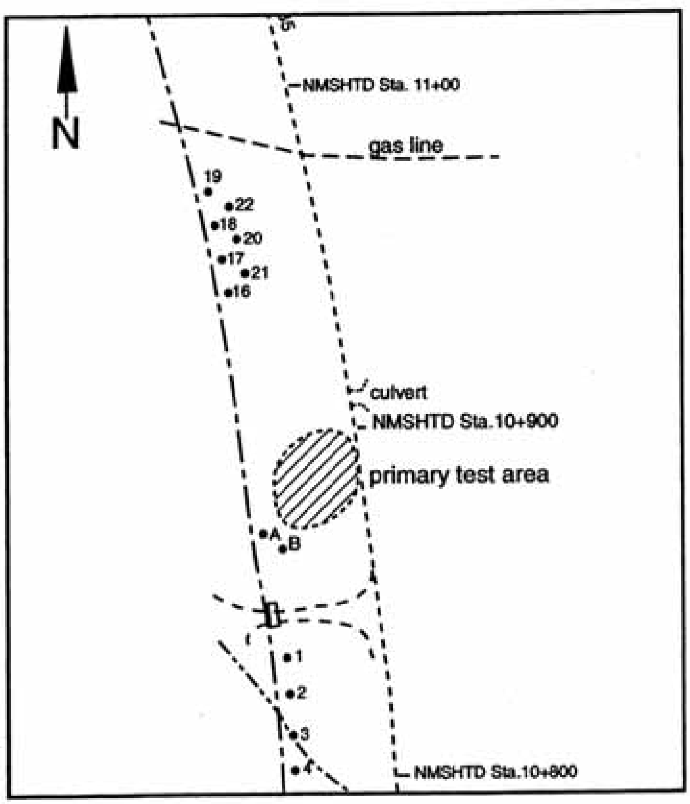
Museum of New Mexico
Office of Archaeological Studies

# The Tesuque Y Site: Archaeological Testing Results and a Plan for Data Recovery at LA 111333, U.S. 84/285 Santa Fe to Pojoaque Corridor, Santa Fe County, New Mexico

by James L. Moore, Jeffrey L. Boyer, and H. Wolcott Toll




Archaeology Notes 316
2002

# MUSEUM OF NEW MEXICO

# OFFICE OF ARCHAEOLOGICAL STUDIES

## THE TESUQUE Y SITE: ARCHAEOLOGICAL TESTING RESULTS AND A PLAN FOR DATA RECOVERY AT LA 111333, U.S. 84/285 SANTA FE TO POJOAQUE CORRIDOR, SANTA FE COUNTY, NEW MEXICO

by
James L. Moore, Jeffrey L. Boyer, and H. Wolcott Toll

Contributions by
Nancy J. Akins
Steven A. Lakatos
Pamela McBride
Mollie S. Toll
C. Dean Wilson

Submitted by
Timothy D. Maxwell
Principal Investigator

Archaeology Notes 316

SANTA FE 2002 NEW MEXICO

# ADMINISTRATIVE SUMMARY

Between August 26 and September 6, 2002, the Office of Archaeological Studies, Museum of New Mexico, conducted testing investigations at site LA 111333, located on land belonging to the Pueblo of Tesuque near the intersection of U.S. 84/285 and NM 591 (the "Tesuque Y") in Santa Fe County, New Mexico. The excavations were conducted at the request of the New Mexico State Highway and Transportation Department in order to define the presence, nature, and extent of subsurface cultural deposits, features, and structures within proposed project limits at the site, and to determine whether additional data recovery investigations may be warranted prior to planned reconstruction of the U.S. 84/285 Rio Tesuque bridge.

LA 111333 was originally recorded as a low, small mound probably representing the remains of a small, early Classic period (ca. A.D. 1325–1475) fieldhouse structure, with an associated artifact scatter. Between the time the site was recorded and the initiation of testing investigations, LA 111333 was disturbed by mechanical blading, which removed the low mound and displaced surface artifacts. Testing investigations revealed that a portion of the probable Classic period structure may remain, evidenced by two small cobble concentrations that may represent informal hearths within the structure, found about 20 cm below modern ground surface.

Auger testing at LA 111333 revealed the presence of a buried deposit consisting of sandy sediment containing charcoal and chipped stone artifacts. This deposit, which was confirmed by excavation of several 1-by-1-m grid units, is about 20 to 50 cm thick, and is separated from the upper Classic period component by two thick, naturally formed, noncultural strata. Charcoal samples from the buried component at LA 111333 yielded 2-sigma calibrated dates of 410 B.C.–A.D. 70 (conventional age: 2160 ± 110 B.P.) and 1390–1130 B.C. (conventional age: 3020 ± 40 B.P.).

Testing investigations at LA 111333 demonstrated that the site has two components, a buried Archaic component that was unsuspected when the site was initially recorded during survey, and a Classic period component represented by the probable remains of a small structure. Consequently, additional data recovery investigations are recommended for the portion of the site within proposed project limits.

This report presents a description of LA 111333 as defined during testing investigations, testing procedures and results, and recommendations. It also presents a plan for data recovery investigations of the two components of LA 111333. Test excavations and data recovery efforts at LA 111333 are linked to a research orientation and to field and laboratory data recovery methods common to prehistoric sites in the U.S. 84/285 Santa Fe to Pojoaque Corridor project. The research focuses on, but is not limited to, inter- and intraregional social and ideological relationships, community formation, economic and subsistence strategies, and ethnic identities in the Tewa Basin. The plan presented in this report specifies research orientations and data recovery methods for Archaic occupations and for specific aspects of Classic period occupations of the area, and links those orientations and methods to the deposits and possible features and structures encountered during testing at LA 111333.

MNM Project 41.710
NMSHTD Project AC-HPP-MIP-084-6(78)166, CN 3402
NMCRIS Project No. 50208
NMCRIS Activity No. 79869
Pueblo of Tesuque permission granted August 12, 2002.
Bureau of Indian Affairs Permit No. BIA/ SRO-02-003.

# CONTENTS

TABLES

# PART 1: PROJECT INTRODUCTION

# 1
# INTRODUCTION TO THE PROJECT

## Jeffrey L. Boyer

Between 1995 and 1998, archaeological survey was conducted along 22.4 km (14 miles) of U.S. 84/285 between Santa Fe and Pojoaque, Santa Fe County, New Mexico (Hohmann et al. 1998). Survey was conducted at the request of the New Mexico State Highway and Transportation Department (NMSHTD) in preparation for planned reconstruction of the highway. Twenty-seven previously recorded archaeological sites were relocated, 29 previously unrecorded sites were recorded, and 5 traditional cultural properties (TCPs) and 311 isolated occurrences were recorded during survey.

One of the sites, LA 111333, is present within existing highway right-of-way near the intersection of U.S. 84/285 and NM 591 (the "Tesuque Y"), on land belonging to the Pueblo of Tesuque (Fig. 1.1). A program of archaeological test investigations was determined necessary to:

1. Assess damage to the site caused by earthmoving activities that occurred since the site was first recorded,

2. Define the presence, nature, and horizontal and vertical extent of subsurface cultural deposits, features, and structures within proposed project limits at the site,

3. Define the nature of subsurface cultural and natural stratigraphy, and

4. Allow evaluation of the data potential of the site and determine whether additional data recovery investigations may be warranted prior to planned reconstruction of the U.S. 84/285 Rio Tesuque bridge, located about 250 m south of LA 111333.

The NMSHTD requested that the Museum of New Mexico's Office of Archaeological Studies (OAS) prepare a plan for archaeological test investigations at the site; a plan was submitted to and approved by the Pueblo of Tesuque, the NMSHTD, the USDI Bureau of Indian Affairs (BIA), and the New Mexico Historic Preservation Division (HPD) in fulfillment of that request (Boyer and Blinman 2002).

Between August 26 and September 6, 2002, the OAS conducted testing investigations at LA 111333. Field work was supervised by H. Wolcott Toll; the field crew consisted of Toll, C. Dean Wilson, Jessica Badner, Richard Montoya, and Isaac Herrera. In the laboratory, Natasha Williamson and Isaac Herrera prepared the artifacts collected during testing for analyses, which will be conducted following data recovery investigations. Robin Gould edited this report, and the graphics were produced by Ann Noble. Timothy D. Maxwell, OAS Director, is the project principal investigator; Eric Blinman, OAS Assistant Director, is the project quality control officer.

This report is organized into three main sections. The first section, Part 1, presents descriptions of the project, the project area, and the site as recorded during survey. Part 2 presents the results of testing investigations at LA 111333, including revision of the site description and recommendations for additional investigations. Part 3 presents a plan for data recovery at LA 111333. Data recovery efforts at LA 111333 are linked to a research orientation and to field and laboratory data recovery methods common to prehistoric sites in the U.S. 84/285 Santa Fe to Pojoaque Corridor project (Boyer and Lakatos 2000b). The research focuses on, but is not limited to, inter- and intraregional social and ideological relationships, community formation, economic and subsistence strategies, and ethnic identities in the Tewa Basin. The plan presented in this report specifies research orientations and data recovery methods for Archaic occupations and for specific aspects of Classic period occupations of the area, and links those orientations and methods to the deposits and possible features and

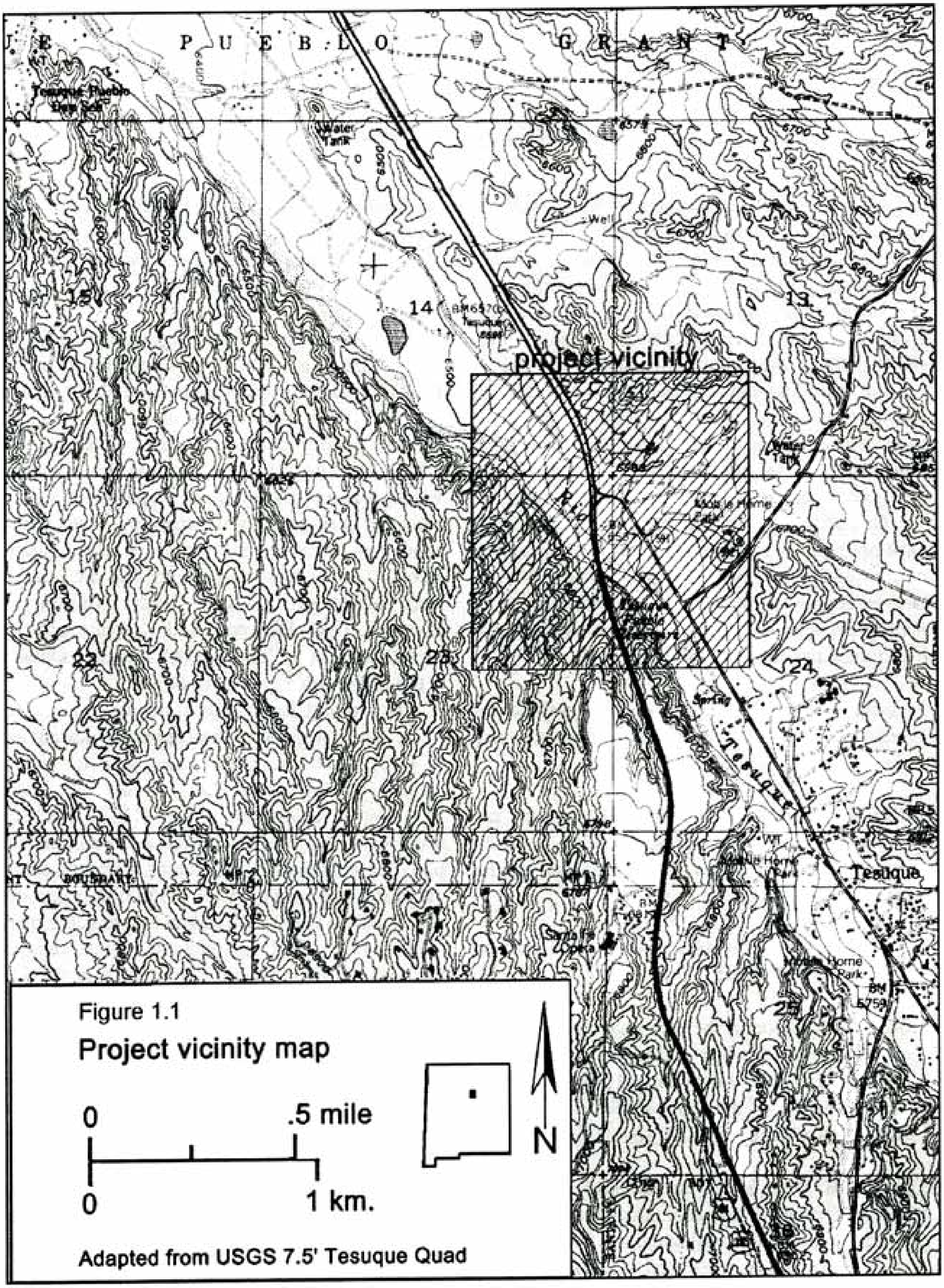



Figure 1.1
**Project vicinity map**

structures encountered during testing at LA 111333.

## LA 111333: Survey Site Description

Hohmann and others (1998:25-26) provide the following description of LA 111333:

> Site LA 111333 is a multi-component site with prehistoric and historic deposits. . . and covers an estimated 10 meters north/south by 25 meters east/west (250 square meters). The site consists of a probable field house and associated sparse artifact scatter and is situated to the west of the southbound lanes of US 84/285 opposite the northern junction with NM 591 (the North Tesuque Y).
>
> The site consists of a probable field house (Feature 1) and two areas of moderate density surface artifacts (one prehistoric and associated with Feature 1, the second historic and located west of Feature l). Feature 1 consists of a four by four meter scatter of cobbles with associated surface artifacts. Rock alignments were noted with the size and composition of the feature suggesting a probable surface room.
>
> Within a one meter diameter area surrounding the feature, a fine-grain basalt primary flake, two primary quartzite flakes, two Jemez obsidian flakes, and four secondary chert flakes were observed, along with a Kwahe'e style (i.e., paste, temper, and slip) whiteware sherd and a Abiquiu Black-on-gray (Biscuit A) bowl sherd. Located seven meters west of the field house structure is a small but dense concentration of agua [sic] colored glass, probably from the same bottle.
>
> The Abiquiu Black-on-gray bowl sherd suggests dates of A.D. 1300 to A.D. 1475. Although the Kwahe'e style whiteware sherd would suggest much earlier dates, Site LA 111332 is located only 40 meters south and contains several different early ceramic forms. It is possible this early sherd is related to activities occurring at LA 111332, and that LA 111333 dates to the later PIII-PIV period. Over 33 pieces of agua [sic] colored glass are present (probably from a single bottle). This type of glass based on color, air bubbles, seams, and finish suggests a date range of 1880 to 1920.
>
> The feature's location on the flood plain of the Rio Tesuque may suggest an agricultural function.

Figure 1.2 is the site map, as presented by Hohmann et al. (1998). Field inspection of LA 111333 by OAS project staff in 1998 revealed a low, small mound representing the probable remains of a small, Classic period fieldhouse and an associated artifact scatter. The structure was probably related to prehistoric farming activities at LA 111332, which is located immediately south of LA 111333, outside proposed project limits.

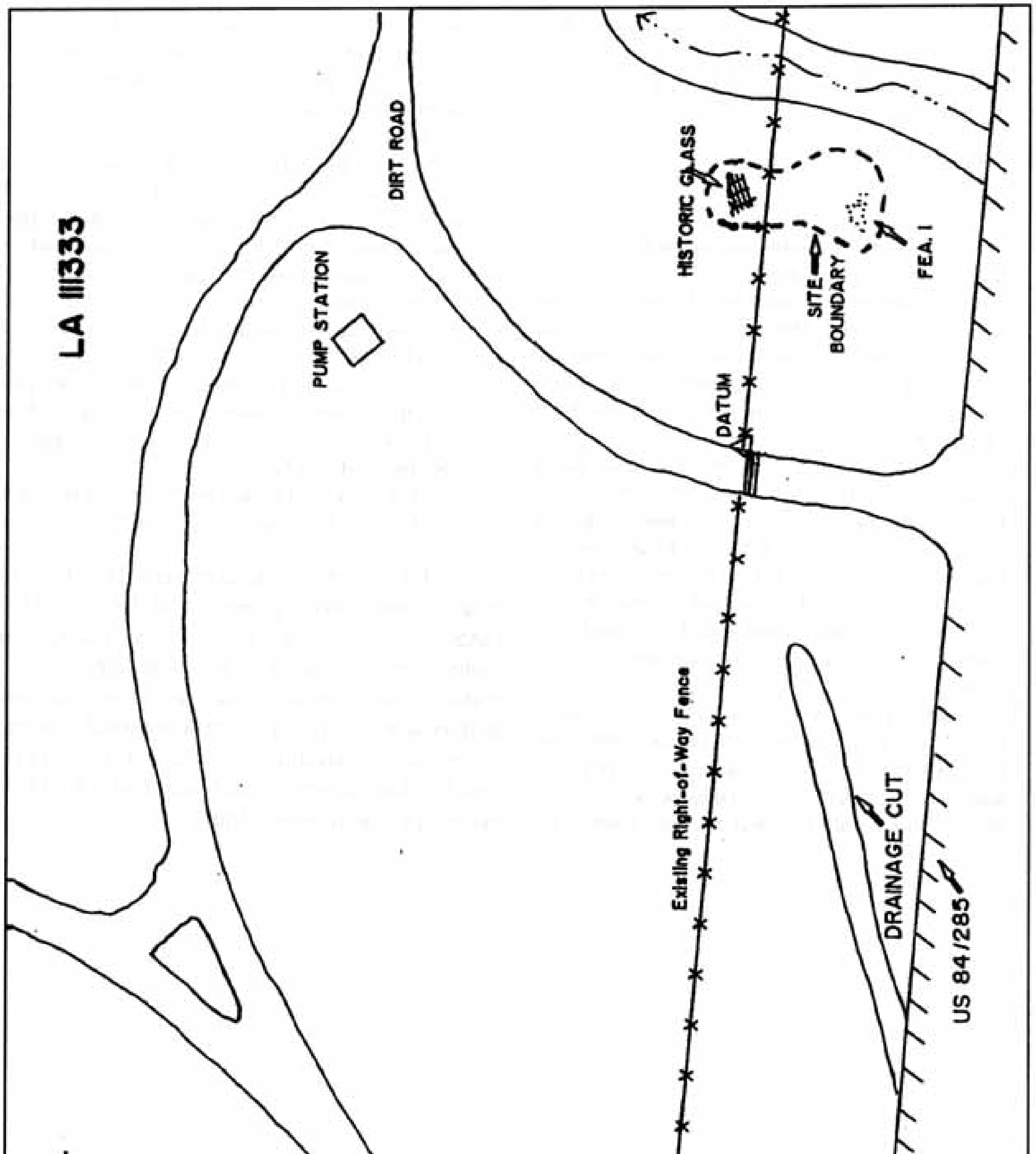



*Figure 1.2. LA 111333: survey site map (from Hohmann et al. 1998).*

# 2
# THE NATURAL ENVIRONMENT

James L. Moore

## Physiography and Geology

The Santa Fe to Pojoaque Corridor project area is situated in the Española Basin, one of six or seven downwarped basins that formed along the continental rift now occupied by the Rio Grande between southern Colorado and southern New Mexico (Chapin and Seager 1975; Kelley 1979). Three episodes of deformation contributed to the development of these depressions, including formation of the ancestral Rocky Mountains during the late Paleozoic and the Laramide uplifts of late Cretaceous to middle Eocene times (Chapin and Seager 1975:299). These events created a north-trending tectonic belt, along which the Rio Grande rift formed. Chapin and Seager (1975:299) note that:

> The Rio Grande rift is essentially a "pull-apart" structure caused by tensional fragmentation of western North America. Obviously, a plate subjected to strong tensional forces will begin to fragment along major existing zones of weakness and the developing "rifts" will reflect the geometry of the earlier structure.

The early deformations weakened the continental plate, causing it to split along the Rio Grande depression and resulting in the formation of downwarped basins as the plate pulled apart.

The Española Basin is considered an extension of the Southern Rocky Mountain Province (Fenneman 1931), and is enclosed by mountains and uplifted plateaus (Kelley 1979:281). The Rio Grande flows through the long axis of the basin, entering through a gorge on the north and exiting through a gorge on the south (Kelley 1979). Boundaries for this physiographic feature include the Taos Plateau on the north, the Brazos and Tusas mountains on the northwest, the Sangre de Cristo Mountains on the east, the Cerrillos Hills and north edge of the Galisteo Basin on the south, the La Bajada fault escarpment and Cerros del Rio on the southwest, and the Jemez volcanic field on the west.

The Rio Chama is the main tributary of the Rio Grande in the Española Basin, and the confluence of these rivers is near the center of that feature (Kelley 1979). The Rio Tesuque and Rio Pojoaque are the principal drainages in the study area, and originate in the Sangre de Cristo Mountains. Both streams flow through narrow valleys and merge northwest of Pojoaque Pueblo, then trend west to empty into the Rio Grande (Anschuetz 1986).

As subsidence proceeded, sediments were eroded into the Española Basin from the highlands to the north, northwest, and east, forming the Santa Fe group of formations. The Santa Fe group consists of thick deposits of poorly consolidated sands, gravels, conglomerates, mudstones, siltstones, and volcanic ash beds (Lucas 1984). At one time, the Tesuque formation of the Santa Fe group was covered by the Ortiz Pediment gravels, but severe erosion removed most of the latter, leaving only isolated remnants on high ridges and hilltops. Subsequent gravel deposition occurred as channel deposits along the Rio Grande.

In places, the Santa Fe group sediments were covered by volcanic deposits, especially in the north and northwest parts of the basin. There, the Puye fanglomerate, which formed after erosion of the Ortiz Pediment began, was covered by a thick layer of Bandelier tuff and local basalt flows. These igneous deposits form the Pajarito Plateau and Black Mesa.

## Climate

Temperature is determined by latitude and elevation, though the latter is the more powerful determinant in New Mexico, with temperature decreasing more rapidly as elevation increases rather than with an increase in latitude (Tuan et al. 1973). Mean annual temperature for Española is 9.7 to 10.4 degrees C (49.4 to 50.7 degrees F; Gabin and Lesperance 1977). Summers tend to be warm, while winters are cool, and the Española area averages 152 frost-free days during the growing season (Reynolds 1956).

Cold air drainage is a common feature of deep New Mexico valleys. Night-time down-valley winds are cool, but 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 channelling air flow in this way, temperatures on broad valley floors are influenced by local relief (Tuan et al. 1973:69). A study of these patterns has shown that temperature drops before sunrise are gradual or at least not extreme when winds are relatively stable throughout the night during spring and fall (Hallenbeck 1918:364-373). 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). 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). This phenomenon may be responsible for a shorter growing season in the Española area than in the Santa Fe area, which is higher in elevation (Anschuetz 1986).

New Mexico is one of three places in the United States that receives over 40 percent of its annual rainfall during the summer months (Tuan et al. 1973). Summer rainfall in the Southwest follows a true monsoon pattern (Martin 1963). Moisture-laden winds flowing north from the Gulf of Mexico are the main source of summer moisture, and their movement is controlled by a high pressure system situated over the Atlantic Ocean. The amount of summer precipitation in the Southwest depends on the positioning of this system. When it is in a northern position, moist tropical air flows into the Southwest and the summer is wet. When it is positioned to the south the summer can be dry, a condition that may be caused by abnormally cold years in north temperate latitudes (Martin 1963).

Winter precipitation is derived from air masses originating in the extratropical regions of the Pacific Ocean or in Canada. While summer storms are generally short and intense, winter precipitation usually falls as snow, which melts slowly and soaks into the soil rather than running off, as does most summer rain. Though all precipitation is beneficial to local biota, winter precipitation is more effective because it soaks into the ground and recharges soil moisture reserves.

This is not to say that precipitation patterns are consistent across the Southwest. Indeed, great variation in rainfall patterns has been found between different parts of the region. Dean and Funkhouser (1995:92) suggest that a bimodal precipitation pattern prevails in much of the southern Colorado Plateau (northwest component) with maxima in both winter and summer. Conversely, a unimodal pattern with a summer maxima seems to prevail in the San Juan Basin and northern Rio Grande Valley (southeast component). This pattern has prevailed since at least A.D. 966 (Dean and Funkhouser 1995:92). There have been disruptions of the pattern since that time, but they have mostly occurred in the northwest component (Dean and Funkhouser 1995:94).

Annual precipitation records from Española indicate that the study area receives a mean of 237 to 241 mm (9.3 to 9.5 inches) of precipitation per year (Gabin and Lesperance 1977). However, precipitation levels can be quite variable from year to year. July through September are the wettest months in the area, receiving about 45 percent of the annual precipitation (Gabin and Lesperance 1977). However, the violence of summer storms results in a great deal of runoff, reducing the amount of moisture actually available for plant growth. Quite a bit of moisture is also lost through evaporation from plants and the soil surface, resulting in an annual moisture deficit of 691 mm (27.2 inches) in Española (Anschuetz 1986). Climatological data suggest that the inner Española Basin is a high-risk area for dry farming (Anschuetz 1986).

## Soils

Soils in the study area can be divided into two groups based on geomorphology—soils of the Dissected Piedmont Plain are most common in the area, with soils of the Recent Alluvial Valleys also occurring (Folks 1975). The Pojoaque-Rough Broken Land association comprises the former group and is derived from Quaternary sediments and alluvium of the Tesuque formation of the Santa Fe group (Lucas 1984). These deep soils are well drained and occur on rolling to hilly uplands dissected by intermittent gullies and arroyos, though a few nearly level to gently sloping valley bottoms and floodplains next to intermittent streams are also included in the association. Most of these soils are forming in unconsolidated coarse to medium-textured and gravelly old alluvium, which is usually calcareous and contains sandy clay loam, sandy loam, or gravelly sandy loam surface layers. Lag gravel deposits often cover the surface of these soils (Folks 1975:4; Maker et al. 1974:33).

Soils of the Rough Broken Land association occur on broken topography, steep slopes, and rock outcrops. Rock outcrops and small areas of highly variable soils dominate this association (Maker et al. 1974:24). Rough Broken Land soils are intermingled with Pojoaque soils, and together tend to occur on ridgetops between drainages.

The El Rancho-Fruitland association dominates the soils of the Recent Alluvial Valleys. They are deep and loamy like the Pojoaque soils, but unlike them tend to occur on low terraces along the Rio Tesuque and Rio Pojoaque. El Rancho-Fruitland soils are derived from sedimentary rocks from the Tesuque formation and granites from the Sangre de Cristo Mountains (Folks 1975:3). They are currently used for irrigated crops, while the Pojoaque soils are not used in modern agriculture.

## Flora and Fauna

The study area contains juniper-piñon grasslands, dry riparian, and riparian-wetland habitats. The former is most common and supports an overstory dominated by juniper and piñon pine, with an understory containing muhly grass, grama grass, other less common grasses, four-wing saltbush, sagebrush, rabbitbrush, prickly pear, and cholla. A recent invader that occurs in the north part of the project area is Russian knapweed.

The dry riparian habitat occurs in arroyo bottoms, on arroyo banks, and on floodplains adjacent to some of the wider drainages (Anschuetz 1986). Plants commonly found in this habitat include rabbitbrush, fourwing saltbush, mountain mahogany, scrub oak, Rocky Mountain beeweed, Indian ricegrass, three-awn grass, side-oats grama, and flax (Pilz 1984). The riparian-wetland habitat occurs only along perennial streams such as the Rio Tesuque and Rio Pojoaque (Anschuetz 1986). Today, this habitat supports willow, cottonwood, tamarix, rushes, and sedges (Pilz 1984).

Animals commonly found in the study area include coyote, badger, porcupine, blacktailed jackrabbit, desert cottontail, spotted ground squirrel, and various birds. Small numbers of mule deer now occur in the region, as do black bears (Pilz 1984). Indeed, bear scat was noted during testing at LA 4968 and showed that black bears still come down from adjacent highlands to take advantage of plants that ripen in the late summer and early fall, such as juniper berries and domestic fruits. Animals that are common in higher elevations of the region include 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).

# 3
# THE CULTURAL ENVIRONMENT

James L. Moore, Jeffrey L. Boyer, and Steven A. Lakatos

Through most of its prehistory the Tewa Basin was linked to a much larger cultural area referred to as the northern Rio Grande. This region stretches from the south edge of La Bajada Mesa to the north end of the Taos Valley, and encompasses the Santa Fe area, Galisteo Basin, Pajarito Plateau, Chama-Ojo Caliente valleys, Pecos region, and Taos District. The prehistory of this large area becomes especially closely linked after agriculture appears and spreads, and farming populations began moving in response to the need for more land or climatic change. Since some parts of this region are better known than others, this discussion will not always focus specifically on the study area.

## Paleoindian Period (9200–5500 B.C.)

The earliest documented occupation of the Southwest was during the Paleoindian period, which contains three broad temporal divisions. Holliday (1997:225) provides dates for these divisions from the southern Plains: Clovis—9200 to 8900 B.C., Folsom—8900 to 8000 B.C., and Late Paleoindian—8000 to 7000 B.C.). Dates for these divisions probably have similar ranges in northern New Mexico, though the end of the Late Paleoindian tradition is usually given as 5500 B.C. in that area. The Late Paleoindian division groups together several different artifact complexes distinguished by variations in projectile points and tool kits that may reflect differences in lifestyle. Fiedel (1999) has reevaluated early Paleoindian radiocarbon dates in light of information provided by other dating methods. He concludes that radiocarbon dates between 12,500 and 10,000 B.P. are problematic because of large-scale fluctuations in $^{14}C$ ratios, yielding dates that may be off by as much as 2,000 years. Thus, he suggests that the Clovis occupation should be redated at 13,400 to 13,000 B.P. (11,400–11,000 B.C.), and Folsom should be similarly dated about 2,000 years older than it currently is. This scheme has not been adequately evaluated to determine whether Fiedel's (1999) conclusions are correct.

At one time all Paleoindians were classified as big-game hunters. Some researchers now feel that the Clovis people were unspecialized hunter-gatherers while Folsom and many later groups turned increasingly toward the specialized hunting of migratory game, especially bison (Stuart and Gauthier 1981). While some Paleoindians drifted out of New Mexico with the migratory big game, those that remained undoubtedly subsisted by a broadly based hunting-gathering economy. The early Archaic inhabitants of the region probably evolved out of this population. Evidence of Paleoindian occupation is rare in the northern Rio Grande and typically consists of diagnostic projectile points and butchering tools found on the modern ground surface or in deflated settings (Acklen et al. 1990).

Recently, two Clovis period components have been reported in the Jemez Mountains (Evaskovich et al. 1997; Turnbow 1997). Data recovery at one component identified two medial Clovis point fragments associated with a single thermal feature and tool manufacturing debris (Evaskovich et al. 1997). Identification of Paleoindian occupations in a montane setting may suggest a changing subsistence adaptation. An increased focus on the hunting of smaller game and collection of wild plant foods toward the end of the Paleoindian period may reflect changes in climate (Haynes 1980; Wilmsen 1974).

In 1961, Alexander (1964) found a "late Paleo-Indian point" on a pueblo site near the mouth of Taos Canyon. This site was revisited in 1981 (Wood and McCrary 1981), but the point could not be relocated. Bases of Belen-Plainview points have been found on sites with later components at Guadalupe Mountain (Seaman 1983) and south of Carson (Boyer 1985). Boyer (1988) found a reworked obsidian Folsom point north of Red Hill on the northwest side of the Taos Valley. The point was submitted for obsidian hydration dating, but the material source could not be determined and no date was obtained (Condie and Smith 1989).

Two isolated late Paleoindian Cody complex artifacts have been reported from the Galisteo Basin (Honea 1971; Lang 1977), and Boyer (1987) reports an isolated Cody knife from the mountains south of Taos. The little evidence of Paleoindian occupation that has been found on the Pajarito Plateau is mostly restricted to isolated projectile points (Powers and Van Zandt 1999). Isolated Clovis, Folsom, Agate Basin, Milnesand, and Scottsbluff points have been found on the Pajarito Plateau and in the nearby Cochiti Reservoir District (Chapman and Biella 1979; Root and Harro 1993; Steen 1982; Traylor et al. 1990). Though no Paleoindian sites have been identified in the Chama-Ojo Caliente valleys, the presence of a handful of diagnostic artifacts indicates that Paleoindians used that area. Anschuetz et al. (1985) note that isolated Clovis and Folsom points have been found in this region, and a secondarily deposited horizon of possible Paleoindian date was identified in the Abiquiu Reservoir area. One Clovis point has been found in the upper Pecos Valley (Nordby 1981), and only one site that may date to this period has been recorded in the Pecos area (Anschuetz 1980). Paleoindian points have also been found in the Sangre de Cristo Mountains and on the Las Vegas Plateau (Stuart and Gauthier 1981).

The paucity of Paleoindian remains through much of this area may be attributed to low visibility rather than lack of occupation. Paleoindian remains may be masked by later Archaic and Pueblo deposits. Poor visibility may also be attributed to geomorphology—surfaces or strata containing Paleoindian remains may be deeply buried and only visible in settings where these deposits are exposed. Cordell (1978) contends that the locations of known Paleoindian sites correspond to the areas of New Mexico where erosion has exposed ancient soil surfaces. If so, it may not be surprising that Paleoindian sites have not been found in the Tewa Basin, which is an area of regional soil accumulation and only local erosion.

## Archaic Period (5500 B.C.–A.D. 600)

At an early date, archaeologists realized that the Archaic occupation of northern New Mexico was in many ways distinct from that of its southern neighbor, the Cochise. Bryan and Toulouse (1943) were the first to separate the northern Archaic from the Cochise, basing their definition of the San José complex on materials found in dunes near Grants, New Mexico. Renaud's (1942, 1946) work along the upper Rio Grande also contributed to the definition of this tradition. Irwin-Williams (1973, 1979) defined the northern Archaic as the Oshara Tradition, and investigations along the Arroyo Cuervo in north-central New Mexico allowed her to tentatively formalize its developmental sequence. However, in applying that chronology outside the area in which it was developed, one must realize that specific trends might not occur throughout the Oshara region. Thus, at least some variation from one region to another should be expected.

The Oshara Tradition is divided into five phases: Jay (5500 to 4800 B.C.), Bajada (4800 to 3200 B.C.), San José (3200 to 1800 B.C.), Armijo (1800 to 800 B.C.), and En Medio (800 B.C. to A.D. 400 or 600). Jay and Bajada sites are usually small camps occupied by microbands for short periods of time (Moore 1980; Vierra 1980). The population was probably grouped into small, highly mobile nuclear or extended families during these phases. San José sites are larger and more common than those of earlier phases, which may suggest population growth. Ground stone tools are common at San José sites, suggesting a significant dietary reliance on grass seeds. Irwin-Williams (1973) feels that corn horticulture was introduced by the beginning of the Armijo phase ca. 1800 B.C. Others (Berry 1982; Wills 1988) feel that corn did not appear in the Southwest until somewhat later, perhaps no earlier than 1000 B.C. Base camps occupied by macrobands appeared by the late Armijo phase, providing the first evidence of a seasonal pattern of population aggregation and dispersal.

The En Medio phase corresponds to Basketmaker II elsewhere, and represents the transition from a nomadic hunter-gatherer pattern to a seasonally sedentary lifestyle combining hunting and gathering with some reliance on corn horticulture. During this phase the population again seems to have increased. Seasonally occupied canyon head home base camps became more numerous, and began occurring in previously unoccupied locations (Irwin-Williams and Tompkins 1968). A strongly seasonal pattern of population aggregation and dispersal seems likely, with a period of maximum social interaction at home base camps followed by a breakup into microbands occupying smaller camps in other locations. While some corn was grown during this period, there does not seem to have been a high degree of dependence upon horticulture, and the population mostly subsisted on foods obtained by hunting and gathering.

Variation from this pattern occurred in southeast Utah, where Basketmaker II people appear to have been nearly sedentary and highly dependent on corn (Matson 1991). Similarly, during the late San Pedro phase in southeast Arizona (which corresponds to Basketmaker II in many ways), nearly sedentary villages dependent on corn agriculture appear to have existed (Roth 1996). Thus, in many areas of the Southwest the Archaic was coming to an end during this period. Northern New Mexico varied from this pattern, and no sedentary preceramic villages have been identified in that region. While the Archaic ended around A.D. 400 in northwest New Mexico when pottery and the bow were introduced and a shift was made to a more sedentary agricultural subsistence system, this process seems to have occurred later in the northern Rio Grande. There, the Archaic is thought to have ended around A.D. 600 in some areas, and even later in others.

The northern Rio Grande Archaic may or may not be related to Irwin-Williams's Oshara Tradition. Projectile points illustrated by Renaud (1942, 1946) resemble the Jay, Bajada, and San José types commonly attributed to the Oshara. Cordell (1978) compared Archaic remains from the northern Rio Grande to those in the Arroyo Cuervo district and saw many similarities. However, similar Archaic point styles occur over a vast region stretching from California to Texas and northern Mexico to the southern Great Plains, so stylistic resemblance cannot always be taken as evidence for similar cultural affinity. Subsequent cultural developments along the northern Rio Grande suggest that the people in this area differed from those occupying the traditional Pueblo heartland in the Four Corners' region. Those differences quite likely had their basis in the makeup of the Archaic populations that originally settled these regions. Thus, a similarity in projectile point styles does not necessarily mean that the northern Rio Grande and Four Corners' areas were occupied by groups of common cultural or even linguistic origin. Indeed, it is quite likely that they were not.

Most Archaic sites found in the Santa Fe area and Tewa Basin date between the Bajada and En Medio phases, though Early and Middle Archaic sites tend to be rather rare. These occupations are generally represented by widely dispersed sites and isolated occurrences (Anschuetz and Viklund 1996; Doleman 1996; Lang 1992; Post 1996, 1999b). Early and Middle Archaic assemblages represent brief occupations with an emphasis on hunting. Materials associated with these occupations are typically mixed with deposits of later temporal components. Early and Middle Archaic sites have been recorded along the Santa Fe River and its primary tributaries (Post 1999a). Until recently, temporal information from this period was derived from obsidian-hydration dating (Lang 1992). However, recent excavations in the Santa Fe area have identified thermal features that yielded radiocarbon dates between 6000 and 5000 B.C. (Anschuetz 1998; Larson and Dello-Russo 1997; Post 1999b). The limited number of associated artifacts recovered by these excavations indicates brief occupations geared toward hunting by small, highly mobile groups.

Although several Middle Archaic sites have been identified in the Jemez Mountains (Larson and Dello-Russo 1997), archaeological evidence for Middle Archaic occupations in the Santa Fe area is rare. A single, hafted San José scraper was identified at a site southeast of Santa Fe (Lang 1992). This tool was mixed with Late Archaic and Pueblo period materials, making it difficult to associate an obsidian-hydration date with a discrete component of the chipped stone assemblage. The Las Campanas Project identified a late San José phase site that yielded one temporally diagnostic projectile point, tool production debris, and ground stone artifacts (Post 1996). These materials were associated with a thermal feature, but no datable charcoal was obtained.

Recently, excavations along the Santa Fe Relief

Route identified four Middle Archaic sites. Radiocarbon dates obtained from thermal features ranged between 3200 and 1800 B.C. Two sites contained shallow structures with associated chipped and ground stone artifacts (Stephen Post, pers. comm. 2000). Although associated materials were not abundant, they may indicate a longer and more formal site occupation than is visible at earlier sites (Post 1999b).

Early and Middle Archaic sites seem to be rare in the Cochiti Reservoir area, just south of La Bajada Mesa. Chapman (1979:64) indicates that the only diagnostic artifacts reflecting use of that area during the Early or Middle Archaic were two bases of either Bajada or San José points. Otherwise, the types of projectile points and point fragments described during that survey suggest that the main Archaic use of that area occurred during the Armijo and En Medio phases (Chapman 1979:64). No domesticates were identified in flotation samples obtained from associated thermal features, but it should also be noted that only two seeds from samples taken on different sites were identified by this analysis (Chapman 1979:72), so preservation was quite bad.

Middle and Late Archaic sites are common in the lower Rio Chama Basin, but most of the Archaic sites investigated in the Chama-Ojo Caliente area are in and around Abiquiu Reservoir. Schaafsma (1976, 1978) completed the first systematic research on the Archaic occupation of that area. Fifty-six Archaic sites were identified in his study, of which 13 were excavated. Most were simple scatters of chipped stone artifacts 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 that study, of which eight contained Archaic components. A Late Archaic occupation was suggested for four sites, all of which seem to have been reused at later times (Bertram 1989; Schutt et al. 1989). Middle to Late Archaic occupations were noted at five sites, 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 in the lower Rio Chama Valley. Tools associated with intensive food processing are rare or absent at sites near Abiquiu, 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 for Pedernal chert between the Paleoindian and Protohistoric periods. Though this material is abundant in Rio Chama and Rio Grande gravels, Pedernal chert was also quarried around Cerro Pedernal and Abiquiu Reservoir; quarries in the former location were originally termed the Los Encinos Culture (Bryan 1939).

Late Archaic sites are fairly common in the Santa Fe area, and this is consistent with regional data (Acklen et al. 1997). An increase in sites during the Late Archaic may be due to changes in settlement and subsistence patterns occurring during the Armijo phase. Changes in settlement patterns include evidence of seasonal aggregation, longer periods of occupation, and use of a broader range of environmental settings. Subsistence changes include the adoption of horticulture, which has been identified at sites south of La Bajada Mesa. Armijo phase sites have been identified in the piedmont area around the Santa Fe River (Post 1996, 1999b; Schmader 1994). These sites range from small foraging camps to larger base camps with shallow structures. Radiocarbon dates obtained from thermal features suggest they were occupied between 1750 and 900 B.C. (Post 1996, 1999a; Schmader 1994).

An Archaic site at the edge of the Tewa Basin and Pajarito Plateau was occupied during the late Armijo or early En Medio phase (Moore 2001). Excavations at LA 65006 indicated that it was reoccupied on several occasions, and that during its main occupation the site served as a workshop for the manufacture of large general-purpose obsidian bifaces (Moore 2001). Though a few corn pollen grains were recovered from this site, their context was unclear, since no macrobotanical evidence of corn was recovered in Archaic contexts. Indeed, a few kilometers south of LA 65006, Lent (1991) excavated a Late Archaic pit structure with an associated roofed activity area that dated between ca.

610 B.C. and A.D. 180, recovering absolutely no evidence for the use of domesticates.

En Medio phase sites are the most common evidence of Archaic occupation in the Santa Fe area. These sites are widely distributed across riverine, piedmont, foothill, and montane settings (Acklen et al. 1997; Kennedy 1998; Lang 1993; Miller and Wendorf 1958; Post 1996, 1997, 1999b; Scheick 1991; Schmader 1994; Viklund 1988). This phase is represented by finds ranging from isolated occurrences to limited activity sites to base camps with structures and formal features. Increased diversity in settlement pattern and site types suggest population increase, longer site occupations or reduced time between occupations, and truncated foraging range.

A wide range of En Medio phase habitation and special activity sites have been identified north of La Bajada Mesa in the Santa Fe area and Tewa Basin. Although many of these sites contain structures, formal features, and grinding implements, evidence of horticulture is virtually absent. Excavation of Late Archaic sites at Las Campanas near Santa Fe (Post 1996) yielded projectile points diagnostic of the period between A.D. 500 and 850. This, in addition to a lack of evidence for the use of horticulture during this period, suggests that Archaic subsistence strategies may have continued to be used into the early or middle A.D. 900s north of La Bajada Mesa (Dickson 1979; McNutt 1969; Post 1996).

## Pueblo Period (A.D. 600–1600)

The Pueblo period chronology follows the framework presented by Wendorf and Reed (1955), which subdivides the Pueblo period into Developmental (A.D. 600-1200), Coalition (A.D. 1200-1325), and Classic (A.D. 1325-1600) periods. They further subdivide the Developmental and Coalition periods according to changes in pottery types and architectural characteristics. The Developmental period is divided into Early Developmental (A.D. 600-900) and Late Developmental (A.D. 900-1200), and the Coalition period into Pindi and Galisteo "stages." Although Wendorf and Reed (1955) coined names for these stages, they did not assign absolute dates, merely inferring them.

Modifications to the terminology and temporal divisions developed by Wendorf and Reed (1955) have been proposed by Wetherington (1968), McNutt (1969), and Dickson (1979). Wetherington assigned phase names to the periods in the Santa Fe and Taos districts and slightly modified the dates. NcNutt renamed one period, preferring Colonization to Developmental, divided that period into "components," and changed the dates for the Coalition period. Dickson subdivided each period into three phases. Terminology aside, each of these researchers found a need to subdivide each period of the Pueblo occupation into early and late, and for one researcher, middle components. Again, subdivisions were based on perceived changes in pottery types and architecture. For each researcher, these subdivisions may have been appropriate and useful for addressing the goals of their studies. For the purpose of this discussion, however, only the Developmental and Classic periods are divided into early and late subperiods.

### *Early Developmental Period*

Early Developmental period sites dating before A.D. 800 are rare in the northern Rio Grande. Although sites dating between A.D. 800 and 900 are more numerous, they are typically represented by limited activity areas and small settlements (Wendorf and Reed 1955). Most reported Early Developmental sites are located south of La Bajada Mesa, primarily in the Albuquerque area, with a few reported at higher elevations along the Tesuque, Nambé, and Santa Fe drainages (Lang 1995; McNutt 1969; Peckham 1984; Skinner et al. 1980; Wendorf and Reed 1955). Early Developmental sites tend to be situated along low terraces overlooking primary and secondary tributaries of the Rio Grande. These locations may have been chosen for their access to water and farm land (Cordell 1978). Terrace locations may also have provided access to ecozones with a wide range of foraging resources (Anschuetz et al. 1997).

Early Developmental habitation sites typically contain one to three shallow, circular pit structures with little or no evidence for associated surface structures (Allen and McNutt 1955; Peckham 1954, 1957; Stuart and Gauthier 1981). One exception is a settlement north of Santa Fe that was identified by

Lang (1995), and apparently contains between five and twenty structures. Unfortunately, the contemporaneity of the structures in this small settlement has not been established.

Excavation data indicate that a suite of construction methods were employed to build these early structures. Typically, pit structures were excavated up to a meter below ground surface and were commonly 3 to 5 m in diameter. Walls were sometimes reinforced with vertical poles and adobe (Allen and McNutt 1955; Condie 1987, 1996; Hammack et al. 1983; Peckham 1954; Skinner et al. 1980). Walls, floors, and internal features commonly lacked plaster. Ventilators were located on the east to southeast sides of these structures, though an exception was a ventilator located on the north side of a structure reported by Peckham (1954). Common floor features include central hearths, ash-filled pits, upright "deflector" stones, ventilator complexes, ladder sockets, and four postholes. Other, less common floor features include small pits identified as sipapus, warming pits, pot rests, and subfloor pits of various sizes and depths (Allen and McNutt 1955; Condie 1987, 1996; Hammack et al. 1983; Peckham 1957).

Ceramics associated with Early Developmental sites include plain gray and brown wares, red slipped brown wares, and San Marcial Black-on-white (Allen and McNutt 1955). These types persist through the Early Developmental period, with the addition through time of neckbanded types similar to Alma Neckbanded and Kana'a Gray, as well as Kiatuthlana Black-on-white, La Plata Black-on-red, and Abajo Red-on-orange (Wendorf and Reed 1955). The accumulation of pottery types and surface textures, as opposed to sequential types and textures, appears to be characteristic of the Developmental period, as well as of the Highland Mogollon area (Wilson et al. 1999).

The types of decorated pottery found at Developmental period sites might be indicative of cultural affiliation with peoples living to the west and northwest of the northern Rio Grande region. However, Early Developmental inhabitants also obtained red and brown wares through trade with Mogollon peoples to the south and southwest (Cordell 1978). Although cultural affiliation may seem more secure in assemblages that are clearly dominated by specific ware groups, cultural affiliation is difficult to determine at Early Developmental sites that contain various percentages of gray, brown, and white wares.

No Early Developmental period sites have been found in the Rio Chama-Ojo Caliente valleys, and there is no evidence of a resident Pueblo population in that region during this period. Though some sites in that region are considered evidence for periodic temporary use during the Early Developmental period, those assertions are generally based on projectile point styles rather than more temporally sensitive artifacts, like pottery (Moore 1992; Schaafsma 1976). In general, these are small corner-notched arrow points that are generally considered to have fallen out of use by about A.D. 900. However, this scenario is based on data from the Four Corners area, and the situation seems to have been quite different in the northern Rio Grande. Indeed, Moore (n.d.) demonstrates that this type of point was manufactured into the seventeenth century in the Pecos area, and they occur at several late Classic period farming sites. This is similar to the accumulative pattern noted in the Mogollon Highlands (Moore 1999), where new point styles were added without replacing earlier types, resulting in a suite of projectile point styles occurring on Late Pueblo sites. Thus, small corner-notched arrow points are probably not temporally sensitive in the northern Rio Grande, and their presence cannot be taken as evidence for an Early Developmental period component.

*Late Developmental Period*

Late Developmental period sites have been identified from the Taos Valley south to the Albuquerque area. This period is marked by an increase in the number and size of residential sites, occupation of a wider range of environmental settings, and appearance of Kwahe'e Black-on-white (Cordell 1978; Mera 1935; Peckham 1984; Wendorf and Reed 1955; Wetherington 1968). Late Developmental residential sites expanded into higher elevations along the Rio Grande, Tesuque, Nambé, and Santa Fe drainages (Allen 1972; Ellis 1975; McNutt 1969; Peckham 1984; Skinner et al. 1980; Wendorf and Reed 1955). These sites are commonly located along low terraces overlooking the primary and secondary tributaries of these rivers; locations that provided access to water, farm land, and a variety of foraging resources (Anschuetz et al. 1997; Cordell 1978). Although Late Developmental sites are more common at higher elevations than are Early Developmental sites, there is little evidence for Late Developmental occupation on the Pajarito Plateau (Kohler 1990; Orcutt 1991; Steen 1977). Toward the middle of this period, the first Pueblo residential sites were established in the Taos district (Boyer 1997).

Late Developmental sites typically consist of a house group containing one or two pit structures, a shallow midden, and sometimes an associated surface structure containing 5 to 20 rooms (Ellis 1975; Lange 1968; Peckham 1984; Stubbs 1954; Stuart and Gauthier 1981; Wendorf and Reed 1955). These house groups occur singly or in clusters that are sometimes considered to comprise a community (Anschuetz et al. 1997; Wendorf and Reed 1955). The Pojoaque Grant site (LA 835) is often used as an example of one of these early communities, and includes 20 to 22 house groups containing 10 to 20 rooms each, their associated pit structures, and a great kiva. However, all of these groups may not have been occupied contemporaneously. House groups are located along low ridges that trend southwest from a prominent sandstone mesita. Those built near the base of the mesita and near the great kiva appear to have been occupied by A.D. 900. Other groups seem to have been built at different times during the Late Developmental period.

An array of construction techniques has been identified in Late Developmental period residential sites (Ahlstrom 1985; Allen 1972; Boyer and Lakatos 1997; Ellis 1975; Lange 1968; McNutt 1969; Stubbs and Stallings 1953; Skinner et al. 1980). Surface structures are commonly constructed of adobe, and little evidence of actual masonry has been reported and is generally limited to stones incorporated into adobe walls or upright slabs used as foundations or footers for adobe walls (Lange 1968; McNutt 1969; Stubbs 1954). Contiguous rectangular rooms are most common, though subrectangular and D-shaped rooms are also reported. Floors are often unplastered, with a few reported examples of adobe, cobble, and slab floors (Ahlstrom 1985; Boyer and Lakatos 1997; Ellis 1975; McNutt 1969; Stubbs 1954; Skinner et al. 1980). Floor features are not common in surface rooms, and when present they typically include hearths and postholes.

Variety in size, shape, depth, and building techniques is typical of Late Developmental pit structures. Circular pit structures are most common, followed by subrectangular. Structure depths range from 0.3 to 2 m below ground surface, and they tend to be between 3 and 5 m in diameter. Pit structure wall surface treatments vary from the unplastered surface of the original pit to multiple courses of adobe, with or without rock, wattle and daub, upright slabs used as foundations, adobe reinforced with vertical poles, or combinations of these techniques (Allen and McNutt 1955; Boyer and Lakatos 1997; Lange 1968; Stubbs 1954; Stubbs and Stallings 1953). Floors range from compact use surfaces to well-prepared surfaces. Common floor features include central hearths, upright "deflector" stones, ash-filled pits, ventilator complexes, ladder sockets, and four postholes located toward the interior of the structure. Other, less common floor features include sipapus, subfloor channels, pot rests, and subfloor pits of various sizes and depths. Ventilators were constructed by connecting the exterior vent shaft to the interior of the structure with a tunnel or narrow trench. Trenches were subsequently roofed using latillas, effectively creating a tunnel. Exteriors of shallow structures were connected to the interior through an opening in the wall. Ventilators were commonly oriented to the east and southeast (Allen and McNutt 1955; Boyer and Lakatos 1997; Lange 1968; Stubbs 1954; Stubbs and Stallings 1953).

Utility ware ceramics found on Late Developmental sites include types with corrugated and incised exteriors in addition to the plain gray, brown, and neckbanded types associated with the Early Developmental period. The array of decorated white wares includes types that were both imported and manufactured locally. Common types are Red Mesa Black-on-white, Gallup Black-on-white, Escavada Black-on-white, and Kwahe'e Black-on-white. Less common types include Socorro Black-on-white, Chupadero Black-on-white, Chaco Black-on-white, and Chuska Black-on-white (Allen 1972; Franklin 1992; Lange 1968; Peter McKenna, pers. comm. 2000). Although decorated red wares are present in Late Developmental assemblages, they occur in low frequencies and include types from the Upper San Juan, Tusayan, and Cibola regions.

The quantity of imported decorated pottery and appearance of Kwahe'e Black-on-white, a locally made type similar to white wares produced in the northern San Juan region, is believed to illustrate a continued affiliation between the northern Rio Grande and San Juan Basin regions (Gladwin 1945; Mera 1935; Moore 2002; Warren 1980; Wiseman and Olinger 1991). Although most of the imported decorated pottery types suggest a continued relationship with people to the west and northwest, Late Developmental peoples also obtained decorated pottery and brown utility wares from the Mogollon region to the south and southwest (Cordell 1978).

*Coalition Period*

The Coalition period is marked by three major changes—an increase in the number and size of residential sites, use of surface rooms as domiciles rather than for storage as was common during the Late Developmental period, and a shift from mineral to vegetal-based paint for decorating pottery (Cordell 1978; Peckham 1984; Stuart and Gauthier 1981; Wendorf and Reed 1955). The apparent increase in number and size of residential sites during this period suggests population increase and an extension of the village-level community organization identified during the Late Developmental period. Areas like the Pajarito Plateau that saw very limited use during the Late Developmental period became a focus of occupation during the Coalition period, while areas like the Tewa Basin that saw heavy use during the Developmental period lost much of their population by A.D. 1200. The apparent increase in number of sites seems to be a function of the areas that have been investigated by archaeologists, and points to the amount of work that has been done on the Pajarito Plateau as opposed to elsewhere in the northern Rio Grande.

Coalition period sites are commonly located at higher elevations along terraces or mesas overlooking the Rio Grande, Tesuque, Nambé, Santa Fe, and Chama drainages (Cordell 1978; Dickson 1979). These locations provided access to water, farm land, and a variety of foraging resources (Cordell 1978). Although residence at higher elevations provided reliable water and arable land, innovative methods were needed to produce crops in these cooler settings (Anschuetz et al. 1997), including intensification of water management and farming practices. The use of check dams, reservoirs, and gridded fields, especially during the later parts of this period and the succeeding Classic period, are examples of this intensification (Anschuetz 1998; Anschuetz et al. 1997; Maxwell and Anschuetz 1992; Moore 1981).

Coalition period residential units typically contain ten to twenty surface rooms, one or two associated pit structures, and a shallow midden (Peckham 1984; Stuart and Gauthier 1981; Wendorf and Reed 1955). Surface structures often consist of small linear or L-shaped room blocks oriented approximately north-south. These room blocks are one to two rooms deep, with a pit structure or kiva incorporated into the room block or located to its east (Kohler 1990; Steen 1977, 1982; Worman 1967). Sites that exhibit this layout are generally considered to date to the early part of the Coalition period. Although most Coalition period sites are relatively small, some contain up to 200 ground floor rooms (Stuart and Gauthier 1981), and are commonly U-shaped and oriented to the east, enclosing a plaza(s). Generally, large Coalition period sites with enclosed plazas are considered to date to the late part of the period (Steen 1977; Stuart and Gauthier 1981).

A variety of construction techniques was used to build Coalition period surface and subsurface structures. Walls of surface and subsurface structures were built from adobe, with or without rock, masonry, or combinations of these techniques. Adobe construction incorporated unshaped tuff into adobe walls on the Pajarito Plateau (Kohler 1990; Steen 1977, 1982; Steen and Worman 1978; Worman 1967). Masonry walls usually consist of unshaped or cut tuff blocks mortared with adobe and sometimes chinked with small tuff fragments (Kohler 1990). The most common room shape is rectangular, though a few examples of subrectangular and D-shaped rooms have been reported (Kohler 1990; Steen 1977, 1982; Steen and Worman 1978; Worman 1967).

Variety in the size, shape, and depth of pit structures is common during the Coalition period. Circular pit structures are the most common type, followed by subrectangular. Pit structures range in depth from 0.3-2.0 m below ground surface, and they were commonly 3-5 m in diameter. Walls of pit structures were built using the same techniques that have been described for surface rooms. Common floor features include central hearths, upright "deflector" stones, ash-filled pits, ventilator complexes, and four postholes located toward the interior of structures. Other, less common floor features include sipapus, entryways, pot rests, and subfloor pits of various sizes and depths. Ventilators were built by connecting exterior vent shafts to the interior of the structure with a tunnel, though shallow structures were vented by an opening in the wall. Ventilators were most commonly oriented to the east and southeast (Kohler 1990; Steen 1977, 1982; Steen and Worman 1978; Stuart and Gauthier 1981; Stubbs and Stallings 1953; Wendorf and Reed 1955; Worman 1967).

Utility wares most commonly have corrugated, smeared corrugated, or plain exteriors, and more rarely have striated, incised, or tooled exteriors. Decorated white wares include Santa Fe Black-on-white, Galisteo Black-on-white, Wiyo Black-on-white, and very low percentages of Kwahe'e Black-on-white. Few trade wares are reported from Coalition period sites; those that are found tend to be White Mountain Redwares (Kohler 1990; Steen 1977, 1982; Steen and Worman 1978; Worman 1967).

In the Santa Fe area, large villages like the Agua Fria School House Ruin (LA 2), LA 109, LA 117, LA 118, and LA 119 were established early in the Coalition period. Other large sites, such as Pindi (LA 1) and Tsogue (LA 742), seem to have been established during the Late Developmental period and grew rapidly during the Coalition period (Franklin 1992; Stubbs and Stallings 1953). The Coalition period also saw the first establishment of farming villages on the Pajarito Plateau (Crown et al. 1996; Orcutt 1991) and the Galisteo Basin (Lang 1977). The previously unoccupied Chama-Ojo Caliente Valleys also began to be settled during this period, with several small to medium-sized Coalition period villages occurring and often serving as the nucleus for much larger villages occupied during the Classic period (Anschuetz 1998; Beal 1987; Bugé 1978; Hibben 1937; Luebben 1953; Peckham 1981; Wendorf 1953). Unfortunately, the extent of the latter communities is unknown because excavation data are scarce.

*Classic Period*

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

Regional ceramic trends shifted to the use of carbon-painted Biscuit wares in the northern part of this region including the Tewa Basin, northern Pajarito Plateau, and the Chama-Ojo Caliente Valleys. Polychrome glaze wares were dominant in the southern part of the region including the Galisteo Basin and southern Pajarito Plateau. The Santa Fe area was essentially the dividing point for this variation in pottery styles, with Biscuit wares being produced to the north and glaze wares to the south. Although reasons for the appearance and proliferation of glaze-painted pottery are ambiguous, many researchers believe it developed from White Mountain Redwares. Similarities between types in the two regions are viewed as evidence for large-scale immigration into the northern Rio Grande from the Zuñi region and the San Juan Basin (Hewett 1953; Mera 1935, 1940; Reed 1949; Stubbs and Stallings 1953; Wendorf and Reed 1955). Other researchers attribute the changes seen during this period to expanding indigenous populations (Steen 1977) or the arrival of populations from the Jornada Branch of the Mogollon in the south (Schaafsma and Schaafsma 1974).

For whatever reason, this was a time of village reorganization. Older sections of sites like Pindi and Arroyo Hondo were reoccupied (Lang and Scheick 1989; Stubbs and Stallings 1953). Intercommunity changes are also suggested by decreasing kiva to room ratios (Stuart and Gauthier 1981) and the revival of circular subterranean pit structures with an assemblage of floor features reminiscent of the Late Developmental period (Peckham 1984). Clearly defined plaza space and "big kivas" (Peckham 1984:280) suggest social organization that required centrally located communal space, which may have been used to integrate aggregated populations through ritual.

The need for defined communal space may also be related to the introduction of the Kachina Cult into the northern Rio Grande during this period (Adams 1991; Schaafsma and Schaafsma 1974). A shift from geometric designs to masked figures and horned serpents in kiva murals and the occurrence of shield-bearing anthropomorphic rock art figures suggest the acceptance of new ideological concepts (Adams 1991; Dutton 1963; Hayes et al. 1981; Schaafsma 1992). Changes in community structure and settlement patterns during the Classic period may reflect adaptation of the indigenous inhabitants of the region to new populations, ideological elements, and organizational systems.

The process of aggregation into large villages and movement to areas bordering major streams continued through the Classic period in the northern Rio Grande. Population decline began in the early Classic period on the Pajarito Plateau and continued through the middle of the period (Orcutt 1991). Most of the large villages in that area were abandoned by 1550, though some continued to be occupied into the late Classic period between 1550 and 1600 (Orcutt 1991). This population seems to have moved into the Rio Grande Valley, with Keres villages like Santo Domingo and Cochiti claiming affinity with Classic period villages in the southern Pajarito Plateau, and Tewa villages like San Ildefonso and Santa Clara claiming affinity with Classic period villages in the northern Pajarito Plateau.

At least 16 large villages were occupied in the Chama-Ojo Caliente Valleys during the Classic period, and 15 have Tewa names and are considered ancestral to existing villages. This area was abandoned by Pueblos as a residential area by A.D. 1620 at the latest. That population moved into the Rio Grande Valley, either joining with or forming some of the existing Tewa villages. Residents of San Juan Pueblo consider Hupobi, Howiri, and Posi'ouingue to be ancestral (Bandelier 1892:50; Ortiz 1979). Sapawe is also claimed as ancestral by some Tewa (Bandelier 1892:53). Jeançon (1923:76) reports traditions at San Juan and Santa Clara pueblos that mention migration from the Rio Chama Valley to their villages.

Classic period villages also occur in the Tewa Basin. Among the areas studied by Snead (1995) in the northern Rio Grande was a part of the upper Rio Santa Cruz drainage, which contains Classic period villages considered ancestral by the modern village of Nambé (Harrington 1916). The first significant occupation of Snead's (1995) study area was during the late Coalition period, with use of the area continuing into the Classic period. The largest village in this area was K'ate Ouinge (LA 245), which contained between 150 and 200 rooms, and Nambé Bugge (LA 254) contained about 100 rooms (Snead 1995). These villages date to the early Classic period, and Snead (1995:203) notes that this area was eventually abandoned during the Classic period for the more productive Nambé Valley.

By the time the Spanish first entered the Pueblo region in 1540–1542, much of the northern Rio Grande was abandoned or in the process of being abandoned—the Pajarito Plateau by the end of the middle Classic period (Preucel 1987:25), and most of the villages in the Chama-Ojo Caliente valleys. Up to five villages in the latter region may have been occupied into the very early 1600s, but direct evidence of possible early historic period occupations is only known from two of these villages—Tsama and Sapawe (Ellis 1975; Schroeder 1979; Schroeder and Matson 1965). By at least the 1620s the only parts of the northern Rio Grande that were still occupied by Pueblos were the Taos district and the Tewa Basin. Those villages that continued to be occupied were all founded during the Classic period, and represent a continuity of occupation by Tewa and Northern Tiwa groups.

## Historic Period

When the first Spanish explorers arrived in the Southwest the Tewa Basin was inhabited by the northern Tewa group of Pueblo Indians. At least eight pueblos were encountered in the Tewa Basin by the Spanish including San Gabriel (Yungue), San Ildefonso (Powhoge), Santa Clara (Kapo), San Juan (Ohke), Jacona, Tesuque, Nambé, and Cuyamunge. Casteñeda's chronicle of the Coronado expedition of 1540 to 1542 mentions that the people of the province of Yuqueyunque (or Tewa) had ". . . four very strong villages in a rough country, where it was impossible for horses to go" (Winship 1896:137). These villages were not visited by Coronado, and Schroeder (1979:250) believes they were in the Chama Valley and may have included the ancestral Tewa pueblos of Sapawi, Psere, Teewi, Ku, or Tsama. The rough country mentioned by Casteñeda could also have been a reference to the northern Pajarito Plateau, which was also occupied by ancestral Tewas, but since recent research suggests that the large Tewa villages on the Pajarito Plateau were abandoned by the end of the middle Classic period, ca. A.D. 1400 to 1500 (Preucel 1987), this is unlikely.

The next expedition to enter the northern Tewa area and report on it was that of Gaspar Castaño de Sosa in 1590 (Hammond and Rey 1966). While de Sosa's expedition quite clearly explored the Tewa Basin, extant accounts lack sufficient detail to allow determination of the specific villages that were visited.

Documents related to Oñate's colonizing expedition in 1598 provide a confused list of villages in the Tewa area (Hammond and Rey 1953:346). The list seems both incomplete and includes names that are not mentioned for this area by any other expedition. Five of the eight historically known northern Tewa villages are listed including Tesuque (possibly), San Ildefonso, Santa Clara, San Juan, and San Gabriel, as are possible versions of names for Tsirege and Tsama, which are considered ancestral by the Tewa but were abandoned by at least the early 1600s (Schroeder 1979:250). Five other villages are listed for the Tewa district, but their names are suspiciously similar to those of several southern Tiwa pueblos (Schroeder 1979:250). This may represent a clerical error, since these names are not associated with the Tewa in other documents.

Eight villages were occupied by the Tewa in the 1620s, as noted by Fray Alonso de Benavides in his Memorial of 1630 (Ayer 1916). People from other northern Tewa pueblos probably joined these villages, either voluntarily as part of a continuing process of population movement out of the Chama-Ojo Caliente drainages and off the Pajarito Plateau, or because of forced resettlement as part of the Spanish policy of combining villages to make governing them easier. Two Tewa villages—Jacona and Cuyamunge—were abandoned during the Pueblo Revolt of 1696, and were never resettled. The six remaining villages were inhabited through the Spanish period, and continue to exist to the present day, interacting with the European populations that moved into the region.

# PART 2: RESULTS OF TESTING INVESTIGATIONS

# 4
# TESTING AT LA 111333

H. Wolcott Toll

Located 250 m north of the Rio Tesuque on the rolling bottom lands of the valley, LA 111333 as originally recorded is skirted by a small northwest-running drainage on the south and west and by U.S. Highway 84/285 on the east (Fig. 4.1). Just across the highway the county road to the Village of Tesuque joins the highway, giving the site its new name, the Tesuque Y site. At the time of testing the site had mature juniper and piñon trees, scattered chollas, and sparse grasses growing on it. An informal road leading from a Pueblo of Tesuque road ended in a clearing in the trees. The site has been a popular place for passers-by to park, consume beverages, and dump trash. All OAS work was performed within the current right-of-way, which is Pueblo of Tesuque land. Artifacts were kept on Pueblo land and we maintained contact with the Pueblo Council through Council members Milton Herrera and Lieutenant Governor Mark Mitchell. We very much appreciate the cooperation of the Council, the patrolling of the site by tribal law enforcement, and the on-site work of Pueblo member Isaac Herrera.

Testing at LA 111333 took place from August 26 through September 6, 2002. The focus and scope of the testing went through a radical transformation during the course of those two weeks. As described above in the introduction, the features visible from the surface were thought to represent a Coalition to Classic period fieldhouse. This component, appar-

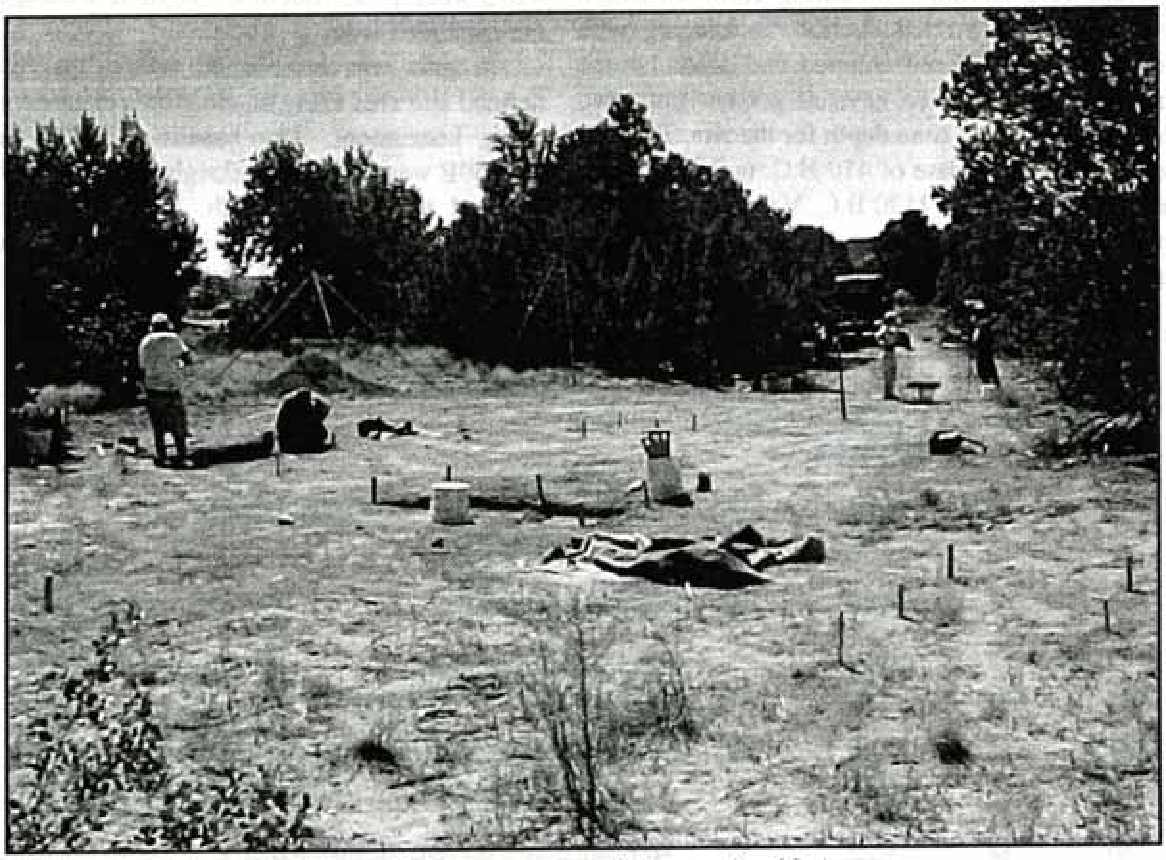


*Figure 4.1. Site area. (Photograph by permission of Tesuque Pueblo.)*

ently small and shallow, had been bladed between the time of survey and testing. Our primary mission, then, was to determine if sufficient portions of the site remained to warrant returning with a data recovery project. As a part of the testing program we were also placing auger tests to search for features not visible from the surface and for deeper deposits. Initially our auger tests were halted at around 1 m, since we still believed the features in question were near the surface. On the second day of testing, however, we began to encounter ash and charcoal-stained sands at greater depth (1.2 to 1.3 m), and commenced augering to at least 1.5 m where possible (though rock is fairly uncommon, gravel lenses frequently halted the progress of auger tests).

The presence of these deep charcoal deposits called for deepening our grid excavations, which we did in areas where the deep deposits had been observed. The expanded tests and deeper augering revealed that there is a considerable occupational level present at this site well below the Pueblo period occupation. Two radiocarbon samples from this stratum were submitted for dating. Both fall within the preceramic, Archaic period, in keeping with only having recovered chipped and ground stone artifacts. Although we have at present only two dates, they suggest time depth for the site. The first result produced a date of 410 B.C. to A.D. 70, the second 1390 B.C. to 1130 B.C. Much of our subsequent effort was directed at determining the extent and nature of this earlier occupation, which is entirely elusive on the surface except where suggested by arroyo cuts. The association of chipped and ground stone artifacts with the stained stratum clearly indicates the cultural nature of the deposit. The artifacts are not abundant, but they are present in four of five locations where we excavated into the layer.

## Field Methods

Testing at the Tesuque Y site comprised two phases. The first phase, directed at testing the possible fieldhouse, was located in an area 25 m in diameter. Within this area, 1-by-1-m test units and regularly spaced auger tests were performed (Tables 4.1–4.2, Fig. 4.2). This area, covered by the testing plan (Boyer and Blinman 2002) for which permits and permissions were initially obtained, we refer to as the primary testing area. When the unexpected deeper cultural deposits were encountered, permission to perform additional auger tests north and south of the original area was obtained. Most of the effort was expended in the primary testing area, but 4 to 5 worker days out of a total of 45 were spent in the expanded area.

A grid was established within the initially defined site area using an electronic distance measuring instrument. The baseline, originating at 50N/50E was tied to a backsight point at 70N/50E, oriented to magnetic north. Several preliminary grids were located with the instrument, and subsequent grids were located both by triangulation with

Table 4.1. LA 111333 Test Excavation Units*

| North | East | Depth (site datum) | Levels | Comments |
|---|---|---|---|---|
| 72 | 45 | 8.70 | 13 | Stratum 3 at 106 cm to 126 cm below surface |
| 65 | 49 | 9.85 | 1 | Stopped at Feature 1 |
| 65 | 50 | 9.90 | 2 | Stopped at Feature 1 |
| 64 | 54 | 10.21 | 2 | Stopped at Feature 4 |
| 63 | 54 | 8.70 | 16 | Stratum 3 104-159 cm below surface |
| 62 | 65 | 9.40 | 15 | Stratum 3 105-144 cm below surface; contained biface |
| 56 | 50 | 9.53 | 7 | Stopped at Feature 3. Stratum 3 52 to 75 cm below surface |
| 50 | 64 | 9.23 | 16 | Abundant alluvial deposits, Stratum 3 absent |

Table 4.2. Auger Tests within Primary Test Area
(Tests are arranged north to south, and, within that order, east to west)

| North | East | Depth cm<br>Surface Elevation | Levels | Comments; Depths from Surface at Test |
|---|---|---|---|---|
| 72 | 44.5 | 260<br>10.02 | 2 | From base of test unit at 130 cm below surface. Fine silty sand with occasional charcoal flecks to 230 cm, then sandier with increased silt last 10 cm |
| 72 | 45 | 178<br>10.02 | 4 | Stratum 1 to 57 cm, Stratum 2 to 110 cm. Stratum 3 from 110 to 132 cm, resting on lighter material with still some charcoal until last 20 cm. |
| 72 | 48 | 145**<br>10.06 | 7 | Stratum 1 with more charcoal than usual around 30 cm, suggesting a feature. Stratum 1 and transition to 2 to 63 cm. Stratum 2 with varying amounts of gravel to 104 cm and pockets of dark soil 104 to 123 cm. Clear Stratum 3 123 cm to 138 cm; rests on cleaner sand, then gravel. |
| 72 | 50 | 100*<br>10.11 | 1 | Loose gray-brown sand; lens of harder sand at 40 cm |
| 69 | 45 | 110**<br>10.02 | 3 | Stratum 1 to 67 cm, Stratum 2 with gravels at 76 cm and increased silt at base; stopped at rock |
| 69 | 50 | 100*<br>10.19 | 2 | Probably terminated in Stratum 2 |
| 69 | 53 | 133**<br>10.33 | 6 | Stratum 1 to 51 cm, lighter, Stratum 2-like sand but with more charcoal at greater depth to 96 cm, cleaner sand with some ash, clumps of orange sand to 110 cm, coarser sand then hints of Stratum 3 123-133 cm; terminates at rock |
| 66 | 53 | 147**<br>10.29 | 7 | Stratum 1 to 58 cm, transition to probable Stratum 2 to 109 cm, increased charcoal at base. Separated by 11 cm cleaner sand from Stratum 3 which extends from 120 to 138 cm. Underlain by 9 cm of cleaner sand, then gravel and coarse sand terminating test. |
| 63 | 45 | 105*<br>10.04 | 5 | Stratum 1 41 cm, transition to sand, gravelly 62 to 77 cm, probably terminates in Stratum 2 |
| 63 | 48 | 98**<br>10.07 | 3 | Stratum 1 to 53 cm, changes to lighter sand (Stratum 2) becomes rocky and impassible at base |
| 63 | 50 | 100*<br>10.16 | 3 | Stratum 1 40 cm, transition to sand, probably terminates in Stratum 2 |
| 63 | 51 | 60*<br>10.23 | 3 | Stratum 1 to 50 cm, sandy silt with gravels, rock impassible at 60 cm |
| 63 | 53 | 169<br>10.27 | 4 | Stratum 1 to 50 cm, Stratum 2 to 111 cm. Increased charcoal, darker Stratum 3 111 to 137 cm; rests on lighter, siltier soil to base. |
| 63 | 54 | 286<br>10.31 | 4 | Extension of test pit, starting at 170 cm below surface, begins at base of Stratum 3 which continues to 181 cm. Clean with increased gravel to 190 cm, some charcoal and clay lens to 286 cm, stops at gravel. |

Table 4.2. Continued.

| North | East | Depth cm Surface Elevation | Levels | Comments; Depths from Surface at Test |
|---|---|---|---|---|
| 63 | 55 | 53** [10.42] | 2 | Stratum 1, looser and sandier toward base; stopped at rock |
| 63 | 57 | 138** 10.54 | 4 | Stratum 1 to 62 cm, two clean sandy units to 120 cm, Stratum 3 120 to 138 cm, sand with charcoal, much darker; rock at base |
| 63 | 60 | 140 10.73 | 6 | Stratum 1 to 74 cm with upper 36 cm more gravel; Stratum 2 to 116 cm with gravels more abundant 74 to 93 cm. Stratum 3 116 to 136 cm; rests on clean stratum. |
| 63 | 66 | 130 10.87 | 5 | Sandy with gravel to 35 cm, Stratum 1 to 72 cm, probable Stratum 2 to 105 cm. Stratum 3 105 to 130 cm; rests on lighter stratum with no charcoal and more gravel |
| 60 | 50 | 80* 10.15 | 3 | Stratum 1 50 cm, transition to sand, probably terminates in Stratum 2 |
| 60 | 53 | 170 10.33 | 4 | Stratum 1 to 64 cm, Stratum 2 to 118 cm, Stratum 3 118 to 130 cm, rests on lighter, siltier layer with gravels. |
| 57 | 50 | 60 10.13 | 3 | Stratum 1 45 cm, transition to sand, terminates at rock and charcoal shown by test to be Feature 2 |
| 57 | 53 | 169 10.35 | 4 | Stratum 1 to 46 cm; Stratum 2 to 116 cm with lithic at 116 cm. Stratum 3, darker with less gravel,116 to 135 cm; rests on lighter silt and gravel stratum. |
| 56.25 | 50.75 | 235 | 6 | Started from base of test pit at 55 cm below surface, adjacent to Features 2-3. Coarse sand and gravel to 73 cm; coarse loose sand, some gravel to112 cm. Slightly gray, finer sand to 129 cm charcoal at base. Fine, clean homogeneous sand, rare charcoal to 215 cm, ending on coarse sand. Some roots even at 235 cm. |
| 56 | 48 | 58** | 2 | Stratum 1 to 40 cm, transitions to sand and stops at rock |
| 56 | 54 | 112** 10.37 | 3 | Stratum 1 to 59 cm, charcoal noted at 48 cm; transition to sand (Stratum 2) with gravels, darker sand, probable Stratum 3 90 to 112 cm, stopping at a rock |
| 56 | 57 | 171 10.64 | 4 | Stratum 1 to 67 cm, Stratum 2 and gravels to 120 cm, dark Stratum 3 120 to 150 cm, resting on lighter soil terminating on gravel |
| 56 | 60.5 | 139** 10.75 | 4 | Stratum 1 to 68 cm, more gravels in top 12 cm, 2 lithics at 26 cm. Probable Stratum 2 is 55 cm thick, underlain by Stratum 3 at 123 to 139 cm. Stops at a rock. |
| 56 | 63 | 136** 10.81 | 5 | Stratum 1 to 64 cm, with top 18 cm gravelly. Sand and gravel 64 to 114 cm (Stratum 2), Stratum 3 darker and more charcoal 114 to 132 cm, underlain by cleaner sand, stopping at a rock |
| 54 | 50 | 10** 9.98 | 1 | Rocky |

Table 4.2. Continued.

| North | East | Depth cm Surface Elevation | Levels | Comments; Depths from Surface at Test |
|---|---|---|---|---|
| 54 | 53 | 14** | 1 | Gravelly Stratum 1 stopped at rock |
| 53 | 63 | 135**<br>10.85 | 3 | Stratum 1 to 55 cm; Stratum 2 to 95 cm, ash noted 75-80 cm, but charcoal absent. Sandier to 135 cm, charcoal sparse and only at top. Stopped at rock. |
| 53 | 66 | 45**<br>11.02 | 1 | Stratum 1 only; lithic recovered at 26 cm |
| 51 | 50 | ** | | Too rocky |
| 50 | 66 | 185<br>11.03 | 4 | Stratum 1 to 50 cm, Stratum 2 to 90 cm. Tan sand with gravels, one piece charcoal at 80 to 145 cm. Charcoal sparse 145 to 185 cm, probable ash at 185 cm. |
| 50 | 63 | 30**<br>10.91 | 1 | Stratum 1, terminated at rock or root. |
| 47 | 66 | 82**<br>10.95 | 2 | Stratum 1 to 46 cm, Stratum 2 to 82 cm, more gravel at 57 cm, all sand at 71 cm |

*Early tests terminated at 1 m
**Tests terminated because of impassible rock

tapes and by resetting the instrument. A number of elevation datums were also established with the instrument, and levels were controlled and recorded using string line levels. The elevation at the site datum was arbitrarily established at 10.00 m. Since the datum is low relative to most of the testing area, most surface elevations are greater than 10.00 m. Elevations range from 11.8 m at the guardrail on the east to 8.7 m at the base of the deepest tests. The site rises from southwest to northeast and from west to east (Fig. 4.2).

All of the test units were excavated by hand in 10-cm arbitrary levels. All material was screened through quarter-inch mesh. Records were kept for each excavation level. Features were mapped, and profiles were drawn as well as photographed in both film and digital formats.

Augering was performed using 70 and 85-mm-diameter augers with maximum potential depths of around 185 cm. Except for augering in the north area on the final day of testing, the larger diameter auger was used. The augered materials were all screened through eighth-inch mesh, and changes in consistency and color were recorded by measuring the test depth when changes became apparent. Each auger test was marked with flagging tape extending the total depth of the hole.

Test placement was based on surface indications and then auger indications, with an eye to maximizing coverage of the site area as originally defined and permitted. Auger test placement was also designed to give extensive coverage, with the general aim of systematic placement at 3-m intervals. Tree coverage, irregular surfaces, drainage location, and ant colonies affected auger test locations to some degree.

Mapping was performed with an EDM. Most points were plotted from Datum A, 50N/50E, on three different setups. The backsight point, 70N/50E, was also used to locate points behind the considerable vegetation present at the time of testing.

## Strata Defined

Especially within the primary testing area, there is a consistent series of strata used in the subsequent unit descriptions. There are, of course, variations within these units across space, but we felt confident in their identification in most locations.

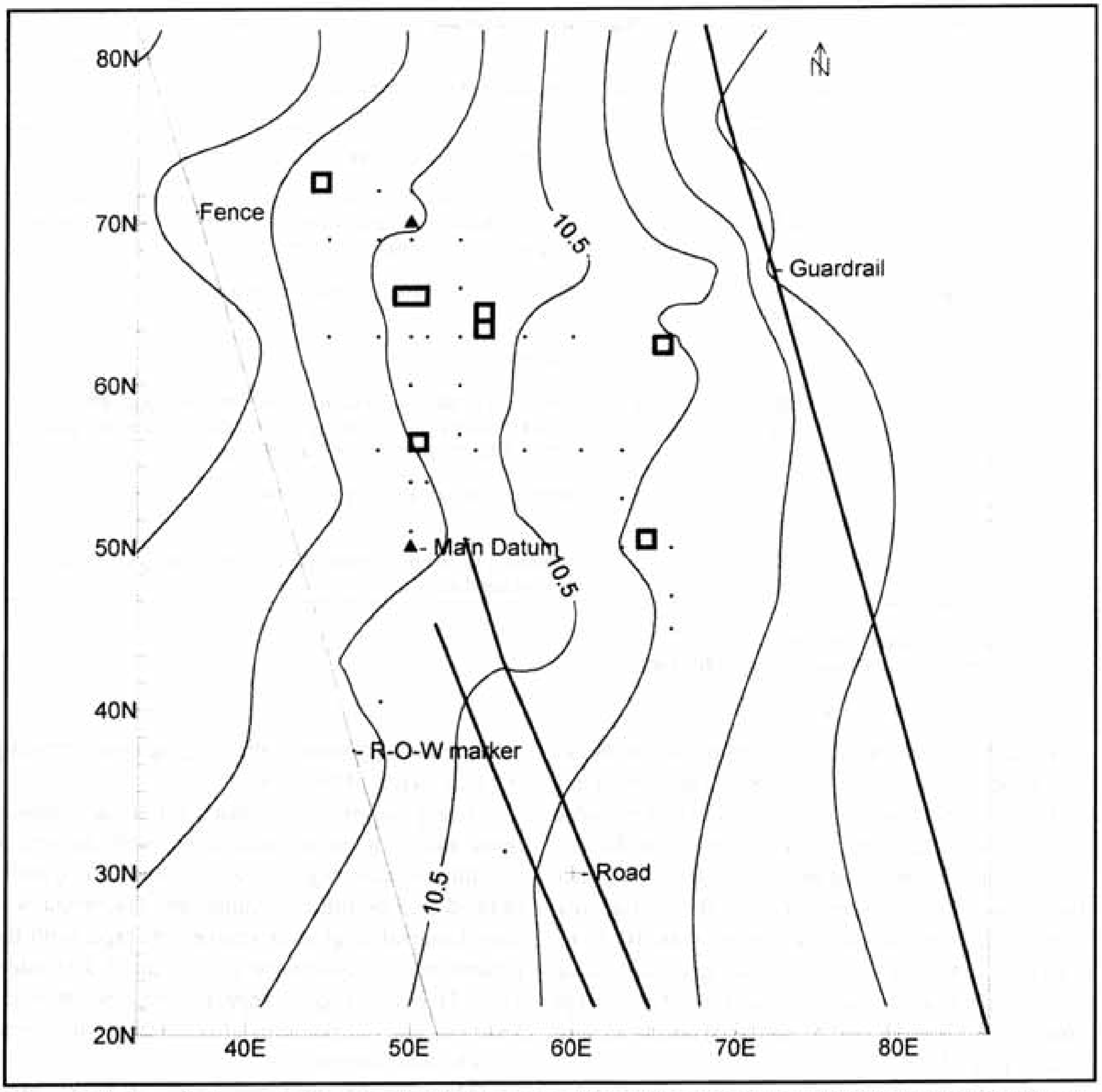



*Figure 4.2. Plan of primary testing area showing test excavations units and auger tests. Contour interval is 50 cm.*

*Stratum 1*

A dark brown (10YR 5/3), blocky stratum with a high clay content, this layer covers the site area outside the washes. It is homogeneous, and it was not possible to find structure within it. Rock, gravel, and charcoal content are all low. Roots seem to be more abundant toward the top of the stratum, though rootlets are present throughout. Compared to other strata here, this layer was difficult to screen, as it forms hard, cohesive clumps. Stratum 1 seems likely to be alluvial in origin, perhaps through low energy flooding in a backwater situation. The homogeneity and massiveness of the deposit are somewhat hard to explain. The Pueblo component of the site is within this stratum. In the excavated test units, Stratum 1 ranges from 30 to 75 cm thick, with the thickest deposits to the east, the thinnest, in 57N/50E, closest to the northwest-trending arroyo along the south and west edges of the testing area.

*Stratum 2*

Usually directly below Stratum 1, Stratum 2 is sandier and much lighter colored (10YR 6/3). It is also homogeneous, although clay laminations are present. It contains charcoal, which may be more visible because of the lighter color and more friable nature of the stratum. Excavated profiles show this stratum to be to 50-cm thick.

*Stratum 3*

Gray and sandy and containing artifacts, this stratum became the object of extensive searching. The appearance of this stratum is sufficiently distinctive as to be readily recognized in auger tests. The thickest exposure of this layer was in the test at 63N/54E, where it is 56-cm thick. This section shows that the stratum can have variable amounts of charcoal and ash in it, and that artifacts seem to be most common toward its base.

*Stratum 4*

Stratum 4 is an alluvial unit consisting of fine yellowish sand (10YR 6/4), small and sparse calcium carbonate and charcoal, and around a fifth gravels. It was defined at maximum test unit depths and in the test unit at the southeast portion of the primary testing area..

*Stratum A*

Also an alluvial deposit, this unit is characterized by abundant gravels and coarse sands. The gravels rarely exceed 10 cm in maximum dimension.

## The Pueblo Component

Traces of this component were remarkably sparse. Boyer and Moore recall that there was a small mound in this location before the area was bladed. We began our testing at two concentrations of cobbles which showed possible alignment. Both of these concentrations crossed grid lines, and were sufficiently ambiguous that we expanded each 1-by-1-m unit into a 2-by-1-m unit, keeping materials from the individual grids separate. Each of these areas contained a feature, though neither contained many artifacts. The rock concentrations probably represent the lowest vestiges of the feature represented by the mound.

*Test at 63–64N/54E*

The surface manifestations at this location were the most suggestive of a feature. The most rock was showing here, and it was confined to a small area. We began by excavating two 10-cm levels in 63N/54E. This process revealed a mostly jumbled concentration of rock with no apparent burning and little associated charcoal. There were, however, several rocks that appeared to be possibly set on edge and possibly aligned. To search for continuation of this pattern to determine the presence of a feature, the test was extended north into 64N/54E. Although we concluded that there was no intentional arrangement of the rock, its concentration and its location in an apparent shallow basin led us to label it Feature 4 (see Fig. 4.3).

**Feature 4.** We dissected one-half to two-thirds of this feature as definable from the surface in an effort to determine its function. In section (Fig. 4.3) the rock appears to be located in a basin around 80 cm in north-south diameter, by perhaps 100 cm east-west. The 28 rocks removed from the excavation are mostly (n=17) pinkish waterworn granite. Other rock includes three pieces of whitish waterworn granitic material, two pieces of a gray metamorphic material, a white cobble, and five pieces or probable fire-cracked rock. The rocks range in size from 6 to 14 cm in maximum dimension. All could have been outwash from the Sangre de Cristo Mountains, gathered from the Rio Tesuque. The most important aspects of them are that they were gathered and that some seem to be fire-altered. Although a few of the rocks could have been placed on edge, we were unable to detect any patterning in the placement of the rock. It is possible that this rock concentration represents the base of a wall or possibly a thermal feature.

*Test at 65N/49–50E*

Although there was less rock present on the surface at this location it also stood out as a possible location of activity on the scraped surface of the site. This rock concentration is about 4 m from the larg-

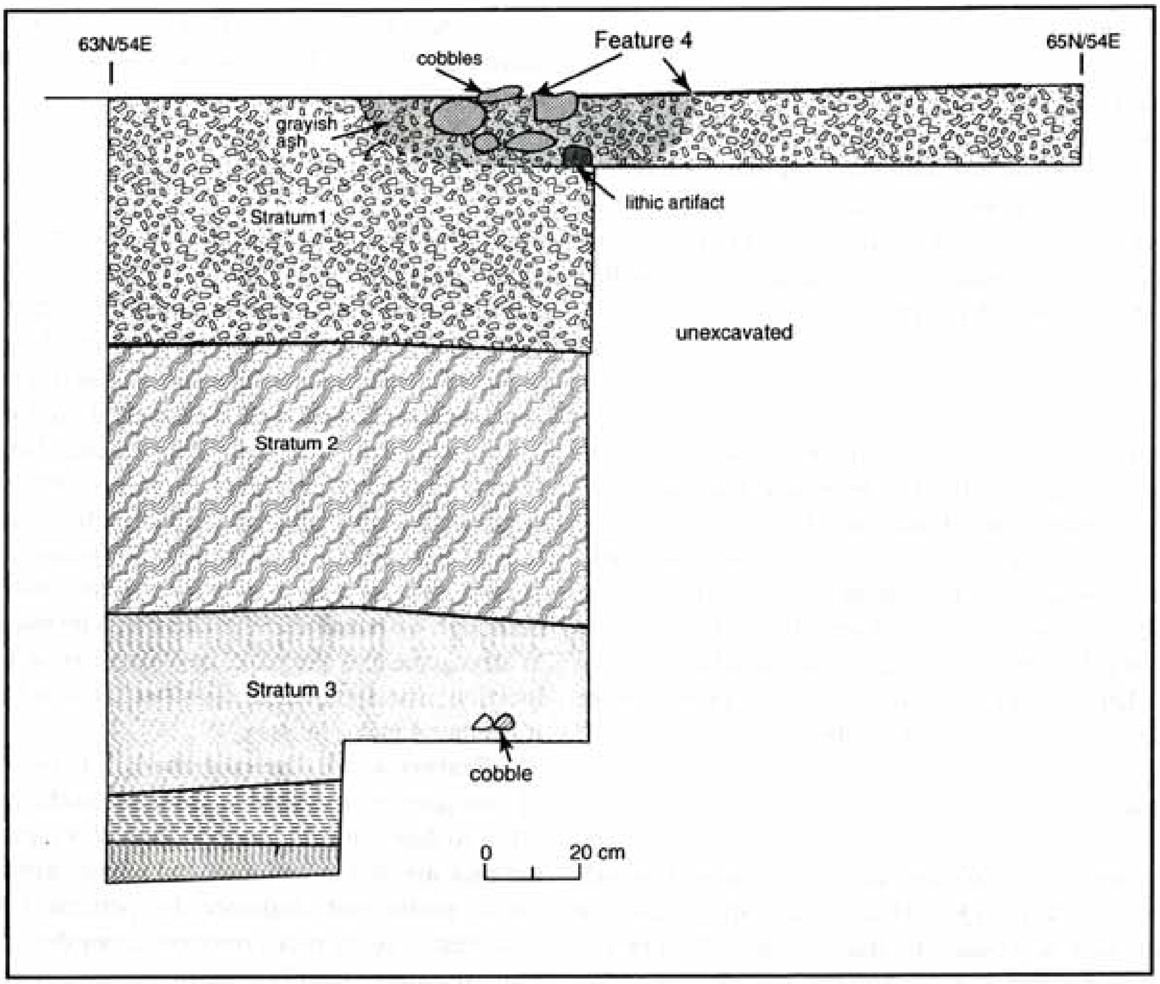



*Figure 4.3. Profile along 54E, from 63N to 65N, showing Feature 4. This profile shows the stratigraphic reltionship between the Pueblo component, Feature 4, at the top of the section, and the Aceramic component, Stratum 3, at the base of the section, as well as the variability within Stratum 3.*

er one, making it quite conceivable that they could be parts of the same small structure. Excavation proceeded by first clearing two levels from 65N/50E, which exposed rock sitting on a gray stained surface along the 50E line, at around 15 cm below the ground surface (9.90 m in relation to site datum). The ambiguous nature of the rock and surface induced us to clear the square meter adjacent to the west (65N/49E). The gray surface does extend into the next grid and more rock is associated. This material was designated Feature 1.

**Feature 1.** There are seven irregular rocks associated with this feature in the portion exposed by excavation. These rocks rest on the stained surface. They are present within an oval area, but do not seem to be formally placed (Fig. 4.4). Rock is not abundant in this soil (Stratum 1), and it is probable that they were brought here by the inhabitants of the site, though their placement does little to suggest the function of the feature. The northern one-third (more or less) of this feature remains in the unexcavated area north of 66N. We took no samples from the portion that we cleared, and the feature should be fully cleared and sampled during data recovery.

### The Aceramic Component

The unexpected presence of this component and its apparent extent was cause for considerable excitement and wonderment. It is obviously well below the Pueblo component, but it is in a location where

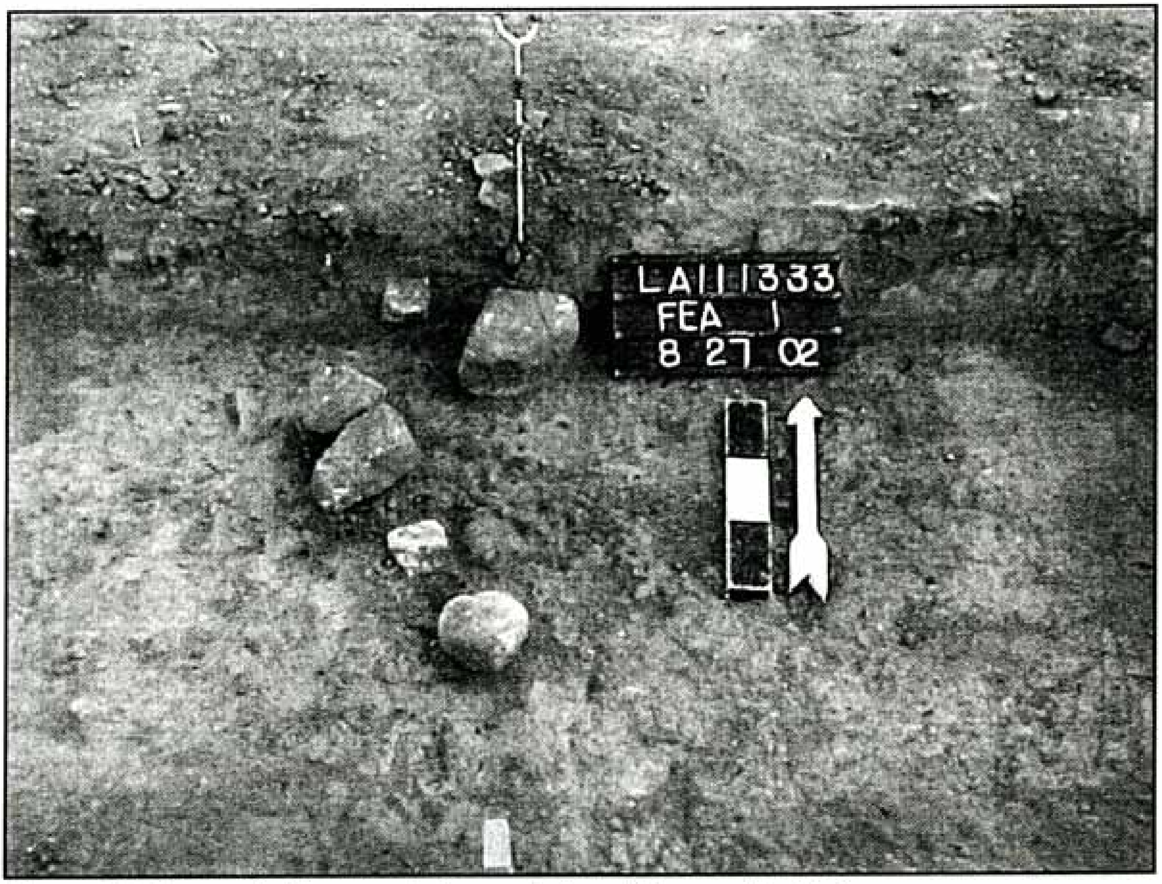



*Figure 4.4. Feature 1. (Photograph by permission of Tesuque Pueblo.)*

rapid deposition is to be expected. It contained no ceramics, and the artifact counts were small. It could therefore fall anywhere from a slightly earlier Pueblo period to thousands of years old. The one formal artifact, an obsidian biface (see Fig. 4.11), was not a diagnostic form, although Moore suggested it may be an incomplete En Medio point, which dates from around 800 B.C. to A.D. 200. Placement by absolute date therefore became quite critical to starting to understand the deposit. With permission of the Pueblo of Tesuque Council, two samples were submitted to Beta Analytic for rapid turnaround dating. The first of these, from Feature 3 returned a date of 410 B.C. to A.D. 70 (95 percent confidence level) making a good case for the early deposits at LA 111333 being Late Archaic in age. The second date is even earlier. It comes from a deeper stratigraphic position, at the lowest known point of the charcoal-bearing deposit, and dates around 1,000 years earlier: 1390 to 1130 B.C. (Also 95 percent confidence level). Although two dates are only an indication, they show that early occupations of considerable duration are likely.

*Test at 56N/50E*

Charcoal and rock were encountered in an auger test at 57N/50E about 60 cm below the ground surface. Because this was one of two early indications of an occupation below the "fieldhouse" level, we placed a 1-by-1-m test in this area. The unit is near the southeast-northwest flowing wash that defined the southern edge of the site. The surface is therefore somewhat lower than the units to the north, northeast, and east, and the surface of the unit inclined.

Excavation proceeded through three 10-cm levels in Stratum 1 and two in Stratum 2. A single lithic was recovered from the top level of Stratum 1. The remaining four levels in Stratum 1 and Stratum 2 contained no artifacts. Charcoal was absent in Stratum 1, sparse in Stratum 2. At the base of Level 5 (9.76 m by site datum) charcoal and rock began to appear in the level, indicating the beginning of

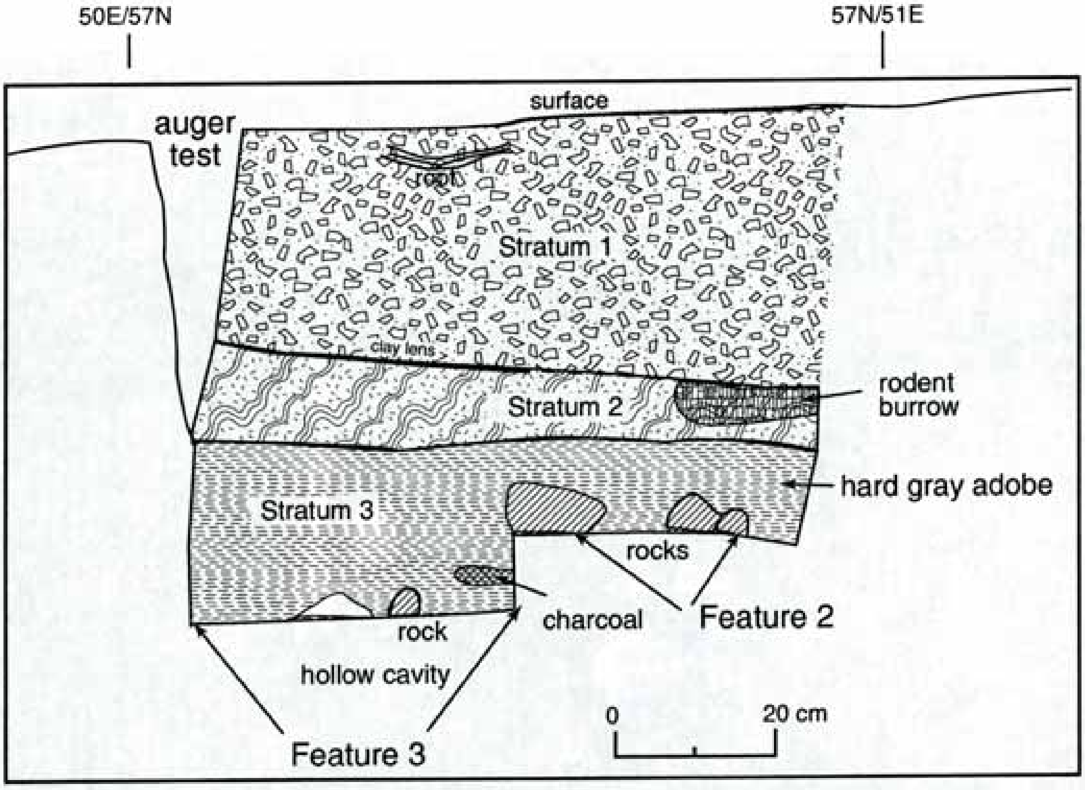



*Figure 4.5. Profile of 57N at 50E showing Features 2 and 3.*


*Figure 4.6. Features 2 and 3, profile of 57N. (By permission of Tesuque Pueblo.)*

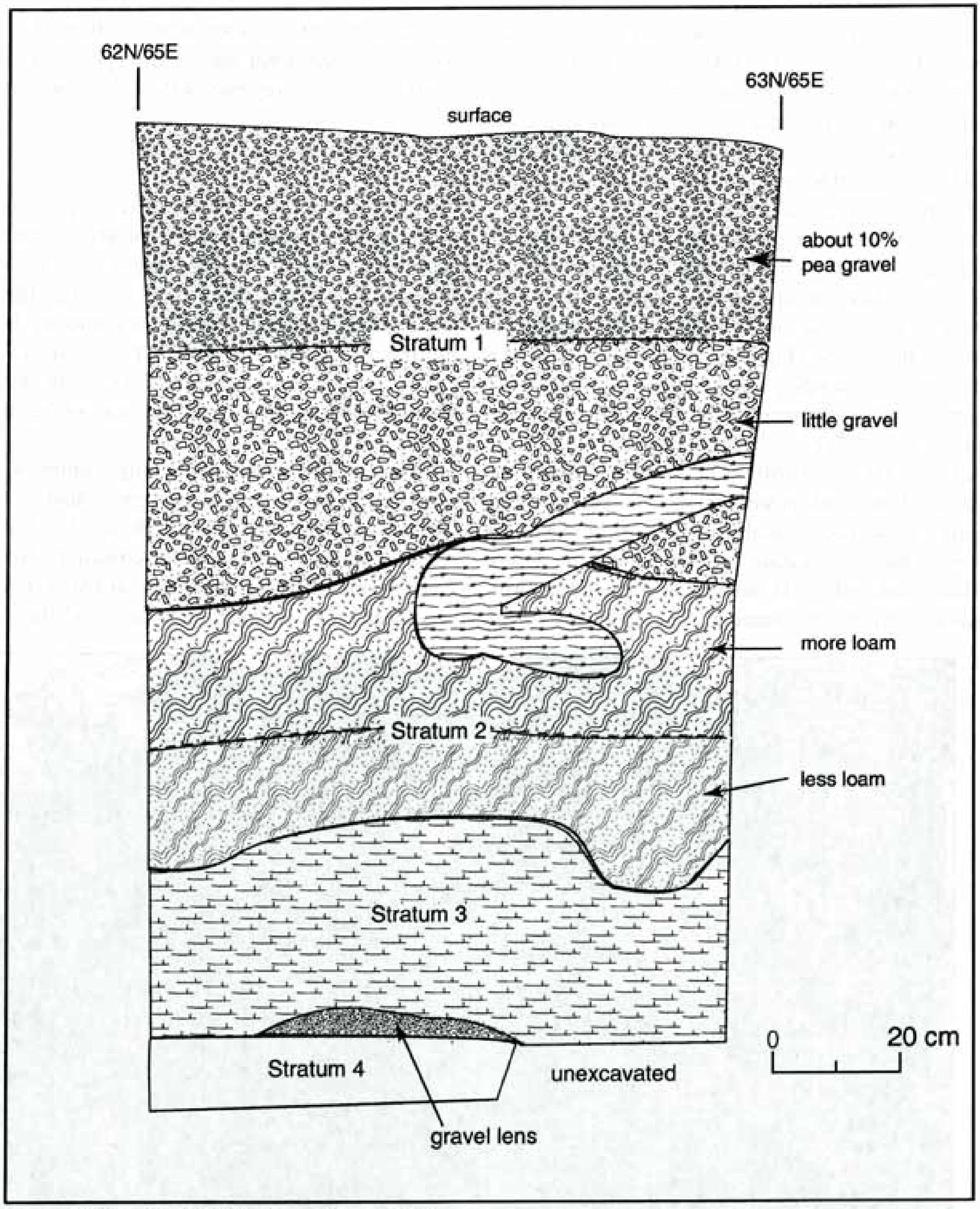



*Figure 4.7. Profile of 65E between 62 and 63N.*

Stratum 3, especially in the northeast corner of the grid (Figs. 4.5, 4.6). These materials were termed Feature 2. In order not to disturb Feature 2, a 40-by-40-cm window was excavated in the northwest corner of the grid. Separated by only about 4 cm vertically, denser charcoal and further rock were exposed by the window. This material was called Feature 3. At the level of Feature 2 an additional fire-spalled rock was present in the southwest corner of the grid, and charcoal and ash staining were present across the grid.

**Feature 2.** This feature was exposed primarily in the profile on 57N and was not fully excavated. The feature consists of six rocks within a 30 (east-west) by 40 cm area. At least three of the rocks seem to be joined by a hard, gray adobe material, which may be oxidized, though it is not reddened. One of the rocks is fire-cracked. Considerable charcoal is associated with the feature, though it was insufficient for a radiocarbon sample.

**Feature 3.** Immediately below Feature 2, Feature 3 consisted of four small rocks more or less in a row. They rest on a heavily stained surface with abundant charcoal on both sides of the alignment and in the profile (Fig. 4.6). Enough charcoal was present for a sample, which gave a calibrated two-sigma (that is, 95 percent probability of being within the living date of the tree) date of 410 B.C. to A.D. 70 (Beta-170390). The wood providing the charcoal was oak (*Quercus* sp.), a species rarely found in archaeological contexts in the Santa Fe area. Oak is abundant in the Sangre de Cristo Mountains and could have been gathered as driftwood from the Rio Tesuque. The durability of oak wood and the possible driftwood source increase the chances that this specimen was burned as "old wood," but the great age of the specimen allows confidence that it represents the era of the deposit.

*Test at 63N/54E*

This grid had been excavated to investigate Feature 4 in the Pueblo component (see above) and was adjacent to one of the first auger tests in which Stratum 3 had been detected (63N/57E). Through use of a window in the southwest corner of the test pit, this test eventually revealed a profile 157 cm below present ground surface (8.70 m by site datum) and was the largest exposure of Stratum 3 (see Fig. 4.3).

Beneath the levels containing Feature 4, four more levels of Stratum 1 were excavated, none of which contained artifacts. At 50 cm bgs the soil changed to the sandy, charcoal-containing Stratum 2, six levels of which contained no artifacts. There is a clear break between Stratum 2 and the higher

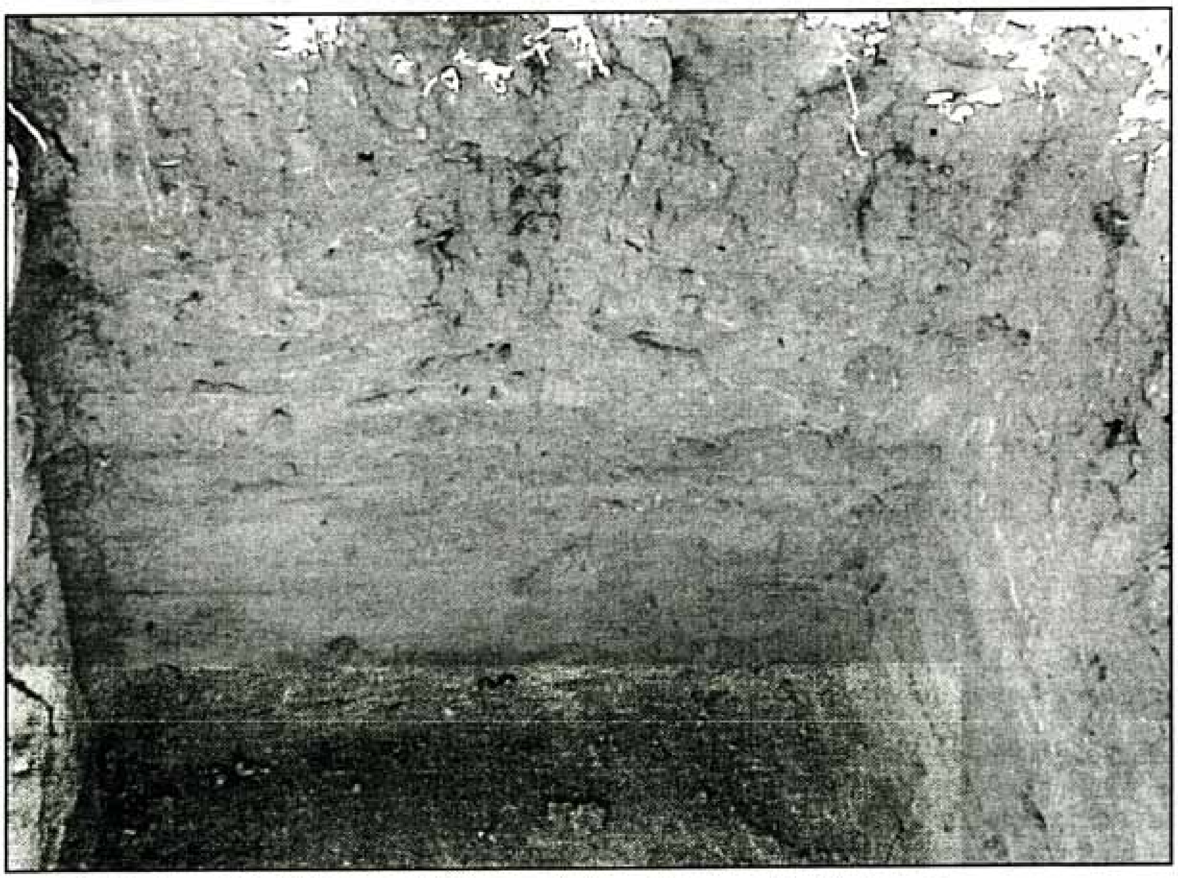


*Figure 4.8. South profile of 72N at 44E. (By permission of Tesuque Pueblo.)*

charcoal content of Stratum 3, which was excavated as a stratigraphic unit subdivided into four 10-cm levels. Differences in quantities of charcoal were clearly visible within Stratum 3 (Fig. 4.3), though all parts of the stratum were sufficiently stained to qualify as Stratum 3. The uppermost level contained a single lithic; a possible ground stone tool is present in the balk at the southeast corner (exposed portion is 11-by-8-by-5 cm, left in situ). The second and third levels contained no artifacts, but the third level (8.90 to 8.80 m by site datum) contained a relatively large piece of piñon wood charcoal (2.1 g), which returned our second radiocarbon date. This date is earlier, but has a smaller error than the oak date: 1390 to 1130 B.C. (Beta-170391). In profile, the bottom level has the most charcoal within the stratum, and also contained two obsidian flakes. Some lamination is apparent in the lowest 20 cm of the stratum. The depth and complexity of Stratum 3 in this unit suggest that it represents serial occupations. It is in the same relative stratigraphic position as the other dated specimen, but in terms of site elevation, it is 70 to 80 cm lower. Unfortunately, some rodent activity is apparent, but it has probably not affected deposits severely enough to endanger our basic interpretation.

*Test at 62N/65E*

Because the charcoal-stained deposit was still present at this location close to the eastern limit of the primary testing area near the base of the highway prism, we placed a test here to expand our lateral coverage of the stratum.

The stratigraphic sequence at the east edge of the site area is consistent with the other units north of the 60N line. Thus, Stratum 1 is 60–70-cm thick; the excavators noted that the upper half of the stratum contained pea-sized gravels, while the lower portion contained little gravel. Stratum 2 showed a gradation from loamier at the top to sandier at the base. A substantial rodent burrow was present across the juncture of Stratum 1 and 2. Stratum 3 is clearly visible as containing much more charcoal, and ranges from 25 to 30 cm thick in profile (Fig. 4.7). Remarkably, the only artifact from the entire test unit is an obsidian biface from within Stratum 3, located in the southwest quadrant of the grid at 9.69 m by site datum (about 120 cm below surface, see Fig. 4.11). In this case the artifact came from within the center of the stratum rather than toward its base as was the case in 63N/54E. A $^{14}C$ sample was collected from the same level within Stratum 3. Though small enough to require special processing to date, the OAS ethnobotany laboratory was able to identify the wood species. Notably, this sample was also oak, as was that recovered from Grid 56N/50E, 16 m away but within 12 vertical centimeters (9.65 and 9.53 m by site datum). The occurrence of this rarely found species in both of these units suggests they are from the same occupation. The layer at the base of the window is composed of sand and gravels and contains only sparse charcoal.

*Test at 72N/44E*

This unit is located at the extreme northwest of the originally defined testing area, with the southeast-northwest drainage dropping away just to the west and the heavily vegetated drainage from the highway culvert just to the north. Though at the edge of the site area, the surface of this unit was nearly level at the beginning of excavation. Among the tests, this unit produced the most artifacts.

The top 50–60 cm here are the usual dark brown clayey Stratum 1, though a sherd and a lithic were present in the first 10 cm level. Stratum 1 contained no further artifacts in the underlying five levels. There is then a transition to the sandy Stratum 2, which here contains two lenses of fine gravel indicating small washes (Fig. 4.8). Unlike all other samples of Stratum 2, however, the two levels at the base of the layer each produced two artifacts, including a Biscuit ware bowl rim at 9.10 to 9.00 m site elevation, over 1 m below surface. A sizable sherd at this depth is anomalous. Considerable rodent activity was present in this unit, which may explain the presence of the sherd, although it was not observed to be in a filled burrow. In this same level a very small piece of calcined animal bone was also present. The bone and the three flakes in this and the level below are more easily explained as rodent introductions, but the presence of artifacts in Stratum 2 does raise the possibility that it, too, has cultural significance and that it may be surprisingly late given the date from Stratum 3. I suspect that these artifacts were introduced through distur-

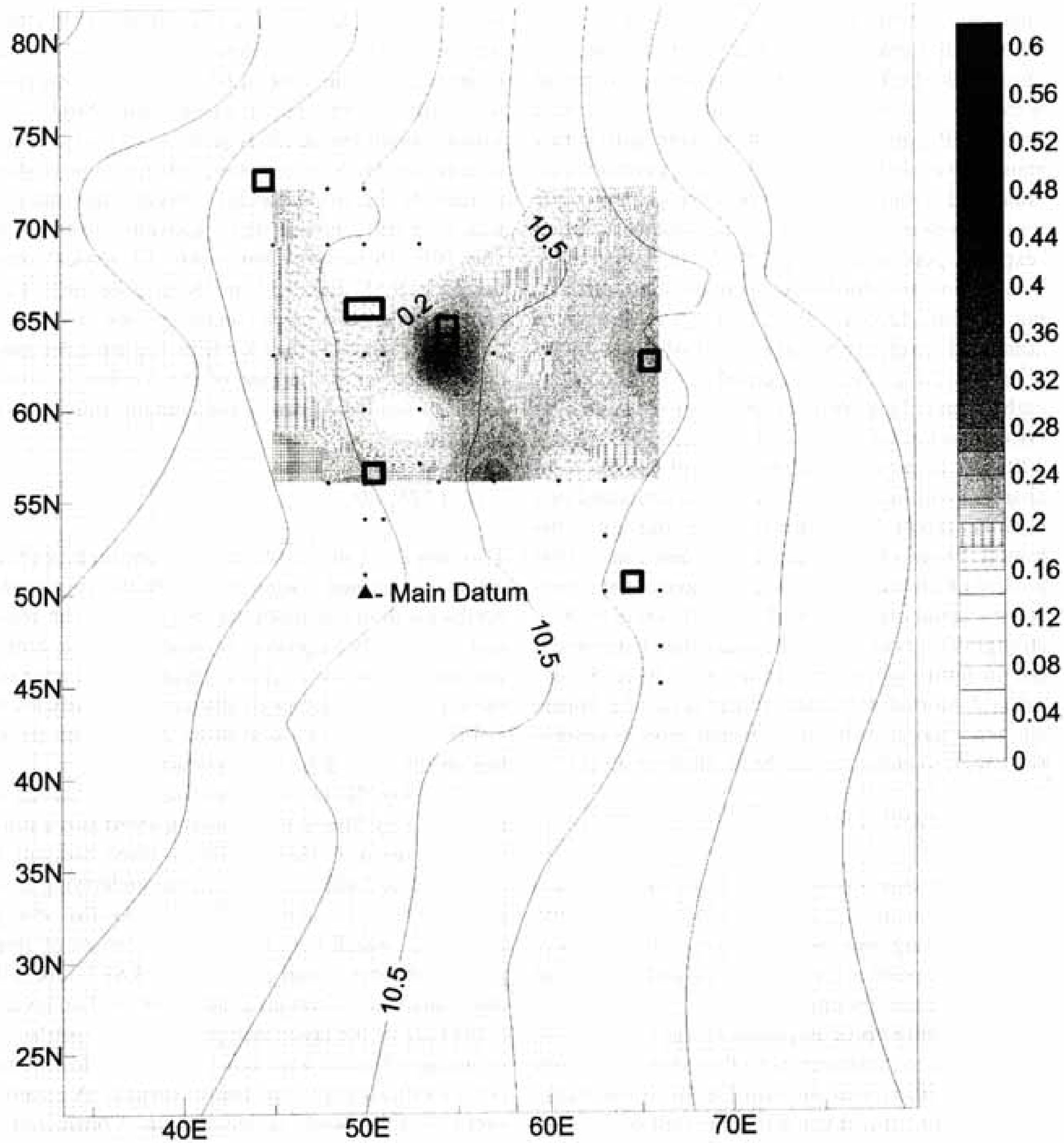



*Figure 4.9. Thicknesses of Stratum 3 in primary testing area. Scale is in centimeters of thickness.*

bance, but cannot prove it. The sherd must have come from above, but the presence of a number of flakes in Stratum 3 makes it the proximate source for lithics if they were in fact introduced.

Stratum 3 in this unit is 16- to 20-cm thick; it was excavated as a stratigraphic rather than arbitrary unit (Fig. 4.8). Two levels were excavated within the stratum. The first of these contained nine flakes and a piece of ground and burned stone, and a piece of fire-cracked rock. The ground stone was not clearly a grinding tool, but was definitely modified. The lower of the two levels also contained nine lithics. Carbon-14 and flotation samples were taken from Stratum 3 as well, but have not been analyzed. Rodent activity is further in evidence, but the concentration of artifacts indicates that they are from this stratum. Soil beneath Stratum 3 reverts to lighter and less stained sand.

*Test at 50N/64E*

The south edge of the originally defined site area was less known and more difficult to access than the area around the Pueblo features reported by the survey. This area, visible in the left background of Figure 4.1, supports a number of piñon and juniper trees and some cholla, and the southern limit of the wash runs through the area. Six auger tests were placed in this area and traces of the cultural stratum were present at 56N/63E, 50N/66E and 53N/63E. This unit was placed to expand our coverage into this area, and examine whether Stratum 3 was fading out to the southeast.

The stratigraphy in this test is distinctive from the other three deep tests. As with the rest of the primary testing area, it is capped with Stratum 1, which reaches 70 cm in thickness here, thicker than in the other tests. Below Stratum 1 there are up to 52 cm of fluvial deposit consisting of sands and gravels, including numerous cobbles and concentration of cobbles, all looking very much like a stream deposit. Charcoal is practically absent from this "Stratum A." Underlying this unit the more familiar Stratum 2 is around 44 cm thick, consisting of much finer sand and rare flecks of charcoal throughout. In the 40-by-50-cm window in the southwest corner at the base of our test, the stream deposit reappears at 170 cm below the surface. No artifacts were encountered in this test, and the quantity of charcoal was very low. This test suggests that the occupation level does not extend into this area. No artifacts were encountered in this test.

## Augering

*Primary Testing Area*

Since structural features tend to be at least 4 m in diameter, several auger transects with tests spaced at 3 m were performed within the initially defined site area (Fig. 4.2). Coverage at 3 m intervals was not complete: some tests are more closely spaced and some tests did not reach the desired depth because of blockage by rock. Auger test results within the primary testing area are tabulated in Table 4.2.

The consistency of Stratum 1 outside the drainages is clearly demonstrated by these tests. The frequency with which tests encountered impassible gravels and rock illustrates that though rock is generally scarce in all columns, small channels are common. At depths of more than 40 cm it does not take a very large rock to stop an auger hole, and a rock 3-4 cm across in a gravel lens will do so. As noted, early in the work at the site, before the earlier component was recognized, several tests were halted at 1 m, a depth clearly below the Pueblo component. Rock-halted and arbitrarily stopped tests are noted in Table 4.2. These various problems notwithstanding, the auger tests did a remarkable job of indicating that an earlier component is present, radically changing the complexion of the site.

Figure 4.9 indicates where Stratum 3 is present. Its appearance is remarkably consistent between 120 and 140 cm below the current surface except near the drainage defining the south and west sides of the testing area where it is closer to the surface.

In addition to the presence of Stratum 3, there are some auger results that should be considered during data recovery. The test at 69N/53E showed 45 cm (51 to 96 cm below surface) of material similar to Stratum 2 except for notably more charcoal and ashy pockets. This unit was not noted elsewhere; it is also shallower than Stratum 3 in other locations. This test could indicate an occupation intermediary to Strata 1 and 3, and its localization suggests a feature of some sort. Though not as well defined as in some locations, a 10-cm section of material like Stratum 3 is present at the base of this test, below the possible intermediary material.

Another possible feature is suggested by more charcoal than usual in Stratum 1 at the north edge of the main test area, 72N /48E. This deposit is around 6 m from Feature 1, and could represent a feature within the Pueblo component. The charcoal deposit was noted at around 30 cm below present surface, which corresponds to the depths of Features 1 and 4.

There are a few tentative indications that cultural deposits may occur at greater depths, such as the deep auger test at 56.25N/50.75E. These can be properly assessed only with deeper trenching.

*Expanded Auger Testing Area*

With the invisibility of Stratum 3 on the surface and the imminent construction plans at this location, the

Table 4.3. LA 111333 Auger Tests in Expanded Test Areas

| Auger Test | Depth (cm) | Levels | Comments |
|---|---|---|---|
| South Area | | | |
| A 31.30N/ 55.82E | 116** 10.77 | 3 | Glass to 30 cm, charcoal to 50 cm, change to sand and much gravel at 60 cm; similar to Stratum 2 92 to 100 cm, increasing to all gravel |
| B 40.50N/ 48.16E | 147** 10.27 | 3 | Stratum 1 with many pebbles to 65 cm, Stratum 2-like with some charcoal in fine sand but still many pebbles 65-140 cm; increased rock and coarse sand, stopped at rock |
| #1 | 70** | 3 | Trash and gravel overburden to 23 cm, Stratum 1 to 50 cm, coarse to medium sand with gravel and cobbles, stopped at rock |
| #2 | 20** | 1 | Stratum 1, stopped at rock |
| #3 | 112** | 4 | Sandy to 26 cm, more compact with some charcoal to 86 cm, 8 cm of Stratum 3: dark gray with charcoal 86 to 94 cm, resting on brown sand with gravel. |
| #4 | 112** | 3 | Loose sandy topsoil to 30 cm, Stratum 1 to 49 cm, darker with some charcoal. Coarse, gravelly sand to termination at rock. |
| #5 | 110** | 4 | Loose brown topsoil to 15 cm changing to consolidated with gravels to 50 cm; light brown fine grained sandy to 67 cm; 67 to 100 cm "slightly dirty;" charcoal; last 20 cm less or no charcoal but soil remains dark Bottom 10 cm lighter with gravels, stopped at rock. |
| #6 | 105** | 4 | Stratum 1 to 81 cm grading to lighter; loose top 37 cm some charcoal and much gravel; 81 to 100 cm charcoal-bearing, grades to darker toward base. Gravelly 100-105 cm, terminated. |
| #7 | 120** | 2 | Brown topsoil to 50 cm, loose for first 15 cm. Lighter brown, finer grain, some gravel 50 to 120 cm. One piece of charcoal observed at 80 cm. |
| #8 | 110** | 2 | Brown topsoil with much rock to 58 cm, changing to light brown sandy fill with gravel and no charcoal |
| #9 | 105 | 2 | Loose sandy silt brown topsoil with gravels and rock to58 cm; lighter with more gravel, and even more below 80 cm. Single piece of charcoal 63 cm. |
| #10 | 127 | 2 | Brown, sandy loam with no charcoal to 85 cm, light tan sand with some gravel and sparse charcoal to base |
| #11 | 95** | 2 | Loose brown silty sandy loam with gravels to 70 cm; lighter with more gravels and a few charcoal flecks at 80 cm; stopped at rock |
| #12 | 150 | 4 | Loose brown sandy loam to 80 cm, tan with gravel and some charcoal to 88 cm; darker tan to brown with clay and very sparse charcoal to 102 cm; brown fine sand to silt at base |
| #13 | 100** | 2 | Loose silty, sandy loam with gravels to 60 cm; lighter with more gravels until 80 cm then darker but no charcoal. |
| #14 | 108 | 3 | Loose brown sandy loam with gravel to 62 cm; tan fine sand to 82 cm; dark brown fine sand to base. |

Table 4.3. Continued.

| Auger Test | Depth (cm) | Levels | Comments |
|---|---|---|---|
| North Area | | | |
| #16 | 114** | 4 | Loose brown clayey silty sand to 34 cm, increasingly clay after 17 cm; blocky brown clay to 51 cm; lighter color increasingly dirty to 90 cm; lighter still, with charcoal at 100 cm, rock at 114 cm |
| #17 | 184 | 6 | Very dark similar to Stratum 1 with organics to 70 cm; 70 to 120 cm lighter than clayey overburden, with increase in charcoal; 120 to 131 cm lighter still, contained 4 very small obsidian flakes. More gravel and yet lighter to 156 cm; fine sand with a few gray pockets, mostly clean to 180 cm. Hint of gray Stratum 3-like soil, with some pockets of gray above; not fully viewed 180 to 184 cm. |
| #18 | 184 | 6 | Loose brown sandy, silty loam to 30 cm; dark brown Stratum 1-like clay with no rock to 85 cm. Less well consolidated, light brown clay small charcoal and carbonate flecks to 115 cm. Tan clay with fine grained sand to 152 cm, brown sandy loam with sparse charcoal and carbonate-like Stratum 2 to 170 cm; tan clay with fine sand or silt to base |
| #19 | 186 | 6 | Loose brown sandy silty sand loam to 40 cm clayey after 33 cm; Stratum 1 consolidated clay to 102 cm small charcoal at 69 cm. Light brown to tan clay increasing sand with depth, no charcoal to 156 cm. Clay lens 156-165 cm; tan silty soil with two pieces of charcoal, one large enough to collect for dating 165 to 184 cm |
| #20 | 188 | 5 | Dark Stratum 1 to 45 cm; mixed dark and lighter clay with rare charcoal flecks to 110 cm. Lighter, and increasingly sandy, but still very clayey, minimal charcoal to 132 cm. Sandier and more pebbles, sometimes quite sandy to 169 cm. Very dark gray with some charcoal; like Stratum 3 mixed with sand 169 to 188 cm |
| #21 | 186 | 6 | Loose brown silty loam to 25 cm changing to dark brown blocky clay to 53 cm; clay becomes lighter to 71 cm where there is one piece of charcoal. Clayey soil containing charcoal and possibly burnt soil; has fill-like appearance with carbonate mixed with other material. Becomes lighter with varying charcoal content, becoming densest toward base. Identified as feature 71 to 158 cm. Tan silt with occasional charcoal and no rock to 181 cm; transitions to brown silt without charcoal. |
| #22 | 185 | 4 | Dark brown clay with rare charcoal to 64 cm; changes to lighter clay mixed with dark, not much charcoal to 108 cm. Tan sand to 170 cm. Dark gray fine sand (could be Stratum 3), ending on clean sand 170 cm to 185 cm |

184-188 cm is the depth limit for these augers
**Tests terminated because of impassible rock

Pueblo of Tesuque, the New Mexico State Highway and Transportation Department, the Historic Preservation Division, and the Office of Archaeological Studies were in agreement that further auger testing should take place on both ends of the site as originally defined. Consequently, we entered a second phase of testing by placing auger tests in areas south and north of the primary testing area. These tests were limited in scope, designed to give a preliminary idea of the presence of deeply buried cultural deposits. They are discussed as a south line and a north line below, and the tests are summarized in Table 4.3.

**South Line.** Sixteen auger tests were performed between the primary testing area and the entrenched banks of the Rio Tesuque. The area

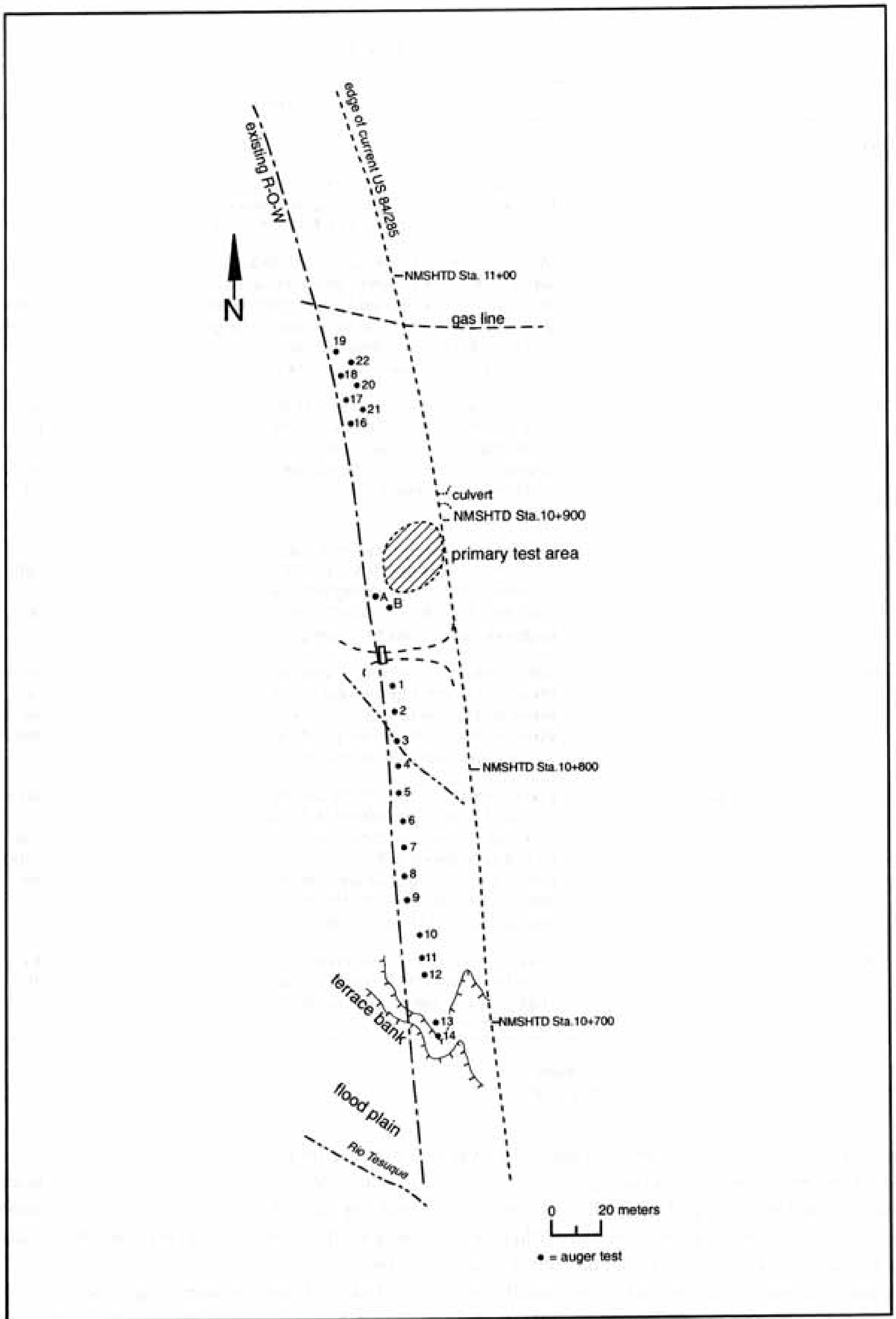



*Figure 4.10. Plan of expanded auger testing, taken from NMSHTD construction plan.*

immediately to the south of the main site area is characterized by relatively thick juniper and piñon cover as well as two small drainages and the two-track road into the primary testing area (not to mention a remarkable quantity of beer bottles and cans and other trash). Thus, we placed two auger tests in areas where it was possible to auger, located at 31.30N/55.82E (Test A) and 40.50N/48.16E (Test B). South of the gate to the tribal road, the terrain and vegetation are more amenable to augering, and we were able to bore a test more or less every 10 m (Fig. 4.10; Table 4.3). Still, 12 of 16 auger tests south of the primary testing area were halted by rock. This contrasts with the north area where only one of seven tests encountered gravel. The presence of rock and gravel closer to the current channel of the Rio Tesuque is logical, even though the appearance of the modern surface and the elevations above the channel in the two areas are similar. This higher level of fluvial activity also means that early deposits are more likely to have been washed away in floods.

Charcoal was present in several of the tests, especially around the modified drainage at highway station 10+800, auger tests 3–6. Generally, after Test 6 there were fewer cultural indications as distance increased from the primary testing area. Based on these results the site limits have been expanded to the south to include tests 1 through 6. The difficulty in augering means that depths comparable to those where Stratum 3 was observed in the primary testing area were often not reached. The sediment most like Stratum 3 in this area was observed in Test 3, where it was 86 to 94 cm below surface, which would fit with an apparent trend for this layer to be closer to the surface from the north area through the primary testing area to this part of the site. This deficiency of deeper observations can be addressed during data recovery using backhoe trenches, as proposed both for the utility clearance and for the examination of the south area.

During augering we observed a campfire ring old enough to have been about half covered by wind-blown deposits. It is located between auger test 9 and the right-of-way fence. A number of beverage cans are associated with the fire ring, including some with aluminum tops and steel sides. These cans indicate that the feature probably dates to the 1960s, making it an earlier instance of the popularity of LA 111333 as a recreation spot. We do not recommend further treatment of this feature.

**North Line.** The terrain north of the primary testing area passes first through a heavily vegetated (much Siberian elm) new drainage created by culverts under the existing highway. Adjacent to this area is a 25 to 30-m expanse of irregular surface. This area reverts to juniper and piñon; it may be drainages abandoned after highway construction. We did not auger in this stretch, but it cannot be dismissed as a location for further deep cultural deposits. The next landform to the north returns to level terrain, similar in appearance to the south area. We placed seven systematically located auger tests in this area, stopping at the gas line which traverses the highway and the right-of-way (Fig. 4.10). Widely scattered sherds and lithics are present in this north area and in the spoil from construction of the gas line.

The seven tests in the north area were particularly productive. Five of the tests could be dug to the full extent of the auger due to the presence of fewer rocks and gravel lenses. The top stratum is highly reminiscent of Stratum 1 in the primary testing area in consistency and color, although in this area it is even darker 10YR to 2.5Y 3/2. It is homogeneous and very clayey; it is difficult to screen, especially through eighth-inch screen. Although the soil becomes lighter in color beneath the thick mantle of dark brown clay, it remains high in clay content instead of the much sandier consistency of Stratum 2 in the primary testing area and the south auger line. It is not until around 1.5 m that the soil becomes appreciably sandy.

The contexts for cultural evidence are thus also different from the primary testing area. Tests 17 and 21, which are 8 m apart, produced the strongest indications of buried cultural deposits. In test 21, below 71 cm of clayey deposit, there is an 87-cm section of highly modified fill including varying amounts of charcoal and possibly burned soil, resting on a lens of charcoal. There is little doubt that this is fill to a feature, and its depth suggests a large one, such as a major storage cist or a pit structure. To the northwest, at a depth of 120 to 131 cm below surface (within the depths bracketing the test 21 feature), four small obsidian flakes were recovered from a clayey deposit. The soil above the level of the flakes also contains charcoal, beginning at 70

Table 4.4. Artifacts from Primary Testing Area, LA 111333

| Provenience | Lithics | Ceramics | Ground Stone |
|---|---|---|---|
| Stratum 1 | | | |
| 72N/44E | 1 | 1 | |
| 65N/49-50E | 4 | | |
| 63-64N/54E | 10 flakes 2 hammer-stones | | |
| 56N/50E | 1 | | |
| 53N/66E auger | 1 | | |
| 56N/60E auger | 2 | | |
| Stratum 2 | | | |
| 72N/44E | 2 | 1* | |
| Stratum 3 | | | |
| 72N/44E | 18 | | 1 |
| 63N/54E | 3 | | 1 |
| 62N/65E | 1 (biface) | | |
| 56N/50E | 3 | | |
| 57N/53E auger | 1 | | |
| Stratum 1-2 North Area | | | |
| Auger 17 | 4 | | |
| Total | 53 | 2 | 2 |

*Also 1 calcined animal bone fragment

cm below surface, just as in test 21. We have no way of dating these deposits, but the different stratigraphic context and shallower depths suggest that they are younger than the Archaic date from the primary testing area and older than the Classic or Coalition dates of the upper features.

Another reason to think that the features are not Archaic is that Stratum 3 appears to be present at the lower limits of our auger testing ability, 1.8 m below surface. Because we saw this type of deposit in tests 17, 20, 21, and 22, I suspect it is there, although we never viewed a full section of it.

## ARTIFACTS

In spite of their small numbers (Table 4.4), the artifacts from the two components are distinctive. The Pueblo component includes hammerstones and cores from locally available gravels, while the earlier materials are dominated by small obsidian flakes. The Pueblo component contained a few sherds (including those observed on the site surface) and a few pieces of obsidian. Obsidian is available in the vicinity, but probably had to be obtained away from the site. The only ground stone and formal chipped stone artifacts came from the earlier component. Although a formal analysis has not yet been conducted, field observation of the debitage indicates a clear difference between the two components. The flakes from the earlier component are almost all small to tiny, the results of manufacture and retouch, while the later flakes are larger, representing expedient edges on unshaped tools. Evidence for stone working in the Pueblo component is a large chert flake that can be refit to its core; these two items are from different proveniences in the 63-64N/54E test.

The obsidian biface recovered from test unit 62N/65E is made from a homogeneous black glass that looks dark brown when the light passes through the edge (Fig. 4.11). On inspection of this tool, James Moore was of the opinion that it was probably a preform for an En Medio point, which was

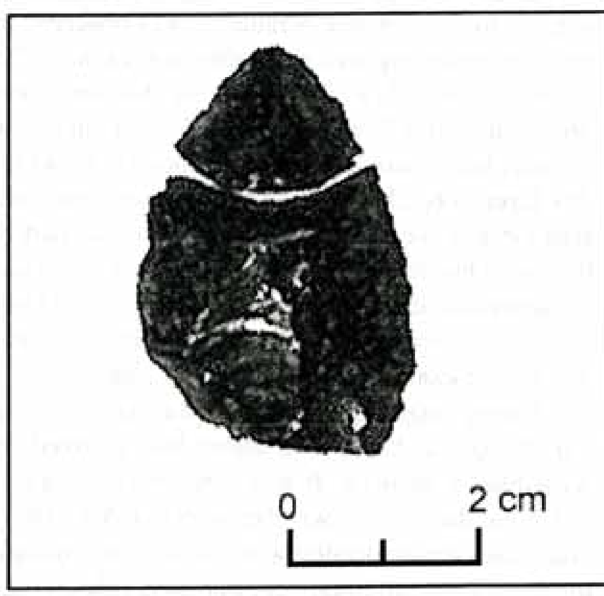



*Figure 4.11. Obsidian biface.*

abandoned because the piece had become too small (Moore, pers. comm. 2002).

Two pieces of ground stone were present in the early context. One was left in situ in the grid 63N/54E balk. It appears to have a ground face, but is probably too small to be a conventional nether stone. The second, from the deep test in the northwest part of the site appears to have been heat damaged, and broke into several pieces. This artifact has a ground edge and face, but is not a conventional mano or metate.

Flotation samples were taken from Stratum 3 in the following grids: 56N/50E (Stratum 3, Level 6), 63N/54E (Stratum 3, Level 13), 62N/65E (Stratum 3, Levels 11 and 14), 72N/44E (Stratum 3, Level 12, two samples). All samples are awaiting processing and analysis.

## Conclusion

Two aspects of the site revealed by testing are at least suggestive of major differences between the modern environment and that of 2,000 years ago. The first is the presence of oak in two different tests 16 m apart. Oak is a superior fuel wood and its use is expectable. It occurs rarely in archaeological contexts, however, so it is remarkable that it occurs twice in our small sample. As noted above, the driftwood oak may have been collected from the Rio Tesuque. Less likely, though worth considering, is whether there were at that time stands of oak close enough to have been sources of firewood. Along the same line, the depositional environments of the Pueblo occupation and the Archaic are very different. Stratum 1, the present surface of the site and the context for the Pueblo material, is around half a meter of very clayey material, which contrasts starkly with the sandiness of Stratum 3, the Archaic context. Changes in the course and flow of the Rio Tesuque surely explain some of these differences, but other differences, such as sources of windblown deposits, are probably also in operation. When sufficient depths were reached by excavation or auger it seems that the stratigraphic column is resting on a gravel bed, suggesting that prior to the occupation sequence, this location was in a larger channel. This suggestion is, of course, based on short sections with little exposure of the underlying stratum.

The extent of charcoal-stained sand of probable Archaic age is challenging to explain. Repeated occupation of the vicinity over many seasons for many decades can account for much of the deposit. Forest fires, whether natural or human caused, would create the same effect, especially in an alluvial situation. The association of artifacts with these deposits and the existence of a number of other early sites in the vicinity clearly indicate that occupation was taking place here and the thickness and variety visible even in the small glimpse afforded by our tests suggest that this place was visited many times. The location by the Rio Tesuque and near both mountain and valley resource zones surely made this setting an attractive one.

Reconstructing the nature of Stratum 3 from the disjointed windows provided by isolated test pits and auger holes is another challenge. The dated exposure at the west edge of the main test area is at a higher elevation than the other exposures of the stratum. Some variation in elevation can be explained by gentle slope and irregularities in the surface. The location of Features 2 and 3 at least 25 cm above other exposures of Stratum 3 at horizontal distances of 8 to 16 m, especially when, on today's surface at least, this location is lower than these other locations, strongly suggests that different occupations are present even within the primary testing area, and that this date may be from one of the later of these uses. The second date received from Stratum 3 indicating an age 700 to 1,000 years earlier from an elevation 70 cm lower adds considerable dimension to the scope of the site. Though horizontally separated, the two oak specimens are at similar elevations relative to the site datum (9.65 m on the east and 9.53 m on the west), while the piñon radiocarbon sample is at 8.90 to 8.80 m. Two occupations are strongly indicated by the elevational consistency of the dates and the occurrence of the species, but the thickness and consistency of the stratum in the center of the tested area makes intervening uses likely. In spite of the elevational and chronological differences among exposures of Stratum 3 (Tables 4.1–4.3), it is important that they all are located in the same relative positions in the clear stratigraphic sequence of Stratum 1 clay (Pueblo age), Stratum 2 sand with sparse charcoal, and Stratum 3 ash and charcoal-stained sand.

The north area auger tests indicate that even greater complexity of occupation of the area is likely. These tests show that cultural materials are present either deep within Stratum 1 or in an undefined layer below Stratum 1 that is clayey but lighter in color. These materials are above what appears to be Stratum 3 but are still 70 to 150 cm below the surface. Only lithics were observed in association, perhaps placing them in the preceramic period as well (though artifacts are rare in auger tests).

The buried pithouse excavated at Nambé Falls (LA 51883, Skinner et al. 1980:47–59) produced radiocarbon dates similar to that obtained at LA 111333, though the authors suggest that the site is most likely to be circa A.D. 400. The setting of that site is similar to this site in that both could take advantage of floodwater farming. Corn was the most abundant floral remain there. The presence or absence of corn at LA 111333 will tell us much about function and temporal placement of this site.

In view of how little is known of the Archaic in the Tewa Basin, and how hard it is to learn more about it, this site will inevitably make a substantial contribution to our knowledge of the area. Already we are seeing use of a species not common in other contexts–oak–which is a hint of the broadening of knowledge that may come. The long-term use of the location indicated by the carbon dates further signifies the site as an important source of information about the transition to agriculture in the region.

# PART 3: A PLAN FOR DATA RECOVERY AT LA 111333, THE TESUQUE Y SITE

5

# A COMMON PERSPECTIVE FOR DATA RECOVERY INVESTIGATIONS IN THE U.S. 84/285 SANTA FE TO POJOAQUE CORRIDOR

Jeffrey L. Boyer

In 1955, Fred Wendorf and Eric Reed presented their "alternative reconstruction" of the prehistoric cultural sequence of the northern Rio Grande region of New Mexico (Wendorf and Reed 1955), based on alterations to Wendorf's (1954) earlier "reconstruction." Regarding the region's prehistory, Wendorf and Reed (1955:133) state:

> Although the Spanish accounts indicated that this area was one of the major centers of Pueblo population in 1540, it seems clear that such conditions were a comparatively recent development in the prehistoric past. Archaeological surveys indicate that during much of the time that the great population and cultural centers of the San Juan and Little Colorado drainages were developing and reaching a climax, the northern Rio Grande was a peripheral area in both population and cultural development.

This perception of the "peripheral" nature of the northern Rio Grande region, relative to the San Juan/Colorado Plateau and Little Colorado regions, led Wendorf and Reed to the following conclusion:

> . . . many of the diagnostic criteria used in chronologically arranging the sites found farther west in New Mexico and Arizona appear late or not at all in the Rio Grande. It is apparent, therefore, that the existing conditions . . . generally employed to categorize the San Juan Anasazi remains in the Four Corners area *could be used in the northern Rio Grande only with considerable modification* . . . (Wendorf and Reed 1955:133–134; emphasis added)

This conclusion is echoed by Peckham, whose later review of the history of Rio Grande archaeology and of differences between archaeology in the Rio Grande and the San Juan/Colorado Plateau regions led him to state:

> It was a matter of some controversy, and the problem was more than just terminological. The Pecos classification worked moderately well in the San Juan Basin of northwestern New Mexico where ruins were abundant and, with the notable exception of Chaco Canyon, fairly consistently reflected the scheme developed at Pecos. The Rio Grande region just didn't fit. No matter how hard Rio Grande archaeologists tried to adjust their interpretations to the Pecos classification, their field work suggested that prior to Pueblo IV evidence of cultural development was either missing, truncated, or inconsistent, and *only occasionally corresponded to that in the west.* (Peckham 1984:275–276; emphasis added)

Wetherington (1968:71) went a step farther in stating, bluntly,

> With the archeological revelation of a distinct Anasazi pattern of culture along the Rio Grande, as well as unique enclaves in more peripheral areas, the Pecos Classification has reached the limit of area-wide applicability and its growing pains have become afflictions of senility.

With this situation in mind, Wendorf and Reed (1955:134) proposed "a chronological framework designed specifically for the developments" in the prehistory of the northern Rio Grande. This framework is the core of their "alternative reconstruction." The idea of the northern Rio Grande as peripheral to the San Juan/Colorado Plateau region could have one of two implications:

1. Developments in the northern Rio Grande were integrally related to, but on the margins of, those in the San Juan/Colorado Plateau region. This would have been a frontier situation in which the northern Rio Grande participated marginally in the developments of the San Juan/Colorado Plateau (see, for instance, Anschuetz 1987; Tainter 1994). If this were the case, there would

be no need for an alternative framework, only for modification of the Pecos framework.

2. Developments in the northern Rio Grande were not integrally related to those in the San Juan/Colorado Plateau, although the former may have participated in some supra-regional patterns. In this case, the northern Rio Grande was not peripheral to the San Juan/Colorado Plateau, except in a geographical sense; rather it was fundamentally different, and an alternative framework might be in order.

Either situation can be modeled and tested archaeologically.

As Boyer and Lakatos (2000b) discuss, a review of both synthetic and project-specific literature suggests that the Wendorf and Reed reconstruction has been dealt with in three ways (see Boyer and Lakatos [2000b] for references). Some researchers have accepted the reconstruction, either as-is or with some modifications. Others have rejected the Wendorf and Reed reconstruction. Some refer only to the Pecos Classification, with modifications to conform the periods to temporal data from the Rio Grande Valley. Finally, some researchers have attempted to correlate the Wendorf and Reed reconstruction with the Pecos Classification, usually by identifying the former by reference to the latter rather than as a different temporal and developmental framework.

Researchers who accept the Wendorf and Reed reconstruction appear to also accept the notion that developments in the northern Rio Grande region were sufficiently different from those in the San Juan/Colorado Plateau region to justify examining them within a different framework. In contrast, those who reject the Wendorf and Reed reconstruction appear to reject the same notion, suggesting that developments in the northern Rio Grande region were sufficiently similar to those in regions to the west to warrant examining them all within the same framework. In this position, the Rio Grande is an Anasazi subregion and developments in the subregion are viewed in light of regional trends. The same position is taken by those researchers who would correlate the Wendorf and Reed reconstruction with the Pecos Classification. They appear to be willing to accept some differences in subregional trends, as described by subregional frameworks, of which they see the Wendorf and Reed reconstruction as one. At the same time, they attempt to correlate the trends, particularly their timing, with the Pecos Classification, which, by inference, describes and integrates developments across the entire region. It is interesting, in this regard, that attempts to correlate the Wendorf and Reed framework with the Pecos Classification do not also attempt to resolve the obvious temporal differences between the two classifications. It may be for this reason that these researchers attempt to use both frameworks—the Wendorf and Reed classification is intended for the region, but, since the Pecos Classification has more and shorter time periods, it seems to provide greater temporal precision when describing sites and assemblages. However, any classificatory framework links chronological periods with normative descriptions ("trait lists") of aspects of the archaeological record (Cordell and Plog 1978; but, see also Cordell [1989] and Cordell and Gumerman [1989] for the attempted but largely unaccepted construction of a chronological classification based on a macroregional, pan-Southwestern perspective). Trying to correlate two such frameworks without resolving discrepancies between them will not increase the utility of either for describing and comparing sites and assemblages.

It is apparent that the Wendorf and Reed reconstruction involves more than a chronological framework within which to describe local or regional trends. The patterns that Wendorf and Reed observed in the archaeological record reflect more than archaeological trends needed merely to define chronological sequences. They also reflect regional and intra-regional trends in ideology, social relations, community structure, architectural structures and features, economy and subsistence strategies, artifact assemblage compositions, and material technologies. As such, the Wendorf and Reed reconstruction potentially provides the bases for testable models of northern New Mexican prehistory.

However, the reconstruction, and particularly the archaeological patterns on which it is based, have not been well tested—we cannot point to a systematic examination of the observed patterns, to determine their validity or assess their relationships to the reconstruction. In fact, a review of the archaeological literature pertaining to the northern Rio Grande suggests that modifying, rejecting, or ignoring the Wendorf and Reed reconstruction falls less on purposeful testing of the patterns on which the reconstruction was predicated than on perceived paradigmatic disagreements (Binford and Sabloff 1982). The most profound disagreement is based on the rejection of cultural-historical studies in favor of explicitly theoretical and, often, nonhistorical interpretations of data. This is the root of paradigmatic conflicts, in that the Wendorf and Reed reconstruction is clearly cultural-historical in nature, and invoking cultural-historical causes for patterns in the archaeological record has been seen as nonexplanatory since the beginning of the theoretical "revolution" in archaeology during the 1960s. We would not pretend to denigrate the contributions made since the 1960s by research directed by cultural-ecological, processual, selectionist, and other paradigms. However, accepting or rejecting interpretations of data and cultural-historical sequences on the basis of agreeing or disagreeing with particular paradigmatic directions without explicitly testing the validity of the data or the relationships of the data to the original paradigmatic model, does not constitute systematic examination of the data.

This is certainly not to argue that other paradigms should be rejected in favor of a return to a strict cultural-historical research. It is to argue, however, that:

- if the archaeological record as it was understood in 1955 was such that Wendorf and Reed saw the need to differentiate the northern Rio Grande region from the San Juan/Colorado Plateau region, and
- if explicit testing of the archaeological patterns observed by Wendorf and Reed and fundamental to their reconstruction has not been performed, but
- additional data have been gathered since presentation of their reconstruction, then

responsible scholarship should include attempts to examine data gathered before and after publication of the reconstruction. Examination of these data should focus on determining:

- whether the data patterns observed by Wendorf and Reed are specific to and embedded in their cultural-historical paradigm and cannot be verified with the addition of more recent data. If this is the case, then their reconstruction lacks validity, particularly in light of the paradigm within which it was defined, because its historical-temporal bases would be invalid.
- Alternatively, examination of the data might reveal that the data patterns can be verified independently of the paradigm where they were first observed. If so, then they can profitably be interpreted within the frameworks of other paradigms. In this scenario, we are also concerned about whether the data trends retain temporal patterning, as observed by Wendorf and Reed.

Toward that end, archaeological data recovery efforts at prehistoric sites in the U.S. 84/285 Santa Fe to Pojoaque Corridor project area, including LA 111333, are aimed at testing the Wendorf and Reed reconstruction by examining the accuracy of the data patterns that they observed. It is beyond the scope of any single project to definitively gather, analyze, and interpret all the data needed for an undertaking of this nature. However, data recovery at prehistoric sites in the project area provides an opportunity, particularly when combined with the results of other projects in the northern Rio Grande, to address the validity of the reconstruction.

Admittedly, this approach has a certain cultural-historical emphasis, since it seeks to validate or refute the Wendorf and Reed reconstruction. Their reconstruction is, at its heart, the definition of regional chronological periods using patterns of artifact assemblages, features, architecture, and site structure that were presumed to be normative to the periods they defined. Nonetheless, it is not a call to return to strictly cultural-historical research, nor do data recovery efforts in the U.S. 84/285 Santa Fe to Pojoaque Corridor project area focus on normative interpretations of data or data patterns. The point made by Binford and Sabloff (1982:147) 20 years ago is well taken today:

> When doing culture-historical research, one normally needs only to recover a sufficient sample of artifacts to permit a "cultural" assessment of the remains. This means that no real understanding of

> internal differentiation or organizational variability among components of a single system will be revealed by carrying out normal, traditional archaeological work.

Rather, the data patterns observed by Wendorf and Reed are being tested to determine whether those patterns can profitably be used to examine questions other than those of "normative" culture history—questions of regional chronology, inter- and intraregional social relationships, community formations and organizations, economic strategies, ideological practices, ethnic identities, and other issues. Those issues can be addressed using a variety of paradigmatic and theoretical perspectives.

The following chapters address research issues specific to the Archaic and Classic period components at LA 111333. Although very different from each other and from the issues discussed in Boyer and Lakatos (2000b), they are linked by the common goal of examining the northern Rio Grande as Wendorf and Reed saw it, a region of unique Puebloan sociocultural developments rather than an Anasazi backwater on the margins of the "real" Puebloan world in the San Juan/Colorado Plateau region.

# 6
# EXAMINING THE ARCHAIC COMPONENT AT LA 111333

James L. Moore and Jeffrey L. Boyer

The deeply buried Stratum 3 represents the earliest known occupation of LA 111333, and the presence of this component was unsuspected from surface examination of the site. The Archaic deposits are separated from the later Classic period component by two strata of naturally deposited alluvium that may represent considerable time depth, and that effectively seal those deposits. It is important to note that buried Archaic strata, often represented by charcoal-stained soil and hearths lacking much in the way of an associated artifact assemblage, seem to be fairly common in Santa Fe County. Indeed, the buried Archaic component at LA 111333 is not a unique occurrence in the project area, but may merely represent one of many ancient buried temporary campsites, suggesting that this part of the Tesuque Valley could have been a favored locale for repeated short-term occupation by Late Archaic peoples. But what is the Archaic, a time period or a type of adaptation to demographic and environmental conditions? This question is addressed in the next section.

## The Nature of the Archaic

The term "Archaic" has been used in the Southwest to denote both a period of time and a stage of cultural development. Characteristics that are generally used to separate the Archaic from the later Pueblo occupations/periods include a high level of residential mobility, the use of the atlatl/dart weapons system, heavy reliance on hunting and gathering for subsistence needs, limited use of corn horticulture late in the period/adaptive stage, and absence of pottery. However, discoveries in the past 10 to 15 years have begun to blur the boundary between Archaic and Pueblo adaptations in some parts of the Southwest. The boundary between the Archaic and Paleoindian periods/adaptive systems had already begun to break down, with some researchers beginning to suggest that certain Paleoindian traditions represented more of a generalized hunter-gatherer adaptation than the more traditional big-game hunters.

The first evidence of a pre-Pueblo adaptation was recognized in the 1890s by Richard Wetherill, who coined the term "Basketmaker" for these predecessors of the pottery-making, village-dwelling farmers of the northern Southwest (Blackburn and Williamson 1997). The Basketmakers were also recognized as predecessors to the Pueblos at the first Pecos Conference in 1927. During that meeting a preliminary and, in many ways, arbitrary, temporal scheme was laid out for the Pueblo area. The Pecos Classification began with Basketmaker II, leaving space for a hypothetical Basketmaker I period. Though the latter term was never used, it was clear at the dawn of Southwestern archaeology that there had been nonpottery-making predecessors to the Pueblos.

Vierra (1994) presents an overview of the development of the Archaic concept in the Southwest, and we will not repeat that discussion here. Vierra (1994:17) also recognizes the difficulty involved in the dual use of the Archaic concept, with an implied conflict between those who use it in a culture-historical framework concerned with traditions and those who use a cultural-ecological approach that focuses on adaptation. In this study we opt for the latter concept. We define the Southwestern Archaic as an adaptation to local environmental and demographic conditions marked by a high degree of residential mobility, lack of permanent or semipermanent residential nodes, and dependence on hunting and gathering for subsistence needs. The use of pottery and specific weapon systems do not enter into the equation. Limited horticulture may have been used to supplement wild food resources, but domesticates did not represent a subsistence focus. This very specific definition is necessary because of what we have been learning concerning the Archaic over the last few decades.

## Changing Views of the Archaic

The first detailed discussion of the Archaic occupation of northern New Mexico was presented by Irwin-Williams (1973), based on research conducted in the Arroyo Cuervo District in the north-central part of the state. Though considered preliminary at the time, Irwin-Williams (1973) presented a temporal scheme detailing changes in hunter-gatherer adaptations for that area that stretched from the end of the Paleoindian period to the beginnings of a settled farming lifestyle. Subsequent researchers have expanded Irwin-Williams' scheme, applying it rather indiscriminantly throughout northern New Mexico and into southern Colorado and northeastern Arizona.

These applications seem primarily based on the presence of similar projectile point styles throughout this region, intimating that the use of similar points connotes some sort of cultural connection. Though the presence of similar styles of projectile points over a large region is certainly indicative of a widespread communication system, it does not necessarily mean that there was cultural continuity across the area. Indeed, similar projectile point styles were used across a region that extended from California to west Texas, and from the Great Plains to northern Mexico. From the linguistic and cultural diversity of the groups found in this region historically, there seems to be little chance that there was any sort of ethnic uniformity across the region at the time these point styles were in use.

A good example of problems inherent in equating similarities in projectile point styles with cultural uniformity can be seen on Cedar Mesa in southeast Utah. This is the area where the Basketmaker concept was developed by Richard Wetherill in the 1890s (Matson 1991:xi), and was later applied to similar finds throughout the northern Southwest. Matson (1991) evaluates several explanatory models for the Basketmaker II adaptation, and concludes that a population dependent on maize horticulture migrated from southeast Arizona to northeast Arizona about 1000 B.C. Though there are many material cultural similarities between this population and the contemporary inhabitants of southwest Colorado (including projectile points), there are also important differences, particularly in house styles and basketry manufacturing techniques. Thus, Matson (1991) concludes that different ethnic groups were present in these areas. A few similarities are not sufficient to equate ethnic identity between regions, especially when important and deep-rooted differences are also discernable.

Projectile points are simply not good cultural markers, and are only barely adequate temporal markers in a regional sense. For instance, contracting stem dart points, which mostly date to the Middle Archaic (ca. 3800 to 1800 B.C.) in New Mexico, appeared later in the Great Basin and through time spread from southeast to northwest across that region (Holmer 1986). In this instance we can see how a specific projectile point style may have originated in one area and spread through part of the communication system over time. This implies that dates for projectile points in one area can only be applied with great care to another, more distant region.

The same is true of the very concept of the Archaic. Simply because this type of adaptation existed between ca. 5500 B.C. and A.D. 400 in north-central New Mexico does not mean that it prevailed at the same time in all parts of the Southwest. A generalized hunter-gatherer focus almost certainly succeeded the Paleoindian big-game hunting-mixed foraging adaptation at an earlier time in some areas than in others. Similarly, the transition to sedentary farming began at widely varying times across the region. This is why it is important to use the concept of the Archaic in an adaptational rather than temporal sense, because the cultural, environmental, and demographic factors that resulted in major adaptational changes that eventually become visible in the archaeological record varied from area to area.

The Southwestern Archaic is considered to come to an end when sedentary farming villages began forming. This occurred at various times across the Southwest, and in a variety of ways. The earliest farming villages found to date are in southern Arizona. These villages date to at least 1000 B.C., and a settled lifestyle dependent on farming may have begun even earlier in that area, since canals that potentially date as early as 1200 B.C. have been found (Doyel and Fish 2000:7). Though

Roth (1996:37) feels that the Late Archaic occupants of southern Arizona were not yet fully sedentary farmers, they were also no longer mobile hunter-gatherers. As discussed earlier, Matson (1991) feels that early farmers migrated from southern Arizona to northeastern Arizona, which would have effectively truncated the Archaic occupation of that region. It also suggests a greater time depth for settled farming villages in southern Arizona, which appears to be borne out by recent finds.

Complicating this picture is the possibility that early farmers actually migrated into southern Arizona rather than developing out of a Late Archaic base. Early proponents of this hypothesis are summarized in Haury (1976:352). Originally proposing that the Hohokam developed out of the Late Archaic population, Haury (1976:352) eventually joined the migrationists, proposing that the early Hohokam migrated into southern Arizona from Mexico by 300 B.C. Recently, combining palaeolinguistic reconstruction with new archaeological data, Hill (2001) explains the northward spread of farming out of Mexico by proposing that it was carried by migrants belonging to the Proto-Uto-Aztecan language family, arriving in southern Arizona by perhaps as early as 1500 B.C. If this hypothesis is correct, then the movement of Uto-Aztecan speakers into northeastern Arizona was probably part of the same process. Archaeologists still tend to see the development of early farming villages as a lengthy in situ process, and Hill's (2001) discussion does not provide evidence for the replacement of the indigenous Archaic population by new peoples. Thus, there is no agreement as yet concerning who established the early farming villages in southern Arizona, though there is no question that they are present during what is still considered to be the Late Archaic period.

So, are these early farming villages Archaic because they lack pottery, or are they something else? By our definition, they would be the latter if a significant reliance on farming was demonstrated. Since canals were used to water fields at a very early date, this would seem to be the case. The transition to sedentary farming villages was under way and, though the population was probably still fairly mobile during certain seasons, it is difficult to consider their lifestyle part of an Archaic pattern. Logistically based seasonal mobility anchored to semipermanent villages is suggested for the Mesilla phase (A.D. 200 or 500–1100) of the southern Jornada Mogollon (Hard 1983). A similar pattern of seasonal movement out of farming villages to logistical camps is suggested for the Late Archaic occupants of the Tucson Basin (Roth 1996). A major difference between these situations is the presence of pottery in Mesilla phase sites and its absence in the Late Archaic of the Tucson Basin. Though pottery has traditionally been associated with the development of a farming economy and the end of an Archaic life style, this association may no longer be tenable in parts of the Southwest. Preceramic farmers may have been proto-Hohokam, proto-Mogollon, or proto-Pueblo, but they were no longer Archaic hunter-gatherers.

Thus, farming villages either began developing in parts of the Southwest before pottery was introduced, or they represent migrants from the south who lacked pottery in their toolkits. In either case, heavy dependence on maize farming signified the end of the Archaic, either as the result of a significant decrease in residential mobility caused by the increasing importance of farming in the subsistence system, or because the hunter-gatherers were exterminated, forced out, or absorbed by newly arrived farmers. Though as yet unsubstantiated for southern Arizona, the migration hypothesis seems to be strongly supported for northeast Arizona and southeast Utah (Matson 1991).

So, what does this discussion mean to the northern Rio Grande? Hill (2001:929) proposes two explanations for the presence of farmers belonging to other language groups in the Southwest that have a history of farming nearly as long as that of the Uto-Aztecans in Arizona. The first is that those language groups may have originally been much more widespread, originating in Mesoamerica like the Proto-Uto-Aztecans. In this scenario, communities that might have provided direct evidence of links to Mesoamerica were eliminated in the sixteenth century during the immediate postcontact period. A second, and more likely possibility, is that one or all of the Tanoan, Keres, and Zuni languages represent the original Archaic inhabitants of the region. In this scenario, one or more of these groups adopted agriculture from the Uto-Aztecans and it subsequently spread throughout the region. In essence, the second scenario would have created a frontier situation in which the migrants arrived possessing farming techniques and, presumably, a social organizational system that allowed them to form small villages that were fairly cohesive and permanent in location, yet flexible enough to permit seasonal movement to logistical camps. The natives—in this case the indigenous Archaic population—had three basic choices in how they would deal with the presence of newcomers in their midst: they could drive them off, move away, or adapt to their presence. Considering the existence of three linguistic isolates in the Southwest in addition to the widespread Uto-Aztecan language family, the indigenous inhabitants would appear to have adapted to the newcomers by adopting farming technology, necessitating changes in their social organizational systems as well.

While this discussion may seem to be wandering away from the focus of this chapter, it is really setting up our next point. Similar questions have been posed for the northern Rio Grande. The northern Rio Grande is thought to have lacked a farming population until the Late Developmental period, ca. A.D. 850 or 900 (Post and Hannaford 2002). The rather sudden appearance of a full-blown farming adaptation at that time could be considered evidence for migration into the area, and the northern San Juan region is often considered the most likely source of that population. However, significant differences have been noted between contemporary settlements in the northern Rio Grande and San Juan regions. Others, most notably Wendorf and Reed (1955), have proposed an indigenous development of farming communities that does not rely on migration from the San Juan region. Which of these views is more likely?

We feel that the formation of farming communities in the northern Rio Grande was a local development rather than the result of migration from another region. However, whether this means that local hunter-gatherers began settling into farming villages or that their development represented a continuing northward movement of proto-Tanoan farmers that either forced the indigenous hunter-gatherers out of the region or absorbed them remains unclear. Thus, the Late Archaic occupation of the northern Rio Grande represents a critical yet poorly understood time period, as is the case with most of the rest of the Southwest. What is known is that hunter-gatherers occupied much of the northern Rio Grande until fairly late, a situation that Post (2002; following Matson 1991) refers to as the "latest Archaic." The Archaic lifestyle seems to have lasted into the A.D. 800s or 900s in our study area—much later than elsewhere in the northern Southwest. Indeed, there may be no Early Developmental period in the Tewa Basin because that area lacked a sedentary farming population before the beginning of the Late Developmental period.

For this reason, aceramic sites in the study area assume added importance if they represent late hunter-gatherer camps. The Early Developmental period may be the tail end of Archaic adaptations in the northern Rio Grande. Whether those late hunter-gatherers quickly adopted a sedentary farming lifestyle complete with pottery manufacture and deep, well-constructed pithouses in the A.D. 800s or 900s is questionable, though not outside the realm of possibility. What is more likely is that they were absorbed by farmers moving into the area, and that those farmers were their cultural and linguistic cousins. We may never be able to absolutely resolve which (if either) of these possibilities is correct, but we may be able to establish some continuity or lack of continuity between the Late Archaic and early farming populations.

## Archaic Site Types

Boiled down to basics, there are three types of Archaic sites: collapsed surface scatters, stratified rock shelters, and buried cultural zones. The first type tends to be the most common, and can range in size from a few artifacts with or without an associated feature to scatters of artifacts and deflated features covering hectares. The small end of the scale usually represents single short-term occupational episodes, while sites at the other end are probably evidence for repeated uses of favored locales over time, compressed by deflation and mixed into palimpsests that may be impossible to decipher. The other types are much rarer, and are often found accidentally or only under the most fortuitous of circumstances. Occupied rock shelters only occur under certain geological conditions—rock escarpments are necessary, and the rock must be of a type that will form stable overhangs when eroded. Since useable space in a rock shelter is dictated by the extent and form of the overhang, sequential occupations in this type of site tend to be on top of one another. While the level of preservation in rock shelters is often quite good, and this type of site can yield a wide range of tools and subsistence-related materials that are rarely recovered from open-air locales, there is often a great deal of mixing that makes it difficult to sort out what materials belonged to which occupation. This can create a situation similar to that found in compressed Archaic sites in which connections are difficult to make between specific features and artifacts.

Buried cultural zones are the third general type of Archaic site found in the northern Southwest. While this type is rarer than compressed surface scatters, they are somewhat more common than rock shelters. Unfortunately, discovery of this site category is often fortuitous—a dark stratum is noted in an erosional channel or cutbank, subtle stains are found on the ground surface, or buried deposits are encountered beneath a later component that occurs near the surface. Archaic sites comprised of buried cultural zones are important to archaeological interpretation because they often represent discrete occupational episodes rather than a mixture of materials deposited during several different uses of the same locale. When a series of buried cultural zones occur in a small area we may be able to study patterns of land use through time, looking for changes that occurred in response to variation in climatic and demographic patterns.

## Late Archaic Sites

Post and Hannaford (2002) discuss the Archaic occupation of the Santa Fe area, which we summarize here. Late Archaic sites dating between ca. 1800 and 1 B.C. are common on the Santa Fe piedmont, but no good evidence for farming has been found in that area before A.D. 850-900. A fair amount of evidence has been recovered concerning the Archaic occupation of the Santa Fe area between ca. 1800 and 800 B.C. Several sites excavated along the Santa Fe River have yielded the remains of houses, thermal features, and tool kits reflecting dependence on hunting and gathering (Dilley et al. 1998; Lakatos et al. 2001; Post 1996, 2002; Schmader 1994). Examination of these sites suggested that "populations regularly moved in and out of the Santa Fe area during the second millennium B.C., with site clusters near water sources as well as near the juniper and grass plains and at the edge of the higher elevation piedmont" (Post and Hannaford 2002:11).

Late Archaic sites containing structural remains probably represent residential camps that reflect a generalized hunting-gathering adaptation, and often seem to be cold-season camps that were occupied for extended periods of time near juniper-piñon woodlands (Post and Hannaford 2002:12).

The later part of the Late Archaic (800–1 B.C.) is more poorly represented by excavated houses, thermal features, and diverse artifact assemblages. Two examples of residential camps cited by Post and Hannaford (2002:12) are considerably less substantial than those that date between 1800 and 800 B.C. This suggests that the Santa Fe area may have been used differently in the later part of the Late Archaic:

> . . . residential mobility may have increased during the late stages of the Late Archaic, perhaps in response to less predictable climate and resource availability and abundance. A change in seasonal mobility or territorial extent may partly explain the low frequency of Late Archaic sites between 800 B.C. and 1 A.D. It is also possible that there was a shift in settlement locations within the Santa Fe area that has not been detected by archaeological investigations. (Post and Hannaford 2002:12)

Thus, there may have been considerable variation in the way Late Archaic peoples used the Santa Fe area between the first and second halves of that long, poorly understood period. This variation might also be expected to occur in our study area in the southern Tewa Basin, which is adjacent to the region discussed by Post and Hannaford (2002).

The period between A.D. 1 and 850 or 900 has been referred to as "the latest Archaic" (Matson 1991; Post and Hannaford 2002:12). The transition from hunting and gathering to farming is usually thought to have occurred during this period, but is poorly known for the Santa Fe area. Post and Hannaford (2002:12) feel that the scarcity of evidence for this transition suggests that farming did not begin until A.D. 850 or 900 in the Santa Fe area.

This may have been partly due to climatic conditions, which were not conducive to farming in the area before A.D. 800 (Post and Hannaford 2002:19).

If this argument is correct, Early Developmental period use of the Santa Fe area and Tewa Basin should be represented by temporary camps occupied by hunter-gatherers rather than farming settlements. But were those hunter-gatherers an indigenous population that had not yet adopted farming, or were they Early Developmental farmers that simply used this region seasonally for hunting and gathering? Fortunately, each of these possibilities would result in different land-use patterns that might be distinguishable if enough sites from the proper time period were studied–Pueblos using the region seasonally for hunting and gathering would not be expected to establish cold-season camps because they should have returned to their main residences for that season. The occurrence of aceramic cold-season camps in the northern Rio Grande would suggest the continued presence of a nonfarming Archaic population.

Though only a few Archaic sites have been excavated in the Tewa Basin to date, they augment information from the Santa Fe area. Lent (1991) excavated LA 51912, a Late Archaic site near San Ildefonso Pueblo that contained a pit structure and two extramural activity areas. Radiocarbon dates for LA 51912 suggested an occupation between 540 ± 70 B.C. and A.D. 110 ± 70 (Lent 1991:i). This site appears to represent a single occupational episode, and was probably used during the cold season, though perhaps not during the coldest months of the year (Lent 1991:64-65). No evidence of domesticated plant use was recovered, though it should be noted that preservation was generally poor.

Moore (2001) excavated LA 65006, a stratified Archaic site near San Ildefonso Pueblo that contained several buried cultural strata reflecting at least three occupations that were fairly widely separated in time. The earliest occupation was the most extensive, and dated between ca. 1429 and 1053 B.C. During this occupation, LA 65006 served as a workshop where large general purpose bifaces were manufactured in anticipation of future need. Though areally extensive, this occupation appears to have been of short duration and by a single band. Extensive deposition around hearths of debris from tool manufacturing activities led to the sequential formation of multiple activity areas. Floral remains indicate that this occupation occurred in the fall.

The second occupation of LA 65006 was between ca. 1150 and 800 B.C. No dates were obtained for the third component, but it was the latest evidence of Archaic use. The manufacture of large general purpose bifaces was an important task in these later occupations, but the remains left by these uses of the site were not as extensive as those of the first component. The second occupation was also during the fall, but no evidence for season of occupation was available for the third component. Components 2 and 3 represent a different type of occupation for this site. Hearths were larger than they were in the first occupation, suggesting more intensive use. Large amorphous charcoal stains were encountered in Components 2 and 3 that either represented formal middens or badly deteriorated structures, with the latter being more likely. In either case, a longer occupational duration is inferred.

In contrast to Late Archaic sites from the Santa Fe area, some evidence of corn was recovered from LA 65006, but is difficult to interpret. The only corn macrofossils came from a Classic period Pueblo hearth on the surface of the site that penetrated down into the top of deposits associated with the latest Archaic occupation. Two corn pollen grains were recovered from soil strata associated with the earliest occupational zone, but no comparable corn macrofossils were found in that component. One corn pollen grain came from stream-laid sediments that truncated Component 1, and the second came from adjacent cultural deposits. Was the corn pollen grain in the stream deposits intrusive from the adjacent cultural stratum or vice-versa? Were both corn pollen grains intrusive from the Classic period feature? Neither of these questions could be answered with any certainty, and in the absence of corn macrofossils, we were forced to conclude that they were probably not associated with the Late Archaic occupation.

A site excavated by Skinner et al. (1980) near Nambé Falls is an excellent local example of a latest Archaic occupation. Site X29SF2 contained a large ephemeral pit structure with numerous internal features that was radiocarbon dated between A.D. 400 ± 60 and A.D. 610 ± 80. An earlier radiocarbon date was also derived for this structure, but is probably anomalous. Considering the potential for old wood dates from simple charcoal samples (Smiley 1985), this structure may even date a few hundred years later. Small corner-notched arrow points were recovered from X29SF2, and corn was the most common carbonized plant remain. The radiocarbon dates and projectile points from this site easily fit expectations for an Early Developmental period occupation, but X29SF2 was aceramic and the pit structure was Archaic in form and construction techniques. Indeed, the pit structure at X29SF2 was very similar to Archaic pit structures excavated in the Tierra Contenta subdivision of Santa Fe (Schmader 1994). Also found at Tierra Contenta were two aceramic sites with pit structures that closely resembled those of the Archaic, but dated to the late 800s and contained no evidence for the use of corn (Schmader 1994).

Perhaps the earliest find of an Archaic site in the Tesuque Valley was made by Miller and Wendorf (1958) at the north edge of the Rio Tesuque very near LA 111333. LA 3297 occurred as a gray-stained horizon containing two probable hearths (Miller and Wendorf 1958:186). An uncorrected radiocarbon date of 275 ± 250 B.C. in addition to an En Medio point fragment indicate that these deposits date to the Late Archaic period.

Though only a few Archaic sites have been excavated in the Tewa Basin, survey results suggest that sites representing this long temporal/adaptational period are common in the region. Post (2001) conducted a sample survey in the southwest Tewa Basin, examining 1,700 acres in 16 parcels. This study recorded 115 sites, 64 of which contain Archaic components. Although temporally diagnostic artifacts were rare, making it difficult to assign dates to most sites, buried cultural deposits were noted in 39 Archaic components. This suggests that buried Archaic deposits may be much more common than is usually thought. Survey and testing along NM 502 in Los Alamos Canyon at the west edge of the Tewa Basin documented six or seven Archaic site components and five quarries that were probably used during several time periods, including the Archaic (Moore 1993; Moore and Levine 1987). One of the sites in this sample was subsequently excavated, and has already been discussed (LA 65006).

Finally, survey along U.S. 84/285 near the Tesuque Y recorded sites with characteristics that are remarkably similar to LA 3297 and LA 111333. Hohmann et al. (1998) recorded three sites in this area (LA 108379, LA 111334, and LA 111348). During a reexamination of these sites, Lakatos (2000a) collapsed LA 108379 and LA 111348 into LA 89021, a site that was previously recorded in that location; LA 111334 was found to have been originally recorded as LA 6562. Thus, we return to the original site designations in this discussion. During the reexamination of LA 6562, site boundaries were expanded to include several thermal features exposed in the east edge of the U.S. 84/285 road cut. Though defined as a Late Developmental period Pueblo site during survey (Hohmann et al. 1998), the additional buried thermal features could be indicative of an underlying Archaic horizon at LA 6562. A similar situation pertains at LA 89021—surface remains are indicative of a Pueblo occupation, but a deeply buried charcoal horizon noted in arroyo cuts (Lakatos 2000a) may represent underlying Archaic remains.

## Research Orientation for the Archaic Component at LA 111333

The preceding discussion suggests several research issues that might be addressed with data from LA 111333 at both regional and site-specific levels. Though one site is rarely capable of providing data that will answer all inquiries, enough data are often available to address at least part of the range of questions that might be generated. Excavation usually provides much more information than is available from surface examination or limited testing. In addition to having the potential to answer some questions about specific time periods or occupational types, excavational data can also help to refine research concerns for future studies.

### *Archaic Research Issue 1: What date(s) can be assigned to the Archaic remains at LA 111333?*

Temporal information is critical to understanding where LA 111333 fits in the occupational sequence of the Tewa Basin, how it relates to other sites in the area, and what the different occupational areas represent. Because of the similarity of cultural deposits at LA 111333 to those described for the nearby LA 3297 and the depth at which they occur at both sites, we assume that LA 111333 was occupied during the Late Archaic period, and this appears to be verified by radiocarbon dates obtained during testing at LA 111333 (Calibrated: 410 B.C. to A.D. 70 and 1390 to 1130 B.C.). However, since three potential occupational areas were defined by testing, different periods of use could be represented.

Accurate dating of LA 111333 is one of the basic building blocks of this study. In order to more fully address the other research issues developed in this section, we will need to obtain multiple dates from different contexts. Experience gained at LA 65006 near San Ildefonso Pueblo suggests that radiocarbon samples comprised of scattered charcoal fragments collected from throughout a cultural stratum are often inaccurate (Moore 2001). Thus, we will target features for radiocarbon sampling, unless large fragments of charcoal representing single pieces of wood are available. Multiple samples will be obtained from each possible occupational area, if available. Considering Smiley's (1985) assessment of radiocarbon sample precision and accuracy, we will target carbonized remains of annuals or the outer layers of construction elements, should these types of samples be available. Charcoal from fuel wood will also be collected for analysis, especially from features. However, we realize that this type of sample often represents a period of decades, sometimes centuries, of wood growth. As a last resort, we will collect bulk soil samples containing powdered charcoal from features if no better materials are available for sampling.

Archaeomagnetic samples, if available, will also be obtained. While we do not expect to be able to date features at LA 111333 using archaeomagnetic samples, they will help expand the current data base and may be comparable to the small array of samples already obtained from other Archaic sites. Artifacts with temporally defined stylistic variation may also help provide dates, though it is more likely that dates currently assigned to specific artifact styles will be evaluated and refined in light of radiocarbon dates.

We expect that various occupational areas might be defined during data recovery at LA 111333 that will yield somewhat different dates falling within a general cultural period. We will assess the relationships between multiple radiocarbon dates from different parts of the site to evaluate the possibility that feature and artifact clusters represent discrete occupational episodes and determine the likelihood that one or more populations are represented. Like the first radiocarbon dates obtained from LA 111333, other dates are anticipated to be similar to the single date from LA 3297, and indicative of multiple Late Archaic period uses.

*Archaic Research Issue 2: What part of the Archaic settlement system is represented by the remains at LA 111333?*

Considering the types of Archaic remains found by excavation in the Santa Fe and Tewa Basin areas, a range of possibilities exists for what will be uncovered at LA 111333. Hunter-gatherers use different site types and occupational strategies to exploit the landscape encompassed by the territory through which they range. Two basic hunter-gatherer subsistence strategies have been identified, and each probably used somewhat different types of sites. Binford (1980) defines two basic hunter-gatherer organizational systems—one in which consumers move to resources (foragers), and a second in which resources are moved to consumers (collectors). Data presented by Irwin-Williams (1973) suggests that Early Archaic hunter-gatherers were foragers, with the transition to a collector-organized system beginning during the Middle Archaic and dominating by the Late Archaic. However, neither this sequence nor a division into foragers and collectors is necessarily clear-cut. For example, Vierra (1990:63) feels that Southwestern Archaic hunter-gatherers "may have implemented a foraging strategy from spring to fall, and a collector organized strategy during the winter. That is, groups were residentially mobile from spring to fall, mapping onto exploitable resources; while during the winter they utilized stored foods, making logistical trips to food caches and for hunting."

With this in mind, it is possible that there was a seasonal fluctuation between foraging and collecting, even during the Late Archaic. The structure of an Archaic site, the range of artifacts found there, and the activities reflected by the assemblage can provide information on the type of use pattern represented. If sufficient data are available we may be able to distinguish between forager and collector functions for the various occupational areas at LA 111333.

Site types can be broken down into two basic categories, though there may be considerable variety within each category. Residential sites (base camps) tend to be the most common type of Archaic site found, and represent locales where a band lived for a period of time ranging from a single night to a season. Resource extractive locales are places where materials were gathered for transport to a base camp. Since most activities that extract resources from the environment leave few material remains behind, most resource extractive locales are archaeologically invisible. Exceptions to this include quarries, where debris was generated during the extractive process. Locations where floral or faunal foods were collected may only be marked by a low density scatter of chipped stone artifacts accumulating over a long period as the area was periodically harvested.

Fuller (1989:18) feels that field camps comprise a third type of site used by hunter-gatherers. Field camps are essentially short-term residential locales used by task-specific groups while collecting resources that will be returned to the base camp for storage. Resources are sometimes cached at field camps for later recovery and movement to the base camp. This type of site may be very difficult or impossible to distinguish from short-term base camps used by foragers.

In general, foragers inhabit base camps for a short period, ranging out from them to exploit resources on an encounter basis. Collectors inhabit base camps for longer periods, exploiting surrounding resources through day trips and sometimes through the use of short-term field camps. Collectors use storage features to cache resources at their base camp in preparation for seasons of limited food availability, a strategy that is not employed by foragers (who simply move on). Thus, small Archaic sites containing few or no thermal features, no evidence of structural remains, and a small array of chipped and/or ground stone artifacts may be indicative of a foraging focus. More extensive sites containing an array of thermal and storage features, small temporary structures, and a comparatively large amount of debris may be indicative of a collector strategy.

There are exceptions to these very general expectations. The earliest component at LA 65006 near San Ildefonso Pueblo fits several of the characteristics for a collector camp, but lacked some of the more critical criteria (Moore 2001). Although that site contained multiple thermal features and thousands of artifacts, there was no evidence of a structure or storage features, and our analysis suggested a short-term, special-purpose use. In some ways this component was logistical in nature, with obsidian obtained in the Jemez Mountains being processed into large bifaces for ease of transport. However, in other ways it was a simple foraging camp, with evidence of some local hunting and gathering but no storage of resources. Thus, each component at a site must be carefully evaluated to determine how it fits the model, remembering that there were no strict rules concerning how a camp should look and what activities could be performed there.

Three theoretical forager and collector site types were identified above—residential base camps, field camps, and resource extractive locales. The last of these is presumed to be archaeologically invisible except under certain rare circumstances. A foraging residential base camp should reflect a wide range of maintenance, production, and food-processing activities without a heavy investment in habitation or storage features. Structural remains, if present, should be ephemeral and indicative of short-term use. Collector residential base camps, on the other hand, should not only contain evidence of a wide range of activities, they should also demonstrate a corresponding investment in habitation and storage structures, indicative of a comparatively lengthy occupation. Field camps associated with a collector adaptation should reflect temporary occupancy by a small group engaged in specialized activities. Therefore, a few specialized activities should be represented, storage features should be absent (unless the site was used as a cache), and structures (if present) should be ephemeral.

A potential problem in applying this model involves separating foraging camps occupied for short periods from field camps used by collectors. Both should exhibit evidence of short-term occupation; the range of activities visible in the artifact assemblage might be quite limited for both. In many cases, these types of sites may be indistinguishable. The problem can be dealt with through analysis of the chipped stone assemblage.

The manufacture of general purpose bifaces reflects a mobile lifestyle, and more commonly occurs at residential base camps than at field camps or resource extractive locales. Kelly (1988:731) defines three types of bifaces: (1) those used as cores as well as tools; (2) long use-life tools that can be resharpened; and (3) tools with specific shapes and functions. Each type of biface may be curated, but for different reasons and in different ways. Use of bifaces as cores is conditioned by the type and distribution of raw materials. When suitable raw materials are abundant and tools are used in the same location as the raw materials they are made from were procured, an expedient flake technology can be expected, with little use of bifaces as cores (Kelly 1988:719). When local raw materials are scarce or of poor quality, bifaces can help overcome the difficulties involved in using materials that are obtained at a distance from the location in which they are used (Kelly 1988:719). When raw material scarcity is extreme, mobility is low, or a specific bifacial tool is required for activities performed away from the residential base camp, there may be some use of bifaces as cores as well as extensive rejuvenation of bifacial tools (Kelly 1988:720).

Bifaces with long use lives may be manufactured under a variety of conditions, "[i]n particular, tools designed for use on long search-and-encounter (as opposed to target specific) logistical forays will be under greater pressure to be designed to meet a variety of needs and tasks (e.g., cutting or scraping tools) and thus will need to be bifacial. This requirement can be relaxed for the equipment of target-specific forays" (Kelly 1988:721). Bifaces may also be manufactured as by-products of the shaping process, and illustrate the importance of the haft to which the tool was attached (Kelly 1988:721). This type of biface might be more frequently maintained or replaced at residential rather than logistical sites (Kelly 1988:721).

Using these concepts, Kelly developed a model to aid in distinguishing between residential and logistical or field camp sites (Fig. 6.1). The model has not been rigorously tested, but it does provide a series of predictions that can be applied to a chipped stone artifact assemblage. When combined with other data sets such as feature type and placement, the number and diversity of activities represented, and the types of resources being exploited, the applicability of the model to a site can be assessed. For example, if residential features are present but chipped stone analysis suggests that the site served as a logistical site or field camp, the model may be incorrect. However, if the residential pattern predicted by both Kelly's model and site structure are in agreement, the model may be tentatively accepted as valid.

The extensive subsurface staining and potential presence of numerous features at LA 111333 suggests that this locale may have primarily served as a residential base camp. However, the small assemblage recovered by testing seems more indicative of a short-term occupation, perhaps with a forager focus. The probable Late Archaic date for these deposits suggests that a collector subsistence strategy should be found if Irwin-Williams' (1973) reconstruction is correct. However, if Vierra's (1990) evaluation of the Late Archaic is more accurate, the type of strategy identified will be dependent on the season of occupation. Without further and more intensive evaluation, it will be impossible to determine how the various parts of LA 111333 functioned in the Late Archaic settlement system.

If LA 111333 represents a foraging focus, we would expect to find evidence for warm-season use. This may include ephemeral shelters lacking internal heating features. There will be no evidence of storage features, and a wide range of activities should be reflected in a fairly small assemblage. The types of floral and faunal materials recovered should also reflect warm-season use. If storage features are present and a limited range of activities is represented in the artifact assemblage, we would have to consider the possibility that a field camp associated with a collecting strategy was represented. As this discussion suggests, a wide range of data will be needed to address this research issue. Information on how structures and features were built and interrelated will be needed, as will detailed data on artifact type and function, and the types of foods that were consumed.

A1. The production and use of bifaces as cores in residential sites should result in:
1. A positive correlation between measures of the frequency of bifacial-flaking debris, utilized biface flakes, or biface fragments and measures of the total amount of lithic debris;
2. A high percentage of utilized biface flakes relative to unretouched flake tools;
3. A low incidence of simple percussion cores, especially unprepared or "casual" cores; and
4. Evidence of "gearing up" at quarries: a low incidence of flakes with much cortex on their dorsal surfaces in residential sites and use of high-quality raw material, such as fine-grained cryptocrystallines, possibly from distant sources.

A2. The production of bifaces in residential sites that are then used as cores in logistical sites should result in:
1. A division of sites into two basic categories, one in which there is a high, and another in which there is a low incidence of utilized biface-reduction flakes, the former being logistical and the latter residential sites; bifacial tools would be produced and maintained in residential sites, whereas they would be used as tools or cores in logistical sites;
2. Likewise, residential sites should display a higher rate of increase (i.e., a higher slope of a regression curve) than logistical sites between biface fragments and measures of the frequency of biface knapping as a function of tool maintenance and replacement; and
3. Residential sites should contain a higher frequency of utilized simple flake tools as opposed to utilized flakes removed from a biface.

B. The use of bifaces as long use-life tools should result in:
1. Infrequent unifacial examples of the tool type (e.g., projectile points); these rare unifacial examples may be instances of expedient tool production;
2. A pattern of tool production in residential sites similar to C (below), with a high correlation between bifacial debris and tool fragments, but these fragments should show evidence of rejuvenation and resharpening;
3. A high frequency of resharpened or recycled instances of the tool type relative to
   a. Other tool types or
   b. The same tool type from other areas or time periods.
4. Evidence in logistical sites of the tool having been resharpened, resulting in a low rate of increase in biface fragments relative to biface flaking debris, as in A2.3, but with few of the biface-reduction flakes having been utilized; and
5. Possibly evidence of haft manufacture and maintenance in residential sites as in C.4 (below).

C. The manufacture of bifaces as a by-product of the shaping process should result in:
1. A concentration of bifacial-flaking debris in residential sites, especially very small bifacial-retouch flakes, and a positive correlation between biface fragments and bifacial-flaking debris;
2. A low incidence of the use of biface-reduction flakes as tools;
3. A relatively high incidence of unifacial instances of a normally bifacial tool type (contrast with B.1 above); and
4. An archaeological record at residential sites indicating the maintenance of hafted tools, including stone tools used for the manufacture of organic items, e.g., flake tools, burins, gravers, spokeshaves, and scrapers.

*Figure 6.1. Kelly's (1988:721-723) model predicting the hypothetical association between site type and lithic artifact assemblage character.*

*Archaic Research Issue 3: What can the spatial organization of LA 111333 tell us about how this location was used through time?*

Three areas containing stained cultural deposits, potential features, and artifacts were identified within the limits defined for LA 111333. Currently, we assume that each of these areas represents an occupational locale, but whether these locales were all used at once or represent repeated visits to the same general area is uncertain. The former possibility could represent a large macroband base camp, while the latter would reflect a sporadic use of the same general area over time by one or more groups. Since only fairly small Archaic base camps have been identified by excavation in the Santa Fe area and Tewa Basin to date, the latter pattern is expected. Indeed, large Archaic macroband camps could be an artificial construct of the archaeological record and may not have occurred at all. This is due to the way in which locations were repeatedly occupied.

Vierra (1985) has examined the process of site reoccupation using ethnographic and archaeological data. In summary, several factors appear to affect the decision to reoccupy previously used sites. Sites might be reused if the selection of suitable alternate locations is limited. "Certain site functions demand much more specific requirements. The more specific the requirements are, and the more limited the number of locations which meet those requirements, the more frequently these advantageous positions will be reused" (Vierra 1985:64).

In general, logistical sites tend to be reoccupied more often than residential locations, especially when hunting is dependent on the planned intercept of game rather than unplanned or unanticipated encounters (Vierra 1985:64). Locational requirements for residential sites are often more flexible, resulting in less need to reoccupy the same spot (Vierra 1985:65). There were also two very good reasons for not reoccupying old residential locations: hygiene and health, and resource depletion (Vierra 1985). Old camps contain unsanitary debris and garbage that can cause infection and sickness as well as parasitic infestation. The zones around them have also been depleted of useable resources, and may require several years to recover sufficiently to allow successful exploitation to again occur. When the same area is reused, new camps tend to be located adjacent to rather than on top of old camps (Vierra 1985:65).

This pattern is replicated archaeologically. Vierra (1985:183-184) found that multicomponent sites containing Archaic and Pueblo materials in the San Juan Basin did not represent a blending of materials, as might be expected when specific areas were reoccupied. Rather, later occupations were structurally distinct, and appear to represent use of adjacent areas. Camilli (1989) found evidence of similar site reoccupation patterns on Cedar Mesa in southeast Utah. While smaller sites appear to represent single-use locales, larger sites contain evidence of overlapping occupations. Eschman (1983) studied site structure at LA 19374 in the San Juan Basin, and concluded that, "The overall extent of these cultural deposits . . . appears to be the result of multiple, overlapping occupations over a considerable time period" (Eschman 1983:379). Thus, when camps were reused, the exact locations were rarely reoccupied. New camps were instead placed in adjacent areas, at times overlapping earlier deposits. This produced sites of large areal extent with artifact densities similar to those of single occupation sites.

In the cases cited above, Archaic strata were mostly deflated and compressed, forming areally extensive but thin deposits. At LA 111333 we have a different situation—deposits that are buried and uncompressed. This should provide us with a clearer picture of how a specific area was reused through time. If our assessment of how LA 111333 was occupied is correct, we would expect each potential occupational zone to reflect a similar type of use, provided those occupations occurred during the same general season. There should be little or no overlap between occupational areas, and there should be redundancy in the types of structures, features, and activities represented.

If these expectations are not upheld, we must consider alternate interpretations. Variation in the type of remains occurring in each potential occupational zone could indicate that repeated uses of the same general area occurred during different seasons and do not represent the same site function. If different site functions are suggested for locales that reflect the same season of use, a basic forager pattern might be represented in which site use and longevity were dependent on the array of resources available in a particular year.

Locational information and data on artifact type and distribution will be needed to address this research issue. By imposing a system of 1-by-1-m grid units over the site we will be able to control for location and artifact distribution, providing data amenable to a variety of analytic methods. Analysis of all recovered artifacts will provide information on the types of activities they represent, which can be combined with the distributional analysis. In addition to these data needs, information on seasonality (discussed later) and dating (discussed earlier) may be critical.

*Archaic Research Issue 4: Do economic data from LA 111333 reflect a similar Archaic subsistence orientation to that of the Santa Fe area?*

Excavated Late and latest Archaic sites in the Santa Fe area demonstrate a reliance on wild floral and faunal foods. This subsistence pattern may not be replicated in the Tewa Basin. The few corn pollen grains recovered from LA 65006 near San Ildefonso Pueblo were of questionable origin, but the possibility that they indicate Late Archaic use of corn in the Tewa Basin cannot be ruled out from these data, just as it cannot be confirmed. There is a much clearer picture at X29SF2 near Nambé Falls, where numerous corn macrofossils were recovered in a latest Archaic context. Corn seems to have been part of the subsistence system in the Tewa Basin before it was used in the Santa Fe area, but the time depth of that differentiation is unclear.

Though corn was probably part of the latest Archaic (ca. A.D. 1–850 or 900) subsistence system in the Tewa Basin, this cannot yet be confirmed for the Late Archaic (ca. 1800–1 B.C.), based on current data. Since the buried occupational zones at LA 111333 seem to date to the Late Archaic, determining whether corn was an integral part of the subsistence system at that time is of critical importance. The absence of corn in a Late Archaic cold-season camp would indicate a close resemblance to the generalized foraging pattern visible in Late Archaic sites of the Santa Fe area. If corn macrofossils are found, however, this would represent a major departure from the Santa Fe pattern, and could indicate different subsistence opportunities, perhaps resulting from variation in climatic patterns allowing corn horticulture in the Tewa Basin, but not in the Santa Fe area.

Corn macrofossils are needed to confirm the use of corn in this area; the presence of corn pollen would not be as conclusive. This is because LA 111333 seems to have been used for farming during the Classic period, an assumption that is addressed in the next chapter. If corn was grown near the modern ground surface during the Classic period, pollen grains could have penetrated deeply into underlying sediments through bioturbation, potentially contaminating those deposits. Thus, unless an extremely high concentration of corn pollen is recovered from a context where contamination from later occupations would be unlikely, the presence of a few corn pollen grains would not be used to press the argument that corn was part of the Late Archaic subsistence system unless corn macrofossils were also recovered. Contexts from which corn pollen might be obtained and not considered evidence of contamination includes pollen washes from ground stone artifacts found cached upside down, and sealed or trash-filled storage features.

We expect to recover information suggesting a generalized hunting-gathering subsistence system involving the consumption of locally available wild plant and animal foods. In addition, we feel it is likely that these subsistence items were supplemented by limited corn horticulture. Thus, the expected pattern would be similar to that of the Basketmaker II adaptation in the San Juan Basin. Most of the food consumed at LA 111333 should represent foraging and hunting activities, with corn providing a predictable and storable resource that would have allowed longer stays in cold-season camps, requiring less movement around the landscape during that period of potential food shortages.

Subsistence data will be obtained from three sources. Faunal remains will hopefully provide information on the types of animals that were exploited for subsistence needs. Macrofloral materials should be recoverable using flotation analysis, and all contexts that appear able to provide this type of information will be sampled. Finally, pollen analysis may provide a more limited view of the subsistence system. In particular, pollen washes from ground stone artifacts may provide subsistence data that will augment information provided by flotation analysis.

*Archaic Research Issue 5: During what time of the year was LA 111333 used by Archaic people?*

As most of the other research issues discussed thus far should have made clear, determining the season of occupation represented by the Late Archaic remains at LA 111333 is of critical importance to this study. Because LA 111333 is similar to probable cold-season camps in the Santa Fe area in location, amount of charcoal present, and extent of cultural deposits, we assume that this site also represents a cold-season occupation. This possibility should be testable with information recovered by excavation at the site.

If LA 111333 was occupied during the cold season, one or more definable structures should be present. Unfortunately, we will only be able to examine a narrow section of site within the U.S. 84/285 right-of-way, so the absence of structures within project limits will not necessarily mean that none was present at the site. Structures could occur in sections of the site outside project limits, and we may only encounter materials representing associated activity areas or rubbish disposal. However, the presence of thicker cultural deposits in some areas investigated by testing may be indicative of structural remains within the right-of-way.

If structures occur, they will probably be fairly ephemeral and difficult to define because they should have been built in shallow pits without formal floor or walls. One or more thermal features should occur within each structure, there may be evidence of post holes for interior roof supports, and interior storage pits may be present. The occurrence of structures that lack internal thermal features and storage pits may be evidence for occupation during the warm season, and are not expected to occur.

Information on the season of occupation may also be obtained through study of macrofloral remains recovered from flotation samples. If a cold-season occupation is indicated, evidence for the processing of plant foods available in late summer or fall is expected. Plant foods available in the spring or early summer are not expected, unless there is evidence that they were stored in anticipation of future need. In particular, we expect corn macrofossils to occur, providing that this domesticate was available for use by site occupants.

Some evidence for seasonality may also be available from faunal remains, provided enough identifiable bone is obtained to allow analysis of subsistence patterns. If a cold-season occupation is reflected, we would expect evidence of 6-month-old artiodactyls, an absence of hibernating species like prairie dogs, and perhaps the presence of bird species that winter in the area. However, Archaic sites rarely yield well-preserved faunal remains, and most of the bone recovered from this type of site is usually either burned or very small unidentifiable fragments. Thus, faunal analysis may augment information available from structural remains and macrofloral fossils, but by itself is unlikely to provide data that are strongly indicative of seasonality.

In order to adequately assess occupational seasonality we must recover information on structure and feature type and interrelationship as well as macrofloral materials. Preliminary testing results suggest that these types of data may be available, though it is impossible to assess the quantity or quality of data that might be recovered at this time. A lack of adequate structural, feature, and macrofloral data will not necessarily render it impossible to address this research issue, but it would make it very difficult.

*Archaic Research Issue 6: What is the potential significance of a cluster of Late Archaic sites in the general LA 111333 vicinity?*

This question is closely tied to Research Issue 3, but expands that inquiry beyond a single site. A cluster of Late Archaic sites implying repeated occupations of a specific area over time suggests that some aspect of that location kept drawing people back. Currently, no information is available from other potential buried Archaic remains in the project area, other than the minimal information on LA 3297 provided by Miller and Wendorf (1958). However, if we are able to establish a relative degree of contemporaneity between LA 3297 and LA 111333, as well as establish that the various areas containing cultural materials at the latter represent different periods of occupation, we have a good example for the establishment of camps in the same general location over time. This study can be expanded if additional information from other sites in the area becomes available at a later time.

If, as we suspect, LA 111333 contains several small cold-season base camps dating to the Late Archaic period, some factor must have been drawing people back to that location. One way in which to explore this possibility is to examine subsistence-related remains from each area on the site in order to look for a common factor. An overwhelming presence of corn macrofossils in all three areas could be indicative of a favorable climatic regime in the area for farming. In this case, corn plots may have been planted nearby and left with little or no tending until harvest. At that time the people who had planted the corn returned, gathered their harvest, and stored it. This may have supplemented other food resources available in the area, allowing site occupants to remain in one place for an extended period of time during a season of food shortages. If this is the case, corn would be represented by husk and stalk fragments in addition to cobs, kernels, and cupules.

In the absence of corn, other plant foods may have provided a surplus that would permit a relatively long-term and repeated occupation of one locale. Piñon nuts are one such resource, and a heavy presence of shells or whole nuts might be indicative of this type of focus. Other factors may also have been at work. Perhaps the Rio Tesuque provided a dependable supply of water and foods available only in a riparian environment. Unfortunately, at this time we have no good idea what factor(s) might have led to repeated occupation of this locale by Archaic populations. Hopefully, data recovered from LA 111333 will provide some clues concerning the advantage conveyed by this occupational pattern.

This research issue will be addressed with data similar to those used in other inquiries discussed above. Indeed, this research issue is closely linked to most of those other inquiries. Analysis of site structure should help determine the pattern of occupation represented by the Archaic remains at LA 111333. If a pattern of repeated cold-season base camp occupation is demonstrated, subsistence information will be examined to determine whether it can shed light on why this locale was repeatedly occupied. Environmental data (including a reconstruction of the local environment derived from analysis of pollen samples) will be used to augment and amplify these data.

*Archaic Research Issue 7: Can the Late Archaic occupants of the northern Rio Grande be linked to the region's later Pueblo population?*

This research issue may be the most difficult to address, but it links the study of this site to the research emphasis of the U.S. 84/285 Santa Fe to Pojoaque Corridor project (Boyer and Lakatos 2000a). In the discussion of their Preceramic period (ca. 15,000 B.C. to A.D. 600), Wendorf and Reed (1955:134–138) presented only brief descriptions of specific artifacts and assemblages. They include Paleoindian artifacts from Sandia Cave and the Estancia Valley. They also include assemblages we now recognize as Archaic: Renaud's (1942, 1946) "Rio Grande Points" from the northern Taos Valley, Bryan's "Los Encinos Culture" artifacts from the Rio Chama Valley, the "Atrisco Points" (Campbell and Ellis 1952; Agogino 1952, 1953), Dick's (1943) aceramic assemblages from the Santa Ana and Albuquerque areas, and artifacts from Manzano and Isleta Caves (Hibben 1941). In their subsequent discussion of the Developmental period, Wendorf and Reed (1955:139) observed a scarcity of ceramic/pit structure sites contemporaneous with Basketmaker III and Pueblo I sites in the San Juan/Colorado Plateau region, and stated, "Some of the 'preceramic' material described above may actually represent, in part, occupation into this period.." They could not characterize or summarize the materials we have come to call Archaic, however, and concluded "Undoubtedly these nonceramic and preceramic finds in the Northern Rio Grande represent a considerable span of time. However, an evaluation of their significance in relation to the development of later ceramic cultures must await correlation with datable geological deposits and the establishment of a local stratigraphy" (Wendorf and Reed 1955:138).

Wetherington (1968) does not mention pre-Developmental period sites in his discussion of northern Rio Grande prehistory. Recognizing that there was no northern Rio Grande equivalent of Basketmaker, however, he relies on a migration scenario, probably from the San Juan/Colorado Plateau, to explain the appearance of Puebloan sites in the Developmental period. Similarily, McNutt (1969) does not mention pre-Developmental period sites, and relies on migration to explain the appearance of Puebloan sites. Dickson (1979) rejects the migration notion, apparently based on a conceptual disagreement with diffusionist models. While his survey did record several "possibly Archaic lithic sites" (i.e., aceramic sites), Dickson does not describe them because of "as yet unresolved problems of the Early Man and Archaic manifestations in the northern Rio Grande region." He does not specify the nature of those problems. Finally, Peckham (1984) also focuses entirely on Puebloan developments in the region, relegating the Archaic to a period between 5500 B.C. and A.D. 400 "when small, nomadic groups of hunters-gatherers explored the area and became familiar with its terrain, available resources, and climate" (Peckham 1984:276).

Neither Wendorf and Reed nor the later proponents and elaborators of their framework for northern Rio Grande prehistory were able to characterize the preceramic period, because, from the 1950s into, apparently, the 1980s, the sites and assemblages attributable to this period did not show the sorts of obvious patterning of artifacts and site structure that allowed normative characterization of later Puebloan developments. This is, it appears, a primary reason that pre- and aceramic sites received little attention until the late 1960s and early 1970s—they were almost impossible to examine within a normative cultural-historical paradigm. How does one classify a site with no diagnostic artifacts? The exceptions to this situation were obvious Paleoindian sites (i.e., those with known Paleoindian artifacts), which were spectacularly old (from a New World perspective), had impressive artifacts, sometimes with the remains of big animals, and were, therefore, more amenable to normative classification.

Irwin-Williams's (1973) definition of the Oshara Tradition allowed, for the first time, a true cultural-historical examination of the Archaic, because she attached dates to artifacts, creating a chronological sequence linked to diagnostic artifacts. Unfortunately, that is the focus of many archaeologists—use of the Oshara Tradition. Irwin-Williams's contributions regarding seasonality of resources and group mobility, formation, and organization, and how those factors are related archaeologically, have been given less attention than whether one can distinguish a Bajada from a San Jose point. As archaeologists bent on creating and recreating cultural-historical sequences for purposes of classification, we have, in the northern Rio Grande, replaced Wendorf and Reed's Preceramic period with Irwin-Williams's Oshara Tradition. On one hand, this is not unreasonable, since the Preceramic period was only poorly described and not at all understood in 1955—witness the difficulty with which Wendorf and Reed identified the period—and it encompassed a huge time span. Thus, by using the Paleoindian "sequence" of point types, and the Oshara Tradition phases, archaeologists have been able to carve the Preceramic period into chewable bites—smaller periods of time associated (hopefully) with diagnostic artifacts. This is not unlike the approach taken by those archaeologists who reject the Wendorf and Reed Classification in favor of the Pecos Classification, or who want to superimpose the latter upon the former, in order to cut the Developmental period into smaller units. On the other hand, the same problems incurred by correlating sequences appear in this situation, but earlier in our sequences. By not resolving issues of data patterns and paradigmatic lenses, the Oshara Tradition became a set of time periods, each identified primarily by a single projectile point style, into which sites and assemblages could be placed.

Interestingly, however, actual studies of Archaic sites in the northern Rio Grande have tended to examine them in a more ahistorical sense, in light of archaeological, ethnographic, and ethnohistorical research on historic and modern hunter-gatherers. Perhaps because archaeologists recognize that the Archaic, however it is defined in terms of economy, settlement, and other factors, took place over a long time, they seem not to feel constrained by time in the actual study of Archaic sites. One gets the impression that Archaic sites are often viewed just as Archaic sites, not within the continuum of time. Yet, surely we must concede that the demise of Pleistocene megafauna had impacts on hunter-gatherer bands that were different than the impacts brought on by the advent of horticulture, or the bow and arrow, or pottery—impacts on needs and uses for specific resources, access to those resources, mobility strategies for bands, parts of bands, and groups of bands, intra- and inter-band relationships, emphasizing and deemphasizing aspects of worldview and group identity.

Still, even if we define the Archaic in an "adaptational" rather than a temporal sense, the time period during which Archaic "adaptations" dominated the sociocultural-economic milieu of the Southwest, including the northern Rio Grande, was a long one, several millennia, during which the Archaic populations of the region developed the deep, canonical aspects of their cultural information and the inscribed behaviors that manifested them (sensu Rappaport 1979; Whitehouse 1992, cited in Buikstra et al. 1998:92). Those aspects provide the opportunity to look for evidence of continuities between Archaic and Puebloan populations.

### *Can We Link Archaic and Puebloan Populations?*

The transition from Archaic to Pueblo in the northern Rio Grande, both temporally and "adaptationally," has been examined by Post (2002; Akins et al. 2000; Post and Hannaford 2002), based primarily on the results of data recovery investigations near Peña Blanca and on the piedmont north of the Santa Fe River. Although preliminary in its conclusions, Post's research suggests that the advent of corn horticulture was a significant factor in changes involving group mobility and organization (Post 2002:3), which we would expect to be important in the development of early Puebloan communities. However, the processes of development of communities of semisedentary horticulturalists from bands of mobile hunter-gatherers—the changes in economy, mobility of bands and parts of bands, organization of bands, and other aspects of society and culture—have not been defined. As a consequence, the archaeological literature for the northern Rio Grande tends to reflect a break between discussions of the Archaic, however it is defined, and subsequent Puebloan developments, as though they were unrelated. This was certainly true of the early proponents and elaborators of the Wendorf and Reed reconstruction, as we noted earlier (although Wendorf and Reed, themselves, did not discount continuity between the Preceramic and Developmental periods). Probably, this is due to the perceived distance, in terms of economy, settlement, and social organization, between Archaic and Puebloan systems. It seems obvious, however, that there was continuity between Archaic and Puebloan peoples, temporally and socioculturally, or there was not, and that this should be testable.

In his examinations of northern Rio Grande pit structures, Lakatos (2000b, 2002) has shown that there is considerable continuity in the presence and orientation of several pit structure characteristics and features. These characteristics and features are present across the entire region, and persist through time from the earliest formal pit structures in the seventh-century to historic kivas. Persistence of this order, spanning the northern Rio Grande for well over a millennium, in the face of the numerous small- and large-scale disruptions of Puebloan life in the region, shows that the characteristics and features, and the cultural behavior behind them, is deeply embedded in Tanoan culture. They comprise an "emblematic footprint" that conveys "canonical information about ethnicity or cultural identity" (Lakatos 2000b:11). That is, in Whitehouse's (1992; cited in Buikstra et al. 1998:92) terms, the behavior is inscribed in Tanoan culture, and it conveys canonical (Rappaport 1979:179–184) cultural information. Canonical information is deep, embedded, and provides the foundation to a people's world view. It is changed only with difficulty, because to do so signals changing understanding of deeply-held world view issues: who we are, where we came from, how we relate to ourselves and our world, etc. In turn, canonical information is conveyed, both to those who hold it and those who do not, by way of inscribed behavior, behavior that is closely linked to the information, so that its presence is understood to convey the linked information. Repetition of inscribed behavior ensures that information is conveyed consistently and accurately.

It is with this in mind that Lakatos (2000b:11–12) is able to argue that "Local populations living in the northern Rio Grande during the Developmental period, and into the Coalition and Classic periods, share [the] same architectural pattern . . . Symbolizing cultural identity, in the form of pit structure architecture, connects the past to the present and the present to the future. With the building of each new structure, from Pecos to the Pajarito, their world view is reconfirmed." He concludes by asserting, "It is this persistent pattern, along with the absence of wing wall, benches, antechambers, recesses, and pilasters, which sets Rio Grande Developmental period pit structure architecture apart from the BM III to P III pit structures of the Four Corners and the San Juan Basin" (Lakatos 2000b:12). In other words, northern Rio Grande pit structure architectural patterns constitute inscribed behavior that conveys canonical information from Tanoan culture. Further, differences between inscribed behavior in the northern Rio Grande and inscribed behavior related to pit structures in the San Juan/Colorado Plateau region indicates that different cultural information was being conveyed; in effect, those differences convey differences in cultural identity.

It seems unlikely to us, and certainly testable, in any case, that canonical information like that being persistently conveyed from the earliest Developmental period structures to historic kivas was not present among those people of the northern Rio Grande who pursued an Archaic lifestyle, both before and following the advent of farming, bows and arrows, pottery, formalized structures, and other hallmarks of Puebloan developments. That is, of course, unless those people were rapidly supplanted or absorbed by farming immigrants holding a worldview whose canonical information and inscribed behaviors quickly overshadowed those of the "natives." After all, if we view the Archaic in a temporal sense (our own definition notwithstanding), it lasted for some six millennia, which was plenty of time to develop some deeply embedded canonical information, and behavior to go with it.

If the "natives" of the northern Rio Grande were Tanoans, which seems likely (Moore 2002), then early Puebloan economy, settlement, and social organization spread through the region, from north to south (Lakatos 2000b, 2002), by expansion of a "puebloan population *over* the "native" Archaic population, or by diffusion of farming, pottery, and "permanent" architecture *through* the "native" Archaic population, or both. In any case, that spread happened on a Tanoan base, as the Tanoans have likely been in the region the longest. Thus, the economic, settlement, social organizational, and, no doubt, ideological, changes associated with the spread of Puebloan developments across the northern Rio Grande were likely grafted to existing Tanoan ideology and world view, and became expressed in Tanoan ways.

Investigations of Archaic sites in the northern Rio Grande, even those like LA 111333 that are considerably older than the Archaic-Puebloan transition beginning in the sixth or seventh centuries A.D., provide us with opportunities to examine Tanoan economy, settlement and land use, and social organization before the Tanos became Pueblos. As such, Archaic sites do not provide information only about hunter-gatherers who occupied the region, mostly before the period in which we can recognize Puebloan sites. That is, Archaic sites in the northern Rio Grande are not just about the Archaic. They are about the Tanoan Archaic. They provide us with opportunities to investigate continuities and discontinuities between Tanoan hunter-gatherers and Tanoan farmers, between Tanoan mobility and Tanoan sedentism, between Tanoan bands and Tanoan communities. They provide us with the opportunity to determine whether canonical information, conveyed by inscribed behavior, such as that in Developmental period and later Tanoan architecture and communities, was present in Archaic Tanoan life or was brought to them along with corn, pottery, and pit structures—that is, how deeply embedded is that information? In turn, comparison of Archaic sites and assemblages in the northern Rio Grande with those in the San Juan/Colorado Plateau region may help us understand whether the ethnic/cultural differences that Lakatos sees in the "emblematic footprints" of northern Rio Grande and San Juan pit structures were also present among Archaic peoples of the two regions.

Clearly, even should it contain numerous structures, features, and artifacts, LA 111333 will not provide all the information needed to adequately address this issue. Nonetheless, we anticipate that LA 111333 will provide an opportunity to obtain site structural and artifactual data that will be valuable for understanding the Archaic in the northern Rio Grande, both as itself and as the precursor to the region's Puebloan developments. The types of data needed to implement this part of the study include, but may not be limited to, detailed plans of dated Archaic structures and features. Ideally, several Archaic structures and features will be encountered at LA 111333, from which we can derive information about the individual structures and features, and about their relationships to each other and to artifacts recovered from the site. However, we will not limit the consideration of this research issue to a single site. Rather, we will collect data from Archaic pit structures, features, and artifacts that have been excavated in the northern Rio Grande for which sufficient information exists. These data will be compared with information derived from Archaic sites excavated in the San Juan Basin in order to compare and contrast any patterns that might be identified. In turn, these results can be compared with patterns derived from studies of early Puebloan sites in order to determine whether there is a continuity of canonical information encoded in structure form and layout and in site structure that might be indicative of a similar continuity in population. Though the results of this analysis may not be conclusive, they may help direct us toward the collection of ancillary data that will help in the pursuit of this goal.

# 7
# EXAMINING THE CLASSIC PERIOD FIELD STRUCTURE AT LA 111333

James L. Moore

## Models of Field Structure Use

Recent analyses of Pueblo field structures have focused on several potential uses in addition to the obvious agricultural function. Preucel (1990a) feels that they developed in response to increasing competition over arable land caused by population growth and aggregation. He defines four patterns of population circulation between residential villages and farmland (Preucel 1990a). In a daily circulation pattern, farmers moved between their residence and fields on a daily basis, and overnight stays were unnecessary. A periodic circulation pattern occurred when occasional stays of at least a night were needed. Seasonal circulation entailed an absence from the permanent residence for at least an entire season. Finally, a long-term circulation pattern was represented by absence from the main residence for more than a year. This discussion is only concerned with the first three of these patterns.

In general, daily circulation occurred when fields were near the permanent residence and overnight or longer stays were not required. Periodic circulation probably occurred when fields were somewhat more distant from the residence and overnight stays were sometimes necessary. Both of these patterns were associated with the use of fieldhouses, which were fairly insubstantial structures that could be used as shelters during the work day or when overnight stays were required. More substantial structures would be required for a seasonal circulation pattern, and in this study are categorized as farmsteads to distinguish them from fieldhouses. These circulation patterns are not mutually exclusive in a settlement system. Some fields may have only needed to be visited daily for maintenance while others may have required stays of longer duration because of distance from the main residence, threat of predation, or higher labor costs resulting from use of water and soil control features.

Seasonal circulation generally (but not always) was associated with use of distant fields by farmers living in large aggregated communities where competition for farmland was severe. As Preucel (1990a) notes, the concept of dual residence is central to this pattern, in which more than one residential locale was occupied and rights and interests were maintained in more than one habitation. Villages and hamlets represent permanent nodes of residence, while seasonally occupied locales were fieldhouses and farming communities. It should be noted that Preucel's (1990a) study does not distinguish between fieldhouses and farmsteads as does this analysis.

Preucel's (1990a) model considers patterns of population circulation between fields and villages to be the result of two processes—population growth and aggregation, and distance of fields from the main residence. Other models consider these processes to be less important. Kohler (1989) feels that use of field structures was as closely related to land tenure as it was to population circulation. Thus, many field structures may have been built as visual representations of vested rights in farm land. When built in areas containing land of low value, field structures may evidence signs of only light use and should contain few artifacts and features. In contrast, when built in areas of valuable farm land there should be evidence of long and heavy use. Thus, rather than suggesting circulation patterns, the features and assemblages contained by these sites are more representative of the value of land and the longevity of its use.

In addition to these models, Orcutt (1990) feels that field structure location may be related to environmental conditions that affected the distribution of arable land. She divided field structures at Bandelier into large and small categories. More large field structures were expected to occur in canyon bottoms because those areas contain the best arable land. Smaller field structures were expected on mesa tops because those areas had lower farming potential. However, the actual pattern was quite different from her expectations. Large field structures dominated on mesa tops, while there was a nearly even split between small and large structures in canyon bottoms. She suggests that this might be because use of canyon bottom lands was at a maximum, requiring more farming in mesa top fields that required intensive care, possibly including water conservation. Orcutt (1990) also concluded that the distance model presented by Preucel seemed to apply to her study at Bandelier, but did not explain all field structure locations. Tests of Kohler's ideas concerning field structures as visible signs of land tenure did not turn out as expected either. Thus, field structure locations were not completely explained by the environmental model, circulation patterns, or land tenure.

It is unlikely that field structures had only a single function in prehistoric farming systems. All three of these models are probably applicable to one degree or another. Distance from the main residence seems to have been an important aspect of field structure use, but the close proximity of some structures to villages suggests that land tenure concerns were also at work. The distribution of arable land across the landscape was also an important aspect of field structure use, and was closely related to both of the other models.

Unfortunately, these models are based on survey data alone, and environmental processes like soil erosion and aggredation that are totally unrelated to cultural use could be affecting archaeological remains. Site sizes can be both enhanced and concealed by these processes. In addition, dates can only be based on associated diagnostic artifacts, which may be sparse or nonexistent. Further, it is difficult to accurately assign a pattern of use from surface indications alone.

All small structural sites are considered field structures rather than residences in these studies, and this may be an incorrect assumption. Preucel (1990a) conjectures that seasonal circulation patterns were present on the Pajarito Plateau in the Early Coalition period, but were extremely limited. Some field structures were identified, but the settlement system was dominated by hamlets (population aggregates lacking ritually integrative features), with a few villages (population aggregates containing ritually integrative features) and no farming communities (seasonally used communal dwellings) being represented. Seasonal circulation first became important in the Late Coalition period, though hamlets still dominated and only a few villages and farming communities occurred. The importance of seasonal circulation increased dramatically during the early Classic period with villages, field structures, and farming communities increasing in abundance and hamlets becoming rare. Finally, during the late Classic period the pattern of seasonal circulation remained unchanged, with hamlets continuing to be rare and the occurrence of farming communities decreasing.

This is a very interesting pattern, but it is flawed by a lack of corroborating excavation data. This is demonstrated by the results of a detailed study of sites in Cochiti Reservoir. Biella (1979) indicates that small sites of one to three rooms were used during both the Pueblo III and Pueblo IV occupation of that area. The Pueblo III period (A.D. 1100 to 1300) overlaps the Late Developmental and Coalition periods of the Rio Grande sequence, while Pueblo IV (A.D. 1300 to 1540) overlaps the Late Coalition and Classic periods. Significant differences were noted between small structural sites in these periods. Excavation showed that most small Pueblo III structural sites were well built, with plastered floors and mortared walls. Internal hearths were found in all but one of the structures in this category, and small bins and cists occurred in about half. In contrast, most small Pueblo IV structures had dry-laid masonry walls that often incorporated boulders. A few pitrooms were also represented, and were the only rooms to contain plastered floors. Hearths were found in about half of these structures, but were mostly represented by simple burned areas on unprepared floors rather than the formal features found in Pueblo III structures. In the few Pueblo IV sites containing two or three rooms, there was a tendency for one room to evidence slightly more labor input, with some coursing in walls, and some mortaring of walls or plastering of floors.

These data led Biella (1979) to conclude that the small Pueblo III structures represented habitations occupied by single commensal groups. In contrast, the small Pueblo IV structures seem to have been occupied seasonally. While the Pueblo III sites were suitable for cold-weather use, this was rarely true of the Pueblo IV sites. Thus, a significant difference in the use of this class of site through time was demonstrated by excavation. This type of distinction is usually impossible to discern when only survey data are used, and a similar pattern might be obscured in studies based on surface data alone. Thus, the few field structures identified by Preucel (1990a) as evidence of limited seasonal circulation during the Coalition period might actually be small residential sites, similar to those excavated at Cochiti Reservoir.

Models of field structure use based solely on survey data should be applied with caution, but they are useful and can be tested with greater accuracy as excavation data become available. Unfortunately, the excavation of a single farmstead will not allow a comprehensive test of any model. However, by determining the type of use pattern exhibited by the Classic period component at LA 111333, we will be able to compare it with the extant models and, hopefully, determine what pattern of use is represented by this small site component. As more data on excavated field structures become available, these models (as well as others that might be developed) can be more carefully evaluated and their accuracy assessed.

### Fieldhouse or Farmstead?

The behavioral aspect of interest for the Classic period component at LA 111333 is the use of small sites. Pilles and Wilcox (1978:1) define small sites as those "whose size and artifactual assemblage suggest a limited temporal occupation by a small group of people, gathered at the locality to carry out a specific, seasonally-oriented set of activities."

In a Pueblo context, small sites reflect sets of activities that may or may not have also been performed at the primary residence. By studying small sites, it may be possible to isolate material traces that are indicative of discrete activities. Recognition of such traces can be an invaluable adjunct to the investigation and analysis of more permanent sites, where specific tool kits inevitably become mixed and obscured by later activities. More importantly, small sites like LA 111333 represent part of the general Puebloan adaptive system. If only major villages are studied, our conclusions concerning prehistoric life will be skewed. By studying sites of all types we can develop a more accurate picture of prehistoric life.

The small size and location of LA 111333 suggest that it was used by persons involved in agricultural pursuits. Sites of this nature are usually defined as fieldhouses. Unfortunately, this term has been applied to remains ranging from ephemeral clusters of rubble associated with sparse lithic and ceramic artifact scatters to substantial masonry structures of one to three rooms with associated middens. This tends to obscure variation in settlement systems and patterns of land use over time. Where one end of the continuum may represent ephemeral structures used for shelter during the work day or for overnight stays of limited duration by task-specific groups, the other suggests residence by an entire family for a season or more while engaged in farming. This variation may be indicative of the relationship of inter- and intragroup competition for arable land, the distribution of land suitable for cultivation, and the relative importance of farming in the subsistence system.

Preucel (1990b:3–4) characterizes the Anasazi agricultural system as a network of permanently and seasonally occupied nodes. Villages and hamlets represent permanent nodes from which individuals circulated while fulfilling economic, cultural, and social needs. While much of the population may have resided at other locations during part of the year, these segments of the settlement system are considered permanent because they represent the nodes from which circulation originated. Villages were characterized by relatively large populations, and contained features related to systems of ritual integration. Like villages, hamlets contained larger populations than seasonally occupied nodes, but lacked ritually integrative elements like kivas. Hamlets were closely linked to villages through kin ties, and though they were occupied on a permanent basis, the population circulated between the two as social and ritual duties needed to be performed. Two types of seasonally occupied nodes are recognized—farming communities and fieldhouses (Preucel 1990b:3–4). The former are small communities occupied during the growing season by more than one extended family group. Historically, many farming communities have become permanently occupied hamlets. Fieldhouses were small residences occupied during the growing season by nuclear families, and exhibit a tremendous variability in form. Both types of seasonal nodes lack ceremonial features.

This model is interesting because it provides for the use of multiple residences on a yearly basis rather than presuming that all activities originated at the primary locus of residence (village). Ethnographically, this seems to have been the norm. Bandelier (1892:15-16) noted that:

> Cultivable soil need not be in the immediate neighborhood of a village, or be contiguous to it. A pueblo might be, as is Acoma today, ten or even fifteen miles from its fields. The custom of emigrating en masse to these fields in summer, leaving at home only a small portion of the people to guard it, explains why we find ruins in places where the nearest tillable patch is quite distant.

While Bandelier's application of this process to prehistoric sites may be questionable, it was quite common in the historic pueblos:

> . . . there is the same tendency to huddle together in winter for protection and shelter, the same inclination to a change of abode in the summer, in every pueblo from Taos to Isleta, from Nambé to Zuñi and the Moquis. In summer, as is well known, the pueblos are nearly deserted. The Zuñis move to Pescado, to Aguas Calientes, to Nutria, etc., at distances of ten to twenty miles away; all the other tribes emigrate into their fields, leaving but a few families at home, until the time comes for housing the crops. Then the return begins, one after another the summer ranchos are abandoned; their inmates move the few household utensils they have taken with them in spring back to their original quarters. . . . (Bandelier 1890:313–314)

Unfortunately, ethnographic observations like these must be applied to prehistoric sites with great care. For example, it is possible that historic farming communities and hamlets developed as village movement became circumscribed by Spanish Colonial law. By giving land ownership a legal definition, the ability of villages to relocate became restricted. The decision to move a settlement no longer belonged to villagers, but was now the purview of the colonial government. Thus, development of farming communities and hamlets may have been a function of European law rather than custom. Since the village could not relocate to a more suitable area, new locales were occupied seasonally and people returned to the main village after harvest.

Conversely, the use of farming communities and hamlets may have begun during the prehistoric period, and could represent an outgrowth of the development of large and closely integrated villages. The concentrated population of a large village would require at least the same amount of farmland as would a dispersed population of the same size; however, concentrating farmers in one location required some to cultivate distant fields. As the distance of fields from the village increased, so did the need for a nearby temporary residence. This need had an economic basis—as the distance to fields increased, so did the amount of time spent in travel. Additionally, the further fields were from the village, the more vulnerable they were to predation, both by animals and other humans. At times, groups of farmsteads may have formed dispersed communities, linked by kinship ties and membership in the same ritually integrated population (village). Eventually, such dispersed communities could become more closely integrated and form a hamlet, residing permanently away from the main village while maintaining kinship and ritual ties. Finally, when relocation became necessary or desirable, hamlets may have formed nuclei for new villages.

Little of this can be addressed by investigations at one site. However, this discussion does provide a perspective for examining information gathered from LA 111333. A small site represents only part of the settlement and adaptive system in which the occupants participated. Thus, it cannot be studied in a vacuum; regional data must be integrated with information obtained by more intensive studies to provide a comprehensive picture of the settlement and adaptive system. Dating will be critical in determining whether LA 111333 represents part of the traditional Pueblo settlement system or is indicative of changes caused by the imposition of a new legal and economic system by Spanish settlers. Another important question that must be addressed is where this site fits in the Pueblo settlement system—was it used on an erratic basis by a task specific group, or was it a seasonal residence occupied by a nuclear family? Until specific dates and function are assigned, it will not be possible to understand the role it played in the Pueblo settlement and adaptive system.

*Fieldhouses versus Farmsteads*

Bruce Moore (1978, 1980) presents detailed discussions of pueblo fieldhouses, or seasonally utilized farm shells (SUFS). He defines SUFS as architectural shells used seasonally by farmers for agrarian activities, which generally occur within or in close visual proximity to fields (B. Moore 1978:10). Wilcox (1978:25-26) essentially agrees with this definition, describing fieldhouses as architectural components of the subsistence-settlement system used as temporary residences located near or within fields or gardens and used during the growing season. They may contain storage facilities, but this is not necessary. These definitions make two aspects of the SUFS concept quite clear—they are located near or on agricultural land, and they are temporarily occupied.

Wilcox notes two important distinctions. First is the difference between fieldhouses and farmsteads. Fieldhouses are occupied seasonally by part of a family, and farmsteads serve as year-round residences for entire families (Wilcox 1978:26). A second distinction is made between temporary and masonry fieldhouses. The latter may have appeared coincident with the development of water and soil control systems, reflecting greater labor investment in agriculture (Wilcox 1978:28). It is possible that both types of features (masonry fieldhouses and water and soil control systems) correlate with increased frequency of field use and an attendant reduction in the fallow cycle, as well as with changes in the land tenure system (Wilcox 1978:28).

This distinction is important, and has been modified for this discussion. Rather than representing year-round occupation by a single family, farmsteads are a variety of seasonally occupied farming shell. In our model, year-round residency at a site suggests it was a permanent node and should be considered part of a dispersed community or hamlet. This distinction demonstrates an interpretive problem in Pueblo archaeology. Small structural sites are often recorded individually and considered to be independent occupational units, particularly when they contain a kiva. However, provided their basic function has not changed significantly in the last six to eight hundred years, kivas were used by organizations whose membership crosscut a range of kin groups and they reflect ritually integrative mechanisms at a community rather than kinship level. Just as every discrete group of rooms in a large village does not contain ritual space, it is not necessary for every roomblock in a dispersed community to have a kiva. Studies in the San Juan Basin (Marshall et al. 1979; Powers et al. 1983) and at Mesa Verde (Rohn 1977, 1989) have identified dispersed communities comprised of noncontiguous roomblocks, many lacking kivas. Rather than reflecting a "rejection of the cheek-by-jowl existence of communal living" (Wilcox 1978:26 citing Bloch 1966:11), small permanent pueblos more likely represent segments of dispersed communities, whether kivas are present or not. Thus, small structural sites lacking kivas cannot be assumed to have functioned as fieldhouses or farmsteads. Only by looking for evidence of seasonal residence by task-specific groups or families can these varieties of SUFS be distinguished from small roomblocks belonging to a dispersed village.

B. Moore (1978:10, 1980:9–10) has presented two lists of characteristics defining SUFS that can be combined into a model of expected SUFS attributes, which can be tested and refined by ethnographic and archaeological data. Though a rigorous test is beyond the scope of this study, the fit of observations made during data recovery to the expected pattern can be examined, and comparisons can be made to earlier studies of field structures that also used this model (Moore 2001, 2002). The following variables comprise the model:

1. *Site morphology and composition:* Though SUFS may vary in morphology and composition, no more than three rooms should be present. Each room should share at least one wall with another room. At least one room should be large enough to permit occupation by at least one adult. Floor areas should be (roughly) no larger than that of contemporaneous habitation rooms in the same settlement system. The structure should be isolated; no other contemporaneous

architectural unit should be present.

2. *Ritual architecture:* Kivas and other ritual features should be lacking. As temporary components of the settlement system, SUFS lack ritual functions.
3. *Site location:* SUFS should be located where their view of nearby fields is unimpaired.
4. *Material remains:* The range of activities reflected in the artifact assemblage at a SUFS should be limited relative to habitation sites or villages.
5. *Pattern of use:* One or more of three patterns of use should be evident: (a) daily, where overnight use is restricted to the period of crop ripening; (b) seasonal, with continuous use during the farming season; (c) throughout the year by travelers.

SUFS exhibiting evidence of daily use by task-specific groups with limited overnight stays (pattern a) are fieldhouses, while those evidencing seasonal occupation by entire family groups (pattern b) are farmsteads. Occasional use by travelers and wayfarers (pattern c) should be archaeologically invisible since transitory overnight use normally leaves few material remains behind.

Other aspects of SUFS are more amenable to study at the regional level, but are mentioned because they are important to understanding the model. B. Moore (1978:11) feels that SUFS result from inconvenience rather than site aggregation, with the perception of inconvenience being sufficient reason to construct them; site aggregation alone is not a satisfactory explanation for their use. Additionally, SUFS and other small sites were extensions of the village. As such, villages cannot be studied in isolation; they are inextricably linked to support sites located around them, and no single site is representative of the entire adaptive system. Finally, SUFS probably contributed to social stability. Besides providing shelter for farmers, SUFS may have served as refuges for people who were weary of some aspect of village life and needed to escape from domestic tensions. This ability may have acted as a safety valve, preventing conflict and stress from building to the point where fissioning was the only alternative. At the very least, this mechanism may have slowed the process of group disintegration. However, it is doubtful that the resolution of conflict was responsible for the development of SUFS; rather, it is more likely that this function originated after they came into use.

*Testing the Model*

The test implications listed below should help determine whether LA 111333 was a fieldhouse, a farmstead, or part of a dispersed community. While it is unlikely that each test implication can be examined in detail with data from only one site, enough information should be recovered to allow an evaluation of site function relative to the SUFS model.

1. Site morphology and composition: If LA 111333 was a fieldhouse, the following characteristics are expected:
   a. A field shelter should be present. Possible types include shades, ramadas, or small structures. If a structure is present it should contain at least one and no more than three rooms.
   b. If more than one room is present, each should share at least one wall with another room.
   c. At least one room should be large enough to permit occupation by at least one adult.
   d. Floor areas in rooms should be consistent with the average for contemporaneous villages of the same settlement system or cultural tradition.
   e. There should be no other contemporaneous structures present.
   f. Evidence of substantial architectural effort should be absent. Structures should lack full-height masonry or adobe walls. Architecture should be unsuitable for cold season use.

If LA 111333 was a farmstead:

a. More than three rooms may be present.
b. If multiple rooms are present, each should share at least one wall with another.
c. One or more rooms should be large enough to permit occupation by more than one adult.
d. Floor areas in rooms should be consistent with the average at contemporaneous villages of the same settlement system or cultural tradition.
e. There should be no other contemporaneous structures present; however, detached shades or ramadas providing exterior work space may be associated.

f. Evidence of substantial architectural effort may be present. Structures might possess full-height masonry or adobe walls. Architecture may be suitable for cold-season use.

If LA 111333 was part of a dispersed community:

a. The number of rooms in individual structures will vary considerably—while there may be as few as one or two rooms present, there can also be more than three.
b. If multiple rooms are present, they may not form a contiguous roomblock.
c. One or more rooms should be large enough to permit occupation by more than one adult.
d. Floor areas in rooms should be consistent with the average at contemporaneous villages of the same settlement system or cultural tradition.
e. Other contemporaneous structures should be located nearby.
f. Evidence of substantial architectural effort should be present. Structures should possess full-height masonry or adobe walls. Architecture should be suitable for cold-season use.

Though subjective judgments are included in this set of characteristics (how much space is required by a single adult?), most are quite specific. Excavation of the structure and examination of the site for evidence of features that were not visible during surface inspection will facilitate comparison of observed site morphology with expected patterns.

2. *Ritual architecture:* Ritual architecture will be absent if the site was a fieldhouse or farmstead. Ritual objects related to farming may occur, but are not expected. If LA 111333 was part of a dispersed village, kivas and other ritual features may be present and generalized ritual objects might be recovered.
3. *Site location:* Land with agricultural potential should be located in direct line of sight with the structure if LA 111333 was a fieldhouse or farmstead. If it was part of a dispersed village, arable land should occur nearby but will not necessarily be in direct line of sight.
4. *Material remains:* The artifact assemblage should reflect a limited range of activities related to farming and equipment maintenance if the site was a fieldhouse. Trash should be surficial or restricted to shallow subsurface deposits. Material remains will be more substantial if the site was a farmstead. A midden should be located near the structure, and a range of activities suggesting occupation by an entire family should be reflected in the assemblage. Material remains should be even more substantial if the site was part of a dispersed village. A midden should be located 5+ m away from the structure, and a range of activities suggesting occupation by at least one family should be reflected in the assemblage.
5. *Pattern of use:* A limited-use pattern should be evident if LA 111333 was a fieldhouse, reflecting daily use with occasional overnight stays. There should be evidence of continuous occupation for at least a season if it was a farmstead. Evidence of year-round occupation should be present if the site was part of a dispersed village.

The latter is perhaps the most difficult characteristic to study, because the two use patterns proposed for SUFS may be indistinguishable from one another and, in some cases, from year-round occupancy. Fieldhouses should produce the fewest remains. Food preparation tools may be present, but food processing tools should be rare or nonexistent. Thus, manos and metates should be absent, and if present should demonstrate low cost and have little value beyond their immediate use. Artifacts associated with farming or tool maintenance may occur. Evidence of hunting or wild plant gathering might be present, but the processing of these foods should have occurred elsewhere unless they were used immediately after collection. Small animal remains should predominate in the faunal assemblage, reflecting hunting in fields to eliminate small herbivores or omnivores. Hearths should be outside the structure and designed for food preparation rather than heating. No human burials should occur at fieldhouses.

Farmsteads should contain artifacts reflecting a wide range of food preparation, tool production, and maintenance activities. Architecture suitable for cold-season use and interior hearths built for heating and cooking may occur, but ritual objects and features should be absent. There should be evidence of food processing as well as preparation—manos and metates might be present; in particular, if they would be broken or evidence little investment in manufacture. Trash disposal patterns may be less standardized and more haphazard than at sites occupied year-round. Middens should be shallow and may be very near the structure. There should be evidence of the consumption of a wide range of animal types and sizes. Human burials will be rare if they occur at all. Burial of more than a single individual is not expected, and the site may have been abandoned immediately after an inhumation occurred.

Year-round occupancy should be reflected by a wide range of food preparation, tool production, and maintenance activities in the assemblage. Architecture should be suitable for cold as well as warm-season use, and interior hearths should have been built for heating and cooking. Ritual architecture or objects may be present. Trash disposal should be standardized, with middens located 5+ m from the structure; trash deposits may be deep. There should be evidence of the consumption of a wide range of animal types and sizes. One or more human burials may occur, with placement in rooms, middens, or both. Site abandonment immediately after an inhumation occurred is not expected.

*Data Required to Test the Model*

Testing results suggest that the Classic period component at LA 111333 was a fieldhouse or a farmstead, and that the former is most likely. Data needed to test this proposition include architectural style and building techniques, feature types and placement, occupational date, range of activities performed, seasonality, location of fields, and the types and distribution of other components of the contemporary settlement system. More intensive investigations during data recovery should provide most of the requisite information. The exception to this are data concerning the contemporary settlement system, which must be obtained from other sources such as earlier survey, testing, and excavation projects.

Architectural data will be recovered by totally excavating any structural remains than may still be present. Surface stripping and augering will be used to examine areas where external features that were not identified during earlier investigations might exist. Chronometric data will be recovered when available, and may include radiocarbon, tree-ring, and archaeomagnetic samples in addition to temporally diagnostic ceramic and lithic artifacts. By using several chronometric techniques to provide dates it should be possible to determine whether some of the results are erroneous. Inconsistent dates could reflect site reoccupation, use of old wood in fires, collection of artifacts from earlier sites for reuse, or the presence of an earlier component.

At least some information on subsistence and range of activities performed should be available from feature deposits and the artifact assemblage. However, testing results suggest that the artifact assemblage is very limited in size and the materials reflect the range of activities. Few data reflecting subsistence are expected to be recovered. Both of these expectations are related to the presumed function of this component, as well as the extent of damage sustained prior to testing. Ground stone tools used for processing vegetal foods may be present, but are not expected. The chipped stone assemblage should reflect a narrow range of activities related to farming tool maintenance and perhaps hunting. Ceramic artifacts should reflect food consumption and perhaps preparation, but no evidence for food storage should be present.

Floral and faunal remains can provide data on activities occurring at the site as well as seasonality. If faunal remains are recovered it may be possible to suggest whether hunting was restricted to fields (rodents and small herbivores), occurred throughout the area (small to large animals including nonherbivores), or occurred in another part of the settlement system (limited body parts represented). Floral remains may be obtained by taking flotation samples from features and cultural deposits. The presence of wild plant foods is indicative of collecting activities and can help determine the season of occupation as well as the relative importance of such foods in the diet. Faunal remains can also provide information on seasonality and the importance of wild dietary supplements. These data can help determine whether the site was occupied seasonally or year-round, and could be of critical importance in determining whether LA 111333 was indeed a fieldhouse.

If LA 111333 was a fieldhouse, fields should have been located near or next to the structure. As the site is at the edge of a perennial stream valley, the most likely location for fields is on the floodplain next to the stream, but that area is unfortunately outside project limits and cannot be investigated. Studies of Pueblo farming in other areas indicate that rather than concentrating farming efforts in one zone, Pueblo farmers tended to spread their fields across the landscape to take advantage of the generally patchy distribution of adequately watered arable soils, and to ensure that no single disaster would destroy an entire crop (Bradfield 1971; Moore 2002).

Studies near Taos and Pecos have shown associated surface artifact scatters adjacent to field structures with agricultural fields (Moore 1994, 2002). The surfaces of both of these fields were covered by diffuse scatters of lithic and ceramic artifacts lacking features, and in both cases analysis of subsurface sediments showed that these areas were used for growing corn. Though a similar diffuse surface artifact scatter was not found in association with the small structural mound originally present on LA 111333, there is a small nearby site (LA 111332) to the south that contains two clusters of artifacts (Hohman et al. 1998). Limited reconnaissance from the current highway right-of-way suggested that small farming features may also be present in this area. Thus, LA 111332 may represent fields associated with the farming structure at LA 111333. Though LA 111332 is outside the limits of this project and therefore is unavailable for further study, samples taken from within project limits near LA 111332 may contain evidence of farming in the area, and will therefore be obtained.

# 8

# FIELD DATA RECOVERY METHODS


## Jeffrey L. Boyer and James L. Moore


This chapter provides a general overview of the techniques that will be used during data recovery investigations. The same general methods will be used to examine LA 111333 as are used at all sites in the U.S. 84/285 Santa Fe to Pojoaque Corridor project area, although, since all sites have unique characteristics, it is usually necessary to tailor investigative techniques to individual cases. This may include selecting certain areas for excavation, how areas around features are treated, and whether or not mechanical equipment is used. For more detailed coverage of project excavation methods, the reader is referred to the field manual (Boyer et al. 2000). This chapter also provides discussions of field data recovery methods specific to the two components identified during testing investigations at LA 111333.

### General Field Methods

#### *Horizontal Provenience: The Grid System*

The first step in excavation will be to redefine the Cartesian grid system that was established during testing. The main site datum, also established during testing, will be used to reference all horizontal and vertical measurements. The main datum will only be moved if it is in an area that will be affected by excavation, or if it is removed or damaged during the time between investigation phases. A plan of the site will be prepared, illustrating the locations of excavation areas, structures, and features.

Surface collection and excavation units will be linked to the Cartesian grid system. These units will be identified by the grid lines that intersect at their southwest corners. Grid units measuring 1-by-1 m will be the basic excavation units used unless they are not the most efficient unit of excavation. This is particularly true in structures. Removing fill from structures, except when on or just above floor, by grid units may provide greater levels of horizontal and vertical control than are needed or desired. In addition, it can be very time consuming. While it is important to know which soil stratum is represented, the grid location may not be as meaningful. Of course, both horizontal and vertical controls are important when deposits reflect specific cultural activities. Thus, excavation units may differ in size depending on the nature of the deposits being investigated.

It must also be remembered that grid systems are artificially imposed over sites. They are simply constructs used to provenience cultural materials and features so that their original relationships can be preserved for later study. Rarely do features conform to a grid system. When features are large it may be desirable to excavate by grid unit to obtain detailed data on placement of materials within them. However, excavation in grid units is often awkward in small features, especially when they extend into one or more units. Thus, features, rather than the grid units in which they occur, will usually be treated as independent excavation units.

#### *Vertical Provenience: Strata and Levels*

Two methods will be used to record vertical excavation units: strata and levels. Soil strata will be assigned unique numeric designations as they are encountered, and descriptions of each will be recorded on individual forms. Since the surface represents an arbitrary layer with no thickness, it will be designated Stratum 0 at each site. In order to track the sequence of strata from one area to another, each vertical excavation unit will also be assigned a level number, beginning with the surface. Again, since the surface is an arbitrary level with no thickness, it will be designated Level 0. The first vertical excavation unit to be dug will be labeled Level 1, the second Level 2, and so on. Since stratum and level numbers represent two completely different series, stratum numbers may not be in sequence as excavation proceeds downward, while level numbers will always be in sequence.

Just as the grid system will be linked to the main datum, so will all vertical measurements. All measurements will be made in meters below datum (mbd) to avoid problems encountered when dealing with both positive (below datum) and negative (above datum) measurements. In this case, vertical measurements will be made consistent by assigning the main datum at each site an arbitrary elevation of 10.00 mbd. Since it is often difficult to provide vertical control for an entire site with one datum, subdatums will be established. Horizontal and vertical control of these points will be maintained relative to the main datum.

Before it is possible to delimit the extent and nature of soil strata it is usually necessary to examine them in cross-section. This requires the excavation of exploratory units, which will consist of 1-by-1-m grid units excavated in arbitrary 10-cm vertical levels. When natural divisions—soil strata—have been defined, they will be used to delimit the boundaries of a level. Outside exploratory grid units, soil strata will be used as the main units of vertical excavation. Exceptions may include noncultural deposits and cultural strata that are very thick and need to be subdivided to make excavation easier.

Vertical treatment of deposits will vary according to their nature. Cultural deposits will be carefully excavated to preserve as much of the vertical relationship between materials as possible. Although the relationship between artifacts in noncultural deposits is rarely meaningful, horizontal and vertical control will be maintained when appropriate. For example, abandoned structures were sometimes used for trash disposal, filling with debris discarded by the inhabitants of nearby houses that were still occupied. Conversely, others were simply left open to the elements, filling naturally with a combination of windblown soil and colluvial sediments. Cultural materials will usually be present in both cases, yet they have completely different meanings. Trash represents materials that were purposely discarded, and can often be separated by strata to determine the sequence of deposition. This may allow researchers to look for minute changes in the artifact assemblage. Artifacts in naturally deposited strata rarely have any similar meaning. Cultural deposits require careful excavation to preserve the relationship between artifacts discarded at different times. Noncultural deposits tend to be jumbled, and relationships between artifacts are almost always obscured because they were moved from their original contexts and redeposited.

Thus, accurate vertical controls may be unnecessary in some cases. While we will always attempt to excavate cultural deposits by stratum, that level of control will only be attempted in noncultural strata if it appears that it will provide data of potential importance to site interpretation. Excavation by strata is considered optimal in cultural deposits because soil layers tend to represent specific depositional episodes.

*Augering*

Soil augers can be effectively used to examine areas, at depth, with minimal effort and impact on the archaeological record. Thus, we may make use of this technique to examine parts of the site to determine whether features or structures are present. In particular, augers may be used to examine parts of sites that exhibit no surface signs of structures or features. When such are encountered, more intensive excavation techniques can then be applied to investigate them. Soil removed from auger holes will be screened to determine whether cultural materials are present. Auger tests will be recorded on individual forms.

*Recording Excavation Units*

The excavation of a grid unit, or any other type of excavation unit, will begin by filling out a form for the surface that provides initial depths (mbd) and other pertinent information. Ending depths in mbd for each succeeding level will be recorded on relevant forms, providing a record of all excavations. A Grid Unit Excavation Form will be completed for each level, including the surface, and will describe soils, inventory cultural materials recovered, and provide other observations considered important by the excavator or site supervisor, including depths, stratum, and level. A description of soil matrix will also be provided, and should include information on cultural and noncultural inclusions, presence of building rubble, evidence of disturbance, and how artifacts are distributed if variations are noticed.

### *Recovery of Cultural Materials*

Most artifacts will be recovered in two ways: visual inspection of levels as they are excavated, and screening though variable-sized mesh. Other materials may be collected as bulk samples that can be processed in the laboratory rather than the field. Regardless of how cultural materials are collected, they will all be inventoried and recorded in the same way. Collected materials will be assigned a field specimen (FS) number, which will be listed in a catalog and recorded on all related excavation forms and bags of artifacts. Field Specimen numbers will be tied to provenience, so that all materials collected from the same horizontal and vertical provenience units will receive the same FS number. For instance, if chipped stone, ceramic, and bone artifacts are recovered from the same level in the same grid unit or the same stratum in the same room quadrant, they will all be identified by the same FS number. Any samples taken from that level or stratum will also receive the same number. The FS number will be the primarily tool that will allow for maintenance of the relationships between recovered materials and associated spatial information.

Most artifacts will be recovered by systematically screening soil removed from excavation units. All soil from exploratory grids and features will be passed through screens, as will at least a sample of soil from both cultural and noncultural strata in structures, as detailed later. Two sizes of screen, quarter-inch and eighth-inch mesh, will most often be used. While most artifacts are usually large enough to be recovered by quarter-inch mesh, some are too small to be retrieved by that size screen. These remains can also provide important clues about the activities that occurred at a site. However, there is a trade-off in gaining this additional information. As the size of mesh decreases, the amount of time required to screen soil and recover artifacts increases. Sampling is a way to balance these concerns; thus, smaller mesh will only be used under certain circumstances. Rather than establishing specific guidelines for sampling by eighth-inch mesh screens, it is considered better to leave this to the discretion of the site supervisor. However, as a minimum, all soil in certain types of features (such as hearths and ash pits) should be screened through eighth-inch mesh, as should all soil at floor or living surface contacts. Other potential applications of this recovery method include culturally deposited strata and activity areas.

Cultural materials from certain types of strata will only be recovered by visual inspection. As discussed in more detail later, only a sample of soil from noncultural strata will be screened to recover cultural materials. Rather than simply ignore artifacts from unscreened strata, however, cultural materials observed during excavation will be collected for analysis. While this will not yield a statistically valid sample, it will increase the number of artifacts recovered and provide more detailed data.

Other cultural materials, such as macrobotanical samples, will be recovered from bulk soil samples. In general, samples for flotation analysis will be collected from culturally deposited strata and features, and should contain at least 2 liters of soil. Macrobotanical materials like corn cobs, piñon shells, wood samples for identification, charcoal, etc., will be collected as individual samples whenever found. All botanical samples will be cataloged separately, and noted on pertinent excavation forms.

## Structures, Features, and Extramural Areas: Specific Field Methods

The excavation of various parts of a site will be approached in different ways, even though the mechanics of excavation will be the same. Most excavation will be accomplished using hand tools. However, in some cases it may be preferable to use mechanical equipment to expedite the removal of noncultural deposits. Thus, it is possible that mechanical equipment will be used to strip noncultural overburden from buried extramural cultural strata, or in areas lacking surface remains. However, fill will be removed from structures by hand to avoid potential damage to remaining architectural elements. Methods of excavation will vary depending upon whether a structure, a feature, or an extramural area is being examined.

*Structures*

Individual numeric designations will be assigned to structures on a site, as well as to the rooms they contain. Excavation within rooms will begin by digging an exploratory trench from one wall to the center of, or completely across a room. Due to safety concerns, exploratory trenches will not exceed 1 m in depth. Below 1 m, adjacent unit(s) or quadrant(s) may be removed to provide room to avoid collapse. Exploratory trenches will be excavated by grid units to provide controlled samples and cross-sections of the deposits. In some cases, this procedure will be repeated, perpendicular to the initial trench, to provide additional information on the filling processes. The exploratory cross section(s) will be profile mapped and the nature of the fill defined. Remaining fill will be excavated by quadrant. Quadrant boundaries will be determined by the locations of grid lines or exploratory trench(es) and, thus, may not always be the same size.

At least one quadrant, whether cultural or noncultural in nature, will be excavated by the defined strata. This method will provide a sample of materials associated with these strata, allowing for a more comprehensive understanding of the filling sequence. The quadrant(s) selected will be left to the discretion of the site supervisor, although in most cases, it will be the quadrant that is assumed to provide the most information. For example, if a structure is filled with cultural deposits, more than one quadrant might be sampled. Remaining fill will be removed without screening, though artifacts will be collected when observed.

Excavation will halt between 5 and 10 cm above the floor to prevent damage to its surface during excavation. At this time, the grid system will be reestablished to permit more systematic sampling of materials near or in direct contact with the floor. This arbitrary layer, commonly referred to as floor fill, will be removed by grid unit and screened through eighth-inch mesh. Finer control in recovering materials from these contexts is necessary since they were likely deposited at or soon after the time of abandonment.

Following complete excavation of a structure, architectural details will be recorded on a series of forms. Building elements encountered during excavation should also be included. In particular, any roof elements found during excavation should be mapped and described. Samples of roof material, if encountered, should be collected for species identification. Descriptions of individual rooms will include information on wall dimensions, construction materials and techniques, and associated features. Structure descriptions will include information on size and dimensions. In addition, scaled plan and profile maps of each structure will be drawn, detailing the locations of rooms and internal features, artifacts found in direct contact with floors, and any other details considered important. A series of 35-mm black-and-white photographs will be completed for each structure showing its overall form, individual rooms, construction details, and the relationship of features with other architectural elements. In addition, photographs may be taken during excavation when warranted and 35-mm color slides may be taken at the discretion of the site supervisor.

*Features*

Features will constitute individual horizontal provenience units. Features will be assigned sequential numbers as they are encountered at a site. Feature numbers will be recorded on Feature Log forms. Prior to excavation, features will be mapped and photographed. Features less than 2 m in diameter may be excavated differently than features greater than 2 m in diameter. After defining the horizontal extent of a feature less than 2 m in diameter, such as a hearth or ash pit, it will be bisected. One half will be excavated in 10-cm arbitrary levels to define internal stratigraphy, and a scale profile will be drawn. The second half will be removed by internal strata. All soil removed from small features will be screened through eighth-inch mesh. After the fill has been removed a second cross section illustrating the feature's vertical form perpendicular to the soil profile will be drawn. In addition, a scale plan of the feature showing the grid location, size, and location of profile lines will be drawn. Feature information will be recorded on a Feature Form describing, in detail, its shape, content, use history, construction detail, and inferred function.

Features greater than 2 m in diameter may be excavated by grid unit. The number of excavated grid units will be kept to a minimum and excavated by defined soil strata whenever possible. A sample of the feature fill, in this case one or more grid units, will be screened through eighth-inch mesh; otherwise quarter-inch mesh will be used. At least two perpendicular scale profiles will be drawn, and forms that describe the shape and content in detail will be completed. Features greater than 2 m in diameter that are not treated in this way will be excavated using the same methods applied to features less than 2 m in diameter. The method of excavation selected for a particular feature will be left to the discretion of the site supervisor. All features will be documented using 35-mm black-and-white photographs before and after excavation. Other photographs, including 35-mm color slides, showing construction or excavation details may be taken at the discretion of the excavator.

### *Extramural Excavation Areas*

Areas outside structures or around features like hearths, were often used as work areas. Thus, certain zones may be examined to determine whether work areas can be defined. Excavation in these zones will proceed by grid unit. Most soil encountered during these investigations will be screened through quarter-inch mesh, though a smaller-sized mesh may be used to sample certain areas. Plans of each extramural area investigated will be drawn, detailing the excavation limits and location of any features.

## Special Situations

### *Sensitive Materials*

This category pertains to the discovery of culturally sensitive materials or objects of religious importance. At this time, the only special situations we can anticipate are human burials, which are not anticipated at LA 111333 because of the nature of the two components. Appendix 2 presents a plan, approved by the Pueblo of Tesuque, for treatment and disposition of human remains, should they be encountered at the site.

In accordance with the plan, human remains would be excavated using standard archaeological techniques, including definition of the burial pit, use of hand tools to expose skeletal materials, and mapping and photographing of the positions of the skeleton and grave goods. After human remains or other sensitive materials are uncovered, no person will be allowed to handle or photograph them except as part of data recovery and repatriation efforts. Photographs of sensitive materials related to data recovery efforts will not be released to the media or general public.

### *Unexpected Discoveries*

There is always a risk of finding unexpected deposits or features during an archaeological excavation, and the project outlined in this plan is no exception. Procedures that will be followed in the event of an unexpected discovery will vary with the nature and extent of the find. Small features, structures, or cultural deposits that were not located during testing will be excavated according to the procedures outlined above. On the other hand, finds that have the potential to significantly alter the scope and intent of this plan will require consultation with the Pueblo of Tesuque, the NMSHTD, the Bureau of Indian Affairs, and the State Historic Preservation Division.

## Data Recovery Strategies for LA 111333

### *Remote Sensing*

Provided that on-site soil/sediment conditions are amenable, we propose to use remote sensing techniques to locate possible features or structures prior to initiation of excavations. These techniques may be useful for defining and prioritizing excavation areas and levels of effort. Remote sensing efforts will focus on three areas of the site: the area of primary testing (where the site was initially defined), and the areas to the north and south of the area of primary testing, where auger testing suggested the presence of buried deposits and features.

High-resolution proton magnetometry survey is most likely to provide appropriate information on soil and sediment anomalies that may indicate the presence of features or structures, particularly in the deeper Archaic deposit (David Hyndman, pers. comm. 2002). The technique measures anomalies in the magnetic alignment of clays and other sediments that may have been created by human activities and features. Soil electrical conductivity/resistivity is less likely to provide useful information in this situation. Because of the site location and condition, surface water runoff from the highway, soil compaction related to the two-track road that ran into the site, and disturbance from recent blading may limit the utility of this technique (David Hyndman, pers. comm. 2002). However, it is also possible that recent blading removed upper soil/sediment layers most impacted by water runoff and compaction, and conductivity/resistivity studies may provide information on deeper deposits, features, or structures. Ground-penetrating radar is an unlikely technique because of the impact of water runoff and the presence of groundwater, and the presence of clay beds in the natural sediments.

If remote sensing techniques prove not to be useful prior to initiation of excavations due to soil/sediment conditions, we may elect to use them following excavation of the Classic period component and mechanical removal of the natural sediments between the Classic and Archaic components, to aid in location and definition of Archaic component features and structures. The decision whether to use remote sensing in this situation will be based on the results of their earlier use and the recommendations of the remote sensing consultant.

*Mechanical Trenching*

In order to examine the corridor for buried utilities along the existing right-of-way boundary, we will use mechanical equipment to excavate a 1-m-wide (approximate) trench along the length of the site as redefined during testing. The trench will be placed about 1.5 m from the existing fence, within the right-of-way. A stratigraphic profile of the trench, or selected portions of the trench, as appropriate, will be drawn to show natural and cultural strata exposed and any evidence of cultural deposits, features, and structures.

*Data Recovery Excavations*

Testing investigations confirm that the Classic period component at LA 111333 is restricted to the area in which the site was first defined and where testing was initially focused, while the Archaic component extends within a larger area, both north and south of the primary testing area. This section discusses excavation methods and efforts for the site, when they may be different from those described in the General and Specific Field Methods sections, or in the case of situations specific to the site.

**The Classic Period Component.** Although defined during survey as covering an area of about 10-by-25 m, recent blading at the site removed much of the surface manifestation of the Classic period component. Testing indicates that the component, comprised of the remains of a possible structure and associated features, may largely be restricted to an area about 6-by-6 m, and a depth of about 20 cm below modern ground surface. A low-frequency scatter of Classic period sherds was observed extending both north and south of the primary testing area, but no indications of features or structures relating to this component were observed on the modern ground surface or during testing north or south of the primary testing area. Surface artifacts in those areas will be collected to aid in dating and defining site occupation and activities.

Investigation of the component will begin by hand excavation of 1-by-1-m grid units, using stratigraphic units defined during testing. Attention will be paid to defining surfaces that may have surrounded the low mound thought to be a structure location.

Current site condition and testing results suggest that the small, low mound was disturbed by recent blading. If data recovery excavations reveal that the structure, or some portion of it, remains and can be defined, rooms will be excavated by quadrants, as discussed in the Specific Field Methods section. Attention will be paid to defining surfaces within or that may have been within the structure. Because the possible structure is close to the modern ground surface and has been impacted by recent blading, we do not anticipate collecting soil/sediment samples for pollen analyses.

Testing suggests that at least two cobble features are present in the area of the low mound. Excavation will attempt to determine whether they were extra- or intra-mural, based on their locations and conditions relative to the structure, as well as their functions. Features will be excavated as individual units rather than by grid units, as discussed in the Specific Excavation Methods section. Samples of feature fill may be collected as appropriate for radiocarbon dating (chronology) and macrobotanical remains (economy, feature functions).

One or two transects of shallow auger excavations, placed at 2 to 4 m intervals, will be placed across the site to collect soil/sediment samples for pollen analysis, specifically to search for domestic plant pollen, to aid in determining whether the Classic period component involved farming. Since testing extended the site boundaries to the north and south, the transects of shallow auger excavations will be extended to examine the expanded site area. Samples for pollen analysis will be collected from about 20 and 50 cm below modern ground surface. The upper samples will be used to determine whether domestic plant pollen is present, indicating use of the area for farming. The lower samples will be used to determine whether pollen from the upper sediment and soil layers is being transported down and may be present in lower levels, particularly the Archaic component. Otherwise, since there are no indications of other Classic period features or structures in the expanded area, we do not anticipate other excavations in this area to examine this component.

**The Archaic Component.** To more accurately define the Archaic component prior to excavation, additional auger testing will be conducted in the expanded site area. The results of additional testing, combined with those of mechanical trenching, should allow us to examine those areas where the component, defined by the presence of Stratum 3 (see Chapter 4 for description), consists of greater and lesser amounts of charcoal, numbers of artifacts, and potential presence of features or structures. Testing reported in Chapter 4 suggests that two such areas are present, one north and the other south of the primary testing area. If mechanical trenching or additional auger testing confirm these observations, block excavation areas will be defined. The sizes of those areas will be determined by the results of additional auger testing. In the primary testing area, the excavation area is expected to be about 20-by-20 m. Based on testing results reported in Chapter 4, other excavation areas are not expected to be smaller than 10-by-10 m, although final definition of excavation area sizes cannot be made until further testing has been completed. This will allow us to pursue a site-specific rather than a feature-specific strategy by examining specific features and structures that may be present within the areas and relating them spatially without intervening blocks whose contents would remain unknown.

Because the Archaic component is separated from the Classic period component by two thick, naturally deposited, noncultural strata (see Chapter 4 for descriptions), the bulk of those deposits in the excavation areas will be removed using mechanical equipment. As noted earlier, we may elect to use remote sensing techniques following mechanical removal of the natural sediments to aid in location and definition of Archaic component features and structures.

Within the excavation areas, the Archaic component, defined as Stratum 3, will be excavated by hand in 1-by-1-m units. A minimum of 10 percent of Stratum 3 in each excavation area will be screened through eighth-inch mesh to attempt to recover very small artifacts, particularly chipped stone flakes from tool manufacture and maintenance. That percentage may be increased if this process recovers significantly more artifacts than are recovered by screening through quarter-inch mesh. Because testing has yielded a relatively small assemblage, suggesting that Stratum 3 contains a relatively low frequency of artifacts, we do not anticipate that the soil screened through eighth-inch mesh will exceed 40 percent. However, that determination cannot be made prior to excavation in each area, and the percent of the soil screened through eighth-inch mesh may be greater than 40 percent.

Attention will be paid to defining surfaces within Stratum 3, to aid in establishing the occupation and deposition sequence(s) of features and structures associated with the Archaic component.

Testing suggests the presence of cobble concentrations that may be features or structures. As noted earlier, remote sensing techniques may be used, as appropriate, to locate other such possible features or structures. Features will be excavated as individual units, as discussed in the Specific Field Methods section. Samples of feature fill may be collected as appropriate for radiocarbon dating (chronology), macrobotanical remains (economy, feature functions, on-site activities), and pollen analyses (paleo-environmental information, on-site activities, economy).

If excavations reveal that structures are present and can be defined, they will be excavated by quadrants. Attention will be paid to defining surfaces within or that may have been within structures. Soil or sediment samples from immediately above structure surfaces may be collected for macrobotanical remains (economy, feature functions, on-site activities) and pollen analyses (paleo-environmental information, activities within structures, economy).

Following completion of excavations, all excavation areas will be backfilled.

# 9
# ARTIFACT ANALYSES AND RESEARCH ISSUES

James L. Moore, C. Dean Wilson, Mollie S. Toll, Pamela McBride, and Nancy J. Akins

Preliminary testing results suggest that the artifact assemblages that will be recovered from the Archaic and Classic period components at LA 111333 will be relatively small. Because this site will be excavated as part of a much larger project, artifact analyses will be fit into the existing research framework whenever possible. That analytic framework is detailed in Boyer and Lakatos (2000a). General analytic procedures and research issues from that discussion are summarized and restated, and new research issues developed for our examination of LA 111333 are presented here.

## Ceramic Artifact Analysis

C. Dean Wilson and James L. Moore

Ceramic data from prehistoric sites provide clues concerning the time and context of occupation as well as an examination of trends relating to the production, decoration, use, and exchange of pottery vessels. To examine various issues, a wide variety of data will be recorded in the form of both attribute classes and ceramic type categories.

Attribute categories used during this study are similar to those employed in other recent OAS projects in this area (Wilson n.d.). Attribute classes recorded include temper type, paint type, surface manipulation, modification, and vessel form. These attributes will be recorded for all sherds examined during data recovery. More detailed studies, such as refiring analysis, petrographic characterizations, stylistic, and technological studies, may provide additional information. Information that will be recorded for whole vessels (should any be recovered) include precise form, measurements of vessel dimension, thickness, modification, and sooting patterns.

Other trends will be examined using ceramic type categories. Ceramic types refer to groups identified by various combinations of paste and surface characteristics with known temporal, spatial, and functional significance. Sherds are initially assigned to a specific tradition based on probable region of origin as reflected by paste and temper characteristics. Ceramic items are then assigned to a ware group based on general surface manipulation and form. Finally, sherds are assigned to temporally distinctive types based on surface texture or painted design styles.

A detailed description of pottery types identified will be presented in the final report for the data recovery project. These will include discussions of distributions of various traits for each type identified, and nuances concerning the definition and separation of various types. Examples of types will be illustrated.

### *Research Issues*

**Temporal Patterns.** Frequencies and distributions of ceramic types and groups are used to determine the time of occupation reflected at a particular site or context. Time of occupation will be one of the most important questions addressed using the ceramic assemblage recovered from LA 111333, which is expected to reflect a Classic period occupation. Thus, there should be significant differences between the pottery available at this site and materials recovered from Developmental and historic period sites investigated during earlier phases of this project. The limited occupational span of LA 1113333 should be reflected in a ceramic assemblage with a temporal association that is entirely limited to the Classic period. Types that might be recovered include Biscuit wares and Rio Grande micaceous utility wares. Glaze ware sherds could be recovered, however this is not considered likely.

**Ceramic Use Patterns.** Unfortunately, because of the limited nature of the ceramic assemblage that we anticipate recovering from LA 111333, it can only be used to address a few questions. Temporality is one of these, and was discussed in the preceding section. The second relevant question involves the pattern of use reflected in the assemblage associated with the field structure. If the Pueblo component at LA 111333 represents a fieldhouse, the model developed in an earlier chapter suggests that ceramic artifacts should reflect food consumption and perhaps preparation, but no evidence for food storage should be present. Vessel forms used for food storage may be present if the component served as a farmstead, but this is unlikely.

## Chipped Stone Artifacts

James L. Moore

Both components from LA 111333 should yield chipped stone artifacts, though numbers may be comparatively small. Our study of these materials will parallel analyses of assemblages recovered by the OAS from other sites along U.S. 84/285 that were investigated during earlier phases of this project, and will address several questions. One of the most important of these concerns residential mobility, or how often people moved around the landscape. Hunter-gatherers tend to move their camps often, occupying many residential sites over the course of a year. In contrast, farmers usually occupy a single residential site for one or more years at a time, though they may also use logistical camps to collect resources that occur at some distance from that location. Analysis of chipped stone assemblages should allow us to examine mobility patterns exhibited by the occupants of LA 111333, and define degrees of residential mobility. This line of inquiry may be important in helping to determine whether the Archaic occupants of LA 111333 used that location as foragers or collectors. It will also augment data collected from other field structure sites in the northern Rio Grande (Moore 2001, 2002), helping to clarify the occupational pattern that is represented by these kinds of remains.

Other topics that will be addressed by these data include ties to other regions, site function, and site structure. By tracking the occurrence of materials that are not native to the Tesuque area, we should be able to define some of the ties this population had to other regions. Such ties can include indirect acquisition of lithic raw materials through exchange or direct procurement by logistical expedition. The condition of materials when they were brought to sites can provide information that will allow us to determine which of these processes is most likely. The variety of tools in an assemblage provides information on the range of activities performed at a site, and an assessment of these data can help determine how a site functioned in the settlement and subsistence system. The distribution of various classes of chipped stone artifacts across a site often provides clues concerning how different areas were used, and can augment data provided by other analyses.

### *Reduction Strategies*

An assessment of strategies used to reduce lithic materials at a site often provides evidence of residential mobility or stability. Two basic reduction strategies have been identified for the Southwest. Efficient (or curated) strategies entail the manufacture of bifaces that served as both unspecialized tools and cores, while expedient strategies were based on the removal of flakes from cores for use as informal tools (Kelly 1985, 1988). Technology was usually related to lifestyle. Efficient strategies tended to be associated with a high degree of residential mobility, while expedient strategies were typically related to sedentism. The reason for this type of variation is fairly simple: "Groups on the move tended to reduce the risk of being unprepared for a task by transporting tools with them; such tools were transportable, multi-functional, and readily modifiable. Sedentary groups did not necessarily need to consolidate tools into a multi-functional, lightweight configuration" (Andrefsky 1998:38).

Of course there are exceptions to this general statement. Highly mobile groups living in areas that contained abundant and widely distributed raw materials or suitable substitutes for stone tools would not need to worry about efficiency in lithic reduction (Parry and Kelly 1987). Where lithic materials suitable for chipping occurred only in the form of small nodules, efficient reduction may have been impossible and another strategy would have been used (Andrefsky 1998; Camilli 1988; Moore 1996). Neither of these exceptions applies to the study area.

Southwestern biface reduction strategies were similar to the blade technologies of Mesoamerica and Europe in that they focused on efficient reduction with little waste. While the initial production of large bifaces was labor intensive and resulted in much waste, the finished tools were easily and efficiently reduced. Efficient strategies allowed flint knappers to produce the maximum length of useable edge per biface. By maximizing the return from biface cores they were able to reduce the volume of raw material required for the production of informal tools. This helped lower the amount of weight transported between camps. Neither material waste nor transport cost were important considerations in expedient strategies; flakes were simply struck from cores when needed. Thus, analysis of the reduction strategy used at a site allows us to estimate whether site occupants were residentially mobile or sedentary.

*Research Questions*

Several of the research questions posed in the data recovery plans for the Archaic and Classic period components at LA 111333 require specific chipped stone data. For the most part, data needs and expectations were presented for these concerns in Chapters 5 and 6. In this section, we detail a few other lines of inquiry that should aid in illuminating patterns of site function and use, and fit the results of this study into a broader framework.

**What mobility pattern is indicated for the Archaic component?** Different patterns of chipped stone reduction are expected in forager and collector mobility modes. These patterns have been modeled by Kelly (1988), and that model was presented in Chapter 5. If the Archaic component at LA 111333 represents a forager base camp, we would expect to find evidence for the use of an efficient reduction strategy focused on the production of large general-purpose bifaces. A relatively high frequency of flakes struck from biface cores should evidence use as informal tools. Little use of an expedient reduction strategy should be evidenced.

If the Archaic component at LA 111333 reflects use as a collector base camp, there should be evidence for the manufacture and maintenance of bifacial tools, but a low incidence of utilized biface flakes. Conversely, a field camp used by collectors should display little evidence for the manufacture of bifacial tools and considerable evidence for their use, both as general-purpose tools and as cores. Evidence for utilization should be common on biface flakes.

However, expectations based on Kelly's (1988) model must be tempered with other considerations. A lack of suitable materials for large biface manufacture in the general site area could result in a pattern where large bifaces and flakes struck from them are mostly made from nonlocal materials, and there is little or no evidence for on-site manufacture of this type of tool. In this pattern, local materials would have been reduced and used in an expedient fashion. A differential reduction of local versus nonlocal materials may also be visible, as observed in the assemblages from LA 65006 (Moore 2001). Nonlocal materials at LA 65006 were mostly reduced using an efficient strategy, while local materials were reduced using a mixture of efficient and expedient reduction strategies.

**What type of reduction strategy is evidenced in the Classic period component?** Our expectations are that the small chipped stone assemblage that we anticipate recovering from the Classic period component should evidence the use of a purely expedient reduction strategy, no matter if the site functioned as a fieldhouse or farmstead.

**How do reduction strategies reflected in the Archaic and Classic period components compare to those seen in nearby Developmental and Hispanic sites?** This question will help link the results of this study with those of earlier phases of this project, which focused on the excavation of Developmental period Pueblo sites and Spanish Colonial to American Territorial period Hispanic sites. The larger database available when all of the available assemblages are compared should enable us to examine changes in reduction strategy, chipped stone tool use, and site function through time. We expect to find considerable evidence for efficient reduction in the Archaic component from LA 111333, and only expedient reduction in the Classic period component. In contrast, Developmental period assemblages are expected to be dominated by expedient reduction, but some evidence for efficient reduction strategies may also be recovered. Like the Classic period component, we expect to find no evidence for efficient reduction in Hispanic assemblages. Indeed, significant differences in the range of materials reduced, types of tools that were used and manufactured, and formal tool manufacturing techniques are expected to occur between the prehistoric and historic assemblages, reflecting different technological and cultural systems.

*Chipped Stone Analytic Methods*

All chipped stone artifacts will be examined using a standardized analysis format developed by the OAS (1994a). Standardization is aimed at increasing comparability between projects completed across the state. Hopefully, this will eventually allow analysts to investigate specific problems with a much larger database representing sites distributed through both time and space. The OAS chipped stone analysis format includes a series of mandatory attributes that describe material, artifact type and condition, cortex, striking platforms, and dimensions. In addition, several optional attributes have been developed that are useful for examining specific questions. This analysis will include both mandatory and optional attributes.

The main areas that will be explored are material selection, reduction technology, and tool use. These topics provide information about ties to other regions, mobility patterns, and site function. While material selection studies cannot reveal how materials were obtained, they can usually provide some indication of where they were procured. By studying the reduction strategy employed at a site it is possible to compare how different cultural groups approached the problem of producing useable chipped stone tools from raw materials, and how the level of residential mobility affected reduction strategies. The types of tools present on a site can be used to help assign a function, define the range of tasks accomplished with this artifact class, and examine the structure of work areas. Chipped stone tools can sometimes provide temporal data, but they are unfortunately usually less time-sensitive than other artifact classes like pottery and wood.

It may be necessary to sample if very large assemblages are recovered. If this becomes necessary, a rough sort will first be performed to provide a characterization of entire assemblages. Any rough sort will include, but will not necessarily be limited to, assessing each provenience unit for counts of artifact and material types. Macroscopic examination will be used to assign artifacts to categories included in the rough sort. While such an approach does not provide the precise information available from intensive analysis, it will allow us to determine whether or not samples are representative of the assemblages from which they were drawn.

Intensive analysis will include the examination of each chipped stone artifact under a binocular microscope to aid in defining morphology and material type, examine platforms, and determine whether it was used as a tool. The level of magnification will vary between 20x and 100x, with higher magnification used for wear-pattern analysis and identification of platform modifications. Utilized and modified edge angles will be measured with a goniometer; other dimensions will be measured with a sliding caliper. Results will be entered into a computerized database for more efficient study and comparison with data from other sites.

*General Chipped Stone Analytic Methods*

Four classes of chipped stone artifacts will be recognized: flakes, angular debris, cores, and tools. Flakes are debitage exhibiting one or more of the following characteristics—definable dorsal and ventral surfaces, bulb of percussion, and striking platform. Angular debris are debitage that lack these characteristics. Cores are nodules from which debitage have been struck, and on which three or more negative flake scars originating from one or more platforms are visible. Tools can be divided into two distinct categories—formal and informal. Formal tools are artifacts that were intentionally altered to produce specific shapes or edge angles. Alterations take the form of unifacial or bifacial flaking, and artifacts are considered intentionally shaped when flake scars obscure their original shape or significantly alter the angle of at least one edge. Informal tools are debitage that were used in various tasks without being purposely altered to produce specific shapes or edge angles. This class of tool is defined by the presence of marginal attrition caused by use. Evidence of informal use is divided into two general categories—wear and retouch. Retouch scars are 2 mm or more in length, while wear scars are less than 2 mm long. While formal tools are morphologically distinguished from the by-products of chipped stone reduction, informal tools are morphologically classified as debitage or cores.

Attributes that will be recorded on all artifacts include material type and quality, artifact morphology and function, amount of surface covered by cortex, portion, evidence of thermal alteration, edge damage, and dimensions. Platform information will be recorded for flakes only. Following are descriptions of attributes included in the standardized OAS analysis.

**Material type.** This attribute is coded by gross category unless specific sources are identified. Codes are arranged so that major material groups fall into sequences progressing from general undifferentiated materials to named materials with known sources. The latter are given individual codes.

**Material texture and quality.** Texture is a subjective measure of grain size within rather than across material types. Within most materials texture is scaled from fine to coarse, with fine materials exhibiting the smallest grain sizes and coarse the largest. Obsidian is classified as glassy by default, and this category is applied to no other material. Quality records the presence of flaws that can affect flaking characteristics, including crystalline inclusions, fossils, cracks, and voids. Inclusions that do not affect flaking characteristics, such as specks of different colored material or dendrites, are not considered flaws. These attributes are recorded together.

**Artifact morphology and function.** Two attributes are used to provide information about artifact form and use. The first is morphology, which categorizes artifacts by general form. The second is function, which categorizes artifacts by inferred use.

**Cortex.** Cortex is the weathered outer rind on nodules; it is often brittle and chalky and does not flake with the ease or predictability of unweathered material. The amount of cortical coverage is estimated and recorded in 10 percent increments.

**Cortex type.** The type of cortex present on an artifact can be a clue to its origin; thus, cortex type is identified, when possible, for any artifacts on which it occurs.

**Portion.** All artifacts are coded as whole or fragmentary; when broken, the portion is recorded if it can be identified.

**Flake platform.** This attribute records the shape and any alterations to the striking platform on whole flakes and proximal fragments.

**Thermal alteration.** When present, the type and location of evidence for thermal alteration are recorded to determine whether an artifact was purposely altered.

**Wear patterns.** Cultural edge damage denoting use as an informal tool is recorded and described when present on debitage. A separate series of codes are used to describe formal tool edges, allowing measurements for both categories of tools to be separated.

**Edge angles.** The angles of all modified informal and formal tool edges are measured; edges lacking cultural damage are not measured.

**Dimensions.** Maximum length, width, and thickness are measured for all artifacts.

*Summary*

Analysis of chipped stone assemblages will aid in examining questions related to the basic characteristics of life in the Tesuque area. The general questions that will be addressed by chipped stone data include:

1. How can the process of selecting raw materials be characterized? Were certain materials and qualities selected for, and can any differences in this process be seen between components and sites? Is there variation in the types and amounts of exotic materials used through time?

2. What do the types of tools tell us about the range of activities that occurred at these sites?

3. How were raw materials reduced? Were there purposeful attempts to enhance their flaking characteristics, or were materials left unmodified?

4. Can the range of materials found on a site tell us anything about the size of the area being exploited on a regular basis? Is there any evidence for changes in the size of the territory being exploited through time?

5. Can the distribution of chipped stone artifacts

provide information on where activities occurred on a site, or were most of these materials redeposited in specific discard areas?

Analysis of chipped stone artifacts will focus on providing data that can be used to characterize the assemblages from LA 111333 and address these general questions. It will also provide information that can be used to deal with more complicated issues concerning characteristics of the region's prehistoric occupation.

## Ground Stone Artifacts

James L. Moore

We expect to recover a few ground stone artifacts from LA 111333—mostly from the Archaic component. This class of artifact is often used to provide subsistence information. Such data can be derived either indirectly or directly. Tool size, form, and other general characteristics have been used in the past to infer function. However, many assumptions are made when such attributes are used to determine how an artifact was used. A better way in which to do this is to collect data that are directly related to that use such as recovering residues (especially pollen) and analyzing wear patterns on grinding surfaces. While ground stone artifacts can provide information on subsistence, can they tell us anything about how a region was occupied?

### *Theoretical Perspectives*

Like other artifact classes, the analysis of ground stone tools may provide information that will aid in examining residential mobility. One of the questions posed in the data recovery plan developed for the early Pueblo occupation of the southern Tewa Basin (Boyer and Lakatos 2000b) was concerned with determining whether the Developmental period occupants of this region were hunter-gatherers in the process of settling down, farmers migrating in from elsewhere, or a combination of both. In addition to providing direct evidence of subsistence pursuits for the Archaic component at LA 111333, a suitable assemblage of ground stone tools from this site will provide us with data that can be compared to patterns seen in Developmental period components, and evaluate the level of mobility displayed by both populations.

That there are differences between the types of ground stone tools used by residentially mobile and sedentary peoples should come as no great surprise. Archaic hunter-gatherers tended to use one-hand manos, basin or slab metates, and mortars. These are fairly generalized tools that can be used to grind a variety of wild and domestic plant foods. However, these forms were not designed to rapidly and efficiently process large quantities of food. Ground stone tools used by Southwestern farmers were more specialized toward the processing of corn, and usually included trough or through-trough metates and two-hand manos. Such tools allow foods like corn to be processed rapidly and efficiently (Lancaster 1983). A group that is wholly dependent on hunting and gathering would be expected to use the simple, generalized tools described for the Archaic. Farming populations would be expected to mostly use the specialized forms which increase grinding speed and efficiency. People in the process of becoming farmers and reducing their dependence on wild resources should use a grinding tool kit that is neither wholly generalized nor completely specialized. Examination of ground stone tool kits should help us estimate the level of mobility demonstrated by the Archaic and Developmental period populations of this area. By comparing mobility trends through time we may be able to illustrate some of the effects of the transition from mobile hunter-gatherer to sedentary farmer.

### *Measures of Grinding Efficiency and Dependence on Cultigens*

In studying grinding tools from the Mimbres area, Lancaster (1983, 1986) determined there was a steady rise in efficiency over time. This took the form of increasingly larger grinding areas and the use of materials of variable texture. Experiments showed that efficiency was enhanced by enlarging the size of the grinding surface (Lancaster 1983:81), which appeared in his sample as an increase in the size of metate grinding surfaces through time (Lancaster 1983:88). While the popularity of basin and slab metates seemed to fluctuate, and these types may have been used as utility grinding implements, trough metate varieties clearly reflect this tendency (Lancaster 1983:48–49).

Trough metates were the most popular form during the Early Pithouse period, but through time were mostly replaced by the through-trough type (Lancaster 1983:47). The former are open at only one end, while the latter are open at both. This modification increased the length of the grinding surface, and consequently its area. Thus, trough metates had an average grinding surface of 758 sq cm, while through-trough metates averaged 1,123 sq cm, a 33 percent increase (Lancaster 1983:42–43). Apparent functional differences between trough and basin-slab metates were based on wear patterns. Both varieties of trough metate exhibited striations parallel to the long axis of the tool, while striation patterns on a large percentage of basin and slab metates were random (Lancaster 1983:45).

There was also variation in the types and textures of materials used, with trough metates being dominantly made from vesicular basalt, and basin-slab metates from nonvesicular basalt and rhyolite. Medium-coarse materials dominated the assemblage before the Classic phase, while during that period the assemblage contained nearly equal amounts of coarse- and fine-grained materials. This is interpreted as a shift from a single-stage to a multistage grinding process (Lancaster 1983:87).

Though Lancaster (1983) was unable to discern any similar patterning in manos, a study by Hard (1986) shows that these tools vary correspondingly. This may be due to the nature of the samples examined. Lancaster did not look at Archaic sites from the Mimbres area, concentrating on sites occupied by people who were more or less dependent on farming. Hard examined a considerable amount of data on the use of ground stone tools by both hunter-gatherers and farmers. Thus, his sample was broader and patterning was undoubtedly easier to discern.

Hard (1986:105) feels that as reliance on cultigens increases, there is a corresponding increase in both mano length and mean metate grinding surface area. Only manos were examined by his study, though Lancaster's (1983) study supports the latter pattern. After an examination of ethnographic and archaeological materials, Hard (1986:161) determined that degree of reliance on agriculture can be measured by mano length. The break between hunting and gathering and dependence on cultigens appears to occur between average lengths of 10 and 13 cm. Hunter-gatherer manos average 10.6 cm long, while a mean length of 13 cm corresponds with a substantial dependence on cultigens (Hard 1986:161). The longest mean in his sample was 25 cm, which appears to equate with about a 70 percent dependence on cultigens (Hard 1986:161). The mean length of Tarahumara manos is 20.8 cm, and they depend on cultigens for about 60 percent of their diet (Hard 1986:161).

While these conclusions are considered tentative, they may have important implications for our study. Hunter-gatherers who are just beginning to settle down as farmers are not expected to be highly dependent on cultigens. While their grinding tools should exhibit an increase in processing efficiency over those used by pure hunter-gatherers, it should not approach the level of efficiency demonstrated by groups whose dependence on cultigens was long-term and continuously increasing. If the Archaic occupants of LA 111333 were mobile hunter-gatherers with no subsistence dependence on domesticates, we would expect the ground stone assemblage to contain manos whose average lengths are at or near the low end of Hard's (1986) range. Slab and basin metates should occur, but there should be no use of trough metates. A low dependence on domesticates (primarily corn) should produce manos that are shorter and metates with smaller grinding surfaces than is the case for groups that exhibit a long history of agricultural dependence. A single-stage grinding system would be expected and trough metates may occur, though basin and slab forms should dominate the assemblage. Through-trough metates are not expected.

Should ground stone tools be recovered from the Classic period component, we expect them to demonstrate a high degree of subsistence dependence on cultigens—manos should be at the long end of Hard's (1986) range, the size of grinding surfaces on metates should be indicative of processing efficiency, a multi-stage grinding process may be evidenced, and trough and through-trough metates may occur.

*Ground Stone Tools and Prehistoric Foodways*

Analysis of ground stone assemblages may also provide information about the range of foods consumed by site occupants. Pollen often adheres to some of the types of plants that are processed with ground stone tools, and can be recovered by a washing procedure. The material acquired in this way can be analyzed like other pollen samples. A study of this nature can potentially provide two types of information. The first is economic in nature. Recovery of pollen that adhered to materials processed by ground stone tools can help determine what those foods were. Of course, our ability to accomplish this depends on whether pollen is preserved in pores in the rock, and the condition of preserved pollen. Like many other analyses, the examination of economic pollen recovered from ground stone tools is a hit-or-miss proposition. Thus, our study of the use of plants for food will not focus on this analysis, but any information derived will be used to expand and amplify other sources of data. Grains of corn starch can also sometimes be identified on ground stone, and will be monitored to supplement and amplify pollen information.

A study of this type also has the potential to provide corroborative data concerning differential uses of ground stone tools. As discussed earlier, researchers have suggested that various types of metates were used for different purposes. Pollen analysis could potentially provide data that will either help corroborate or refute such arguments.

Of course, several potential problems should be kept in mind. Recovery of economic pollen from ground stone tools is not a given, especially if they have been exposed to the elements. Thus, tools that appear to have been buried since discard or abandonment, preferably within structures, will be the focus of this analysis. Tools from extramural trash deposits will also be considered, depending on their condition, position, and evidence of weathering. In all likelihood, only a sample of tools will be studied, and examples of each type defined (e.g., slab, basin, trough, or through-trough) may be included in the sample.

*Ground Stone Analytic Methods*

Ground stone artifacts will be examined using a standardized methodology (OAS 1994b), which is designed to provide data on material selection, manufacturing technology, and use. Artifacts will be examined macroscopically, and results will be entered into a computerized database for analysis and interpretation. Several general attributes will be recorded for each ground stone artifact, and specific attributes will be recorded for certain tool types. Attributes that will be recorded for all ground stone artifacts include material type, material texture and quality, function, portion, preform morphology, production input, plan view outline form, ground surface texture and sharpening, shaping, number of uses, wear patterns, evidence of heating, presence of residues, and dimensions. Specialized attributes that will be recorded include mano cross-section form and ground surface cross section.

By examining function(s), it is possible to define the range of activities in which ground stone tools were used. Because these tools are usually large and durable, they may undergo a number of different uses during their lifetime, even after being broken. Several attributes are designed to provide information on the life history of ground stone tools, including dimensions, evidence of heating, portion, ground surface sharpening, wear patterns, alterations, and presence of adhesions. These measures can help identify post-manufacturing changes in artifact shape and function, and describe the value of an assemblage by identifying how worn or used it is. Such attributes as material type, material texture and quality, production input, preform morphology, plan view outline form, and texture provide information on raw material choice and the cost of producing various tools. Mano cross-section form and ground surface cross section are specialized measures aimed at describing aspects of form for manos and metates, since as these tools wear they undergo regular changes in morphology that can be used as relative measures of age.

Pollen washes will be conducted in the laboratory, necessitating certain precautions. Ground stone tools from trash deposits will be placed in plastic bags after removal from the ground, and will be lightly brushed to remove loose soil. A thin cover of dirt will be left on tools found on floors or in mealing bins until they are ready for photographing. Loose dirt will be removed prior to photographing, and the artifacts will be placed in plastic bags as soon as feasible after that procedure is completed.

Laboratory processing will proceed as follows: the entire surface of tools will be brushed before samples are collected. Grinding surfaces will be scrubbed to collect embedded materials using distilled water and a tooth brush. The size of the area sampled will be measured and noted. Wash water will be collected in a pan placed under the sample and packaged for storage. Samples selected for analysis will receive a short (10 minute) acetolysis wash. Under certain circumstances, this may help preserve the cytoplasm in some modern pollen grains, allowing recent contaminants to be distinguished from fossil pollen.

Pollen samples from ground stone artifacts will be subjected to a full analysis to attempt to distinguish economically used wild plants as well as cultigens. The occurrence of broken and whole grains and clumps of grains will be monitored during counting. In addition, evidence for the presence of corn starch in samples will be noted.

*Summary*

Ground stone artifacts will be used to provide data in three general areas. We have suggested that there will be differences in the types of tools used by hunter-gatherers that are fully mobile, hunter-gatherers who are in the process of settling down and farming, and farmers with a long history of sedentary life. Both the types of metates found in assemblages and the average lengths of associated manos can be used to examine this phenomenon. Fully mobile hunter-gatherer ground stone assemblages should contain generalized tools including relatively short manos and metates with small grinding surfaces. Recently settled hunter-gatherer assemblages should be dominated by metates designed to grind corn with moderate efficiency, and manos of moderate length. Established farming populations or those that have recently migrated into an area should possess an assemblage dominated by metates that are highly efficient for corn processing and manos that are relatively long. Both Lancaster's (1983) and Hard's (1986) analyses should provide useful comparisons.

Ground stone tools will also be sampled to try to determine what foods were being processed. In particular, we will try to determine whether basin-slab and trough metates were used to grind different suites of materials. Of course, this study is dependent on the range of ground stone tools recovered, how well pollen is preserved on grinding surfaces, and whether or not post-depositional processes have damaged or removed pollen. Unfortunately, we will not be able to determine this until at least a sample of specimens have been analyzed.

## Botanical Remains: Research Issues and Analysis

Mollie S. Toll, Pamela McBride, and James L. Moore

*Research Directions for Floral Studies*

Botanical data will provide information particularly useful to focus on subsistence strategies in the prehistoric era. Several lines of evidence suggest that the practice of farming in the northern Rio Grande Valley in the Developmental period approached a model of mixed horticulture with hunting and gathering, rather than intensive agriculture. Sites often located on low terraces over major tributaries suggest settlement in relation to water and arable land. Limited activity sites and small settlements in a variety of site types and settings imply a diversity of economic pursuits, and not a single-minded focus on agriculture. At the few local sites with botanical analyses, remains of crop plants are widespread—occurring in two-thirds or more of flotation samples—but not abundant. Faunal remains are indicative of hunting a broad range of local fauna. It is not until after the Developmental period that more aggregated settlements and agricultural features such as check dams and extensive gravel mulch fields suggest a determined effort to support significant human populations by farming in a region with marginal growing season length. Our meager floral database reveals no significant differences between Developmental and Coalition period flotation remains in the northern Rio Grande Valley.

What differences should there be between these early farming adaptations and the Archaic? Botanical analysis should help determine whether or not domesticates were used in the Late Archaic period. There is some evidence that corn was being grown during the latest Archaic in the southern Tewa Basin (Skinner et al. 1980), but as yet there is no good evidence that it was used during the Late Archaic in this area. Analysis of botanical samples from LA 111333 will help evaluate the Late Archaic diet, and should aid in determining whether corn was integral. If corn was consumed during the Late Archaic, comparisons of dietary information should help determine whether there was significant variation between Archaic and early Pueblo subsistence systems. In contrast, botanical information from the Classic period component should be indicative of a high degree of subsistence dependence on domesticates.

*Analysis Methods*

Botanical analyses of archaeological deposits from LA 111333 will include flotation analysis of soil samples, species identification and (where appropriate) morphometric measurement of macrobotanical specimens, and species identification of wood specimens from both flotation and macrobotanical samples. Flotation is a widely used technique for separation of floral materials from the soil matrix. It takes advantage of the simple principle that organic materials (and particularly those that are carbonized or no longer viable) tend to be less dense than water, and will float or hang in suspension in a water solution. Each soil sample is immersed in a bucket of water. After a short interval, heavier soil and sediment particles settle out, and the solution is poured through a screen lined with chiffon fabric (approximately 0.35 mm mesh). The floating and suspended materials are dried indoors on screen trays, then separated by particle size using nested geological screens (4.0, 2.0, 1.0, and 0.5 mm mesh), before sorting under a binocular microscope at 7–45x. This basic method was used as long ago as 1936 (see Watson 1976), but did not become widely used for recovery of subsistence data until the 1970s. Seed attributes such as charring, color, and aspects of damage or deterioration are recorded to help in distinguishing cultural affiliation from post-occupational contamination. Relative abundance of insect parts, bones, rodent and insect feces, and roots help to isolate sources of biological disturbance in the ethnobotanical record.

All macrobotanical remains collected during excavation will be examined individually, identified, repackaged, and catalogued. Condition (carbonization, deflation, swelling, erosion, damage) will be noted as clues to cultural alteration or modification of original size dimensions. When less than half of an item is present it will be counted as a fragment; more intact specimens will be measured as well as counted. Corn remains (if available) will be treated in greater detail. Width and thickness of kernels, cob length and mid-cob diameter, number of kernel rows, and several cupule dimensions will be measured, following Toll and Huckell (1996). In addition, the following attributes will be noted: over-all cob shape, configuration of rows (straight vs. spiral), presence of irregular or undeveloped rows, and post-discard effects (compression, erosion).

*Botanical Sampling Guidelines*

The potential contribution of botanical analyses to the prehistoric component of the project, while necessarily limited by the sampling universe of proveniences and preservation conditions located within project limits, is maximized by attention to reasonable and appropriate sampling in the field. It is helpful to recognize a fundamental difference between floral data collected in soil samples and virtually every other artifact category. Standard field procedure now dictates collection and curation with provenience information of every sherd, bone, and lithic artifact encountered during excavation of most cultural proveniences; sampling of this universe may take place later in the lab. Doing the equivalent for botanical materials would mean bringing home the entire site, a ludicrous proposition. This makes every soil sample collected in the field a sampling decision. Samples not taken are generally gone forever. On the other hand, a systematic decision to sample widely and intensively (such as alternate meter grid units in every cultural stratum) to guard against such information loss can generate hundreds or even thousands of unanalyzed samples. Lacking infinite time and resources, we must try to garner maximal information from judicious sampling. Two aspects hallmark the most effective sampling protocols—awareness of depositional contexts that are most productive for floral remains, and recognition of site areas from which subsistence data will be of most interpretive use for the research foci of the project. Both are, fundamentally, selection processes.

The following general sampling guidelines and tips for sampling specific provenience categories provide some simple directives for field personnel to choose flotation sampling locations.

**Guideline 1.** Concentrate on coverage of the most informative contexts. By coping with less-informative proveniences by minimal sampling (a small number of well-placed samples), we can maintain the option of sampling more complex and informative proveniences in greater detail, generating finer scale information where it will be appropriate and helpful.

Prime among differentiated, potentially informative contexts are intact interior floor surfaces protected by fill and roof fall. Sampling multiple locations on interior floors contributes data for mapping cultural activities involving plant materials. This patterning informs on the organization of economic and cultural behavior on a household level. Analogous exterior surfaces, such as extramural work areas with associated cooking and storage features, are of equal interpretive interest, but tend to have very poor preservation of perishable remains, and consequently do not merit intensive sampling.

Trash fill and roof fall, though voluminous and originating from cultural behavior, are of considerable interest, but as an entity. Except in the rare case of a burned roof falling intact on the floor below and quickly covered by protective fill, horizontal differences in floral debris are really only a sampling problem.

**Guideline 2.** Focus on primary deposits. Minimize sampling from contexts without good cultural affiliation (for example, room or structure fill, unless well linked to a later occupation elsewhere at the site; disturbed areas).

**Guideline 3.** Take large samples. Take full 2 liter samples where possible. We know from other projects in north-central New Mexico (Carter 1980; Cummings 1989a, 1989b; Toll 1995, 1996; Toll and McBride 1995; McBride and Toll 1999) that smaller samples are minimally adequate or inadequate for optimal recovery of data.

### *Sampling Specific Provenience Categories for Flotation*

**Floors in structures.** Samples from fill immediately overlying an intact living or storage floor are very important. We want to know about central work areas near thermal features. We also want to know about other work areas that may be encountered away from any central activity areas. For a clearer picture of what plant materials are associated with specific work areas, we also need samples from floor contexts that are not associated with feature concentrations. The best way to insure adequate sample coverage is to take samples from alternate grid units. Later, samples from floor loci that will represent major activity areas, as well as one or more control samples, can be selected for analysis.

**Features.** Take a single sample from near the bottom of primary deposits. Take multiple samples only when primary deposits are clearly stratified. Samples can be taken from secondary deposits but do so with the understanding that these do not reflect the function of the feature itself, but are most often trash fill similar to floor fill.

**Roof fall.** Take a single sample. An extensive, intact roof fall level within a structure should be sampled from alternate grid units, like an intact floor.

**Post-occupational trash fill.** Sample only if well linked to a later occupation elsewhere at the site. Take a single sample from each distinct stratum.

### *Extramural Features*

**Surfaces.** Intact surfaces of ramada or outdoor activity areas are not common. If present, they should be sampled like intramural floors.

**Pits and hearths.** Take a single sample from near the bottom of primary deposits. Take multiple samples only when primary deposits are clearly stratified.

**Middens.** Take a single sample from each clearly definable cultural stratum. If the sample is big enough, and taken accurately from the provenience it is meant to represent, multiple samples from the same stratum are redundant.

### *Pollen Sampling*

Pollen analysis should be considered complementary rather than parallel to flotation. Pollen is preserved in very different contexts than carbonized seeds, and has different contributions to make to the biological data corpus that informs on subsistence and environmental parameters. Whereas primary and secondary deposits from thermal features make up much of the useful flotation record (along with far less frequent catastrophic burn events), pollen does not survive burning or deposition in alkaline, water-holding features. Pollen's particular gift lies in locating plant utilization activities that are not likely to involve burning, in places such as milling bins, ground stone artifacts, storage features, coprolites, and interior floors. On well-preserved interior floors, systematic intensive sampling (such as alternate grid units) of pollen and flotation can work well together to produce relatively detailed mapping of activity areas of household space. With emphasis on site and household economic organization, we see floors of domestic structures as a ripe area for investigation. The potential contributions of pollen analysis are generally wasted on strata such as trash fill, roof fall, and middens.

### *Macrobotanical Wood and Charcoal*

Attentive field collection of wood and charcoal can greatly increase the interpretive value of this artifact category. Charcoal samples should be directed towards those proveniences that can most clearly represent fuel wood, roofing material, or construction timbers. To the degree that such deposits can be confidently identified, species composition data will provide far more detailed and accurate pictures of prehistoric wood use. We know from the detailed wood data from Chaco Canyon that fuel and construction wood are likely to have very different selection trajectories (Toll 1985, 1987; Windes and Ford 1991). Consequently, some of the most interesting aspects of wood use emerge when these functional contexts are differentiated and compared. The number of charcoal loci that are clearly one functional context or another may be few, but excavation surely constitutes the best opportunity for identifying suitable samples. Opportunities for subsampling include proveniences with large numbers of wood specimens. A maximum of 30 identifiable specimens from a given functional context and provenience will be considered an adequate sample.

## Faunal Remains

Nancy J. Akins and James L. Moore

Analysis of faunal remains should provide important information concerning subsistence practices in the study area during the Late Archaic period and, potentially, the Classic period. If the Archaic occupation of LA 111333 represents a series of cold-season residential base camps, as we assume, then how important was hunting during that part of the year? An abundance of diverse faunal remains would suggest that it was of critical importance, while the occurrence of few faunal remains of limited range may indicate that hunting was fairly unimportant in cold-season camps, and perhaps occurred only as random encounters. The presence of faunal remains in deposits associated with the Classic period occupation may be indicative of field hunting, which also tends to be based on random encounters.

Differences should be visible between Late Archaic and Classic period faunal exploitation patterns, but may not be as visible when Archaic and Developmental period assemblages are compared. Preliminary assessment of Developmental period faunal use for this region suggest that a fairly mobile pattern of resource exploitation was still being used, with a heavy dependence on hunting and gathering in addition to some use of horticulture (Akins 2000). Thus, we would expect few major differences to be visible when Late Archaic and Developmental period assemblages are compared.

### *Methodology*

Sampling may be necessary if large amounts of bone are recovered. If sampling is necessary, proveniences analyzed will include not only those with the potential to contribute the most high quality information on species utilization through time, but those that will inform on site structure. This should include most, if not all, of the eighth-inch screened stratigraphic samples, a diversity of deposits, and all occupational contexts.

Specimens chosen for analysis will be identified using the OAS comparative collection supplemented by those at the Museum of Southwest Biology, when necessary. Recording will follow an established OAS computer coded format that identifies the animal and body part represented, how and if the animal and part was processed for consumption or other use, and how taphonomic and environmental conditions have affected the specimen. The following briefly describes the variables.

**Provenience Related Variables.** Field Specimen (FS) numbers are the primary link to more detailed proveniences within the site. Each data line is also assigned a lot number that identifies a specimen or group of specimens that fit the description recorded in that line. It also allows for retrieving an individual specimen if questions arise concerning coding or for additional study. The count identifies how many specimens are described by that data line.

**Taxon.** Taxonomic identifications are made as specific as possible. When an identification is less than certain, this is indicated in the certainty variable. Specimens that cannot be identified to the species, family, or order are assigned to a range of indeterminate categories based on the size of the animal and whether it is a mammal, bird, other animal, or cannot be determined. Unidentifiable fragments often constitute the bulk of a faunal assemblage. By identifying these as precisely as possible, these data can supplement those obtained from the identified taxa.

Each bone (specimen) is counted only once, even when broken into a number of pieces by the archaeologist. If the break occurred prior to excavation, pieces are counted separately and their articulation noted in a variable that identifies conjoinable pieces, parts that were articulated when found, and pieces that appear to be from the same individual. Animal skeletons are considered as single specimens so as not to vastly inflate the counts for accidentally and intentionally buried taxa.

**Element (Body Part).** The skeletal element (e.g., cranium, mandible, humerus) is identified and then described by side, age, and portion recovered. Side is recorded for the element itself or for the portion recovered when it is axial, such as the left transverse process of a lumbar vertebra. Age is recorded at a general level: fetal or neonate, immature, young adult (near or full size with unfused epiphysis or young bone), and mature. Further refinements based on dental eruption or wear are noted as comments. The criteria used for assigning an age is also recorded. This is generally based on size, epiphysis closure, or texture of the bone. The portion of the skeletal element represented in a particular specimen is recorded in detail to determine how many individuals are present in an assemblage.

**Completeness.** Completeness refers to how much of that skeletal element is represented by the specimen. It is used in conjunction with the portion represented to determine the number of individuals represented. It also provides information on whether a species is intrusive, and on processing, environmental deterioration, animal activity, and thermal fragmentation.

**Taphonomic Variables.** Taphonomy is the study of preservation processes and how these affect the information obtained by identifying some of the nonhuman processes that affect the condition or frequencies found in an assemblage (Lyman 1994:1). Environmental alteration includes degrees of pitting or corrosion from soil conditions, sun bleaching from extended exposure, checking or exfoliation from exposure, etching from the acids excreted by roots, and polish or rounding from sediment movement. Animal alteration is recorded by source or probable source and where it occurs. Choices include carnivore gnawing and punctures, scatological or probable scat, rodent gnawing, and agent uncertain. Burning, when it occurs after burial, is also a taphonomic process.

**Burning.** Burning can occur as part of the cooking process, part of the disposal process, when bone is used as fuel, or after burial. The color, location, and presence of crackling or exfoliation are recorded. Burn color is a gauge of burn intensity. A light tan color or scorch is superficial burning, while charred or blackened bone becomes black as the collagen is carbonized, and when the carbon is oxidized, it becomes white or calcined (Lyman 1994:385, 388). Burns can be graded over a specimen reflecting the thickness of the flesh protecting portions of the bone, or light on the exterior and black at the core, reflecting burns that occur when the bone is dry. Graded burns can indicate a cooking process, generally roasting, while completely charred or calcined bone does not. Uniform degrees of burning are possible only after the flesh has been removed and generally indicate a disposal practice (Lyman 1994:387). Potential boiling or cooking brown is also recorded as brown and rounded, brown with no rounding, rounding only, and waxy.

**Butchering.** Evidence of butchering is recorded as orientation of cuts, grooves, chops, abrasions, saws, scrapes, peels, and intentional breaks. The location of the butchering is also recorded. A conservative approach is taken to the recording of marks and fractures that could be indicative of processing animals for food, tools, or hides since many natural processes result in similar marks and fractures.

**Modification.** Other types of modification are indicated through this variable. Manufacturing debris and tool forms are one option as are potential use wear and pigment stains.

## Dating: Collection and Analysis of Chronometric Samples

James L. Moore

Accurate dates are needed in every archaeological study to place sites in the proper context, both locally and regionally. Inaccuracies are built into many chronometric techniques, or perhaps more properly phrased, some methods may not actually reflect the event they are being used to date. In order to assign accurate occupational dates to a site, it is usually desirable to obtain as many types of chronometric data as possible. That way they can be used to cross-check one another and permit the researcher to identify and eliminate faulty dates.

Several categories of chronometric data are potentially available from LA 111333, including dateable artifacts, radiocarbon samples, archaeomagnetic samples, and tree-ring samples. Each category can provide useful and important temporal information, but there are also problems associated with each. Various types of samples will be collected under different circumstances, as detailed below.

### *Dateable Artifacts*

At least three categories of artifacts have the potential to provide dates, including pottery, chipped stone, and bone. However, only pottery has the potential to provide accurate chronometric information, and should only be available from the Classic period component. Ceramic types that have been dated by tree-ring correlations can be especially useful in assigning a date to this component.

Some chipped stone artifacts also have the potential to provide relative dates. Projectile points, in particular, are often used for this type of dating (see, for instance, Thoms 1977; Turnbow 1997). Unfortunately, dates for specific projectile point styles are usually not well anchored. In most cases they can only be assigned to time spans measured in centuries or millennia rather than years or decades. Some styles were used for long periods of time. In addition, projectile points were frequently collected from earlier sites and reused, "contaminating" later sites with earlier styles. Thus, this artifact category can only be used to provide very gross dates.

Certain chipped stone materials are somewhat more useful for dating sites. The physical properties of obsidian allow it to be dated, but the results are often questionable and open to interpretation. This type of analysis is based on the tendency of obsidian to absorb moisture at a relatively constant rate, depending on certain factors. The first of these factors is source. Obsidians from different volcanic flows vary in composition and absorb moisture at different rates. This problem can be overcome by certain tests (such as x-ray refraction) that provide information on the elemental makeup of obsidians, allowing them to be assigned to sources with known hydration rates (if a match exists). Temperature and soil moisture also effect the rate at which obsidian absorbs moisture. By placing sensors on or next to sites to monitor variations in soil moisture and temperature over time, enough information can be gathered to take these effects into consideration.

However, even when obsidians are sourced and environmental information gathered, this dating method is fraught with potential problems (see Boyer [1997] for an examination of obsidian hydration dates from Developmental period sites). Foremost among them is determining what event is being dated. Obsidian is perhaps the best material available in the Southwest for production of chipped stone tools, and does not occur naturally in the Tesuque area. Obsidian had to be imported, and therefore represents a desirable resource on abandoned sites. Thus, much of the obsidian on our sites may potentially have been salvaged from earlier sites in the area. Depending on where an artifact is sampled, analysis could date either period of use.

Many problems are associated with obsidian hydration analysis. This method may be used, but only when other types of chronometric data are unavailable. Since it appears that obsidian found on the surface or at shallow depths hydrates at different rates than specimens that are deeply buried where soil temperature and moisture content are more constant, analysis of samples from less than a meter deep is undesirable. If cultural deposits are that deep, it is unlikely that obsidian will be the only temporally sensitive material present. Thus, this material will only be used to provide chronometric information in extreme cases.

Bone is the third category of artifacts that can potentially provide temporal information. Like wood, bone contains a radioactive isotope of carbon that is amenable to accurate dating. However, floral specimens are better suited for this type of analysis, and it is unlikely that we will need to submit any bone for radiocarbon dating.

*Radiocarbon Dating*

Radiocarbon analysis has been used to date archaeological sites since the 1950s. While this process was initially thought to provide accurate absolute dates, several problems have cropped up over the years that now must be taken into account. The three most pervasive problems have to do with the ways in which wood grows and is preserved. Both animals and plants absorb a radioactive isotope of carbon ($^{14}C$) while they are alive. Immediately following death, $^{14}C$ begins decaying into $^{13}C$ at a known rate. Ideally, by simply measuring the proportion of each carbon isotope it should be possible to determine how long ago that entity stopped absorbing radioactive carbon. Since plant parts are often available on sites, this technique is usually applied to those types of materials. However, more recent research has tossed a few bugs into the system. For example, some plants use carbon in different ways. This variation can be taken into account by determining the type of plant being dated.

A more serious problem is encountered when wood or wood charcoal is submitted for dating (Smiley 1985). Only the outer parts of trees continue to grow through the life of the plant, hence only the outer rings and bark absorb carbon. Samples of wood submitted for dating may contain numerous rings, each representing growth in a different year. Thus, rather than measuring a single event (when the tree died or was cut down), the dates of a series of growth years are averaged. This often tends to overestimate the age of the material. Smiley (1985:385) notes that a large error in age estimation can occur in arid or high-altitude situations, where tree-ring density may be high and dead wood can preserve for long periods of time. Disparities as large as 1,000+ years were found in dates from Black Mesa, and there was an 80 percent chance that dates were overestimated by over 200 years and a 20 percent chance that the error was over 500 years (Smiley 1985:385–386).

The disparity in dates was even greater when fuel wood rather than construction wood was used for dating (Smiley 1985:372). This is because wood can be preserved for a long time in the Southwest, even when it is not in a protected location. Thus, wood used for fuel could have been lying on the surface for several hundred years before it was burned. Again, the event being measured is the death of the plant, not when it was used for fuel.

One other problem with the use of this method is caused by solar activity. Sunspots cause fluctuations in atmospheric $^{14}C$ levels, and hence in the amount of radioactive carbon absorbed by living entities. This introduces error into the calculations, which is currently corrected by using a calibration based on decadal fluctuations in atmospheric $^{14}C$ as measured from tree-ring sequences (Suess 1986). While this problem may no longer be as significant as the others mentioned, it indicates that we are still learning about how this isotope is absorbed and decays, and that it is affected in many ways that were not originally considered.

Even considering these problems, radiocarbon analysis can provide relatively sensitive dates when properly applied. For example, annuals or twigs from perennials represent short periods of growth and can often be confidently used. Construction wood can also be sampled in a way that measures the approximate cutting date rather than a series of growth years. This can be accomplished by obtaining only bark and outer rings instead of sending in a large lump of charcoal. This is often difficult and time consuming, but provides dates that are much more reliable.

Radiocarbon samples will most likely be the only materials recovered from Archaic strata and features that will be amenable to accurate chronometric analysis. Thus, a wide range of carbonized plant materials will be collected from this component in order to provide the most accurate dates possible. Samples of fuel woods will be submitted to provide dates for thermal features. Construction wood is the best type of material for radiocarbon dating, when available, especially when it comes from small elements. Construction wood would be sampled as outlined above, provided any is available. Other samples that may be considered for radiocarbon analysis are those that contain materials from annuals, or twigs and leaves from trees. Considering the potential inaccuracies of radiocarbon dating when dealing with archaeological events that were of short duration, we probably will not use this method to provide dates for the Classic period component.

*Archaeomagnetic Dating*

Archaeomagnetic dating analyzes the remanent magnetization in materials that were fired prehistorically. Those materials must contain particles with magnetic properties (ferromagnetic minerals), usually iron compounds like magnetite and hematite. Ferromagnetic minerals retain a remanent, or permanent, magnetization, which remains even after the magnetic field that caused it is removed (Sternberg 1990:13–14). When ferromagnetic materials are heated above a certain point (which varies by the type of compound), the remanent magnetization is erased and particles are remagnetized (Sternberg 1990:15). Samples of that material can be analyzed to determine the direction of magnetic north at the time of firing. Since magnetic north moves over time and the pattern of its movement has been plotted for about the last 1,500 years in the Southwest, comparison with the archaeomagnetic plot can provide a reasonably accurate date. However, it should be remembered that only the last event in which the material was heated to the point where remagnetization could occur is being dated. Thus, a feature could have been in use over a span of decades, but only the last time that it was fired to the proper heat can be dated by this method.

Archaeomagnetic analysis can potentially contribute good temporal data for sites, providing the proper fired materials are encountered. Boyer's (1997) examination of chronometric dates from Developmental period sites in the Taos Valley showed that archaeomagnetic dating provided the best control for determining the ages of individual and groups of sites. When a structure burns it occasionally attains the necessary heat for remagnetization to occur, and these events can also be dated. However, as noted above, one must keep in mind the event that is actually being dated. An archaeomagnetic date from a pithouse hearth cannot be used to place the construction of that structure in a temporal perspective because that is not the event being dated. Thus, archaeomagnetic samples can provide dates for the last use of certain features at a site, but cannot be used to determine when they were built.

Archaeomagnetic samples will be taken whenever possible. In most cases only hearths will be amenable to this type of analysis. However, if other burned soils are found in situ, samples of them may also be taken if they appear related to events that occurred during the time of occupation. While this method may provide dates for the Classic period occupation, there are not currently enough data available to use this method to date Archaic period occupations. However, as noted above, archaeomagnetic samples will also be obtained from Archaic contexts, if available, in order to aid in projecting the curve backwards.

*Tree-Ring Dating*

This method was developed in the early twentieth century and is based on the tendency of growth rings in certain types of trees to reflect the amount of moisture available during a growing season. In general, tree rings are wide in years with abundant rainfall, and narrow when precipitation levels are low. These tendencies have been plotted back in time from the present, in some cases extending over several thousand years. An absolute date can be obtained by matching sequences of tree rings from archaeological samples to master plots. This is the most accurate dating technique available because it can determine the exact year in which a tree was cut down. However, once again it is necessary to determine what event is being dated.

Because the reuse of wooden roof beams was common in the prehistoric Southwest, it is not always possible to determine whether a date derived from a viga is related to the construction of the structure within which it was found, or to a previous use. Clusters of similar dates in roofing materials are usually, but not always, a good indication that the approximate date of construction is represented. Isolated dates may provide some information, but are often of questionable validity.

Another problem associated with tree-ring dating concerns the condition of the sample being analyzed. In order to apply an accurate date to an event (in this case, the year in which a tree stopped growing), the outer surface of the tree is needed. An exact date can be obtained only when the outer part of a sample includes the bark covering of the tree, or rings that were at or near the tree's surface. In addition, enough rings must be present to allow an accurate match with the master sequence. It is often possible to provide a date when only inner rings are present, but this will not be a cutting date.

Even considering the potential problems associated with this technique, it represents the best method available for dating sites in the Southwest. Samples of construction materials that appear to contain enough rings for analysis will be collected, though it is unlikely that any will be available.

### *Summary*

As in every archaeological endeavor, chronological control is critical to our examination of these sites. We will attempt to obtain as many samples of diverse types as feasible, because it is impossible to accurately predict whether certain types of materials will be encountered. Thus, while tree-ring samples would provide the most accurate information concerning building dates, and archaeomagnetic samples are useful in determining when structures were abandoned, we will also collect other types of samples in case optimal materials are not recovered. This will include samples for radiocarbon and obsidian hydration dating. It is likely that not all samples of these materials will be processed.

## Human Remains

Nancy J. Akins and James L. Moore

While human remains are often recovered from prehistoric sites, rarely is the information gained from their study integrated into broader research perspectives, even when the topics relate to subsistence, diet, and demography (Martin 1994:88–89). Descriptions of mortuary treatment are fairly standard, but few go beyond placing the individual burial into the site context. The potential for understanding social behavior and organization gained from mortuary practices, which change in response to social, demographic, and economic conditions (Brown 1995:7; Larsen 1995:247), is rarely pursued.

Studies of human remains have shifted from constructing cultural sequences and identification of racial groups to identifying broad patterns of social organization and change. Mortuary remains are often highly patterned and reflect social organization more directly than other classes of archaeological remains (Trinkaus 1995:53). Recent mortuary analyses have approached a variety of topics, ranging from individual, gender, ethnic, political, and social identity to interpersonal conflict, resource control, labor and organization, ritual and meaning, social inequality, trade, population dynamics, and residential patterning (Larsen 1995:260).

Advances in the study of human remains provide important insights on heath, diet, genetic relationships, microevolution, and population characteristics. Inherited skeletal features are being used to address conflicting land claims by indigenous groups and studies of past human populations have provided information on inherited predispositions for diseases like diabetes and anemia (Buikstra and Ubelaker 1994:1).

Even the most basic analyses of human remains have the potential to contribute significant information on life during prehistory. Human bones and teeth record conditions during life as well as at death (Goodman 1993:282). Several indicators of physiological stress are routinely monitored to assess general health. These include adult stature, which may result from undernutrition, and subadult size, which can indicate the timing of stress events.

Sexual dimorphism tends to decrease with stress, and, over time, increase with greater divisions of labor. Enamel defects, hypoplasias or pitting, are associated with specific physiological disruptions and can be relatively accurately assigned an age of onset. Dental asymmetry begins in utero and reflects developmental stress while dental crowding can be nutritional or genetic. Dental caries reflect refined carbohydrates in the diet and can lead to infection and tooth loss. Dental abscessing can become systemic and life-threatening. Osteoarthritis and osteophytosis can indicate biomechanical stress. Osteoporosis, related to calcium loss and malnutrition, can be acute to severe during pregnancy and lactation. It also affects the elderly. Porotic hyperostosis is related to iron deficiency anemia and leaves permanent markers. Periosteal reactions result from chronic systemic infections (Martin 1994:94–95).

*Research Issues*

Considering the types of components represented by LA 111333, there is little likelihood that human remains will be recovered. This is especially true of the Classic period component. If human remains are recovered from the Archaic component, they will most likely be in a poor state of preservation. Thus, little information may be available from this class of cultural remains. If human remains are recovered, however, nondestructive observations during excavation and reinterment may be used to address general health, degree of mobility demonstrated by individual remains, and the presence of evidence for trauma associated with conflict, accident, or disease.

*Consultation Procedures*

Consultation procedures for the treatment of human remains are dependent on land status. For sites on Tesuque tribal land, the Native American Graves Protection and Repatriation Act (25 U.S.C. 3002, 1990) states that any human remains and associated funerary objects, sacred objects, or objects of cultural patrimony belong to the lineal descendants or if the lineal descendants cannot be ascertained, to the tribe on whose land the objects were discovered. These groups must be consulted before any items are excavated or removed. The criteria for determining lineal descent (43CFR10.14) are fairly rigorous. Lineal descendants are individuals who can trace their ancestry directly without interruption by means of the traditional kinship system of the appropriate tribe. Given the location and antiquity of LA 111333, consultations will be completed with Tesuque Pueblo concerning any human remains, funerary objects, sacred objects, or objects of cultural patrimony that might be encountered. All aspects of discovery, recovery, analysis, and final disposition will be agreed on before excavation begins. Steps of the consultation process and disposition are provided in Appendix 2.

*Excavation Procedures*

Excavation of human burials will be consistent with current professional archaeological standards. This generally includes the identification of a burial pit and careful removal of fill within the pit. When possible, half the fill will be removed to provide a profile of the fill in relation to the pit and the burial. The pit, pit fill, burial goods, and burial will be examined and recorded in detail on an OAS burial form with special attention paid to any disturbance that may have taken place. Scaled plans and profiles and photographs will further document the burial and associated objects. Flotation and pollen samples will be taken from all burials.

Disarticulated or scattered remains will be located horizontally and vertically, drawn, and photographed. Any associated materials and the potential cause of disturbance or evidence of deliberate placement will be recorded in detail.

*Analysis Methods*

The human bone analysis will proceed following notification of Tesuque Pueblo representatives and will consist only of superficial examination of bone as they are excavated and as they are prepared for reburial. Observations will follow the procedures set out in Standards for Data Collection from Human Skeletal Remains (Buikstra and Ubelaker 1994). This comprehensive system focuses on the need to gain the maximum amount of comparable information by recording the same attributes using the same standards. A series of 29 attachments and documentation on how these should be recorded include the following information:

1. A coding procedure for each element that makes up a relatively complete skeleton is provided. Diagrams of skeletons and anatomical parts allow for the location of any observations concerning these parts. Another form records commingled or incomplete remains.
2. Adult sex is determined by examining aspects of the pelvis and cranium. Age changes are documented on the pubic symphysis using two sets of standards, on the auricular surface of the ilium, and through cranial suture closure.
3. For immature remains, the age-at-death is determined by scoring epiphyseal union, union of primary ossification centers, and measurements of elements.
4. Recording of dental information includes an inventory, pathologies, and cultural modifications. Each tooth is coded and visually indicated for presence and whether it is in place, unobservable, or damaged, congenitally absent, or lost premortem or postmortem. Tooth development is assessed, occlusal surface wear is scored, caries are located and described, abscesses are located, and dental hypoplasias and opacities are described and located with respect to the cemento-enamel junction. Any premortem modifications are described and located.
5. The secondary dentition is measured and dental morphology scored for a number of traits.
6. Measurements are recorded for the cranium (n=35), clavicle, scapula, humerus, radius, ulna, sacrum, innominate, femur, tibia, fibula, and calcaneus (n=46).
7. Nonmetric traits are recorded for the cranium (n=21), atlas vertebra, seventh cervical vertebra, and humerus.
8. Postmortem changes or taphonomy are recorded when appropriate. These include color, surface changes, rodent and carnivore damage, and cultural modification.
9. The paleopathology section groups observations into nine categories: abnormalities of shape, abnormalities of size, bone loss, abnormal bone formation, fractures and dislocations, porotic hyperostosis/cribra orbitalia, vertebral pathology, arthritis, and miscellaneous conditions. The element, location, and other pertinent information is recorded under each category.
10. Cultural modifications such as trepanation and artificial cranial deformation are recorded in another set of forms.

The number and detail of observations taken may be limited by restrictions placed on our examination of human remains, as determined by an agreement that will be worked out between the OAS and Tesuque Pueblo prior to the initiation of data recovery.

# REFERENCES CITED


Acklen, John C., G. M. Brown, D. G. Campbell, A. C. Earls, M. E. Harlan, S. C. Lent, G. McPherson, and W. N. Trierweiler

1990 *Archaeological Survey Results for the Ojo Line Extension Project,* vol. 1. Archaeological Report No. 7. Public Service Company of New Mexico, Albuquerque.

Acklen, John C., Christopher A. Turnbow, and Dorothy Larson

1997 Conclusions and Recommendations. In *Ole,* vol. 3, *Analysis,* edited by John C. Acklen. TRC Mariah Associates and Public Service Company of New Mexico, Albuquerque.

Adams, E. Charles

1979 Cold Air Drainage and Length of Growing Season in the Hopi Mesas Area. *The Kiva* 44:285-296.

1991 *The Origin and Development of the Pueblo Katsina Cult.* University of Arizona Press, Tucson.

Agogino, George A.

1952 The Santa Ana Preceramic Site: A Report on a Cultural Level in Sandoval County, New Mexico. *The Texas Journal of Science* 1:32-37.

1953 The Santa Ana Preceramic Sites. *El Palacio* 60(4):131-140.

Ahlstrom, Richard V.

1985 The Interpretations of Archaeological Tree-Ring Dates. Unpublished Ph.D. dissertation, University of Arizona, Tucson.

Akins, Nancy J.

2000 Faunal Remains: Issues and Analyses. In *The Santa Fe to Pojoaque Corridor Testing Project: Archaeological Data Recovery from Five Sites and a Data Recovery Plan for the Prehistoric Sies along U.S. 84/285 North of Santa Fe, New Mexico,* by J. Boyer and S. Lakatos, pp. 133-137. Archaeology Notes No. 265. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Akins, Nancy J., Stephen S. Post, and C. Dean Wilson

2000 Life at the Edge: Early Developmental Period Mobility and Seasonality in the Northern Middle Rio Grande Valley. Paper presented at the Sixth Occasional Anasazi Symposium, Farmington.

Alexander, Robert K.

1964 *Highway Cultural Inventory Project Final Report 1961-1964.* New Mexico State Highway Department and Museum of New Mexico, Santa Fe.

Allen, Joseph W.

1972 *The Tsogue Highway Salvage Excavations near Tesuque, New Mexico.* Laboratory of Anthropology Notes No. 73. Museum of New Mexico, Santa Fe.

Allen, Joseph W., and Charles H. McNutt

1955 A Pit House Site Near Santa Ana Pueblo, New Mexico. *American Antiquity* 20(3): 241-255.

Andrefsky, William, Jr.

1998 *Lithics: Macroscopic Approaches to Analysis. Cambridge Manuals in Archaeology.* Cambridge University Press, Cambridge, United Kingdom.

Anschuetz, Kurt F.

1980 Rowe Pueblo Archaeologic Stie Survey: Preliminary Report. Ms. on file at the Archeological Records Management Section New Mexico Historic Preservation Division, Santa Fe.

1986 *Archaeological Excavation of Two Human Burials within the U.S. 285 Right-of-Way at Pojoaque Pueblo, Santa Fe County, New Mexico.* Laboratory of Anthropology Notes 353. Museum of New Mexico, Santa Fe.

1987 Pueblo III Subsistence, Settlement, and Territoriality in the Northern Rio Grande: The Albuquerque Frontier. In *Secrets of a City: Papers on Albuquerque Area Archaeology in Honor of Richard A. Bice,* edited by A. V. Moore and J. Montgomery, pp. 148-164. The Archaeological Society of New Mexico: 13. Albuquerque.

1998 *Archaeological Data Treatment Investigation at SW 414.104 and SW 414.108 for the Proposed College Hills Subdivisions Northwest of Santa Fe, Santa Fe County, New Mexico.* Research Series No. 414c. Southwest Archaeological Consultants, Santa Fe.

Anschuetz, Kurt F., John C. Acklen, and David V. Hill

1997 Prehistoric Overview. In *Ole,* vol. 1, *Context,* edited by John C. Acklen. TRC Mariah Associates and Public Service Company of New Mexico, Albuquerque.

Anschuetz, Kurt F., Timothy D. Maxwell, and John A. Ware

1985 *Testing Report and Research Design for the Medanales North Project, Rio Arriba County, New Mexico.* Laboratory of Anthropology Notes 347. Museum of New Mexico, Santa Fe.

Anschuetz, Kurt F., and Lonyta Viklund

1996 *A Cultural Resources Inventory Survey of the Proposed College Hills Subdivision, Northwest of Santa Fe, Santa Fe County, New Mexico.* Research Series No. 414. Southwest Archaeological Consultants, Santa Fe,

Ayer, Mrs. Edward E. (editor)

1916 *The Memorial of Fray Alonso de Benavides, 1630.* Privately printed. Copyright to Edward E. Ayer, Chicago.

Bandelier, Adolph F.

1890 *Final Report of Investigations among the Indians of the Southwestern United States, Carried on Mainly in the Years From 1880 to 1885,* Part I. Papers of the Archaeological Institute of America 3. Cambridge University Press, Cambridge, Massachusetts.

1892 *Final Report of Investigations Among the Indians of the Southwestern United States, Carried on Mainly in the Years From 1880 to 1885,* Part II. Papers of the Archaeological Institute of America 4. Cambridge University Press, Cambridge.

Beal, John D.

1987 *Foundations of the Rio Grande Classic: The Lower Chama River, A.D. 1300-1500.* Southwest Project No. 137. Southwest Archaeological Consultants, Santa Fe, New Mexico.

Berry, Michael S.

1982 *Time, Space, and Transition in Anasazi Prehistory.* University of Utah Press, Salt Lake City.

Bertram, Jack B.

1989 The Abiquiu Obsidian Hydration Study: Its Implications for the Abiquiu Area and for Archaeological Methods and Analytical Techniques. In *Report of Surface Collection and Testing at 18 Sites near Abiquiu Reservoir, Northern New Mexico,* by J. B. Bertram, J. A. Schutt, S. Kuhn, A. C. Earls, W. N. Trierweiler, C. Lintz, J. C. Acklen, C. M. Carrillo, and J. Elyea, pp. 263-304. Mariah Associates, Inc., Albuquerque, New Mexico.

Bertram, Jack B., Jeanne A. Schutt, Steven Kuhn, Amy C. Earls, W. Nicholas Trierweiler, Christopher Lintz, John C. Acklen, Charles M. Carrillo, and Janette Elyea

1989 *Report of Surface Collection and Testing at 18 Sites Near Abiquiu Reservoir, Northern New Mexico.* Mariah Associates, Inc., Albuquerque, New Mexico.

Biella, Jan V.
1979 Changing Residential Patterns among the Anasazi, A.D. 750-1525. In *Archeological Investigations in Cochiti Reservoir, New Mexico,* vol. 4, *Adaptive Change in the northern Rio Grande Valley,* edited by Jan V. Biella and Richard C. Chapman, pp. 103-144. Office of Contract Archeology, University of New Mexico, Albuquerque.

Binford, Lewis R.
1980 Willow Smoke and Dogs Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity* 45:4-20.

Binford, Lewis R. and Jeremy A. Sabloff
1982 Paradigms, Systematics, and Archaeology. *Journal of Anthropological Research* 38(2):137-153.

Blackburn, Fred M., and Ray A. Williamson
1997 *Cowboys and Cave Dwellers: Basketmaker Archaeology in Utah's Grand Gulch.* School of American Research Press, Santa Fe, New Mexico.

Bloch, M.
1966 *French Rural History: An Essay on its Basic Characteristics.* University of California Press, Berkeley.

Boyer, Jeffrey L.
1985 *Plains Electric Cooperative's Hernandez-Taos 115kV Transmission Line: An Archaeological Inventory Survey.* Contract Archaeology Report No. 8. Kit Carson Memorial Foundation, Taos.
1987 *Frijoles Timber Sale: Cultural Resources Inventory Survey.* Cultural Resources Report No. 1987-02-079-B. Carson National Forest, Taos.
1988 *Colorado Aggregate Company's Planned Red Hill Scoria Mine: Archaeological Inventory Survey*. Report No. 88-03. Taos.
1997 *Dating the Valdez Phase: Chronometric Reevaluation of the Initial Anasazi Occupation of North-Central New Mexico.* Archaeology Notes 164. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Boyer, Jeffrey L., and Eric Blinman
2002 *A Plan for Test Excavations at LA 111333, U.S. 84/285 Santa Fe–Pojoaque Corridor, Santa Fe County, New Mexico.* Archaeology Notes 314. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

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

Boyer, Jeffrey L., and Steven A. Lakatos (editors)
2000a *The Santa Fe to Pojoaque Testing Project: Archaeological Testing Results from Five Sites and a Data Recovery Plan for the Prehistoric Sites along U.S. 84/285 North of Santa Fe, New Mexico.* Archaeology Notes 265. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.
2000b In Search of Wendorf and Reed: A Framework for Data Recovery Investigations. In *The Santa Fe to Pojoaque Testing Project: Archaeological Testing Results from Five Sites and a Data Recovery Plan for the Prehistoric Sites along U.S. 84/285 North of Santa Fe, New Mexico,* edited by J. L. Boyer and S. A. Lakatos, pp. Archaeology Notes 265. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Boyer, Jeffrey L., James L. Moore, and Steven A. Lakatos
2000 *A Manual for Investigations at Archaeological Sites in New Mexico.* Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Bradfield, Maitland
1971 *The Changing Pattern of Hopi Agriculture.* Royal Anthropological

Institute, Occasional Papers No. 30. London.

Brown, James
1995 On Mortuary Analysis–with Special Reference to the Saxe-Binford Research Program. In *Regional Approaches to Mortuary Analysis,* edited by Lane Anderson Beck, pp. 3-26. Plenum Press, New York.

Bryan, Kirk
1939 Stone Cultures Near Cerro Pedernal and Their Geological Antiquity. *Bulletin of the Texas Archeological and Paleontological Society* 11:9-45. Abilene.

Bryan, Kirk, and Joseph H. Toulouse Jr.
1943 The San Jose Non-Ceramic Culture and its Relation to a Puebloan Culture in New Mexico. *American Antiquity* 8:269-290.

Bugé, David E.
1978 Preliminary Report: 1978 excavations at NM-01-1407, Ojo Caliente, New Mexico. Unpublished report on file at the Laboratory of Anthropology, Museum of New Mexico, Santa Fe.

Buikstra, Jane E., Douglas K. Charles, and Gordon F. M. Rakita
1998 *Staging Ritual: Hopewell Ceremonialism at the Mound House Site, Greene County, Illinois.* Kampsville Studies in Archeology and History, No. 1. Center for American Archeology, Kampsville.

Buikstra, Jane E., and Douglas H. Ubelaker
1994 *Standards for Data Collection form Human Skeletal Remains.* Research Series No. 44. Arkansas Archeological Survey, Fayetteville.

Camilli, Eileen L.
1988 Lithic Raw Material Selection and Use in the Desert Basins of South-Central New Mexico. *The Kiva* 53:147-163.
1989 The Occupational History of Sites and the Interpretation of Prehistoric Technological Systems: An Example from Cedar Mesa, Utah. In *Time, Energy, and Stone Tools,* edited by R. Torrance, pp. 17-26. Cambridge University Press, Cambridge, Massachusetts.

Campbell, John Martin, and Florence Hawley Ellis
1952 The Atrisco Sites: Cochise Manifestations in the Middle Rio Grande Valley. *American Antiquity* 17(3):211-221.

Carter, Carol
1980 Flotation Analysis. In *Archaeological Investigations at Nambe Falls,* by S. Alan Skinner, C. Shaw, C. Carter, M. Cliff, and C. Heathington, Appendix 1. Research Reports 121. Archaeology Research Program, Southern Methodist University, Dallas.

Chapin, Charles E., and William R. Seager
1975 Evolution of the Rio Grande Rift in the Socorro and Las Cruces Areas. In *Guidebook of the Las Cruces Area,* edited by W. Seager, R. Clemons, and J. Callender, pp. 297-321. Twenty-Sixth Field Conference, New Mexico Geological Society, Socorro.

Chapman, Richard C.
1979 The Archaic Occupation of White Rock Canyon. In *Archaeological Investigations in Cochiti Reservoir, New Mexico,* vol. 4, *Adaptive Change in the Northern Rio Grande Valley,* edited by J. Biella and R. Chapman, pp. 61-73. Office of Contract Archeology, University of New Mexico, Albuquerque.

Chapman, Richard C., and Jan V. Biella
1979 A Review of Research Results. In *Archaeological Investigations in Cochiti Reservoir, New Mexico,* vol. 4, *Adaptive Change in the Northern Rio Grande Valley,* edited by J. Biella and R. Chapman, pp. 385-406. Office of Contract Archeology, University of New Mexico, Albuquerque.

Condie, Carol J.
1987 The Nighthawk Site (LA 5685), a Pithouse Site on Sandia Pueblo Land, Sandoval County, New Mexico. In *Secrets of a City: Papers on Albuquerque Area Archaeology in Honor of Richard A. Bice,* edited by A. V. Poore and J. Montgomery, pp. 63-76. Papers No. 13. Archaeological Society of New Mexico, Albuquerque.
1996 The Third Pithouse at the Nighthawk Site (LA 5685). In *La Jornada: Papers in Honor of William F. Turney,* edited by M.S. Duran and D.T. Kirkpatrick, pp. 109-227. Volume 22. Archaeological Society of New Mexico, Albuquerque.

Condie, Carol J., and Landon D. Smith
1989 *Data Recovery from Seven Archaeological Sites at a Proposed Scoria Mine on Red Hill, Rio Arriba County, New Mexico for Colorado Aggregate Company.* Quivira Research Center Publications 148. Quivira Research Center, Albuquerque.

Cordell, Linda S.
1975 Predicting Site Abandonment at Wetherill Mesa. *The Kiva* 40:189-202.
1978 *A Cultural Resources Overview of the Middle Rio Grande Valley, New Mexico.* USDA Forest Service and USDI Bureau of Land Management, Santa Fe and Albuquerque.
1989 Northern and Central Rio Grande. In *Dynamics of Southwestern Prehistory,* edited by Linda S. Cordell and George J. Gumerman, pp. 293-335. Smithsonian Institution, Washington, D. C.

Cordell, Linda S., and George J. Gumerman
1989 Cultural Interaction in the Prehistoric Southwest. In *Dynamics of Southwestern Prehistory,* edited by Linda S. Cordell and George J. Gumerman. Smithsonian Institution, Washington, D. C.

Cordell, Linda S., and Fred Plog
1978 Escaping the Confines of Normative Thought: A Reevaluation of Puebloan Prehistory. *American Antiquity* 44(3):405-429.

Crown, Patricia L., Janet D. Orcutt, and Timothy A. Kohler
1996 Pueblo Cultures in Transition: The northern Rio Grande. In *The Prehistoric Pueblo World, A.D. 1150-1350,* edited by Michael A. Adler, pp. 188-204. University of Arizona

Cummings, Linda Scott
1989a Pollen and Macrofloral Analysis at LA 2, Agua Fria Schoolhouse Site, Northern New Mexico. In *LimitedEexcavations at LA 2, the Agua Fria Schoolhouse Site, Agua Fria Village, Santa Fe County, New Mexico,* by Richard W. Lang and Cherie L. Schieck. Southwest Report 216. Southwest Archaeological Consultants, Santa Fe.
1989b Pollen and Flotation Analyses. In *The KP Site and Late Developmental Period Archaeology in the Santa Fe District,* by Regge N. Wiseman, pp. 77-83. Laboratory of Anthropology Note 494. Museum of New Mexico, Santa Fe.

Dean, Jeffrey S., and Gary S. Funkhouser
1995 Dendroclimatic Reconstructions for the Southern Colorado Plateau. In *Climate Change in the Four Corners and Adjacent Regions: Implications for Environmental Restoration and Land-Use Planning,* edited by W. Waugh, pp. 85-104. Mesa State College, Grand Junction.

Dick, Herbert W.
1943 Alluvial Sites of Central New Mexico. *New Mexico Anthropologist* 6, 7(1):19-22.

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

Dilley, Michael, David Barsanti, and Matthew Schmader
1998 *Archaeological Investigations at Three Sites in Tierra Contenta Phase 1B, Santa Fe.* Rio Grande Consultants, Albuquerque, New Mexico.

Doleman, William H.
1996 *Archaeological Survey of the Southern Caja del Rio: Class III Inventory of a Portion of the Camel Tracks Training Area.* Report No. 185-548. Office of Contract Archeology, University of New Mexico, Albuquerque.

Doyel, David E., and Suzanne K. Fish
2000 Prehistoric Villages and Communities in the Arizona Desert. In *The Hohokam Village Revisited,* edited by D. Doyel, S. Fish, and P. Fish, pp. 1-35. Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Fort Collins, Colorado.

Dutton, Bertha P.
1963 *Sun Father's Way: The Kiva Murals of Kuaua, a Pueblo Ruin, Coronado State Monument, New Mexico.* University of New Mexico Press, Albuquerque.

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

Eschman, Peter N.
1983 Archaic Site Typology and Chronology. In *Economy and Interaction along the Lower Chaco River,* edited by P. Hogan and J. Winter, pp. 375-384. Office of Contract Archeology and Maxwell Museum of Anthropology, University of New Mexico. Albuquerque.

Evaskovich, John A., R. W. Coleman, R. A. Anduze. E. T. Crollett, R. Dello-Russo, J. C. Acklen, K. J. Roxlau, R. W. Lang, M. F. Kemrer, D. J. Larson, R. Loehman, and D. G. Campbell
1997 Cañones Mesa Geoarchaeological Unit. In *OLE,* vol. 1, *Context,* edited by John C. Acklen. TRC Mariah Associates and Public Service Company of New Mexico, Albuquerque.

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

Fiedel, Stuart J.
1999 Older Than We Thought: Implications of Corrected Dates for Paleoindians. *American Antiquity* 64:95-115.

Fiero, Kathleen
1978 *Prehistoric Garden Plots along the Lower Rio Chama Valley: Archeological Investigations at Sites LA 11830, LA 11831, and LA 11832, Rio Arriba County, New Mexico.* Laboratory of Anthropology Notes 111E. Museum of New Mexico, Santa Fe.

Folks, James L.
1975 *Soil Survey of Santa Fe Area, New Mexico: Santa Fe County and Part of Rio Arriba County.* USDA Soil Conservation Service, Cartographic Division, Washington, D.C.

Franklin, Hayward H.
1992 Survey and Testing Ceramics from Tesuque Pueblo. Manuscript prepared for Quivira Research, Albuquerque.

Fuller, Steven L.
1989 *Research Design and Data Recovery Plan for the Animas-La Plata Project.* Four Corners Archaeological Project Report No. 15. Complete Archaeological Service Associates. Cortez, Colorado.

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

Associates, Socorro, New Mexico.

Gladwin, H. S.
1945 *The Chaco Branch Excavations at White Mound and in the Red Mesa Valley.* Medallion Paper 38. Gila Pueblo, Arizona.

Goodman, Alan H.
1993 On the Interpretation of Health from Skeletal Remains. *Current Anthropology* 34(1)281-288.

Hallenbeck, C.
1918 Night Temperature Studies in Roswell Fruit District. *Monthly Weather Review* 46:364-373.

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

Hammond, George P., and Agapito Rey
1953 Translators and editors. *Don Juan de Oñate: Colonizer of New Mexico, 1595-1628.* University of New Mexico Press, Albuquerque.
1966 *The Rediscovery of New Mexico 1580-1594: The Explorations of Chamuscado, Espejo, Castaño de Sosa, Morlete, and Leyva de Bonilla and Humana.* University of New Mexico Press, Albuquerque.

Hard, Robert J.
1983 A Model for Prehistoric Land Use, Ft. Bliss, Texas. American Society for *Conservation Archaeology Proceedings,* pp. 41-51.
1986 Ecological Relationships Affecting the Rise of Farming Economies: A Test from the American Southwest. Unpublished Ph.D. dissertation, University of New Mexico, Albuquerque.

Harrington, John P.
1916 *The Ethnogeography of the Tewa Indians.* Twenty-Ninth Annual Report of the Bureau of American Ethnology. Government Printing Office, Washington.

Haury, Emil W.
1976 *The Hohokam: Desert Farmers and Craftsmen.* The University of Arizona Press, Tucson.

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

Haynes, C.V., Jr.
1980 The Clovis Culture. *Canadian Journal of Anthropology* 1(1):115-121.

Hewett, Edgar L.
1953 *Pajarito Plateau and its Ancient People.* School of American Research and University of New Mexico Press, Albuquerque.

Hibben, Frank C.
1937 Excavation of the Riana Ruin and Chama Valley Survey. *The University of New Mexico Bulletin, Anthropological Series* 2(1):1-50. University of New Mexico, Albuquerque.
1941 *Evidences of Early Occupation in Sandia Cave, New Mexico, and Other Sites in the Sandia-Manzano Region.* Smithsonian Miscellaneous Collections 99(23). Washington, D.C.

Hill, Jane H.
2001 Proto-Uto-Aztecan: A Community of Cultivators in Central Mexico? *American Anthropologist* 103:913-934.

Hohmann, John W., Margaret Davis, Joel D. Irish, Donald C. Irwin, and Christine H. Virden
1998 *Phase I (Class III) Archaeological Survey of 22.4 Kilometers (14 Miles) along US 84/285, Santa Fe to Pojoaque, Santa Fe*

*County, New Mexico.* Cultural Resource Group Clearance Report No. 48. Louis Berger and Associates, Inc., Santa Fe.

Holliday, Vance T.
1997 *Paleoindian Geoarchaeology of the Southern High Plains.* University of Texas Press, Austin.

Holmer, Richard N.
1986 Common Projectile Points of the Intermountain West. In *Anthropology of the Desert West: Essays in Honor of Jesse D. Jennings,* edited by C. Condie and D. Fowler, pp. 89-115. University of Utah Anthropological Papers No. 110. Salt Lake City.

Honea, Kenneth H.
1971 LA 356: La Bolsa Site. In *Salvage Archaeology in The Galisteo Dam and Reservoir Area, New Mexico.* Museum of New Mexico, Santa Fe.

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

1979 Post-Pleistocene Archeology, 7000-2000 B.C. In *Handbook of North American Indians,* vol. 9, *Southwest,* edited by A. Ortiz, pp. 31-42. Smithsonian Institution Press, Washington, D.C.

Irwin-Williams, Cynthia, and S. Tompkins
1968 *Excavations at En Medio Rock Shelter, New Mexico.* Eastern New Mexico University, Contributions in Anthropology 1(2), Portales.

Jeançon, Jean A.
1923 *Excavations in the Chama Valley, New Mexico.* Bureau of American Ethnography Bulletin 81, Washington, D.C.

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

Kelly, Robert L.
1985 Hunter-Gatherer Mobility and Sedentism: A Great Basin Study. Unpublished Ph.D. dissertation, Department of Anthropology, University of Michigan, Ann Arbor.
1988 The Three Sides of a Biface. *American Antiquity* 53(4):717-734.

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

Kohler, Timothy A.
1989 Fieldhouses and the Tragedy of the Commons in the Anasazi Southwest. Paper presented at the 54th annual meeting of the Society for American Archaeology, Atlanta, Georgia.
1990 *Bandelier Archaeological Exavation Project: Summer 1989 Excavations at Burnt Mesa Pueblo.* Reports of Investigations 62. Department of Anthropology, Washington State University, Pullman.

Lakatos, Steven A.
2000a Letter report to F. Craig Conley dated March 6, 2000. On file at the Office of Archaeological Studies, Museum of New Mexico, Santa Fe.
2000b Pit Structure Architecture of the Developmental Period (A.D. 600-1200). Paper presented at the Sixth Occasional Anasazi Symposium, Farmington, New Mexico.
2002 What is a Rio Grande Kiva? Origin and Development of Rio Grande Pit

Structures. Paper presented at the 67th annual meeting of the Society for American Archaeology, Denver, Colorado.

Lakatos, Steven A., Stephen S. Post, and Jesse B. Murrell
2001 *Data Recovery Results from Two Archaeological Sites Along North Ridgetop Road, Santa Fe County, New Mexico.* Archaeology Notes No. 290. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Lancaster, James W.
1983 An Analysis of Manos and Metates from the Mimbres Valley, New Mexico. Unpublished M.A. thesis, University of New Mexico, Albuquerque.
1986 Ground Stone. In *Short-Term Sedentism in the American Southwest: The Mimbres Valley Salado,* by B. Nelson and S. LeBlanc, pp. 177-190. Maxwell Museum of Anthropology Publication Series. University of New Mexico Press, Albuquerque.

Lang, Richard W.
1977 *Archaeological Survey of the Upper San Cristobal Arroyo Drainage, Galisteo Basin, Santa Fe County, New Mexico.* School of American Research, Santa Fe, New Mexico.
1992 *Archaeological Excavations at Dos Griegos, Upper Cañada de los Alamos, Santa Fe County, New Mexico: Archaic through Pueblo V.* Southwest Report 283. Southwest Archaeological Consultants, Santa Fe, New Mexico.
1993 *The Sierra del Norte Sites: Processing and Use at Flint Quarries of the Lower Santa Fe Range, New Mexico.* Southwest Research Series 241. Southwest Archaeological Consultants, Santa Fe, New Mexico.
1995 *Investigations of Limited Activity Sites at Bishop's Lodge in the Santa Fe Foothills.* Southwest Research Series 284. Southwest Archaeological Consultants, Santa Fe, New Mexico.

Lang, Richard W., and Cherie L. Scheick
1989 *Limited Excavations at LA 2, The Agua Fria Schoolhouse Site, Agua Fria Village, Santa Fe County, New Mexico.* Southwest Report 216. Southwest Archaeological Consultants, Santa Fe, New Mexico.

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

Larsen, Clark Spencer
1995 Regional Perspectives on Mortuary Analysis. In *Regional Approaches to Mortuary Analysis,* edited by L. Beck, pp. 247-264. Plenum Press, New York.

Larson, Dorothy L., and Robert Dello-Russo
1997 Site Structure. In *Ole,* vol. 3, *Analysis,* edited by J. Acklen. TRC Mariah Associates and Public Service Company of New Mexico, Albuquerque.

Lent, Stephen C.
1991 *The Excavation of a Late Archaic Pit Structure near Orowi, San Ildefonso Pueblo, New Mexico.* Archaeology Notes No. 52, Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

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

Luebben, Ralph A.
1953 Leaf Water Site. In *Salvage Archaeology in the Chama Valley,* assembled by F. Wendorf, pp. 9-33. Monographs of the School of American Research 17, Santa Fe.

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

Maker, H. J., H. E. Dregne, V. G. Link, and J. U. Anderson
1974 *Soils of New Mexico.* Research Report No. 285. New Mexico State University Agricultural Experiment Station, Las Cruces.

Marshall, Michael P., John R. Stein, Richard W. Loose, and Judith E. Novotny
1979 *Anasazi Communities of the San Juan Basin.* Public Service Company of New Mexico and New Mexico State Historic Preservation Division, Albuquerque.

Martin, Debra L.
1994 Patterns of Health and Disease: Stress Profiles for the Prehistoric Southwest. In *Themes in Southwest Prehistory,* edited by G. Gumerman, pp. 87-108. School of American Research Press, Santa Fe, New Mexico.

Martin, Paul S.
1963 *The Last 10,000 Years.* University of Arizona Press, Tucson

Martin, William C., and Robert Hutchins
1981 *Flora of New Mexico.* Braunschweig, W. Germany.

Matson, R. G.
1991 *The Origins of Southwestern Agriculture.* The University of Arizona Press, Tucson.

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

McBride, Pamela, and Mollie S. Toll
1999 *Results of Flotation and Wood Analysis at LA 61315 and LA 61321, Northwest Santa Fe Relief Route, Santa Fe, New Mexico Project 41.600.* Ethnobotany Lab Technical Series 73. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

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

Mera, Harry. P.
1935 *Ceramic Clues to the Prehistory of North Central New Mexico.* Technical Series Bulletin No. 8. Laboratory of Anthropology, Museum of New Mexico, Santa Fe.
1940 *Population Changes in the Rio Grande Glaze Paint Area.* Technical Series Bulletin No. 9. Laboratory of Anthropology, Museum of New Mexico, Santa Fe.

Miller, John P., and Fred Wendorf
1958 Alluvial Chronology of the Tesuque Valley, New Mexico. *Journal of Geology* 66(2):177-194.

Moore, Bruce
1978 Are Pueblo Field Houses a Function of Urbanization? In *Limited Activity and Occupation Sites,* edited by A. Ward, pp. 9-16. Center for Anthropological Studies, Contributions to Anthropological Studies 1. Albuquerque.
1980 Pueblo Isolated Small Structure Sites. Ph.D. dissertation, Southern Illinois University. University Microfilms (no. 8017423). Ann Arbor, Michigan.

Moore, James L.
1980 Archaic Settlement and Subsistence. In *Human Adaptations in a Marginal Environment: The UII Mitigation Project,* edited by J. Moore and J. Winter, pp. 358-381. Office of Contract Archeology, University of New Mexico, Albuquerque.
1981 Prehistoric Soil and Water Conservation in the Middle Rio Puerco Valley. Unpublished M.A. thesis, University of New

Mexico, Albuquerque.

1992 *Archaeological Testing at Three Sites West of Abiquiú, Rio Arriba County, New Mexico.* Office of Archaeological Studies, Archaeology Notes No. 33. Museum of New Mexico, Santa Fe.

1993 *Archaeological Testing at Nine Sites along NM 502 near San Ildefonso, Santa Fe County, New Mexico.* Archaeology Notes No. 35. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

1994 Chipped Stone Artifact Analysis. In *Studying the Taos Frontier: The Pot Creek Data Recovery Project,* by J. Boyer, J. Moore, D. Levine, L. Mick-O'Hara, and M. Toll, pp. 287-338. Archaeology Notes 68. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

1996 *Archaeological Investigations in the Southern Mesilla Bolson: Data Recovery at the Santa Teresa Port-of-Entry Facility.* Archaeology Notes 188. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

1999 Projectile Points. In *Archaeology of the Mogollon Highlands: Settlement Systems and Adaptations,* vol. 3, edited by Y. Oakes and D. Zamora, pp. 25-84. Office of Archaeological Studies, Archaeology Notes No. 232. Museum of New Mexico, Santa Fe.

2001 *Prehistoric and Historic Occupation of Los Alamos and Guaje Canyons: Data Recovery at Three Sites near the Pueblo of San Ildefonso.* Office of Archaeological Studies, Archaeology Notes no. 244. Museum of New Mexico, Santa Fe.

2002 *Historic Occupation of the Glorieta Valley in the Seventeenth and Nineteenth Centuries: Excavations at LA 76138, LA 76140, and LA 99029.* Office of Archaeological Studies, Archaeology Notes No. 262. Museum of New Mexico, Santa Fe. [DRAFT]

n.d. Prehistoric Agriculture in the Lower Rio Chama Valley. In *Adaptations on the Anasazi and Spanish Frontiers: Excavations at Five Sites Near Abiquiu, Rio Arriba County,* New Mexico, by J. Moore, J. Boyer, and D. Levine. Archaeology Note No. 187. Office of Archaeological Studies, Museum of New Mexico, Santa Fe. [Draft]

Moore, James L., and Daisy F. Levine

1987 *An Archaeological Survey of Proposed Adjustments and Realignments to State Road 4, Santa Fe County, New Mexico.* Laboratory of Anthropology Notes No. 408. Museum of New Mexico, Santa Fe.

Nordby, Larry

1981 The Prehistory of the Pecos Indians. In *Exploration,* edited by D. Noble, pp. 5-11. Annual Bulletin of the School of American Research, Santa Fe, New Mexico.

Office of Archaeological Studies Staff (OAS)

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

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

Orcutt, Janet D.

1990 Field Houses, Communities, and Land Use on the Pajarito Plateau. Paper presented in the symposium Small Sites in the Big Picture, 55th Annual Meeting of the Society for American Archaeology. Las Vegas, Nevada.

1991 Environmental Variability and Settlement Changes on the Pajarito Plateau, New Mexico. *American Antiquity* 56:315-332.

Ortiz, Alfonso

1979 San Juan Pueblo. In *Handbook of North American Indians,* vol. 9, *Southwest,* edited by A. Ortiz, pp. 278-295. Smithsonian Institution, Washington, D.C.

Parry, William J., and Robert L. Kelly
1987 Expedient Core Technology and Sedentism. In *The Organization of Core Technology,* edited by J. Johnson and C. Morrow, pp. 285-304. Westview Press, Boulder, Colorado.

Peckham, Stewart
1954 A Pueblo I Site Near San Felipe Pueblo, New Mexico. In New Mexico Highway Salvage Archaeology, 1(4):41-51. Museum of New Mexico, Santa Fe.
1957 Three Pithouse Sites near Albuquerque, New Mexico. In *New Mexico Highway Salvage Archaeology* 3(12):39-70. Museum of New Mexico, Santa Fe.
1981 The Palisade Ruin (LA 3505): A Coalition Period Pueblo Near Abiquiu Dam, New Mexico. In *Collected Papers in Honor of Erik Kellerman Reed,* edited by A. Schroeder, pp. 113-147. Papers of the Archaeological Society of New Mexico No. 6, Albuquerque.
1984 The Anasazi Culture of the Northern Rio Grande Rift. In *New Mexico Geological Society Guidebook, 35th Field Conference: Rio Grande Rift, Northern New Mexico,* pp. 275-281. New Mexico Bureau of Mines and Mineral Resources, Socorro.

Pilles, Peter J., Jr., and David R. Wilcox
1978 The Small Sites Conference: An Introduction. In *Limited Activity and Occupation Sites,* edited by A. Ward, pp. 1-5. Center for Anthropological Studies Contributions to Anthropological Studies 1, Albuquerque, New Mexico.

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

Post, Stephen S.
1996 *Las Campanas de Santa Fe Sunset Golf Course, and Estates IV, Estates V, and Estates VII Excavations.* Archaeology Notes 193. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.
1997 Archaeological Clearance Letter for Phase 2 of the Northwest Santa Fe Relief Route, Santa Fe County, New Mexico. On file at the Office of Archaeological Studies, Museum of New Mexico, Santa Fe.
1999a *Excavation of a Late Archaic Period Limited Base Camp (LA61282) along Airport Road, Santa Fe, New Mexico.* Office of Archaeological Studies, Museum of New Mexico, Santa Fe. [Draft]
1999b *Excavation of LA 61315 and LA 61321 along the Northwest Santa Fe Relief Route (State Road 599), Phase 3, Santa Fe, New Mexico.* Office of Archaeological Studies, Museum of New Mexico, Santa Fe. [Draft]
2001 *The Archaic Sites Project: A Sample Archaeological Inventory of the Former Santa Fe Ranch Lease, Taos Field Office, Bureau of Land Management, Santa Fe County, New Mexico.* Santa Fe Northwest Advisory Council Report No. 2, Santa Fe, New Mexico.
2002 Linking Early Occupations of the Northern Rio Grande: The Northwest Santa Fe Relief Route (NM 599) and Peña Blanca (NM 22) Projects in Northern New Mexico. Paper presented at the 67th Annual Meeting of the Society for American Archaeology, Denver, Colorado.

Post, Stephen S., and Charles A. Hannaford
2002 *Data Recovery Plan for LA 134297, Located at Gonzales Elementary School, 851 West Alameda, Santa Fe, New Mexico.* Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Powers, Robert P., William B. Gillespie, and Stephen H. Lekson
1983 *The Outlier Survey: A Regional View of Settlement in the San Juan Basin.* Reports of the Chaco Center No. 3. National Park Service Division of Cultural Research, Albuquerque, New Mexico.

Powers, Robert P., and Tineke Van Zandt
1999 An Introduction to Bandelier. In *The Bandelier Archaeological Survey,* vol. 1, edited by R. Powers and J. Orcutt, pp. 1-31. USDI National Park Service, Intermountain Cultural Resources Management Professional Paper No. 57. Santa Fe, New Mexico.

Preucel, Robert W.
1987 Settlement Succession on the Pajarito Plateau, New Mexico. *The Kiva* 53:3-33.
1990a *Seasonal Circulation and Dual Residence in the Pueblo Southwest: A Prehistoric Example from the Pajarito Plateau, New Mexico.* Garland Publishing. New York.
1990b Seasonal Circulation and Dual Residence in the Puebloan Southwest. Paper presented in the symposium Small Sites in the Big Picture, 55th annual meeting of the Society for American Archaeology, Las Vegas, Nevada.

Rappaport, Roy A.
1979 The Obvious Aspects of Ritual. In *Ecology, Meaning, and Religion,* by R. A. Rappaport, pp. 173-221. North Atlantic Books, Berkeley.

Reed, Erik K.
1949 Sources of Upper Rio Grande Pueblo Culture and Population. *El Palacio* 56:163-184.

Renaud, Etienne B.
1942 *Reconnaissance Work in the Rio Grande Valley, Colorado and New Mexico.* University of Denver Department of Anthropology Archaeological Series No. 3, Denver.
1946 *Archaeology of the Upper Rio Grande Basin in Southern Colorado and Northern New Mexico.* University of Denver Department of Anthropology Archaeological Series No. 6, Denver.

Reynolds, S. E.
1956 *Climatological Summary. New Mexico: Temperature 1850-1954; Frost 1850-1954; and Evaporation 1850-1954.* Technical Report 5. New Mexico State Engineer's Office, Santa Fe.

Rohn, Arthur H.
1977 *Cultural Change and Continuity on Chapin Mesa.* The Regents Press of Kansas, Lawrence.
1989 Northern San Juan Prehistory. In *Dynamics of Southwest Prehistory,* edited by L. Cordell and G. Gumerman, pp. 149-177. Smithsonian Institution Press, Washington, D.C.

Root, Matthew J., and Douglas R. Harro
1993 Stone Artifacts from Casa del Rito and Burnt Mesa Pueblo. In *Bandelier Archaeological Excavation Project: Summer 1990 Excavations at Burnt Mesa Pueblo and Casa del Rito,* edited by T. Kohler and M. Root, pp. 107-134. Reports of Investigations No. 64, Department of Anthropology, Washington State university, Pullman.

Rose, Martin R., Jeffrey S. Dean, and William J. Robinson
1981 *The Past Climate of Arroyo Hondo New Mexico Reconstructed from Tree-Rings.* Arroyo Hondo Archaeological Series 4. School of American Research Press, Santa Fe.

Roth, Barbara J. (editor)
1996 *Early Formative Adaptations in the Southern Southwest.* Monographs in World Archaeology No. 25. Prehistory Press. Madison, Wisconsin.

Schaafsma, Curtis F.
1976 *Archaeological Survey of Maximum Pool and Navajo Excavations at Abiquiu Reservoir, Rio Arriba County, New Mexico.* School of American Research Contract Archaeology Program, Santa Fe.
1978 Archaeological Studies in the Abiquiu Reservoir District. *Discovery* 1978:41-69. School of American Research, Santa Fe.

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

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

Scheick, Cherie L.
1991 *A Research Design for the Investigation of Limited Activity Sites at Las Campanas de Santa Fe.* Draft Report. Southwest Report 287. Southwest Archaeological Consultants, Santa Fe, New Mexico.

Schmader, Matthew, F.
1987 *Excavation of the Santo Niño Site (LA 64677): An Early Coalition Period Pithouse in Northern Santa Fe.* Rio Grande Consultants, Albuquerque.
1994 *Archaic Occupations of the Santa Fe Area: Results of the Tierra Contenta Archaeological Project.* Rio Grande Consultants, Albuquerque.

Schroeder, Albert H.
1979 Pueblos Abandoned in Historic Times. In *Handbook of North American Indians,* vol. 9, *Southwest,* edited by A. Ortiz, pp. 236-254. Smithsonian institution Press. Washington, D.C.

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

Schutt, Jeanne A., Steven Kuhn, Janette Elyea, Jack B. Bertram, and Amy C. Earls
1989 *Site Descriptions. In Report of Surface Collection and Testing at 18 Sites near Abiquiu Reservoir, Northern New Mexico,* by J. Bertram, J. Schutt, S. Kuhn, A. Earls, W. Trierweiler, C. Lintz, J. Acklen, C. Carrillo, and J. Elyea, pp. 49-262. Mariah Associates, Inc., Albuquerque, New Mexico.

Seaman, Timothy J.
1983 *Archeological Investigations on Guadalupe Mountain, Taos County, New Mexico.* Laboratory of Anthropology Note No. 309. Museum of New Mexico, Santa Fe.

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

Smiley, Francis E., IV
1985 The Chronometrics of Early Agricultural Sites in Northeastern Arizona: Approaches to the Interpretation of Radiocarbon Dates. Unpublished Ph.D. dissertation, University of Michigan, Ann Arbor.

Snead, James E.
1995 Beyond Pueblo Walls: Community and Competition in the Northern Rio Grande, A.D. 1300-1400. Unpublished Ph.D. dissertation, University of California, Los Angeles.

Steen, Charlie R.
1977 *Pajarito Plateau Archaeological Survey and Excavations.* Report LASL-77-4. Los Alamos Scientific Laboratory, Los Alamos, New Mexico.
1982 *Pajarito Plateau Archaeological Survey and Excavations, II.* Report LA-8860-NERP. Los Alamos National Laboratory, Los Alamos, New Mexico.

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

Sternberg, Robert S.
1990 The Geophysical Basis of Archaeomagnetic Dating. In *Archaeomagnetic Dating,* edited by J.

Eighmy and R. Sternberg, pp. 5-28. The University of Arizona Press, Tucson.

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

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

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

Suess, Hans E.
1986 Secular Variations of Cosmogenic C14 on Earth: Their Discovery and Interpretation. *Radiocarbon* 28:259-265.

Tainter, Joseph A.
1994 Southwestern Contributions to the Understanding of Core-Periphery Relations. In *Understanding Complexity in the Prehistoric Southwest,* edited by G. J. Gumerman and M. Gell-Mann, pp. 25-36. Proceedings Volume 16, Santa Fe Institute Studies in the Sciences of Complexity. Addison-Wesley, Reading.

Thoms, Alston V.
1977 A Preliminary Projectile Point Typology for the Southern Portion of the Northern Rio Grande Region. Unpublished M. A. thesis, Texas Tech University, Lubbock.

Toll, Mollie S.
1985 An Overview of Chaco Canyon Macrobotanical Materials and Analyses to Date. In *Environment and Subsistence of Chaco Canyon, New Mexico,* edited by F. Mathien, pp. 247-277. Chaco Canyon Studies, Publications in Archeology 18E. USDI National Park Service, Albuquerque, New Mexico.
1987 Plant Utilization at Pueblo Alto: Flotation and Macrobotanical Analyses. In *Investigations at the Pueblo Alto Complex, Chaco Canyon,* vol. 3, part 2, edited by F. Mathien and T. Windes, pp. 691-784. Chaco Canyon Studies, Publications in Archeology 18F. USDI National Park Service, Santa Fe, New Mexico.
1995 *Charcoal and Zea Mays Remains from Testing LA 53681, Taos County, New Mexico (Blueberry Hill).* Museum of New Mexico Project 41.594. Office of Archaeological Studies, Ethnobotony Lab Technical Series 41. Museum of New Mexico, Santa Fe.
1996 *Macrobotanical Materials from LA 101412, Pojoaque, New Mexico.* Museum of New Mexico Project 41.578. Office of Archaeological Studies, Ethnobotony Lab Technical Series 48. Museum of New Mexico, Santa Fe.

Toll, Mollie S., and Linda Huckell
1996 Guidelines for Standardizing Collection of Zea mays Morphometric Data: or How to Get the Most Out of Your Maize. Paper prepared for the 5th Southwest Paleoecology Workshop, Flagstaff, Arizona.

Toll, Mollie S., and Pamela J. McBride
1995 *Botanical Analyses at Las Campanas: Archaic to Early Classic Small Sites (LA 847580, 84787, 86139, 16159, 86150, 84793, 98690, 84759).* Technical Series 31. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Traylor, Diane, Lyndi Hubbell, Nancy Wood, and Barbara Fiedler
1990 *The 1977 La Mesa Fire Study: An Investigation of Fire and Fire Suppression Impact on Cultural Resources in Bandelier National Monument.* Southwest Cultural Resources Center Professional Paper No. 28. Branch of Cultural Resources Management, Division of Anthropology, National Park Service. Santa Fe, New Mexico.

Trinkaus, Kathryn Mauer

1995 Mortuary Behavior, Labor Organization, and Social Rank. In *Regional Approaches to Mortuary Analysis,* edited by L. Beck, pp. 53-75. Plenum Press, New York.

Tuan, Yi Fu, Cyril E. Everard, Jerold G. Widdison, and Ivan Bennett

1973 *The Climate of New Mexico.* Revised edition. New Mexico State Planning Office, Santa Fe.

Turnbow, Christopher A.

1997 Projectile Points as Chronological Indicators. In *Ole,* vol. 2, *Artifacts,* edited by J. Acklen. TRC Mariah Associates and Public Service Company of New Mexico, Albuquerque.

Vierra, Bradley J.

1980 A Preliminary Ethnographic Model of the Southwestern Archaic Settlement System. In *Human Adaptations in a Marginal Environment: The UII Mitigation Project,* edited by J. Moore and J. Winter, pp. 351-357. Office of Contract Archeology, University of New Mexico, Albuquerque.

1985 Hunter-Gatherer Settlement Systems: To Reoccupy or Not To Reoccupy, That is the Question. Unpublished M.A. Thesis, University of New Mexico, Albuquerque.

1990 Archaic Hunter-Gatherer Archaeology in Northwestern New Mexico. In *Perspectives on Southwestern Prehistory,* edited by P. Minnis and C. Redman, pp. 57-67. Westview Press. Boulder, Colorado.

1994 Archaic Hunter-Gatherer Archaeology in the American Southwest. In *Archaic Hunter-Gatherer Archaeology in the American Southwest,* edited by B. Vierra, pp. 5-61. Eastern New Mexico University, Contributions in Anthropology 13(1), Portales.

Viklund, Lonyta

1988 *A Predictive Model for Archaeological Remains in Santa Fe.* Southwest Report 211. Southwest Archaeological Consultants, Santa Fe, New Mexico.

Warren, A. Helene

1980 Prehistoric Pottery of Tijeras Canyon. In *Tijeras Canyon: Analyses of the Past,* edited by L. Cordell, pp. 149-168. University of New Mexico Press, Albuquerque.

Watson, Patty Jo

1976 In Pursuit of Prehistoric Subsistence: A Comparative Account of Some Contemporary Flotation Techniques. *Mid-Continental Journal of Archaeology* 1(1):77-100.

Wendorf, Fred

1953 Excavations at Te'ewi. In *Salvage Archaeology in the Chama Valley,* assembled by F. Wendorf, pp. 34-93. Monographs of the School of American Research 17, Santa Fe.

Wendorf, Fred, and Erik Reed

1955 An Alternative Reconstruction of Northern Rio Grande Prehistory. *El Palacio* 62:131-173.

Wetherington, Ronald K.

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

Whitehouse, H.

1992 Memorable Religions: Transmission, Codification, and Change in Divergent Melanesian Contexts. *Man* 27(4):777-797.

Wilcox, David R.

1978 The Theoretical Significance of Fieldhouses. In *Limited Activity and Occupation Sites,* edited by A. Ward, pp. 25-32. Center for Anthropological Studies Contributions to Anthropological Studies 1, Albuquerque, New Mexico.

Wills, Wirt H.

1988 *Early Prehistoric Agriculture in the American Southwest.* School of American Research Press, Santa Fe, New Mexico.

Wilmsen, Edwin.N.
1974 *Lindenmeier: A Pleistocene Hunting Society.* Harper and Row, New York

Wilson, C. Dean
n.d. LA 103919 Ceramics. In *Excavations at LA 103919, a Developmental Period Site near Nambé Pueblo, Santa Fe County, New Mexico,* by S. Lentz. Archaeology Notes 199. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Wilson, C. Dean, David V. Hill, Yvonne R. Oakes, Linda Mick-O'Hara, Patrick Severts, and Sonya O. Urban
1999 *Archaeology of the Mogollon Highlands: Settlement Systems and Adaptations,* vol. 4, *Ceramics, Miscellaneous Artifacts, Bioarchaeology, Bone Tools, and Faunal Analysis,* edited by Y. Oakes and D. Zamora. Archaeology Notes 232. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Windes, Thomas C., and Dabney Ford
1991 *The Chaco Wood Project: The Chronometric Reappraisal of Pueblo Bonito.* Chaco Wood Project Series, 1. USDA National Park Service, Southwest Regional Office, Division of Cultural Research, Santa Fe, New Mexico.

Winship, George P.
1896 *The Journey of Coronado, 1540-1542.* Fulcrum Publishing, Inc. (1990 edition), Golden, Colorado.

Wiseman, Regge N., and Bart Olinger
1991 Initial Production of Painted Pottery in the Rio Grande: The Perspective from LA 835, The Pojoaque Grant Site. In *Puebloan Past and Present: Papers in Honor of Stewart Peckham,* edited by M. Duran and D. Kirkpatrick, pp. 209-217. Archaeological Society of New Mexico: 17, Albuquerque.

Wood, Nancy, and Oliver C. McCrary
1981 *A Cultural Resource Inventory of the 23.36 Mile Taos-Black Lake Transmission Line and Proposed Access Routes: Taos and Colfax Counties, New Mexico.* Report No. 060. School of American Research, Santa Fe, New Mexico.

Worman, Frederick C. V.
1967 *Archaeological Salvage Excavations on the Mesita del Buey, Los Alamos County, New Mexico.* Report LA-3636. Los Alamos Scientific Laboratory, Los Alamos, New Mexico.

# APPENDIX 1. TREATMENT OF SENSITIVE MATERIALS

LA 111333 is located on Pueblo of Tesuque lands. For archaeological sites on tribal land, the Native American Graves Protection and Repatriation Act (25 U.S.C. 3002, 1990) states that any human remains and associated funerary objects, sacred objects, or objects of cultural patrimony belong to the lineal descendants or if the lineal descendants cannot be ascertained, to the tribe on whose land the objects were discovered. These groups must be consulted before any items are excavated or removed. The criteria for determining lineal descent (43CFR10.14) are fairly rigorous. Lineal descendants are individuals who can trace their ancestry directly without interruption by means of the traditional kinship system of the appropriate tribe. Given the location and antiquity of LA 111333, consultations will be completed with Tesuque Pueblo concerning any human remains, funerary objects, sacred objects, or objects of cultural patrimony that might be encountered.

Discussions with Pueblo of Tesuque representatives have resulted in the following guidelines for the treatment of human remains:

1. Upon any discovery of human remains, the designated representatives of the Pueblo of Tesuque will be contacted immediately, followed by the NMSHTD representative, and the Bureau of Indian Affairs. Excavation will proceed to the extent necessary to establish that the human remains are archaeological and not part of a crime scene. That determination will be made in consultation with the Pueblo of Tesuque representatives, and a schedule for excavation will be discussed. If immediate full excavation is not possible, the immediate area of the discovery will be secured and covered, and full excavation will be deferred until it can be completed within a day.

2. Following consultation, full excavation will proceed when removal can be substantially completed within a work day (this will minimize the risk of vandalism or other damage to the remains). No human remains will be left exposed in the field overnight or over a holiday or weekend without consultations with Pueblo of Tesuque representatives and without arrangements to maintain the security of the remains. The excavation will be fully documented with drawings and photographs, and only Tesuque representatives and official OAS staff will be allowed to take images. All images will remain the property of the Pueblo of Tesuque.

3. Grave goods will be excavated simultaneously with the human remains. They will be documented with the burial, and a written inventory of all grave goods will be prepared during excavation. That inventory will be submitted to Pueblo of Tesuque representatives upon the removal of the grave goods from the field.

4. Following the completion of excavation, the human remains and grave goods will be conveyed to the secure facilities of the Office of Archaeological Studies where they will be prepared for reburial. The reburial schedule will be determined by Pueblo of Tesuque representatives at the time the remains are excavated. Preparation will include surface cleaning, measurements, visual observations, and laboratory photographs. No destructive analyses will be permitted.

5. Reburial will take place at a location and in a manner to be determined in consultation with representatives of the Pueblo of Tesuque. That location will be as near as possible to the original excavation location while considering issues of security, disturbance of archaeological deposits, and anticipation of future agents of disturbance. An inventory of each reburial (including grave goods) will be provided to the Pueblo of

Tesuque, along with detailed documentation suitable for use by law enforcement officials should the human remains or grave goods ever be disturbed in the future. The reburial location will be identified in the confidential state archaeological site records as a reburial site, insuring that its preservation needs will be considered should any future development be proposed in the area of the reburial location.

6. All observations concerning human remains and grave goods that are carried out by OAS staff will be recorded in a separate report. That report will be provided to the Pueblo of Tesuque and to other appropriate agencies and individuals, but it will not be distributed to the general public. Human remains and grave goods will be referred to in the general site report, but they will not be illustrated with photographs or given detailed exposure without the express permission of the Pueblo of Tesuque.

7. If isolated human bone is not recognized at the time of excavation and is discovered within the course of laboratory analysis, Pueblo of Tesuque representatives will be contacted immediately, along with NMSHTD representatives and the Bureau of Indian Affairs. The isolated bone will be reburied as described above (5).

8. These guidelines may be amended during the course of excavation by the action of the Pueblo of Tesuque Council.

In addition to human remains, members of the Pueblo of Tesuque regard all ancestral materials to be worthy of reverent treatment if not having explicitly sacred status. As such, the excavation of LA 111333 will encounter objects of cultural patrimony or sacred objects. The field archaeologists will bring any unusual materials to the attention of Pueblo of Tesuque representatives during the course of excavation. All excavated material will remain under the control of the Pueblo of Tesuque during the process of excavation and analysis, and will be subject to review and examination at that time. No materials will be removed from Pueblo of Tesuque lands without express written permission.

Official photography, film and digital, by OAS staff will be permitted to document the excavations, but no personal photographs may be taken. All photos will remain the property of Tesuque Pueblo. The Office of Archaeological Studies may use the photographic records for research purposes during the analysis phase of the archaeological project, but the images will remain the property of the Pueblo. The Office of Archaeological Studies may request permission to use images in the report of the results of the excavations. Final disposition of records and images will be determined by the Pueblo of Tesuque in consultation with the Office of Archaeological Studies.

# APPENDIX 2. RADIOCARBON RESULTS

Mr. Timothy D. Maxwell
Museum of New Mexico

Report Date: 9/12/02
Material Received: 9/6/02

| Sample Data | Measured Radiocarbon Age | 13C/12C Ratio | Conventional Radiocarbon Age(*) |
|---|---|---|---|
| Beta - 170390 | 2160 +/- 110 BP | -25.3 o/oo | 2160 +/- 110 BP |

SAMPLE: 1113339
ANALYSIS : Radiometric-Timeguide delivery (with extended counting)
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid
2 SIGMA CALIBRATION: Cal BC 410 to Cal AD 70 (Cal BP 2360 to 1880)

---

Timothy D. Maxwell
Museum of New Mexico

Report Date: 9/20/02
Material Received: 9/6/02

| Sample Data | Measured Radiocarbon Age | 13C/12C Ratio | Conventional Radiocarbon Age(*) |
|---|---|---|---|
| Beta - 170391 | 2960 +/- 40 BP | -21.5 o/oo | 3020 +/- 40 BP |

SAMPLE: 11133312
ANALYSIS : AMS-Advance delivery
MATERIAL/PRETREATMENT: (charred material): acid/alkali/acid
2 SIGMA CALIBRATION: Cal BC 1390 to 1130 (Cal BP 3340 to 3080)