30.3	28.2	06.5	07.3	03.1	05.1	00.8
LA874-X115	TBF	35.5	33.6	30.9	08.0	05.8	02.9	05.3	00.7
LA874-X116	TBF	45.5	36.3	18.2	09.8	09.1	04.0	06.1	00.4
LA874-X117	TBF	53.4	38.3	08.3	14.2	17.4	03.8	12.1	00.6
LA874-X118	TBF	43.9	29.2	26.8	07.4	07.9	02.6	05.9	01.0
LA874-X119	TBF	41.8	31.6	26.6	08.8	07.1	05.0	06.5	02.2
LA874-X120	TBF	40.6	32.0	27.4	08.2	06.3	03.0	05.5	01.9
LA874-X121	TBF	40.3	31.8	27.9	07.9	08.8	04.1	05.9	00.6
LA874-X122	TBF	47.0	33.0	19.7	10.9	09.7	04.9	06.9	01.3
LA874-X123	TBF	43.7	31.8	24.5	09.0	09.1	04.1	05.6	00.7
LA874-X124	MCS	37.4	32.7	29.8	10.1	07.1	03.4	05.6	00.7
LA874-X125	MCS	43.7	29.2	27.2	07.1	08.1	05.2	04.5	01.0
LA874-X126	MCS	39.5	32.1	28.5	09.2	08.8	03.6	06.5	01.1
LA874-X127	MCS	39.8	30.3	29.9	07.8	07.4	05.0	04.2	01.8
LA874-X128	MCS	44.8	30.2	25.0	06.8	05.6	05.5	03.8	01.2

LA874-X129	MCS	50.3	28.8	20.9	06.0	05.8	02.8	05.1	01.6	
LA874-X130	MCS	37.7	34.0	28.3	09.6	09.7	03.9	07.2	01.0	
LA874-X131	MCS	45.2	28.4	26.4	05.5	08.0	04.3	04.8	00.7	
LA874-X132	MCS	42.2	32.9	25.0	07.4	07.2	04.6	04.2	01.2	
LA874-X133	MIC	62.5	31.7	05.8	05.9	06.8	02.7	05.0	00.8	6.0MM
LA874-X134	MIC	52.4	33.5	14.1	11.4	11.0	03.6	05.8	01.5	4.4MM
LA874-X135	MIC	55.5	37.5	07.0	10.8	12.6	03.6	09.0	01.5	5.1MM
LA874-X136	MIC	63.4	26.6	10.0	05.9	08.4	01.7	05.3	00.8	3.9MM
LA874-X137	MIC	59.9	24.7	15.4	09.8	10.2	04.3	06.1	01.7	3.9MM
LA874-X138	MIC	65.6	22.9	11.5	07.5	08.8	02.5	03.5	02.1	3.7MM
LA874-X139	MIC	55.1	36.0	08.9	05.9	06.3	02.0	06.4	01.0	5.5MM
LA874-X140	MIC	62.5	23.8	13.7	06.2	06.0	03.8	05.4	01.9	4.0MM
LA874-X141	MIC	71.2	20.4	08.4	05.1	05.5	03.0	06.3	00.6	6.3MM
LA874-X142	MIC	65.7	24.1	10.2	08.1	09.5	04.2	05.3	01.6	4.3MM
LA874-X143	MIC	68.6	22.9	08.6	05.2	07.1	02.1	04.1	01.5	6.2MM
LA874-X144	MIC	58.5	33.5	08.0	08.4	06.7	03.3	05.5	01.1	5.2MM
LA874-X145	MIC	51.7	39.8	08.5	08.5	11.5	03.3	06.4	03.0	4.1MM
LA874-X146	MIC	52.6	28.6	18.8	26.2	14.1	07.5	13.8	04.8	5.5MM
LA874-X147	MIC	68.6	23.5	07.8	03.9	07.5	02.6	02.6	01.0	4.3MM
LA874-X148	MIC	57.5	35.9	06.6	07.7	07.3	02.7	08.1	01.4	5.4MM
LA874-X149	MIC	63.9	23.8	12.3	05.2	08.0	02.3	04.7	02.7	4.1MM
LA874-X150	MIC	57.2	26.0	16.8	08.0	09.0	03.5	06.1	01.5	4.0MM
LA874-X151	MIC	64.2	27.2	08.6	09.3	06.8	03.8	04.9	01.4	5.5MM
LA874-X152	MIC	58.6	24.1	17.3	05.9	09.1	04.6	06.7	02.1	4.3MM
LA874-X153	MIC	58.0	34.8	07.2	05.9	08.9	03.2	06.1	02.8	4.4MM
LA874-X154	MIC	60.4	26.7	12.9	05.5	05.5	02.4	04.8	01.4	4.7MM
LA874-X155	MIC	57.3	35.7	07.1	05.9	08.9	03.0	08.2	02.0	4.7MM
LA874-X156	MIC	65.4	27.7	06.9	08.0	09.2	03.3	04.8	02.0	3.9MM
LA874-X157	MIC	64.9	23.5	11.6	06.6	09.7	03.2	05.7	02.5	4.3MM
LA874-X158	MIC	61.8	31.4	06.7	10.1	09.3	04.4	06.9	02.1	5.2MM
LA874-X159	MIC	56.9	32.2	10.9	07.0	08.2	03.4	04.9	02.6	4.8MM
LA874-X160	MIC	57.7	30.0	12.3	06.6	05.9	06.3	08.9	03.0	4.1MM
LA874-X161	PCL	66.8	25.6	07.6	06.5	05.8	02.7	05.0	01.1	
LA874-X162	PCL	43.8	30.8	25.4	06.2	08.3	06.4	05.2	02.1	
LA874-X163	PCL	54.9	29.7	15.3	11.1	11.3	05.1	07.7	02.0	
LA874-X164	PCL	54.8	29.0	16.1	07.9	09.8	06.3	06.0	00.6	
LA874-X165	PCL	45.1	30.8	24.1	07.7	11.3	05.4	05.1	02.5	
LA874-X166	GLZ	63.2	28.1	08.7	06.4	08.3	04.9	07.1	15.4	
LA874-X167	GLZ	36.1	32.3	31.5	02.4	06.8	03.7	04.2	06.3	
LA874-X168	GLZ	46.2	34.4	19.4	13.7	11.2	04.1	09.1	03.2	
LA874-X169	GLZ	53.8	38.4	07.8	07.4	10.2	04.4	13.7	25.3	
LA874-X170	GLZ	47.7	32.7	19.6	13.1	07.8	05.6	14.8	23.3	
LA874-X171	GLZ	48.1	31.8	20.1	12.9	10.6	05.7	08.6	04.4	
LA874-X172	GLZ	60.6	30.9	08.5	03.2	07.2	07.6	06.5	22.8	
LA874-X173	GLZ	48.1	25.6	26.4	05.4	04.6	02.3	06.4	12.6	
LA874-X174	GLZ	44.8	21.7	33.5	02.6	05.9	04.1	03.3	05.7	
LA874-X175	GLZ	49.6	19.8	30.5	03.2	03.3	03.3	03.3	01.8	
LA874-X201	BSB	30.1	42.8	27.0	11.1	13.2	04.5	08.9	01.1	
LA874-X202	BSB	41.2	36.7	22.1	13.1	15.0	04.3	09.1	01.2	
LA874-X203	BSB	49.2	36.8	14.0	13.6	10.9	04.0	09.0	01.5	
LA874-X204	BSB	33.0	39.3	27.8	11.1	12.8	04.3	07.3	01.7	
LA874-X205	BSB	47.1	30.4	22.4	09.2	09.2	04.5	06.7	00.8	
LA874-X206	BSB	45.9	31.8	22.3	09.6	10.3	03.3	05.9	01.3	
LA874-X207	BSB	34.4	43.8	21.7	13.4	11.9	04.0	10.8	00.8	
LA874-X208	BSB	38.8	33.8	27.5	08.5	06.6	04.5	06.5	01.7	

LA874-X209	BSB	46.3	30.7	23.0	08.1	08.2	03.6	07.2	00.1
LA874-X210	BSB	43.5	33.6	22.9	08.0	06.8	02.8	07.7	01.4
LA874-X211	BSB	49.4	33.5	17.2	15.0	11.5	03.5	06.2	01.8
LA874-X212	BSB	38.6	34.4	27.0	08.6	10.2	03.3	06.5	01.5
LA874-X213	BSB	38.1	35.0	26.9	08.8	11.7	03.9	07.5	01.7
LA874-X214	BSB	28.5	40.4	31.1	11.3	10.9	02.2	08.0	01.8
LA874-X215	BSB	33.4	43.8	22.8	12.8	13.2	03.6	11.1	01.1
LA874-X216	BSB	33.2	37.3	29.5	11.4	10.9	04.2	09.8	01.4
LA874-X217	BSB	38.9	34.0	27.1	09.0	08.6	03.7	06.6	01.1
LA874-X218	BSB	49.9	27.6	22.5	08.6	06.4	03.1	05.9	01.2
LA874-X219	BSB	49.0	41.0	10.1	14.8	11.5	03.1	09.9	02.0
LA874-X220	BSB	44.0	34.8	21.2	10.6	10.7	04.2	07.5	00.8
LA874-X221	BSB	30.8	32.7	36.5	08.5	10.4	03.3	06.5	00.6
LA874-X222	BSB	54.8	33.7	11.6	10.1	13.2	02.1	08.7	01.0
LA874-X223	BSB	25.4	31.8	42.8	07.9	08.2	02.6	06.4	00.5
LA874-X224	BSB	41.4	34.5	24.1	08.3	06.5	02.3	05.2	00.5
LA874-X225	BSB	41.1	34.0	24.9	10.5	12.5	02.7	09.5	01.3
LA874-X226	BSB	45.7	32.8	21.5	08.3	10.6	04.1	07.9	01.4
LA874-X227	BSB	33.0	41.9	25.1	06.4	14.5	02.5	09.3	01.0
LA874-X228	BSB	44.7	38.8	16.5	10.4	09.1	03.3	06.2	00.8
LA874-X229	BSB	39.5	36.3	24.2	09.7	10.9	03.3	06.4	01.2
LA874-X230	BSB	50.4	31.7	17.8	07.8	10.3	03.7	06.8	01.8
LA874-X231	BSB	30.6	34.6	34.8	09.6	10.8	02.2	06.7	01.6
LA874-X232	BSB	36.6	40.9	22.5	14.0	16.6	04.7	11.1	01.6
LA874-X233	BSB	31.5	45.0	23.5	13.8	19.6	03.5	09.1	01.2
LA874-X234	BSB	47.1	27.5	25.4	06.6	06.6	03.5	04.9	00.8
LA874-X235	BSB	40.6	32.4	27.0	08.5	10.1	03.5	05.5	00.4
LA874-X236	BSB	43.7	31.4	24.9	07.3	10.4	04.3	05.9	00.8
LA874-X237	BSB	37.9	43.3	18.8	12.4	14.1	04.8	08.6	00.5
LA874-X238	BSB	42.3	32.8	24.9	06.9	08.4	02.5	06.4	00.8