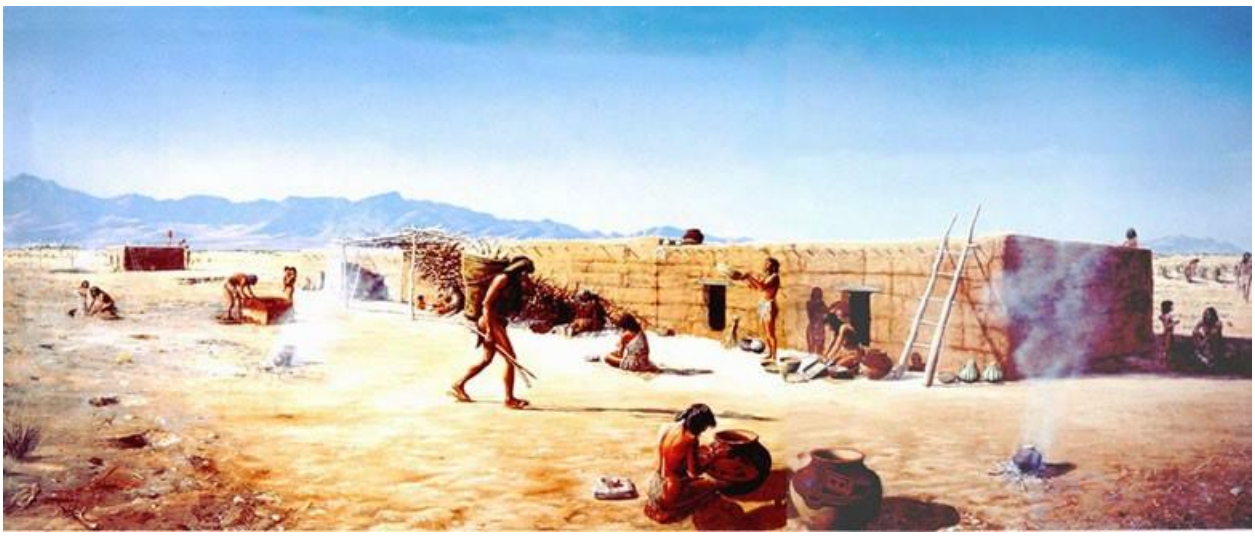
FIRECRACKER PUEBLO
A LATE PUEBLO PERIOD SITE IN EL PASO, TEXAS

Thomas C. O'Laughlin



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A NOTE FROM THE SERIES EDITOR

Ordinarily the Maxwell Museum Technical Series does not include reports not edited and reformatted by the museum. In this case the author has done such a careful job of preparing the report that the museum will publish the report virtually as submitted. To do any more would be to seriously delay publication of the report. That would be a disservice to the many researchers who will find it to be an essential research reference.

David A. Phillips, Jr.

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ACKNOWLEDGMENTS

Rex Gerald, Director of the Centennial Museum and a professor of anthropology at the University of Texas at El Paso, was much interested in Firecracker Pueblo and obtained the permit for excavation from the land owner, R.B. Price Estates. However, he was unable to oversee the work in 1980 and asked me to stand in his place. As they say, the rest is history...or, perhaps prehistory given the time from inception of the project to completion of a report. Rex encouraged the work, helped find students to assist with the project, and arranged for lab space at the university. Thank you Rex.

Over the years of excavation at Firecracker Pueblo, students and professors in various fields at the University of Texas at El Paso assisted with the work. Professional archaeologists likewise contributed to the field effort. Among them were Mark Bentley, Bruce Boeke, Jane Bradley, Mark Calamia, E. Mott Davis, Glen Degarmo, Bob Estes, Mike Foster, Anne Fox, Rex Gerald, Mike Kirkwood, Ray Mauldin, Ron Ralph, Vern Scarborough, Martha Sharp, and Chris Ward. Jane Bradley also identified shell from the site. Thank you all.

The Texas Archaeological Society field school brought over 200 participants to El Paso for eight days in 1986. Six structures were excavated, as well as numerous extramural features. Financial manager for this event was Carol Hedrick, Gene Collins was the camp boss, and Jack Hedrick was in charge of the lab. James Everett directed youth activities. Area supervisors were E. Mott Davis, Anne Fox, and Jim Word. Crew chiefs included Ray Dickinson, Charlotte Harris, Norma Hoffrichter, Paul Lorrain, Bill Parnell, John Pollan, Bill Schurmann, Bob Smith, Gay Smith, Jim Smith, Francis Stickney, Rob Vantil, and Rex Wayland. Ron Ralph oversaw survey crews in the nearby Franklin Mountains State Park. The efforts of all were outstanding.

The real heroes of this project were members of the El Paso Archaeological Society. They were the work horses for almost ten years of excavation and another five years of lab work. The most ambitious of them were Peggy Baker, Ken Burlingham, Dorothy Colletta, Jeanine and Gene Collins, Helen and Les Davis, Richard Dillard, Joe Guinn, Carol and Jack Hedrick, Janice Keller, Sid Shepperd, Hal Siros, and Wes Wilson. They were a great team.

Financial assistance for the field school and some of the analyses was provided by the Texas Archaeological Society. Support for six of the radiocarbon dates was promoted by Myles Miller and given by the Chronometric and Relative Chronology Project of the Cultural Resources Branch of Fort Bliss and the University of Texas at El Paso.

Unfunded projects, certainly one of this size, can be difficult to finish. Fortunately, my understanding wife and partner, Debbie Martin, knows how to inspire. It also helped to have encouragement from my long-time amigo, Mike Foster.

T.C.O.

CHAPTER 1
INTRODUCTION

Firecracker Pueblo is a relatively small, Pueblo period site of the El Paso phase of the Jornada Mogollon. It is located northeast of El Paso, Texas, and some eight kilometers south of the border with New Mexico (Figure 1). Situated along the west side of Highway 54, the site name derives from the placement of fireworks stands along the highway in the 1970s. Fieldwork at Firecracker Pueblo was undertaken intermittently between 1980 and 1989 with the assistance of the University of Texas at El Paso (UTEP), the El Paso Archaeological Society (EPAS), and the Texas Archaeological Society (TAS).

Firecracker Pueblo was brought to attention in 1975 when sand dunes were leveled on either side of Highway 54 and members of EPAS observed freshly exposed adobe walls and artifacts in one area on the west side of the road. At the time, this area was private land outside the limits of the City of El Paso, and the land had been leveled for temporary and permanent fireworks stands. A permit was sought from the land owner to investigate the damage to the site and provide a field school opportunity for students from UTEP. Unfortunately, a permit could not be secured in time for a field school that year.

The site area was again graded in 1978 for fireworks stands. Additional adobe walls and dark soils were revealed and indicated a pueblo of six or more rooms. Pottery sherds and chipped stones were found scattered over about half a hectare. Also in 1978, the City of El Paso annexed the area and other lands to the state border, and the selling of fireworks along the highway was discontinued. Once more, a permit was requested to assess damage to the pueblo and investigate other areas and features of the site. The permit was granted by the land owner, R.B. Price Estates, and the fieldwork began on July 10, 1980.

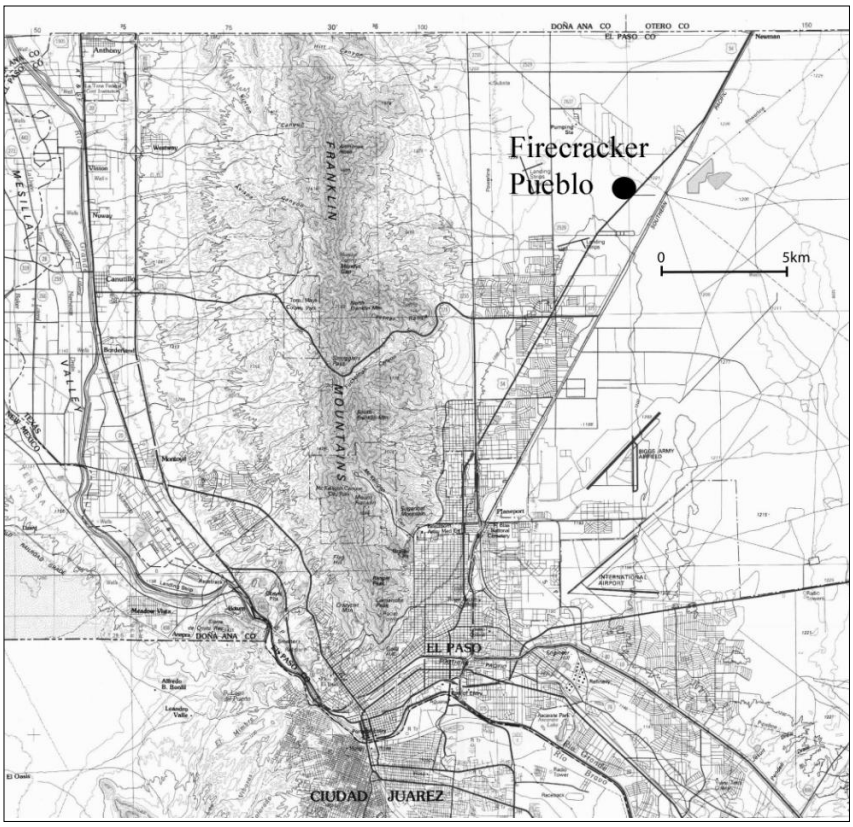


Figure 1. Location of Firecracker Pueblo (41EP25). Detail of USGS, 100 000, El Paso map, 1983 edition.

Volunteers provided the direction and workforce for the project, and literally hundreds participated in the excavation on weekends, holidays, and on occasion for one or two weeks in the summer. Many were members of EPAS, but the location of the site next to a major highway lured numerous passersby into providing their help. Television and newspaper coverage also stimulated interest. Professors in a variety of disciplines from UTEP spent time at the site, as did their students (sometimes for credit). Summer classes in art and archaeology through the local science museum included fieldwork at Firecracker Pueblo and an analysis of artifacts from the site. In 1986, the TAS held its field school at the site

Figure 2. Aerial photograph of Firecracker Pueblo in July of 1980, looking north. Graded areas along Highway 54 and abandoned fireworks stands are visible, as is the initial excavation of Rooms 1 to 5 in the center of the image. (photo courtesy of Rex E. Gerald)

and over 200 participated in the eight day event. Following the closure of fieldwork, members of EPAS met for one evening a week for five years to catalog and describe the materials and process samples from Firecracker Pueblo. The materials and records for Firecracker Pueblo are curated by the Texas Archaeological Research Laboratory at the University of Texas at Austin.

Results of the Investigation

The many years of work at Firecracker Pueblo reflected a necessary schedule of intermittent fieldwork by volunteers. However, this protracted period of fieldwork also provided time to periodically review field methods and research issues. The site also proved larger and more complex than first expected. As more was learned about the site, new questions arose and strategies were accordingly altered (see O'Laughlin 2001b).

Excavations at Firecracker Pueblo were initiated with the intent of assessing impacts to the pueblo and describing what was believed to be a relatively small room block. Some five to seven rooms were suggested by the grading of the site in 1975. In 1980 and at the start of fieldwork, grading had exposed additional walls and a larger pueblo of some eight to 11 rooms (Figure 2). The first or core rooms of the pueblo were identified by bonded and abutted walls and were the focus of the initial excavations. By 1982, six rooms had been excavated. Erosion and grading had taken part of one room, and grading had also removed some of the overburden or fill of rooms. There were also a few disturbances by relic seekers. Nevertheless, the

rooms were in good condition with cultural materials in the lower fill and intact floor features. Five of the rooms had also burned, and roof debris was variably represented on the floors. Relatively few artifacts were found on floors, and macrofloral (aside from roofing elements) and faunal remains were sparsely represented.

Information was gathered and samples taken to address questions of room function, social organization, pueblo growth and abandonment, chronology, and to a limited extent, subsistence, and technology. Firecracker Pueblo appeared to be much like other small, linear, adobe-walled pueblos of the Jornada region where prior excavations had focused almost exclusively on architecture. Excavations could have ceased at that point, if trash-filled pits had not been found beneath and along the north walls of three of the rooms.

Earlier investigations of El Paso phase pueblos rarely ventured beyond walls. A few trash-filled pits were tested, and small thermal features and miscellaneous pits noted (Brook 1966, 1980a; Foster and Bradley 2021; Foster et al. 1981; Green 1968, 1969; Lowry 2005; Morrow 1970; O'Laughlin 2001a). Recorded features also occurred close to room blocks. Otherwise next to nothing was known of the kinds of extramural features and their spatial arrangements in pueblo sites.

The investigation of Firecracker Pueblo shifted in 1982 from the known adobe-walled rooms to the systematic exploration of extramural spaces. This was accomplished through a checkerboard excavation of one meter squares placed three meters apart, followed by testing between these squares and expanded excavations in areas of interest. This resulted in the identification of patterns in the distribution of surface trash and features and the recording of a variety of features. Over two hundred extramural features were recorded and included postholes, hearths, roasting pits, non-specific pits, borrow pits, and apparent large storage pits. Trash deposits were also present in features with any depth, and some features had cached grounding stones. The information gleaned from this site-wide investigation was considerable and important to understanding site structure, formation processes, subsistence economy, site abandonment, settlement organization, and residential mobility.

Extramural excavation was also pursued to learn if there were any burials outside of rooms. Few inhumations had been recorded for Jornada pueblo rooms (Miller 2004; O'Laughlin 1983), and there was a question of possible cemeteries near room blocks. Only a single burial was found in the extramural investigation of Firecracker Pueblo. This finding complemented other data and added to considerations of settlement organization and mobility.

The placement of test squares around the pueblo led to the discovery of additional rooms extending to the west. Erosion and grading had left little of some rooms, but a linear pueblo with up to 17 rooms and of one to two rooms in width was defined.

The systematic investigation of areas around the pueblo also yielded evidence of other structures. Nineteen isolated rooms that varied from surface rooms to deep pit houses were discovered, the first of which was noted in early 1983. At that time, a small number of isolated rooms were known for a few sites (Brook 1966, 1967a, 1969, 1980a; Green 1969; Lowry 2005; O'Laughlin 1975), but the number and character of the structures at Firecracker Pueblo was not expected. Two of the isolated rooms compared well with the square and adobe-walled rooms of the pueblo. However, the other isolated rooms tended to be smaller and with a lesser investment of energy in their construction. They occurred in two principal groups. Some were beneath the pueblo, and others were cut by later extramural features. Multiple occupations of variable duration and radiocarbon dated from the 14th to the middle 15th centuries were represented by the isolated rooms, pueblo, and extramural features and trash. Clearly, Firecracker Pueblo had a complex occupational history with significant information with which to address site structure and regional settlement and mobility patterns.

The progress of the excavation of Firecracker Pueblo and the presence of isolated structures were presented at a number of conferences (O'Laughlin 1981, 1982, 1983, 1985a, 1986, 1993). At about the same time, other El Paso phase isolated structures were being reported and similarly drawing attention to variability in architecture and settlements of the Jornada (Batcho et al. 1985; Browning 1991a, 1991b; O'Laughlin et al. 1988; O'Laughlin and Martin 1990). As well, Mauldin (1986) presented a model of land use during the Jornada Pueblo period that incorporated variability in site types and mobility strategies. The energy created by these endeavors sparked interest in settlement dynamics in coming years.

CHAPTER 2
ENVIRONMENT

Subsistence and settlement systems are conditioned, in part, by environmental factors. The interpretation of the archaeology of Firecracker Pueblo thus necessitates some appreciation of the natural environment and knowledge of spatial and temporal variability of pertinent resources. To this end, background information on physiography and geology, soils, vegetation, fauna, climate and surface water is provided below.

Physiography and Geology

The project area is within the Mexican Highlands section of the Basin and Range Physiographic Province with fault block ranges which were uplifted in the late Tertiary period and intermontane basins which were filled with detritus principally from the erosion of uplands in the in the Pleistocene epoch (Kottlowski 1958; Strain 1966). More specifically, Firecracker Pueblo lies on the edge of the alluvial fan bordering the eastern flank of the Franklin Mountains and at the western edge of the Hueco Bolson (Figure 3). The Hueco Bolson is an intermontane lowland which extends from south-central New Mexico through extreme western Texas and into northern Chihuahua, Mexico. The Rio Grande cuts through older sediments of the Hueco Bolson some 22 kilometers south of the site, and at about the New Mexico-Texas border the Hueco Bolson is separated by an underlying structural arch from the Tularosa Basin to the north. The Franklin Mountains define the western margin of the Hueco Bolson, and the smaller Hueco Mountains lie on the east side.

The Franklin Mountains are a steep, rugged range of mountains which reach an elevation of 1640 to 2000 meters approximately nine kilometers west of the site. Uplifting and faulting of these mountains has exposed rocks of Precambrian, Paleozoic, Cretaceous, and Tertiary age on the east slopes of the Franklin Mountains (McAnulty 1967). Quaternary deposits of the coalescing alluvial fans along the eastern slope of the mountains are dominated by rhyolite and quartzite, but limestone, granite, shale, and sandstone can also be found. Cherts occur on these fans but are uncommon.

The Hueco Bolson was formed during three major deformation events: uplifting of mountain ranges in the late Pennsylvanian; thrusting and folding during the Laramide Orogeny; and basin and range block faulting during the Rio Grande Rift development. Sediment fill of the basin includes the older Fort Hancock Formation and the middle to late Pleistocene aged Camp Rice Formation (Strain 1969). The Fort Hancock Formation has a maximum thickness of 2,745 meters along the eastern slopes of the Franklin Mountains. The Camp Rice Formation rests disconformably upon the Fort Hancock Formation and is composed principally of sand, gravel, clay, and silt. Rock types from regional mountain ranges dominate this deposit, but obsidian, cherts, and quartzites from more distant sources are also represented (Ruhe 1967). Much of these latter and non-regional materials may have been deposited when the ancestral Rio Grande crossed the project area in the early Kansan period (Hawley 1969).

Soils

Soils of the project area have been mapped by Jaco (1971) and Pigott (1978). The pedogenic classification utilized by Pigott is followed here. Soils in the project area have formed since the last major Quaternary pluvial and cap the Camp Rice Formation.

Today, much of the floor of the Hueco Bolson is characterized by sheet and dune sands (torripsamments) which are generally unstable and mostly of recent development (Gile 1966; Pigott 1978). More mature, calcareous sandy loams (calciorthids) can be found in some areas and covered much of the project area before the last century (Pigott 1978).

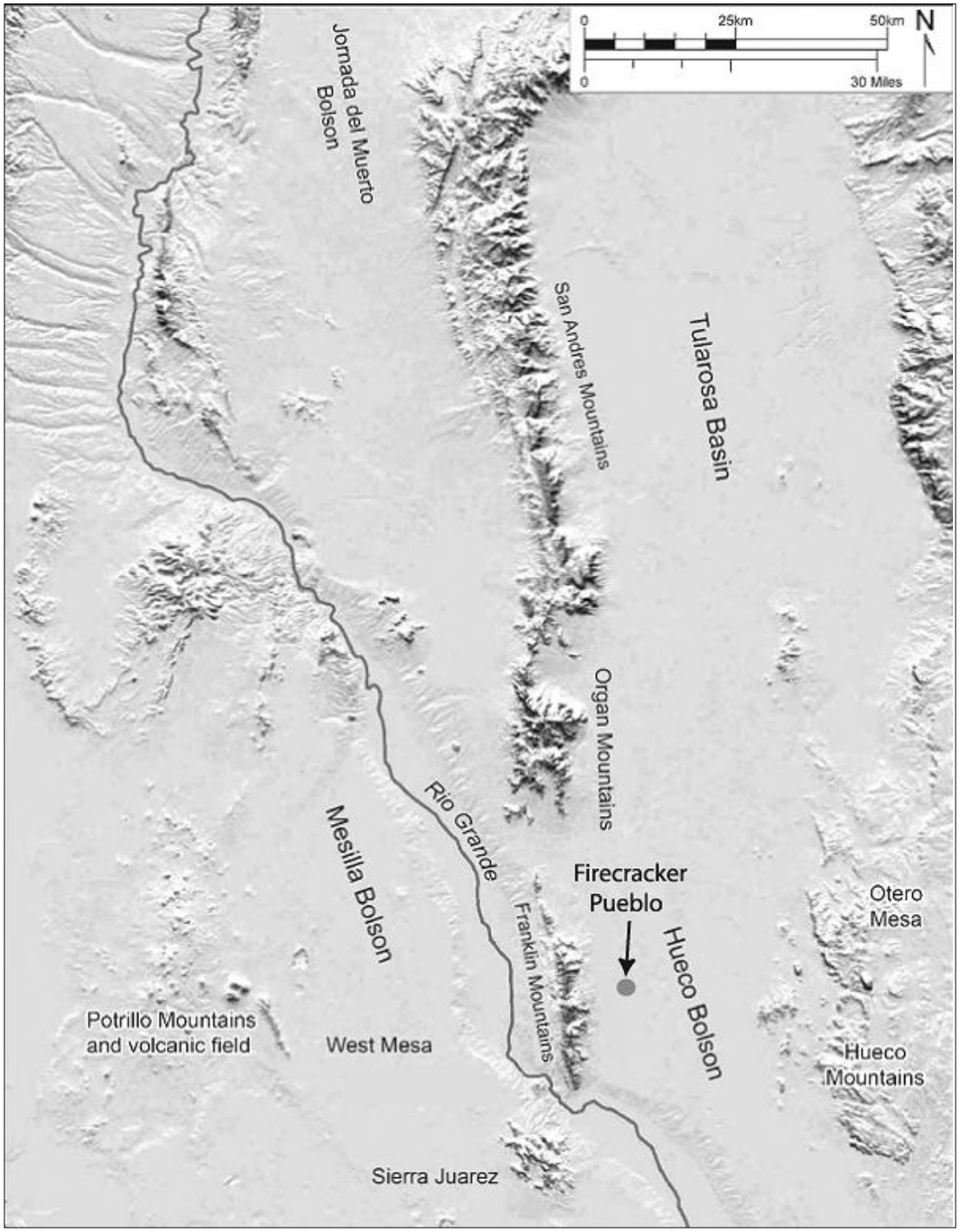


Figure 3. Physiographic setting of Firecracker Pueblo.

The soils of the eastern portion of the alluvial fan piedmont of the Franklin Mountains and the broad alluvial flats around Firecracker Pueblo and a few kilometers to the east and south are clay loam soils (paleargids) which have a moderate water-holding capacity. These soils are the result of the erosion and redeposition of uplifted Fort Hancock clay beds which form an escarpment along the north east side of the Franklin Mountains. Some of these soils, as well as similar soils (aquic paleargids) in playas just east of the site, receive run-off water from the Franklin Mountains. These are the best suited soils for agriculture in the area; however,

paleargids which do not receive run-off are also suitable for dryland farming with sufficient rainfall (Jaco 1971). It is noteworthy that dryland farming of beans was practiced in the vicinity of Firecracker Pueblo as recently as 1915 (Land Office Survey Records, Bureau of Land Management, Santa Fe, New Mexico).

Aquic paleargids and aquic calciorthids occur in the other playas more toward the interior of the Hueco Bolson and receive some run-off and retain more moisture than the surrounding sandy soils of the basin. These playas are of limited extent but may also have seen occasional small-scale plant cultivation in prehistoric times.

Climate

The modern climate for the El Paso area is semiarid mesothermal with hot days, cool nights, and a low relative humidity. Average annual precipitation is 22.3 centimeters (8.8 inches) with a little more than half of that falling during July, August, and September. Mean monthly temperatures range from 29.1 degrees Celsius (84.4 degrees Fahrenheit) in June to 7.8 degrees Celsius (46.1 degrees Fahrenheit) in December (United States Weather Bureau, 1991-2022).

A climate comparable to today was apparently established about 8,000 years ago (Betancourt et al. 1990). At that time, juniper-oak woodlands disappeared from the lower elevations of mountains near the project area, and shortly thereafter desert species such as creosotebush (*Larrea tridentata*), acacia (*Acacia* sp.), mesquite (*Prosopis glandulosa*), agave (*Agave* spp.), sotol (*Dasylirion wheeleri*), and ocotillo (*Fouquieria splendens*) made their first appearance (Van Devender and Riskind 1977; Van Devender and Spaulding 1979). Van Devender and Spaulding have suggested that hot summers with monsoonal rains and cold and relatively dry winters developed, that rainfall was greater than at present, and that by the middle Holocene grasslands were favored in intermontane basins.

A number of studies indicate cyclical periods of increased or decreased precipitation from the middle Holocene to historic times which resulted in the expansion of grassland or desert shrub communities (Buck 1996; Freeman 1972; Holmgren et al. 2003). There is some debate over the timing of these cycles, but there is also general agreement that the environment became warmer and drier over this period. Variability in rainfall is also recorded in tree-rings from southern New Mexico between A.D. 622 and the present (Grissino-Mayer et al. 1997). Periods of drought and higher than average rainfall are noted. No significant droughts are noted for the 14th century, but severe droughts are indicated for A.D. 1405-1415 and A.D. 1445-1450. Interestingly, the abandonment of El Paso phase pueblos also seems to have been by about A.D. 1450.

The combination of temperature and rainfall make for marked seasonality and one long growing season that is presently about 241 days (Office of the State Climatologist 1987). The peak season of plant and animal productivity is between spring and early fall, and natural and agricultural productivity is primarily tied to moisture availability rather than growing season temperature (Ludwig and Whitford 1981).

Surface Water

There are no permanent sources of surface water within the project area. Small springs are located in the Franklin Mountains some 10 kilometers west of Firecracker Pueblo, and the Rio Grande flows no closer than about 22 kilometers to the west or south.

A number of playas are situated east and south of Firecracker Pueblo and would see seasonal flooding with run-off from the Franklin Mountains prior to recent construction of diversion channels and retention dams by the Army Corps of Engineers. Long-time residents of northeastern El Paso report that playas receiving run-off from the Franklin Mountains would hold water for months and well into the winter in some years (Hard 1983b; Jack Hedrick, personal communication 1986).

The flooding of playas in the region is a highly random and unpredictable phenomenon (Miller and Graves 2009). The summer monsoon season between July and October accounts for most of the floods. One playa may be dry while a short distance away another playa may have water. A flooded playa may contain water for a few hours or months. Undoubtedly, the spatial and temporal availability in easily accessible water had an affect on the distribution and duration of settlements.

Vegetation

The vegetation of the project area is characteristic of the Chihuahuan Desert which is found in southern and southwestern New Mexico, extreme western Texas, and northeastern Mexico and noted by lechuguilla (*Agave lechuguilla*) and sotol in uplands and tarbush (*Flourensia cernua*) in lowlands (Shreve 1942). Considering landform and vegetation, three landform zones are noted in the project area with considerable overlap in species composition: basin floor, bajada, and mountain. While there have been historic impacts to the vegetation of the region, these zones provide a useful means of describing the likely distribution of plant resources during the occupation of Firecracker Pueblo.

Basin Floor Zone

The basin floor includes those lands east of Firecracker Pueblo that comprise the Hueco Bolson. The basin floor averages a little over 1200 meters in elevation on the western side and near the Franklin Mountains. The area is distinguished by playas or longitudinal, north-south trending fault depressions which may seasonally contain some standing water. The low rolling relief of the area evidences only about 20 meters of elevation range.

Mesquite is the dominant shrub of the basin floor and is found on sandy, torripsamment soils and coppice dunes, and four-wing saltbush (*Atriplex canescens*) may also be found with mesquite. Broom snakeweed (*Xanthocephalum sarothrae*) commonly occurs with mesquite, especially in interdunal areas, and soaptree yucca (*Yucca elata*) is infrequent and most common around playas.

Mesquite appears to have replaced an earlier desert shrub/grassland complex with the combined effects of drought and overgrazing by cattle in the late 19th and early 20th centuries which culminated in a drastic reduction of grass cover, the loss of soil surfaces, and the firm entrenchment of desert shrubs (Buffington and Herbel 1965; Dick-Peddie 1975; Gardner 1951). A limited area of desert grassland is known to the northeast of Firecracker Pueblo and consists of a somewhat disturbed association of dropseed (*Sporobolus* spp.) and broom snakeweed on calciorthid soils. Pigott (1978) infers that torripsamment soils are of recent origin and that calciorthids dominated soil surfaces of the project area prior to the last century. This would suggest that desert grassland was formerly the characteristic vegetation of the project area. However, the climate of the region is presently on the xeric edge of that needed to support desert grassland. Thus, it is quite probable that the relative importance of grasses and desert shrubs in the past varied with slight changes in effective precipitation.

Bajada Zone

This zone corresponds to Whalen's (1978) runoff zone for the western Hueco Bolson and is the bajada, piedmont, or broad alluvial fan at the base of the Franklin Mountains. The upper bajada meets the Franklin Mountains at about 1300 meters in elevation west of Firecracker Pueblo, and the soils of the moderately sloping upper bajada are gravelly or rocky and dominated by creosotebush, lechuguilla, ocotillo (*Fouqueria splendens*), sotol (*Dasylirion wheelerii*), datil (*Yucca bacatta* and *Y. Torreyi*), and prickly pear (*Opuntia* spp.) and other cacti. The lower and gentler slopes of the bajada have deeper and less gravelly or finer soils. Here,

creosotebush dominates and may co-occur with mesquite, and ridgelines may exhibit some ocotillo and lechuguilla or the occasional datil, prickly pear or mariola (*Parthenium incanum*). Grasses are rare and include threeawn (*Aristida* sp.), bush Muhly (*Muhlenbergia porteri*), and dropseed (*Sporobolus* spp.). Drainages traversing the bajada support, mesquite, saltbush, little-leaf sumac (*Rhus microphylla*), Apache plume (*Fallugia paradoxa*), and desert willow (*Chilopsis linearis*).

The soils of the eastern terminus of the bajada and adjoining lands of the basin floor are described as paleargids by Pigott (1978) and as having clay loam subsoils of the Turney-Burino Association by Jaco (1971). These soils absorb water well and have a high available moisture capacity and fertility. They are occasionally flooded by runoff from the mountains and may be ponded for a few days after heavy rain. Jaco (1971) also notes at the time of his study that 640 acres was under irrigation for crops, principally alfalfa, corn for silage, and grain sorghum. These soils are the best suited soils for agriculture in the project area, and Firecracker Pueblo is situated on them.

Mountain Zone

The mountain zone takes in rocklands of the Franklin Mountains above about 1300 meters in elevation. The slopes are steep with considerable areas of bedrock, and canyons are shallow and relatively unprotected. Most slopes are dry with vegetation comparable to the upper part of the bajada. North facing slopes and more mesic areas may also have wait-a-minute (*Mimosa biuncifera*), whitethorn (*Acacia constricta*), beargrass (*Nolina texana*), mountain mahogany (*Cercocarpus montanus*), algerita (*Berberis trifoliolata*), and oak (*Quercus* spp.). One relic stand of juniper (*Juniperus monosperma*) is known, and cottonwood (*Populus fremontii*), hackberry (*Celtis reticulata*), Wright's silktassel (*Garrya wrightii*), and wafer-ash (*Ptelea trifoliata*) are limited to a couple of well-watered canyon bottoms. Grasses are uncommon and include black grama (*Bouteloua eriopoda*), sideoats grama (*B. curtipendula*), and bush muhly.

The vegetation of the Franklin Mountains has been heavily impacted (Harris n.d.). In the historic past, junipers and other large trees were apparently more common and were reduced in numbers as a result of being cut for fuel and timber. A reduction in grass cover as a result of over grazing by sheep, goats, and cattle is also probable and has been exacerbated by droughts and soil erosion.

A large number of plant species in the three landform zones have potential economic uses. Summaries of ethnographically recorded uses for various plants of the region can be found in Kenmotsu (1977), O'Laughlin (1980), Smith (1977), Way (n.d.) and others, and Basehart (1974) has excellent descriptions of the use of plants by the Mescalero Apache in the vicinity of El Paso and to the north in New Mexico. No attempt will be made here to enumerate all of the plants and their uses: however, mention can be made of some of the more important food plants. The best times for procurement are during the growing season and in the spring/summer or the summer/fall. The mountain and upper bajada zones share many of the same potential resources that include the crowns of sotol and lechuguilla, fruits of datil, fruits and buds of prickly pear and other cacti, pads of prickly pear, and the beans of mesquite. Resources of the basin floor are the beans of mesquite and the flowers, stalks, and crowns of soaptree yucca. The seeds and/or greens of ruderals such as amaranth (*Amaranthus* spp.), goosefoot (*Chenopodium* spp.), and purslane (*Portulaca* spp.) could have been obtained in any zone with disturbed soils. Finally, grass seeds could also have been collected in any of the zones, but the basin floor may have had the best grass cover in prehistoric times.

Fauna

Mammals common to the area and represented in the archaeofauna of the region (see O'Laughlin 1977a) include rodents, lagomorphs, carnivores, and artiodactyls. Among the rodents are kangaroo rats (*Dipodomys* spp.), woodrats (*Neotoma* spp.), ground and rock squirrels (*Spermophilus* spp.), and mice (*Peromyscus* spp.), and black-tailed jackrabbit (*Lepus californicus*) and cottontail (*Sylvilagus audubonii*) are the two lagomorphs.

Rodents and lagomorphs are most abundant during the growing season. They also occur in all three landform zones but with preferences for different habitats. Jackrabbits, kangaroo rats, and ground squirrels prefer open grassland and shrub desert of the basin floor, while cottontail, woodrats, and rock squirrels are found more often in the upper bajada and mountain zones. Carnivores range through all of the landform zones, are few in number, and include coyote (*Canis latrans*) and badger (*Taxidea taxus*). Artiodactyls of the area are deer (*Odocoileus hemionus*), pronghorn (*Antilocapra americana*), and mountain sheep (*Ovis canadensis*). Deer can be found in all zones but are most common in the upper bajada and mountain zones. However, the Franklin Mountains are relatively small, and the number of deer may have been limited. Pronghorn are associated with desert grassland and would have been more plentiful to the north in the Tularosa Basin. A few mountain sheep may have been present in the past in the Franklin Mountains. Otherwise, the closest opportunity for hunting mountain sheep would have been in the Organ Mountains to the north.

Few reptiles and birds are recorded for open sites. Colubrid snakes, rattlesnakes (*Crotalus* spp.), collared lizard (*Crotaphytes collaris*), box turtle (*Terrapene ornata*), perching birds, and raptors are infrequently represented. Scale quail (*Callipepla squamata*) and Gambel's quail (*C. gambelii*) occur in small numbers. These are lowland quail with scale quail preferring grassland or areas of sparse shrubs while Gambel's quail tend toward dense shrub vegetation.

CHAPTER 3
JORNADA PUEBLO SETTLEMENTS

A brief overview of the El Paso phase is provided below and is followed by an introduction to pueblo settlements investigated in the vicinity of Firecracker Pueblo. The last section outlines general research topics, as influenced by the findings over the extended time of field work at Firecracker Pueblo.

El Paso Phase Background

The El Paso phase is the last Jornada Formative period phase, as well as the terminal Pueblo period occupation of the region. Lehmer (1948) dates this phase to A.D. 1200-1400. However, radiocarbon dates suggest a beginning date of A.D. 1250-1300 to an ending date as late as A.D. 1450 (Miller 1996; Whalen 1985).

The phase was named by Sayles (1935), and its principal range was noted by the distribution of El Paso Polychrome in south-central New Mexico, west Texas, and northwestern Chihuahua, Mexico (Brand 1935; Sayles 1935; Stallings 1931). Lehmer (1948) followed with a more detailed description of El Paso phase pueblo architecture and material culture and also outlined earlier archaeological phases in what he called the Jornada Branch of the Mogollon. More recent detailed overviews of excavations and findings were presented by Marshall (1973) and Miller and Graves (2009).

Most El Paso phase pueblos are relatively small, linear arrangements of rooms, though larger pueblos with enclose plazas are known (Browning 1991; Lehmer 1948; Lekson and Rorex 1987; Yeo n.d.). Variability in room size and features suggests variability in function, such as habitation and storage rooms. Many of the pueblos in the region also have an exceptionally large room with multiple features for every six to12 of the smaller rooms. Caches of shell jewelry have occasionally been found beneath the floors of these rooms. These larger rooms have been interpreted as communal rooms which served an integrative function (Brook 1971; Marshall 1973; Miller and Graves 2009; O'Laughlin 1980, 1985b, 2001b). Their location within small, unit pueblos and room blocks of the larger pueblos has also been taken as an indication of a social organization that may have been based upon lineages (Miller 2019; Miller and Graves 2009; O'Laughlin 1984; O'Laughlin and Martin 1990). Nevertheless, O'Laughlin (1980) speculates that social organization was probably still largely egalitarian and that kinship likely was the basis for residence patterns, task group and ceremonial society composition, and exchange and information networks.

The architecture of the El Paso phase was once thought to be comprised solely of above-ground, adobe-walled pueblos (Lehmer 1948; Marshall 1973). However, isolated surface rooms and deep pit rooms or pithouses have been documented at a number of sites (Batcho et al. 1985; Brook 1967a; Browning 1991; Browning et al. 1992; Condon et al. 2010; Mauldin et al. 1998; O'Laughlin et al. 1988; O'Laughlin and Martin 1990; Sale and Laumbach 1989). Isolated surface rooms have also been noted in proximity to contiguous room pueblos (Kenmotsu et al. 2008; Lowry 2005). Few extramural features and low densities of artifacts would indicate ephemeral occupation at these sites. It has been inferred by some (Batcho et al. 1985; Browning et al. 1992) that they represent seasonal field houses. These limited occupations have also been interpreted as reflecting part of a dynamic settlement system that incorporated residential mobility (Condon et al. 2010; Kenmotsu et al. 2008; Miller and Graves 2009; O'Laughlin et al. 1988; O'Laughlin and Martin 1990).

The wide variety of intrusive ceramic types at El Paso phase sites, the consistent occurrence of shell jewelry at residential sites, and the occasional occurrence of rare items such as copper bells have been cited as evidence for an increase in inter-regional interactions and exchanges during the El Paso phase (Whalen 1977, 1978, 1981). Wimberly (1979) suggests that the growth of particular population centers was an outcome of their

position along established routes of communication and exchange. Developments during the El Paso phase have also been attributed to the fluorescence of Casas Grandes to the southwest in Chihuahua, Mexico, and the establishment of an integrative network that included southwestern and south-central New Mexico and far west Texas (LeBlanc and Whalen 1980; Ravesloot 1988; Schaafsma 1979; Wimberly 1979). Within the Jornada Mogollon region, variation in the size of pueblo sites has been interpreted as evidence for societal differentiation and a hierarchical settlement organization (Whalen 1977, 1978, 1981a). Coupled with this is an elaboration of socio-religious artifacts and rock art and formal rooms which may have had socio-religious functions that bespeak of the development of ceremonial sodalities and increased socio-religious integration (O'Laughlin 1980, 1985b; Schaafsma and Schaafsma 1974; Whalen 1977, 1978, 1981a).

The El Paso phase is viewed by many researchers as a time when most populations resided in permanent villages and relied heavily upon agriculture. Whalen (1977, 1978, 1981a) is a strong proponent of this perspective and argues that specialized intensive farming was practiced and that the gathering of wild plant foods was on a smaller scale than during earlier times. Macrofloral remains from pueblo sites are characterized by relatively abundant cultigens which included several varieties of corn, beans, and squash and bottle gourd and ample evidence of wild plant foods such as mesquite, datil, cacti, herbaceous plants, and grasses, (Brook 1966; Ford 1977; Foster and Bradley 1984, 2021; Green 1980; O'Laughlin 2005a). The native plants show the use of resources from a number of environmental zones, as do faunal remains which include rabbits and hares, deer, pronghorn, a variety of small to medium-sized mammals, and occasionally birds (Brook 1966; Foster and Bradley 1984, 2021; O'Laughlin 1977a, 2005b). Fish and turtle are also noted at one pueblo along the Rio Grande (Foster and Bradley 1984, 2021).

Large and small structural sites of the El Paso phase are often located at basin edges and on or near alluvial fans which emanate from the larger mountains, presumably to take advantage of surface runoff for agriculture (Beckes et al. 1977; Whalen 1977, 1978). Other structural sites have been documented near basin playas (Camilli et al. 1988; Carmichael 1986; Whalen 1977, 1978) and along the Rio Grande (Foster and Bradley 1984, 2021; O'Laughlin 1980). Small camps are found in all environmental zones and are generally believed to represent seasonal or special activity sites for hunting, gathering, and processing activities (Carmichael 1986; O'Laughlin 1980; Whalen 1977, 1978). Large camps, including agave roasting camps, are found on the piedmonts of mountains (O'Laughlin 1979, 1980; Whalen 1977, 1978, 1981a). However, there is a noticeable decrease in the use of camps in central basins and on alluvial fans during this time (Miller and Kenmotsu 2004), suggesting that land use was dominated by agricultural activities.

The documentation of both small and large structural sites, numerous limited activity sites, and a differential use of the landscape has prompted researchers to question the degree of sedentism during the El Paso phase and the nature of residential mobility. A settlement and subsistence model with primary villages in well-watered areas for agriculture and secondary villages elsewhere for hunting and gathering has been suggested by Mauldin (1986). Periodic mobility or short-term sedentism with the abandonment of villages under resource stress has been proffered by Dering et al. (2001). Following Nelson and Anyon (1996), the complete relocation of a village due to extreme resource exhaustion has been mentioned as a possibility (Kenmotsu et al. 2008). And, there is the interesting concept of adaptive diversity with contemporaneous populations focusing either on agriculture or hunting and gathering (Johnson and Upham 1988). These constructs differ in detail but share a view that adaptive strategies during the El Paso phase were fluid and diverse in response to variation in the environment and local resource stress and depletion.

The El Paso phase ends sometime after A.D. 1400 and likely before A.D. 1500 with abandonment of the region by permanent agricultural populations. Marked changes in the environment may have occurred at this time or the collapse of the system may have been the result of too heavy a reliance on agriculture which is a tenuous adaptation for this area and the technology and social organization of the El Paso phase (O'Laughlin 1980). It may also be possible that the dispersal or reduction in population noted at the end of this phase may be related to the decline at about the same time of the Casas Grandes regional integrative network (LeBlanc

and Whalen 1980; Ravesloot 1988; Schaafsma 1979; Wimberly 1979). There is little archaeological evidence for occupation of the region after the El Paso phase and before the establishment of Spanish mission communities. Most of this consists of chronometric dates for features with few or no associated artifacts (Beckett and Corbett 1992; Miller 2001; Seymour 2002). These remains would not be unexpected for a hunter/gatherer adaptation similar to that observed for indigenous populations in the region at the time of Spanish contact (Carmichael 1986; O'Laughlin 1980; Wimberly 1979). Camilli et al. (1988) provide a good summary of early historic accounts of indigenous groups such as the Manso and Suma.

El Paso Phase Settlements in the Vicinity of Firecracker Pueblo

Surveys of Maneuver Area I on Fort Bliss (O'Laughlin 1987; Whalen 1978) and northeast El Paso (Fitzgerald 1981) have identified a concentration of large and small El Paso phase sites where the alluvial flats of the Franklin Mountains meet the floor of the Hueco Bolson and where the best soils for agriculture can be found in the area (Jaco 1971; Pigott 1978) (Figure 4). These sites often exhibit dense scatters of ceramics and lithics, have visible architecture on occasion, and are also in proximity to a number of playas.

A number of these El Paso phase sites have been subjected to excavation. In some cases, remains of architecture could not be found (Condon et al. 2010; Kenmotsu et al. 2008). However, there are a number of sites, including Firecracker Pueblo, with structures that mark the abovementioned concentration of sites in the western Hueco Bolson (Figure 4). The structures on these sites provide a base for comparison with Firecracker and range from medium-sized linear pueblos to isolated surface rooms and pithouses (Figure 5). Aside from plaza oriented pueblos, these sites illustrate the variability in El Paso phase architecture.

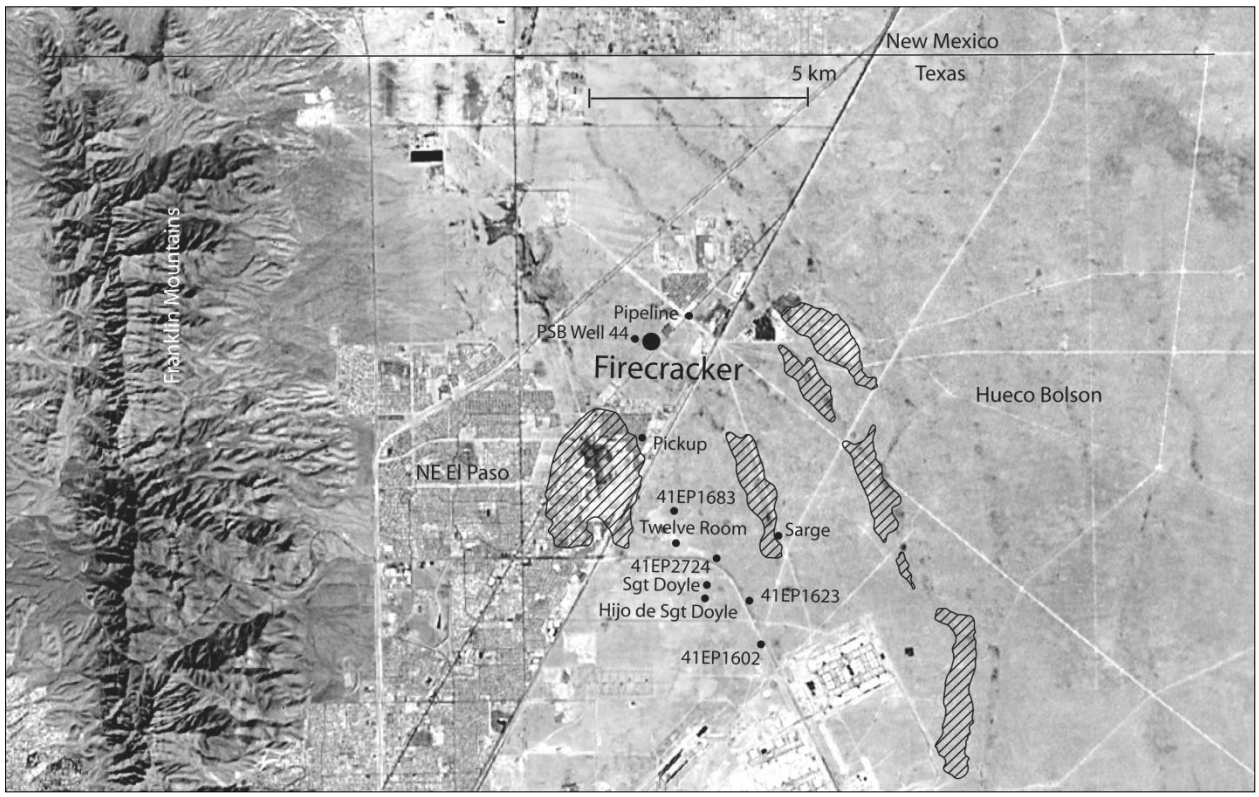


Figure 4. El Paso phase settlements near Firecracker Pueblo and Hueco Bolson playas (hachured).

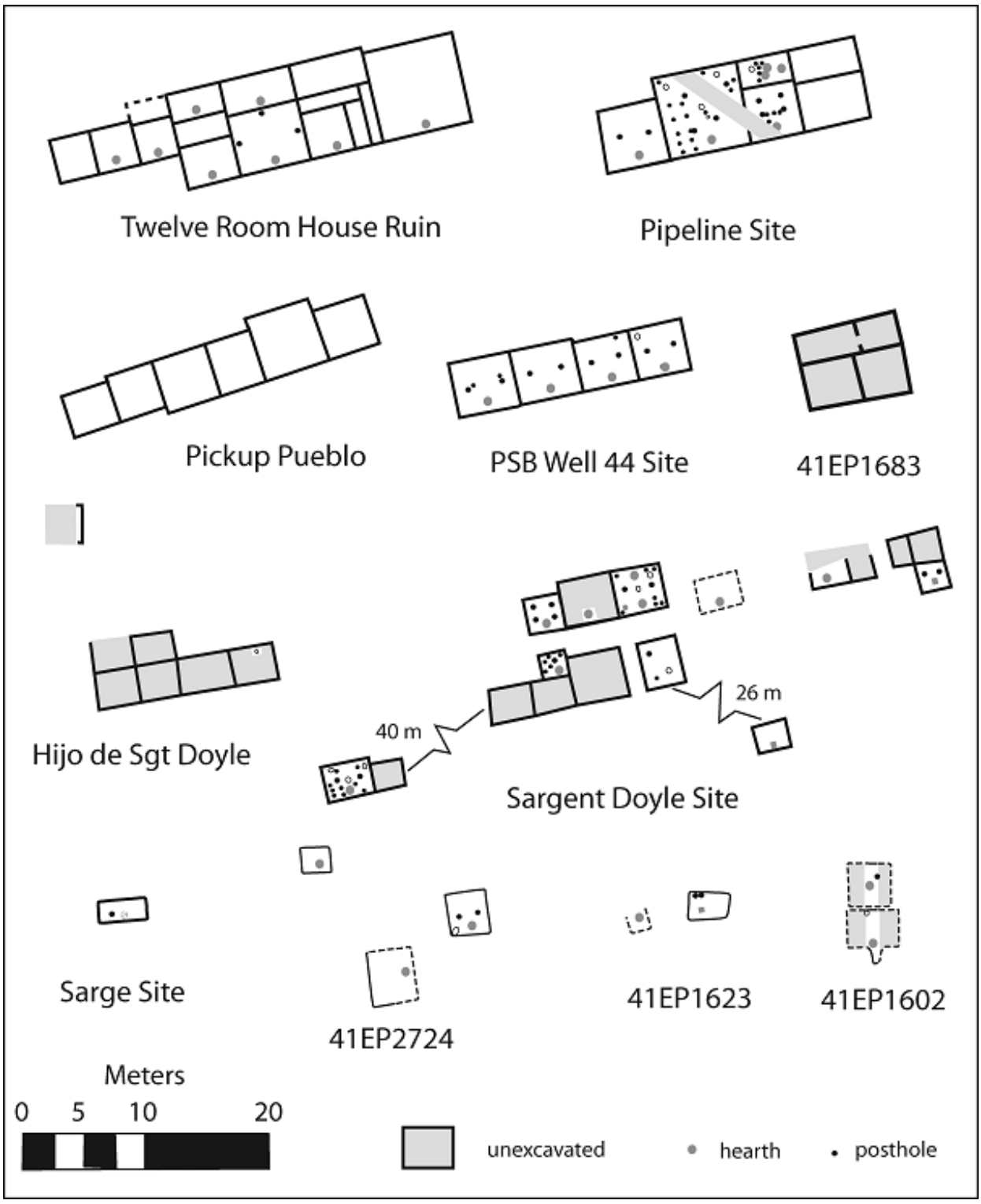


Figure 5. El Paso phase structures in the western Hueco Bolson.

The medium-sized pueblos include Twelve Room House Ruin (Moore 1948), the Pipeline Site (EPAS, site notes on file; Vernon Brook, personal communication, 1975), and Pickup Pueblo (Gerald 1988). The PSB Well 44 Site (Green 1968) and 41EP1683 (O'Laughlin et al. 1988) are smaller room blocks with four rooms.

Hijo de Sgt. Doyle (Kenmotsu et al. 2008) and the Sgt. Doyle Site (Green 1969; Lowry 2005) have small room blocks of three to six rooms and isolated surface structures. One to three isolated surface structures are present on the Sarge Site (Brook 1967a), 41EP2724 (O'Laughlin and Martin 1990), and 41EP1623 (Condon et al. 2010). Finally, two adjoining pithouses are known for 41EP1602 (O'Laughlin et al. 1988).

All of the rooms at Pickup Pueblo and two rooms at the Pipeline Site suffered from erosion and only the foundations for walls remained. In general, adobe walls of contiguous room pueblos resisted erosion and were identifiable. Foundations for walls were often not present for isolated rooms, and erosion had taken walls from many of the isolated single room structures.

There was a general practice of excavating a shallow pit for the floor of rooms. This was in addition to any deeper surrounding foundation trench for walls. Walls were raised, and then a caliche floor was laid to the walls or edge of the excavation. Caliche floors may be all that remained of a room. This was the case for isolated surface structures at 41EP2724 and 41EP1623.

Most rooms have formal hearths in the plastered floors. Smaller rooms may have two major postholes, and larger rooms may have four major postholes. Various pits may be present, and smaller postholes occur and may have helped support the roof or provided for room partitions and furniture. Rooms at the Twelve Room House Room have a noticeable lack of floor features, and it is suspected that they may not have been found or investigated in this early excavation.

Large, communal rooms are present in the three largest pueblos. The best preserved and documented example is the large room at the Pipeline Site which has multiple floor features and a cache of shell beads in a floor pit. Core rooms at Twelve Room House Ruin and the Pipeline Site also had been burned, possibly as part of closing rituals with settlement abandonment.

Isolated surface rooms tend to be smaller and have fewer postholes than rooms of pueblos. The absence of preserved walls for most isolated rooms also suggests less investment in the construction of these rooms. This is also apparent for the 30-46 cm deep pithouses at 41EP1602 where walls and floors are unplastered and informal hearths are present on the earthen floors.

There was little investigation of extramural areas at most of these sites, and few features were reported. Two refuse-filled features and sheet trash are noted for Twelve Room House Ruin, and a small bell-shaped pit and larger barrow pit were excavated at the Pipeline Site. A hearth and two apparent barrow pits were tested at Pickup Pueblo where sheet trash was noted south and east of the pueblo. Three informal hearths, two refuse-filled barrow pits, and three areas of sheet trash were recorded around the structures at Hijo de Sgt. Doyle. A hearth, four thermal features with burned caliche, and two refuse-filled pits were identified at the Sgt. Doyle Site.

Block excavations at two sites provided better coverage of extramural areas. Two isolated surface structures, two hearths and a trash-filled pit were found in an 8 m by 8 m excavation at 41EP1623. Block excavations north and east of the structures revealed another 25 carbon-stained features and two pits with refuse that may be contemporaneous with the structures. A total of 533 square meters was excavated around a cluster of three isolated surface rooms at 41EP2724. There was some evidence for a fourth structure and a possible brush structure or ramada. Little trash and few features were found near structures. Away from structures and primarily to the south and west were 34 hearths and roasting pits and areas of secondary refuse. A barrow pit was located north and east of the structures. Three possible storage pits were also recorded. The block excavations at these two sites furnished information on site structure and variability in features not detailed at the other sites.

The deposition of trash within rooms has not been documented for these settlements, suggesting that occupations may not have been long-lived. Instead, trash is found in middens and extramural features, and the testing of middens and extramural features at these sites generally provides substantial numbers of artifacts as well as the majority of faunal and macrofloral remains (see Dering 2001; Jacobson 2010; O'Laughlin 2005a, 2005b; Presley and Shaffer 2001; Hickey et al. 2010).

Few burials have been found in El Paso phase settlements, and this is also the case for settlements in the western Hueco Bolson. Pickup Pueblo and PSB Well 44 Site each have one recorded burial from beneath a room floor. Two burials are ported from beneath the floor of one room at the Sgt. Doyle Site.

Research Topics

There is a long history of exploration of El Paso phase settlements, but comparative data are limited and contexts are often omitted. Thus, the investigation of Firecracker Pueblo follows a descriptive approach. That is, a strategy with emphasis on the collection of data to assess basic questions of chronology, site structure, technology, and subsistence. In turn, this information is placed in broader contexts oriented toward addressing larger, regional questions of adaptive behavior patterns, particularly patterns in settlement and land use, following Dering et al. (2001), Hard (1983a), Kenmotsu et al. (2008), Mauldin (1986), Mauldin et al. (1998), Miller and Graves (2008), and O'Laughlin and Martin (1989, 1990).

Chronology

The co-occurrence of El Paso Polychrome and architectural remains at Firecracker Pueblo indicate an El Paso phase occupation. A better appreciation of the overall temporal occupation of the site and the relative timing of site components relies on chronometric dating, relative dating techniques, and stratigraphic context.

The chronometric dating methods employed for Firecracker Pueblo include radiocarbon, archaeomagnetic, and obsidian hydration dating. Radiocarbon dates indicate a late El Paso phase occupation and suggest occupation into the 15th century. Unfortunately, they do not set apart all of the different site components. Similarly, the only archaeomagnetic date simply brackets the period of occupation. A set of 18 obsidian hydration dates is a result of opportunities to provide radiocarbon dated obsidian artifacts to assist the evaluation of experimental rates of hydration (Miller 1996; Stevenson 1986). The dates, however, range from 668 B.C. to 1721 A.D. and prove to be of little help in dating the occupations at Firecracker Pueblo.

Relative dating techniques employed with assemblages from Firecracker Pueblo include ceramic cross-dating, vessel rim morphology, and lithic reduction technology. Ceramic cross-dating is a relative dating technique that utilizes chronologies of established ceramic types, particularly trade wares. Vessel rim morphology of local ceramic types varies temporally (Lehmer 1948), and a rim sherd index can measure some of this variability (Whalen 1978). Lithic reduction technology varies with residential mobility, and the lithic assemblage at Firecracker pueblo should exhibit a low residential mobility pattern of expedient core technology and logistical procurement of materials (see Carmichael 1986; O'Laughlin 1980). While these relative dating techniques can show between-phase temporal differences, they are not expected to reflect differences in occupational components at this site. Nevertheless, these techniques are explored herein to aid general regional efforts in chronological research.

Many sites in the regional have evidence of multiple occupations, but few exhibit the super-positioning of structures and features like Firecracker Pueblo. Stratigraphic context provides a means of recognizing occupational components and assists the definition of site structure. Matching sherds of the same vessel and fragments of the same ground stone object help define the relationships of structures and extramural features of occupational components.

Site Structure and Formation Processes

More than one occupation is evident at Firecracker Pueblo, and the recognition and interpretation of the different occupations requires contextual information. This may be gained by a consideration of site structure and formation processes. Formation processes are natural and cultural transformations that result in the structure of an archaeological site. Following Binford (1983), site structure includes the size of the occupational component and spatial arrangement and form of habitations, activity areas, refuse areas, and other features. Together, an understanding of the formation and structure of the archaeological record is important to the analysis of settlement pattern and land use.

Formation processes that have conditioned the cultural remains at Firecracker Pueblo include natural transformations and modern and prehistoric cultural transformations. Formation processes are dynamic and responsible not only for the creation of an archaeological site but also for its preservation or modification with time.

The most important natural transformation process for Firecracker Pueblo is aeolian erosion that has collapsed natural and cultural stratigraphy. The modern environment for the site area is one of mesquite coppice dunes where soils have been eroded, exposed and buried, especially in recent historic times. Excepting structures and extramural features, the result is that cultural materials from different occupational episodes are intermixed within a single horizon. Lacking stratigraphic integrity, the definition of components of occupation relies heavily on spatial distributions of habitations, extramural features, and artifacts.

Historic cultural transformations consist of highway construction, site grading, refuse dumping, and pothunting. The construction of Highway 54 may have taken a few features and some refuse and caused additional weathering of the eastern end of the pueblo. Modern trash is noted above one of the isolated rooms, and disturbed areas from pothunting are noted for three rooms of the pueblo. The most serious impact has been the grading of the eastern two-thirds of the site to provide a level surface for parking and temporary fireworks stands. There is also a graded, unimproved access road along the north site boundary. Fortunately, there appears to have been relatively little disturbance to features and deposits, as sand from dunes was moved and covered much of the site. Nevertheless, two areas with architecture are recorded as having upper walls and fill pushed some distance, and a third area may have been exposed to the elements and suffered from additional erosion.

Prehistoric cultural transformations are those processes associated with occupation, abandonment, reoccupation, and other human behaviors. An appreciation of formation processes is also a prelude to understanding site structure. For example, discard and disposal of cultural materials is responsible for most of the cultural material in the archaeological record for the Jornada region. The behavior associated with refuse has a systemic context that is discoverable through analysis of archaeological context and has three principal forms: de facto refuse, primary refuse, and secondary refuse (Schiffer 1972). Site structural patterns in cultural materials can be interpreted and related to systemic contexts and reveal the nature of settlement and land use.

Items left in place and abandoned are termed de facto refuse and can provide information on the locations of specific activities. The floors of pithouses and pueblos in residential sites are where de facto refuse can be encountered. Special cases of de facto refuse include the caching of objects and ritual deposits, both of which have been noted for pueblo settlements (Miller and Graves 2009; O'Laughlin 2001b).

Primary refuse is comprised of materials discarded or lost at the place of production, maintenance or use. However, if activity areas are maintained or cleaned, then primary refuse may be indicated by small items or low density scatters of cultural material. Spaces in residential settlements where primary refuse can be

expected to have been cleaned up and removed include the floors and entrances of structures, traffic areas, activity areas near structures, and where activities compete for the use of space.

The maintenance of spaces and the removal of primary refuse create secondary refuse. That is, discarded material that has been removed from the place of production. Secondary refuse often has large items and dense accumulations of materials. At residential settlements, dedicated areas for trash disposal may include middens, pits, and abandoned structures, and the quantities of materials will contrast with maintained spaces. Trash disposal at some distance from structures may also be anticipated for long-lived settlements.

The number and variety of extramural features should correlate with occupational stability. Residential settlements of some duration should exhibit a pattern of features that reflects the differential use and maintenance of space much like that for secondary refuse. In turn, different kinds of features, such as simple hearths and roasting pits, may have different spatial patterns reflective of the associated activities.

The spatial arrangement of residences provides evidence of social organization and residential stability. Architectural forms for the El Paso phase range from isolated rooms and pithouses to groups of isolated rooms to contiguous room pueblos. Residential occupation may also range from seasonal to more permanent. Social relations and concomitant site structure should similarly become more formal with increasing sedentism. The recovery of spatial patterns of residences, activity areas, refuse, and other features offers the opportunity to interpret land use and household relations. Additionally, and important for Firecracker Pueblo, site structure can support the recognition of multiple occupations.

Material Culture

Substantial numbers of artifacts and diverse assemblages are known for El Paso phase residential sites. They offer opportunities to explore occupational stability, technology, material selection, and interregional exchange. Evidence of maintenance, recycling and secondary use, scavenging, and conservation of items can also be monitored with ceramics, flaked stone, and ground stone.

Changes in subsistence, food preparation, and storage should be reflected in ceramic vessel morphology. Indeed, differences are noted in vessel form from the Pithouse period to the later El Paso phase that correspond to an increasing reliance on agriculture and increased sedentism. Jars are larger and bowls better represented for the Pueblo period than for earlier times. Neckless, direct rim jars are also replaced with necked and everted rim jars in the Pueblo period. While temporal differences in vessel form have been observed, the representation of vessel forms at ephemeral and longer-lived residential sites does not appear to be dissimilar (Condon et al. 2010; Hard 1994; Miller 1996; Miller and Burt 2007; Scarborough 1992; Shafer et al. 2001; Whalen 1981b). Miller and Kenmotsu (2004) suggest that similarities in the representation of bowl and jar forms across different sites would indicate uniform vessel functions and a relatively sedentary population for the El Paso phase.

The ceramic assemblage from Firecracker Pueblo is quite large and the analysis of attributes of vessel form and size is undertaken to characterize the different occupations. Intrusive ceramics are categorized as well to help identify those occupations, provide relative dates, and a measure of extra-local exchange. Ceramic materials are also examined for indications of scavenging, recycling, and secondary use, all of which should be evident at a residential settlement. Firecracker pueblo is also unique for the region in having de facto refuse for pottery manufacture.

Settlement patterns, subsistence, and raw material variability condition chipped stone technology, and a number of patterns in regional analyses of chipped stone provide expectations for the late Formative, El Paso phase (Dockall 1999; Miller 1990, 2007; O'Laughlin 1979, 1980; Schaffer et al. 2001). Throughout the Formative period, an expedient core technology is characteristic and reflects the abundance of readily

available raw material. This technology includes non-standardized, unprepared cores from which flakes are removed, used and discarded. With increased duration of occupation, residential settlements could be anticipated to have diverse assemblages, a greater reduction of cores, more debitage, and more intensive use of tools. Evidence of scavenging and tool maintenance should also be expected. Formal tools and evidence of bifacial reduction, however, would be less prominent on Pueblo period sites than those of earlier periods with mobile populations and a greater emphasis on hunting.

There are also patterns in material selection that do not follow the natural raw material availability. Coarse-grained materials are most abundant in local landforms, but the preference through time is for fine-grained materials for stone tools. Nevertheless, there appears to an increase in the use of coarse-grained materials in the late Formative period, probably related to an increased reliance on plant foods. Obsidian occurs as small nodules in lag gravels along the Rio Grande and where the ancestral Rio Grande once traveled between the Franklin and Organ Mountains. Obsidian occurs in only small amounts in Jornada settlements, but an increase in the use of obsidian is noted for the late Formative, especially for projectile points (Miller and Kenmotsu 2004).

The lithic collection from Firecracker Pueblo is classified by technological category and general function, when possible. The analysis of lithic attributes is undertaken principally to yield information on raw material selection and reduction technology. The intent of this study is to provide comparative data for an intensively occupied residential site of the El Paso phase that presently does not exist.

Ground stone from Firecracker Pueblo is examined for form and size. There is a general increase in grinding stones and a movement from basin to slab metates from the Archaic to the Pueblo period, and these changes are correlated with an increasing dependence on maize agriculture (Calamia 1983; Hard et al. 1996; Mauldin 1993). Recycling and secondary uses of exhausted grinding stones is also anticipated at Firecracker Pueblo.

Subsistence

The documentation of subsistence at Firecracker Pueblo is centered on biological data. Floral and fauna remains are analyzed in an effort to describe subsistence resources, articulate procurement strategies, and evaluate the results with respect to models of settlement and land use. In that biological remains tend to vary with intensity of occupation, it would be expected that charred botanical and faunal remains would be well-represented.

Populations of puebloan settlements are viewed as more dependent on agriculture than populations of earlier times. This has generally been substantiated by higher ubiquity values for maize and domesticated beans in flotation samples and appreciable numbers of maize parts in field samples (Hard et al. 1996; Miller and Kenmotsu 2004). Miller and Kenmotsu (2004) also suggest that the use of mesquite pods, cacti, and leaf succulents declines during the El Paso phase. Carbonized plant remains from Firecracker Pueblo will be compared with those of other Pueblo period settlement to discern patterns of resource use. Additionally, the mix of domesticates and native plants for the different occupations at Firecracker Pueblo will be considered with respect to occupational stability and intensity of occupation.

Faunal remains from lowland sites away from the Rio Grande are remarkably consistent for the Formative period and follow a lowland hunting pattern as defined by O'Laughlin (1977a). That is, cottontail and jackrabbit dominate assemblages, rodents and birds are not uncommon, artiodactyls are occasionally represented, and carnivores are infrequently represented. The faunal assemblage from Firecracker Pueblo is expected to conform to this pattern. The processing of animals, disposal of bone, and modification of bone will also be followed.

CHAPTER 4
FIELD METHODS AND SOILS

Firecracker Pueblo was investigated over a ten year period. Field methods were adapted as project goals were modified with time and findings. Initial excavations centered on visible architecture of the pueblo. Later, the field work moved to an exploration of features and deposits around the pueblo. By the end of the project, the breadth of the site had been examined in an attempt to document occupations and site structure.

Grading of the site leveled the mesquite coppice dunes and spread sand in a relatively thin layer over most of the area. Some deposits were disturbed, and the core rooms of the pueblo were revealed. Few artifacts were visible on the surface with the blanket of sand. Artifact collectors had also visited the site before the excavation, and a controlled collection of surface artifacts was not warranted. Prior to excavation, a site datum was set with rebar near the south wall of the pueblo and southwest corner of Room 3.

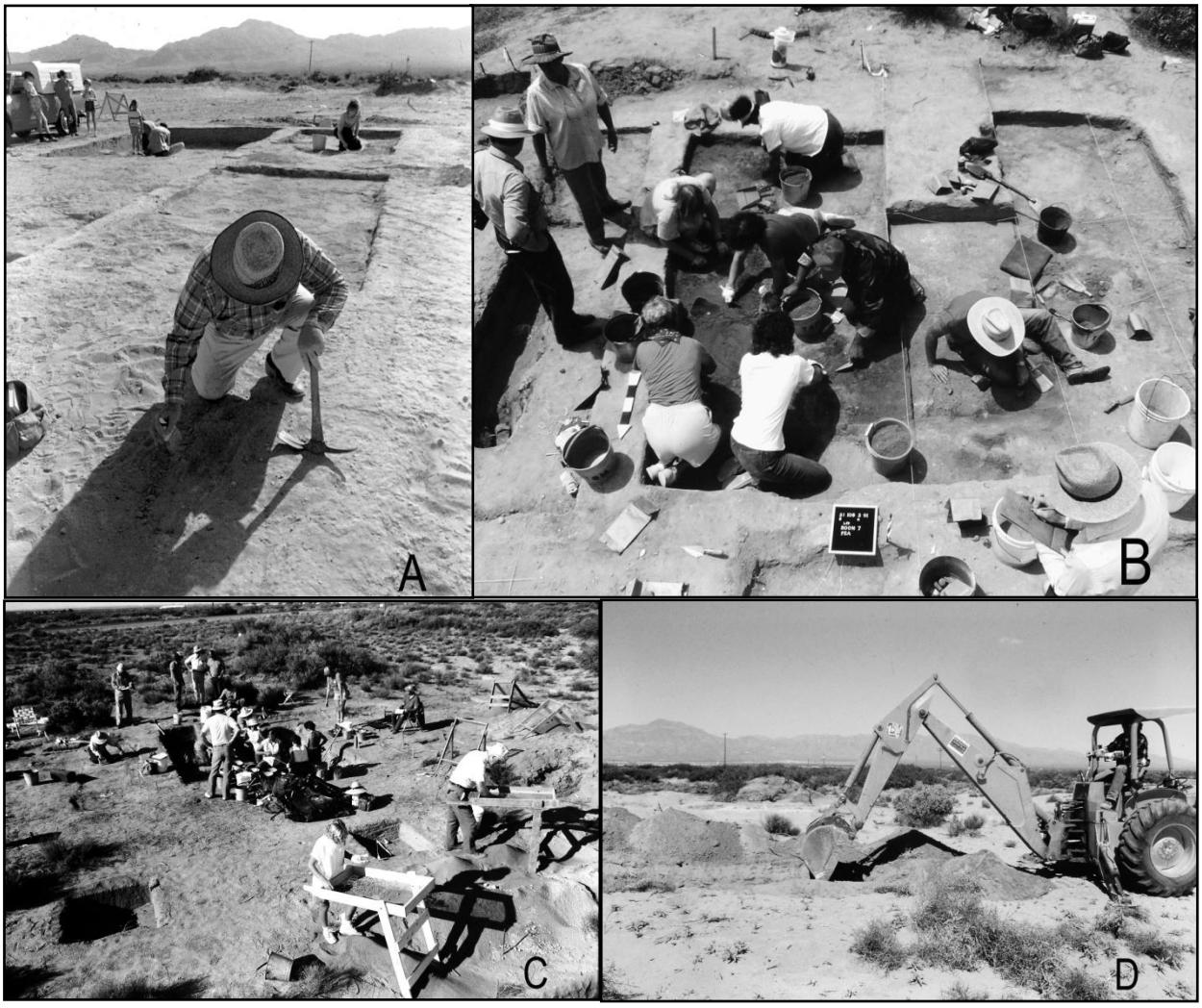


Figure 6. Firecracker Pueblo excavations: a, 1980 excavation of Rooms1-5 by natural levels; b, 1986 TAS field school excavation of Room 7 by 1 m squares; c, 1986 TAS field school and systematic excavation of 1 m squares; d, 1988 backhoe trenching.

Manual Excavation of Structures and Extramural Features

Rooms within the pueblo, isolated surface rooms, pithouses, and extramural features were excavated by natural levels. Unstratified deposits more than 20 cm thick were usually subdivided into arbitrary levels. Charcoal greater than 0.5 mm in size and recognizable macrobotanical remains, such as maize cobs and mesquite pods, were collected when present, and flotation and pollen samples were taken from floor features of rooms and the carbonaceous fill of extramural features. Structural elements from burned roofs of core rooms in the pueblo were also recovered. The matrix removed from all units was screened with ¼ inch mesh, and all ceramic, lithic and faunal material was bagged by provenience and level.

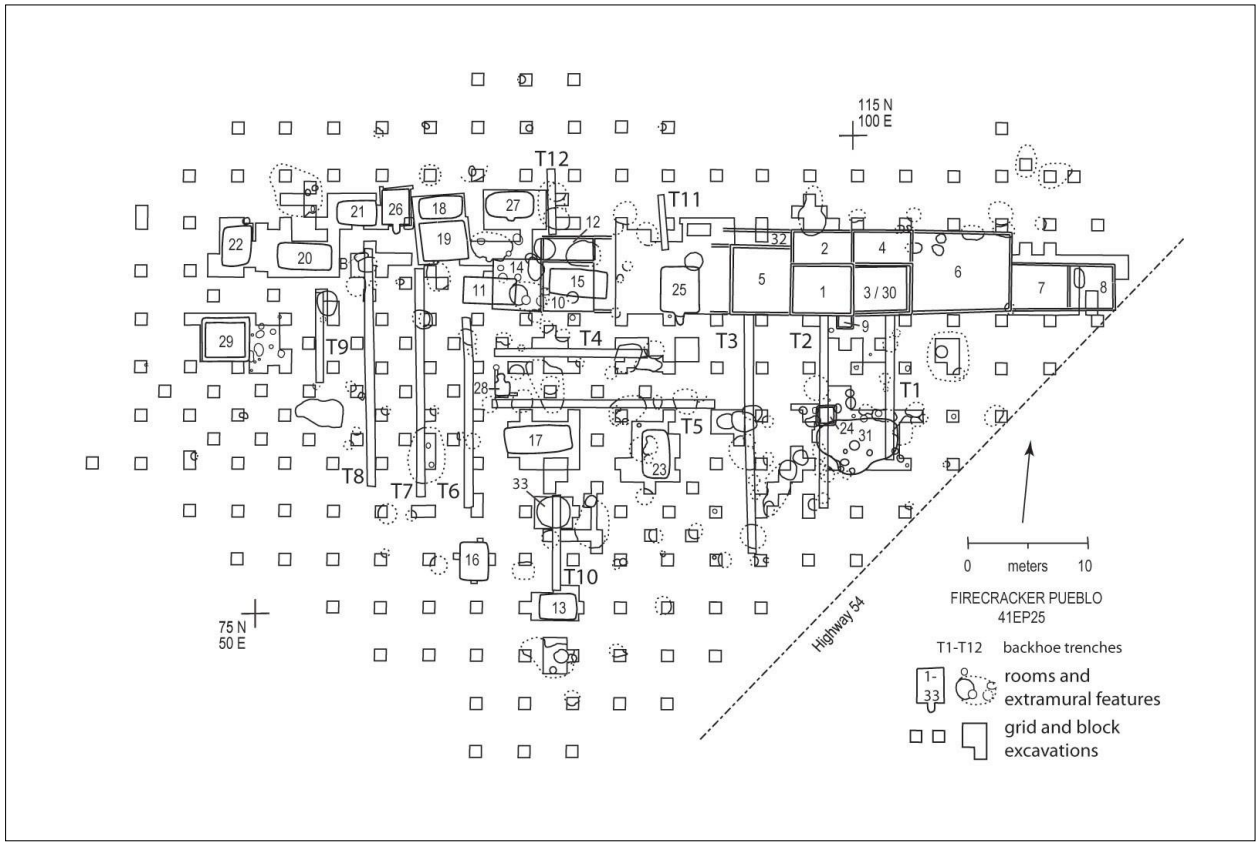


Figure 7. Plan of Firecracker Pueblo showing areas of excavation.

Rooms 1 through 5 of the pueblo (Figure 7) and the first rooms investigated at the site were excavated as single units but subdivided into sections for some control over the horizontal distribution of materials. The eroded area in the middle of the pueblo and isolated Rooms 16 and 19 were also excavated as single units because floors were severely eroded and there were few floor features and no intact floor deposits. And, Pueblo Room 9 and isolated Rooms 24 and 28 were excavated as single units as their floor areas were less than 1.5 sq m. The other pueblo rooms, isolated surface rooms and pithouses were exposed with 1 m square control units referenced to a north-south and east west grid based on the site datum at 100N and 100E and labeled by coordinates at the southwest corner.

Artifacts on the floors of pueblo rooms, isolated surface rooms, and pithouses were piece-plotted in reference to the grid system. Cached items and other de facto refuse within floor features were recorded. Where secondary refuse rested on floors or was contained within floor features, the artifacts were recorded by 1 m square units or the floor feature. Halves of most floor features were excavated, profiles were drawn,

and the remaining soil was removed. Some postholes were too deep to section and were excavated by natural levels.

The examination of extramural features followed several courses. Small features, especially those within a 1 m square, were bisected, profiled, and then the remaining fill was excavated. Larger features were often excavated up to the edge of a 1 m square unit and profiled. For some features, additional squares were excavated, forming a block excavation for the feature or a number of features. Three large extramural features, Features 54, 60 and 203, were exposed as single units by arbitrary levels.

Systematic Excavation

The systematic, subsurface investigation of extramural areas was an essential part of the research effort at Firecracker Pueblo (Figure 7). Prior to the excavation at Firecracker Pueblo this had not been attempted at a pueblo site in the Jornada region, and it was hoped that new information on extramural features and their spatial distributions would be found. The approach was simple, and approximately 20% of the site area outside of structures was excavated.

First, a checkerboard of 1 m squares was dug with a distance between the excavated 1 m squares of three meters. Then, a number of squares were excavated in the middle of the areas defined by every four excavated squares. This was followed by expanded block excavations to learn more about particular extramural features or deposits. This method was also very successful in locating isolated surface rooms and pithouses. The interval subsurface testing of Firecracker Pueblo was discontinued where insignificant numbers of features and artifacts were recorded on the periphery of the site. Two hundred and fourteen extramural features and 15 isolated surface rooms and pithouses were found beyond the walls of the pueblo through these excavations and backhoe trenching.

Mechanical Excavation and Soils

Twelve backhoe trenches were excavated near the end of fieldwork at Firecracker Pueblo (Figure 7). Backhoe trenches were excavated primarily to characterize the geomorphic strata. A number of extramural features and a pithouse were visible in trench walls and are included in the above count. The

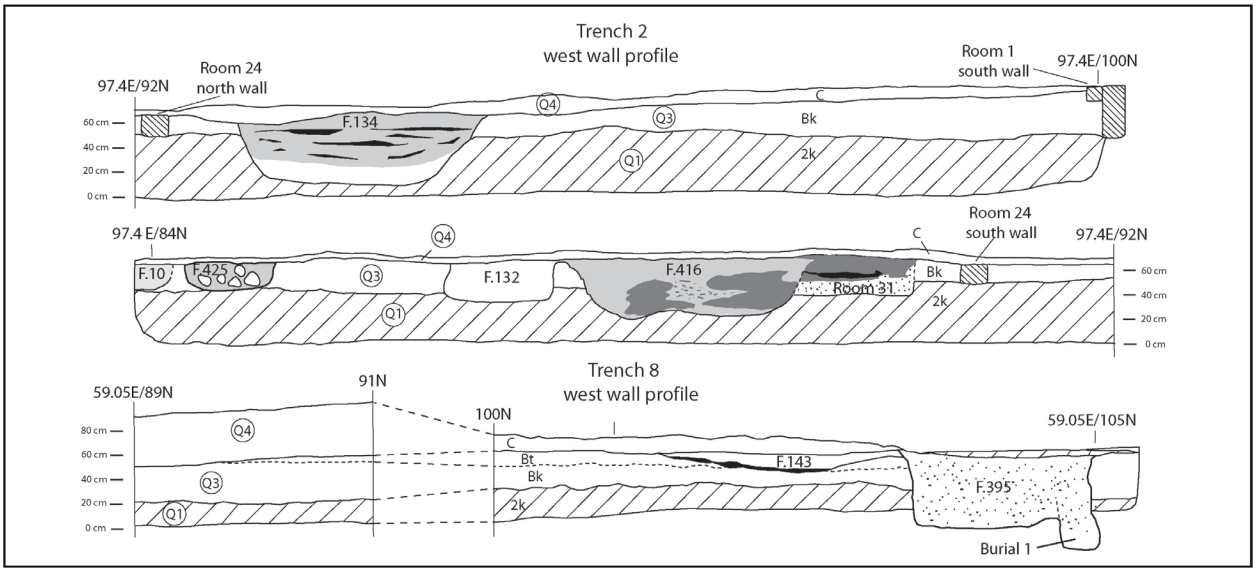


Figure 8. Profiles of Backhoe Trenches 2 and 8.

only burial noted for the site was found within a pit partially cut by Trench 8. Additional manual excavation was conducted based on the findings from the backhoe trenches. Trenches were dug into the underlying indurated caliche and exposed 30-90 cm of soils above the caliche. Exemplary soil profiles are shown in Figure 8.

Three distinct sediment horizons are identified for the trenches, and nomenclature follows Blair et al. (1990) for Q or Quaternary sediments. The lowest and oldest stratum is Q1 and is a layer of calcium carbonate or caliche and is analogous to the eroded Pleistocene-aged La Mesa geomorphic surface that underlies the area (Gile et al. 1981; Monger 1993). On top of the caliche is a Q3, Holocene-aged layer of compact, light brown (7.5YR 6/4) sandy loam with weak carbonate filaments and small isolated pebbles. In the western part of the site, the Q3 has a thin layer of compact to blocky, light reddish brown (5YR 6/4) silty loam that grades into the lower sandy loam. Archaeological remains rest on or are intrusive into the Q3 layer. Historic aeolian sands of Q4 cover the archaeological and geomorphic deposits.

CHAPTER 5
THE PUEBLO

The account of structures at this site begins with the contiguous room pueblo. This is appropriate as the site is named for this pueblo, and the pueblo is the first area investigated at the site. An overview of the pueblo and architectural details are provided and followed by room descriptions and a discussion of room function, growth and abandonment of the pueblo, and evidence of post-abandonment activity. The next chapter provides information on isolated surface rooms and pithouses.

Pueblo Room Block

The pueblo of Firecracker Pueblo is a single block of rooms, measuring 52.9 m east-west and 7.3 m north-south and is oriented a little to the southeast and 7 degrees off of true east-west (Figure 9). It has been suggested that this orientation may have astronomical or cosmological significance (Brook 1979; Miller and Graves 2009). The pueblo is also linear, adobe-walled, and one to two rooms wide and comprised of some 15 to 17 single storied rooms (Figure 10). Rooms are variable in size and include one very large, communal room. This structure is similar to the nearby pueblos of Twelve Room House Ruin, Pipeline Pueblo, and Pickup Pueblo (Figure 5) and other large linear pueblos of the region (Lehmer 1948; Marshall 1973: Miller and Graves 2009).

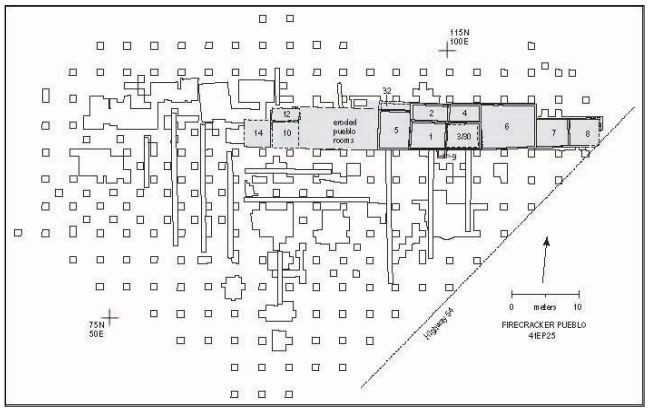


Figure 9. Site plan with pueblo location.

Parts of the pueblo are well-preserved, and other parts are not. Construction of Highway 54 may have hastened the erosion of the easternmost room where only the wall foundation remained of Room 8. The grading of the site moved some of the upper fill of burned roofing materials of Rooms 3 and 4 over Rooms 1 and 5. Grading also exposed walls of Rooms 1 to 8 and likely led to the disturbance of Rooms 2, 3, and 4 by relic seekers. Rooms 1 to 9 and 12 have foundations for walls and are better preserved than other rooms where erosion left little of the rooms. Rooms 10 and 14 are defined by small wall remnants and the weathered remains of caliche plastered floors. The west wall of Room 32 could not be located, the north wall is considerably reduced, and the floor, however, is weathered but present. The most severe impact of erosion is to the area between Rooms 5 and 32 on the east and Rooms 10 and 12 on the west. No walls or wall foundations could be found in this area, and former presence of rooms is noted by a dense layer of caliche pebbles over the area at the same level as the floors of Rooms 10, 12, 14, and 32. The southern limit of this layer or pavement is sharp and matches with the southwest corner of Room 5 and the southeast corner of Room 10. The northern edge of this layer is less definite but extends from the north wall of Room 32 to the northeast corner of Room 12. This eroded area may once have had four rooms or perhaps one exceptionally large room and one or two other rooms. With the 13 identifiable rooms, the total number of rooms for the pueblo is, therefore, thought to be between 15 and 17.

Walls

The preservation and construction of walls differed between the earlier eastern rooms and the later western rooms of the pueblo. What they do share is the common use of yellowish brown to brown adobe with variable amounts of small gravel and caliche pebbles. Walls were also likely constructed of coursed

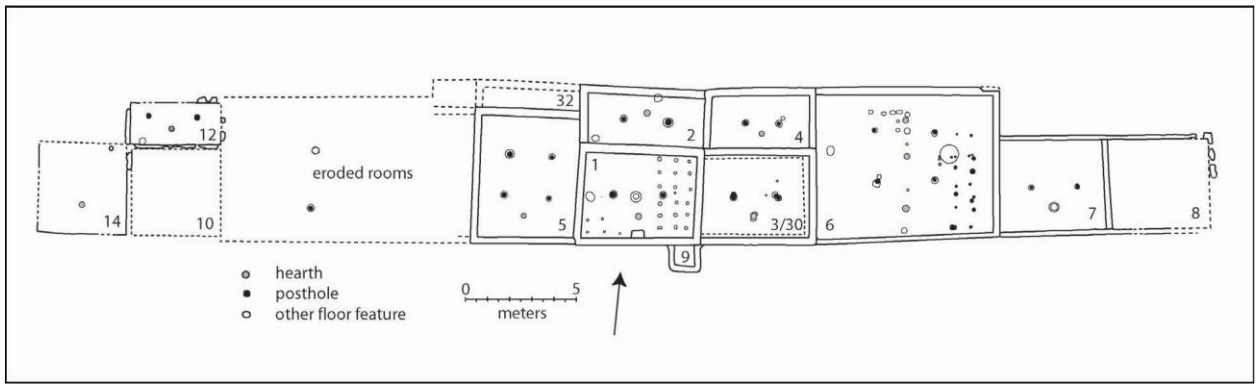


Figure 10. Plan of the pueblo showing interior room features.

with variable amounts of small gravel and caliche pebbles. Walls were also likely constructed of coursed adobe. However, courses of adobe could only be identified for the higher walls of Room 1 where the courses were 25-30 cm in height, a measurement comparable to the height of adobe courses in other pueblos of the region (see Miller and Graves 2009).

Rooms of the eastern half of the pueblo have well-preserved walls that are 20 to 42 cm wide, are as high as 17 cm above the ground surface, and have foundation trenches as deep as 47 cm below the ground surface (Table 1). Foundation trenches vary from half as wide as the upper walls to as wide as the upper walls. Segmented or tier foundations of adobe are recorded for Rooms 4, 6, 7 and 8 where a series of short trenches were excavated instead of a single trench (see Figure 21). Tiered foundations have not been noted for other sites in the region, but foundation trenches are known (Lowry 2005; Miller and Graves 2009; O'Laughlin 1999; O'Laughlin et al. 1988).

Few rooms could be identified for the western half of the pueblo. Indeed, only three of as many as seven rooms have walls or floors that allow their recognition. Erosion of this part of the pueblo was undoubtedly hastened by the absence of foundations for walls. The few wall remnants in this area rest on an earlier surface of occupation, excepting the western wall of Room 12 with a 35 cm deep foundation trench. Surviving wall widths are 22 to 28 cm, and walls are only 3 cm high.

Some of the interior walls were plastered with a thin layer of fine caliche and others were not. Rooms 6 and 30 have caliche plaster on the walls. Room 1 has interior walls as high as 49 cm with no evidence of caliche plaster. Instead the walls are well-smoothed adobe and blackened from burning of the room. Rooms 2 through 5 and 7 also have smooth surfaces to the adobe walls. However, it is possible that caliche plaster has been removed by the elements, though identifiable remains of plaster are not recorded for the fill of these rooms. The walls of Rooms 8, 9, 10, 12, 14, and 32 are too weathered to know if they were plastered or not.

No openings or other wall features were found, but doorways are suggested by an adobe step, hearth locations, and traffic patterns. On the floor, against the middle of the south wall, and opposite the hearth is an adobe step in Room 1 (see Figure 13). Interior steps below a doorway and opposite a hearth are known for the region (Brook 1967b) and indicate that a doorway had once been present in the south wall of Room 1. Further, entryways are generally in the middle of an exterior wall and the floor hearth is close to the center of that exterior wall. Thus, doorways may well have been present in the center of the south walls of Rooms 3, 5, 6, 7, 8, 14, and 30. Similarly, a doorway may have been in the north wall of Room 2, but there is little evidence of activity on the north side of the pueblo. Hearth locations for Room 4 and

Table 1. Attributes of pueblo rooms.

Room	Floor Area (sq m)	Wall Width (cm)	Foundation Depth (cm)	Floor Depth (cm)	Primary Support	Secondary Support	Formal Hearth	Other Floor Features
1	19.4	33-42	33-47	30-35	3	18	1	step, 1 informal hearth, 5 small pits
2	11.8	36-38	36-38	0	2		1	2 small pits
3	17.6	31-35	23-36	0	2		1	2 small pits
4	10.8	26-37	25-28	0	2		1	1 small pit
5	24.2	29-38	16-32	13-16	4		1	
6	48.1	20-37	26-39	13-15	4	23	3	two floors: 7 small pits, 1 sealed pit, 6 depressions
7	17.1	20-26	unknown	6-8	2		1	
8	16.7	20-26	20-25+	unknown	eroded	eroded	eroded	
9	0.8	24-29	none	0				
10	16.1	23-25	none	0	eroded	eroded	eroded	
12	8.1	22-28	35	0	2		1	1 small pit
14	16.7	25	none	0	eroded	eroded	1	1 small pit
30	15.8	unknown	none	30	2		1	hearth superimposed on earlier hearth
32	5.3	30-32	none	0				

12 could suggest connecting doorways between these rooms and the larger rooms south of them. Compacted soils of walls and floors, possibly from traffic, also suggest a doorway between Rooms 3 and 4, as well as for the exterior south wall of Room 3. Southern facing entryways would correspond with the ample record of extramural activity south of the pueblo. And, the possible interconnecting doorway between Rooms 3 and 4 could imply that pairs of large and small rooms may represent suites for larger households.

Roofs and Primary Roof Supports

Primary roof supports and construction of the superstructure are of concern in this section, and secondary postholes are considered under floor features.

Room size seems to be the determining factor for the number of primary roof supports (Table 1). Rooms of 8 to 19 sq m have two primary postholes aligned east to west in room centers, and the two larger rooms have four primary postholes in a quadrilateral pattern. Room 9 has a floor area of less than 1 sq m and has no postholes. Room 1 is unusual in that a single post in the center of the room was apparently replaced with two posts. A single possible primary posthole is also located in the area of eroded rooms. Posts not only support beams and roofs but allow roofing to be accomplished with primary or secondary roofing elements of a lesser size or of other materials than if no supports were used.

Postholes terminated at the underlying indurated caliche layer or were excavated into that layer. A mano fragment, hammerstone, and lumps of adobe provided a base for the east posthole in Room 3, and a metate fragment was at the base of the southwest posthole in Room 6. Stones in the east posthole of Room 2 and

the southwest posthole of Room 6 may have been used as wedges. Adobe was used to pack the postholes, and post molds approximate the sizes of posts which ranged from 13 to 24 cm in diameter. A portion of the post in the northwest posthole of Room 6 was found to be juniper and no less than 10 cm in diameter. Remnants of burn cottonwood posts were recovered from Rooms 1 to 3, and the post in the east posthole of Room 1 was minimally 10-12 cm in diameter. A shell pendant in the fill of the west posthole of Room 30 and a turquoise pendant in the fill of the northwest posthole of Room 5 may have been objects of termination or dedication.

Rooms 1 to 4 and 6 have burned roofing material on their floors and provide information on roof construction. The remains include cottonwood beams of 3 to 8 cm in diameter, flowering stalks of agave lechuguilla, yucca, and sotol that are 1 to 4.5 cm in diameter, and dropseed and reed stems (*Phragmites communis*). Materials used in roof construction at the Hueco Bolson sites of Sgt. Doyle and Hot Wells are the same as those for this pueblo (O'Laughlin 2005). To the north and close to the Organ Mountains, Madera Quemada has the same roofing materials but shows a greater use of juniper and also the use of pinyon (*Pinus edulis*) and ponderosa pine (*P. ponderosa*) (Miller and Graves 2009). The small representation of juniper and the absence of pine at Firecracker Pueblo is a reflection of the scarcity of juniper and the absence of pines in the nearby Franklin Mountains.

Roof detail was best preserved in Room 4 where two posts likely divided the room into thirds, and the western third had remains of secondary beams that would have been perpendicular to a primary beam supported by a post and the opposing wall (Figure 17). Pieces of lechuguilla and yucca stalk occasionally crossed the secondary beams, as well as a few grass and reed stems. Two pieces of burned adobe with impressions the size of lechuguilla or yucca stalks were among the burned roof debris and indicated that the roof was closed with adobe. None of the other rooms had definite evidence of a layer of adobe over the roof.

Posts in Rooms 1 to 4 and 6 were apparently in place when the rooms burned. However, posts may have been removed with abandonment of the pueblo or with rebuilding of a room as in the case of Room 30. The upper packing material had been removed or disturbed with the removal of posts from the postholes of Room 30. Similarly, the upper adobe packing is missing from two of the postholes of Room 5 and all of the packing is gone from the postholes of Room 7.

Floors

The preparation for most floors involved little more than leveling the ground surface. However, Rooms 1, 3, 5, 6, and 7 of the eastern half of the pueblo have floors that were laid on the bottom of pits excavated 6 to35 cm below the surface (Table 1). Rooms 1 and 30 appear to be the first rooms of the pueblo and have the deepest floors at 30-35 cm. As with walls, floors have characteristics that differ from the eastern and western halves of the pueblo.

A mixture of mostly caliche and some adobe was used to plaster most room floors. Where undisturbed or weathered, the floors are hard, level, and smooth and curve upwards to form corners at walls. The caliche is granular and surfaces uneven for the weathered floors of Rooms 10 and 14 and the area of eroded rooms. The thickness of the caliche floor plaster varies from 1 to 6 cm but generally ranges between 2 and 4 cm. Floors above the soft fill of earlier subfloor features may also be uneven, broken, or even partially missing.

Badly worn or replastered areas of floor were not observed. For an unknown reason, the southwestern and northwestern corners of Room 1 had an additional layer of caliche where the floor meets the wall and corner. The only other modification was the addition of a caliche floor over the center of Room 6 where the lower floor had subsided and showed some wear.

Rooms without good caliche floors are Rooms 8, 9, and 32. Erosion has taken whatever floor there was in Room 8. Room 9 is very small and has an unplastered, earthen floor. The floor of Room 32 is very weathered but appears to have been adobe with a small amount of caliche.

Hearths

Formal, plastered hearths are present in all of the uneroded rooms, excepting the small Rooms 9 and 32. Room 6, the largest and possible communal room, has three hearths on the north-south axis of the room. Other rooms with hearths have a sole hearth near the center of the south wall, a common orientation for linear pueblos of the region. The exception is Room 2 where the hearth is more towards the north wall of this narrow room. The plaster for hearths is caliche with lesser amounts of adobe. Ash is not present in any of the hearths, and the fill is the same as that on the floors of rooms. One hearth in Room 6 had been sealed with adobe, and another had been covered by additional flooring. The hearth in Room 30 had been remodeled from a circular to a sub-rectangular form and is the only case of a remodeled hearth. These formal, plastered hearths are rather insubstantial for cooking and may well have been used for heat and light.

With the exception of the remodeled hearth in Room 30, all hearths are circular with diameters of 20 to 28 cm and are shallow to deep basin-shaped and 6 to 11 cm deep. These hearths have two methods of construction. The first includes the southern tier of Rooms 1, 3, 5, and 7. A shallow basin shaped depression in the floor was filled with plaster, and the bowl of the hearth was sculpted into the plaster. This has the result of a plaster collar around the hearths with widths of 9 to 24 cm. Collars tended to be slightly higher than the surrounding floor. The second method is associated with the hearths of Rooms 2, 4, 6, and 12 and the first hearth of Room 30. Simple pits in the floor were lined with 2-4 cm of plaster, and the plaster was melded with floor plaster to give a rim at floor level or slightly higher. The hearth in the upper floor of Room 6 is somewhat different in that the bottom of the hearth is the lower floor.

The sub-rectangular, remodeled hearth of Room 30 also differs from the circular hearths in that it has a smaller bowl-shaped depression in the base of the hearth and a ridge or ledge of plaster along one side at the rim (Figure 33). Basal cup-like features of unknown function are not unknown and occur as well with circular hearths (Kenmotsu et al. 2008; Miller and Graves 2009; O'Laughlin 2001).

In addition to the formal hearths, an informal hearth was near the center of the west wall in Room 1. This was a 38-43 cm wide and 11cm deep depression with a fire-reddened bottom, a fill of sand and adobe pieces, and a cap of 7 cm of adobe and caliche.

Secondary Postholes

Sizeable numbers of secondary postholes are recorded for Rooms 1 and 6. In room 1 there are 18 secondary postholes arranged in three rows between the east wall and the east primary posthole, with diameters mostly between 10 and 18 cm and depths of 13 to 28 cm. The fill of these features is a gray soil with a fair number of artifacts, including a piece of turquoise, two drills, and a polishing pebble. One has also been capped with adobe. None of these features appear to have been in use at the time this room burned as no portions of burned posts were found. Room 16 has 23 secondary postholes arranged in roughly in two rows between the east primary postholes and the east wall, with diameters mostly between 10 and 22 cm and depths of 6 to 26 cm. Some appear to have been in use with the lower floor, some with upper floor, and some with both floors. The fill of these features is reddish brown sand that is different from the upper floor fill and did not have remnants of burned posts. As with Room 1, these features do not appear to have been in use at the time Room 6 burned.

The secondary posts of Rooms 1 and 6 are not thought to have been used to support sagging roofs or roof beams. Their numbers and regular patterning would suggest something more like platforms, racks, or perhaps partitions. Similar arrangements of secondary postholes for large communal rooms and large domestic rooms are known for the Bradfield Site (Lehmer 1948), Hot Wells (Lowry 2005), Madera Quemada (Miller and Graves 2009), and the Pipeline Site (Figure 5).

Small pits and Depressions

Small pits are present in a number of rooms and vary in size and shape and may be unlined or lined. More often than not, the fill of these features is like that of nearby floors.

The most common pits are unlined pits with diameters of 7-10 cm and depths of 6-14 cm. Two have tapering sides and are in Room 3. Room 1 has six of these small features. One is isolated with straight sides, and five are in the southwest corner, are in two evenly spaced rows, and have poorly defined profiles or may be undercut. This group of features resembles secondary postholes but is smaller in size. Still, they may have served a similar function.

Unlined basin-shaped pits make up a second group of pits that may have served for temporary storage. They have diameters of 13 to 34 cm and depths of 3 to 20 cm. One of these features occurs in each of Rooms 2, 4, 6, 12, and 14. There is also an example for the area of eroded rooms which was filled with adobe. A similar but irregular pit is cut into the north wall of Room 2 but is likely the result of pothunting activity.

The remaining features are all in the large, communal Room 6. Jornada pueblo communal rooms are noted for having multiple primary supports for roofs, multiple hearths, occasional alignments of multiple secondary postholes, and an assortment of pits along the central and often north-south axis of the room. Room 6 follows this pattern. Primary and secondary postholes, hearths, and a small pit found in Room 6 have been described earlier. Here the interest is in other features in Room 6 that include pits on or near the north-south axis of the room and depressions.

The lower floor has a south hearth and a central hearth on the central axis of the room. On the axis and north of the central hearth are a 10 cm diameter and 20 cm deep unlined pit that is angled towards the central hearth and then two lined pits. Just to the west of the two lined pits are two more lined pits. The lined pits have a layer of caliche and adobe that is 1-2 cm thick, they are cylindrical or basin-shape, and they are 12-25 cm in diameter and 8-12 cm deep. The upper floor also has two hearths and to the north of the south hearth is a cylindrical, unlined pit that is 11 cm in diameter and 9 cm deep. In some communal rooms, caches of shell beads have been found in one or more pits along the central axis of a room (Brook 1971; Hammack 1964; Lehmer1948; Miller and Graves 2009). However, the pits of Room 6 only have sand.

An unusual pit for rooms is in the east-central area of the upper floor of Room 6. It is basin-shaped, fairly large, and lined with 1-3 cm of caliche and adobe plaster. The diameter is 81-83 cm and the depth is 15 cm, and it is filled and capped with adobe. The function of this feature is not known, but the open aspect of this feature suggests that it may not have been used for storage.

Finally, there are six floor depressions in Room 6. One shallow depression is near the center of the south wall where the doorway was probably located and likely resulted from traffic in and out of the room. Four depressions are oval to somewhat irregular, 3-6 cm deep and 16-28 cm in width, in a row in the upper floor, and close to the north wall and north hearth. Perhaps these depressions were used as pot rests for large jars. Another 4 cm deep and 32-40 cm wide depression is near the center of the west wall where a doorway could not have been located. However, it also appears to be too large for use as a pot rest.

Room Descriptions

The architectural details and other aspects of each room of the pueblo and the area of eroded pueblo rooms are presented here. The rooms are described in their number order (see Figure 10). Numbering follows the order of excavation, excepting Room 30 which was later distinguished from Room 3 as a separate room rather than as a lower floor. Room descriptions are then followed with considerations of construction sequence, remodeling, floor assemblages, room function, and abandonment.

Room 1

Room 1 is in the middle of the pueblo (Figure 10). Rooms 3 and 30 are to the east, Room 2 is to the north, and Room 5 is to the west. It is rectangular with square corners, measures inside 3.81 m north-south and 5.10 m east-west, and is a moderately large room of 19.4 sq m (Figures 11 and 12).

The construction of Room 1 followed the demolition of Room 30, as the east wall and foundation of Room 1 occupied the area where the west wall of Room 30 had been. Also, Room 30 is narrower than Room 1 indicating that the rooms were not contemporaneous constructions. Room 3 replaced Room 30 and abutted Room 1. However, Room 3 was either added shortly after the construction of Room 1 or was constructed at the same time as Room 1.

Fill: The upper 5-10 cm of soil was a mixture of gray sands with some charcoal and yellowish brown adobe. Grading of the area had disturbed soils above rooms and moved deposits about. Below the disturbed soils, room fill was mostly reddish brown aeolian sand with occasional fragments of wall fall.

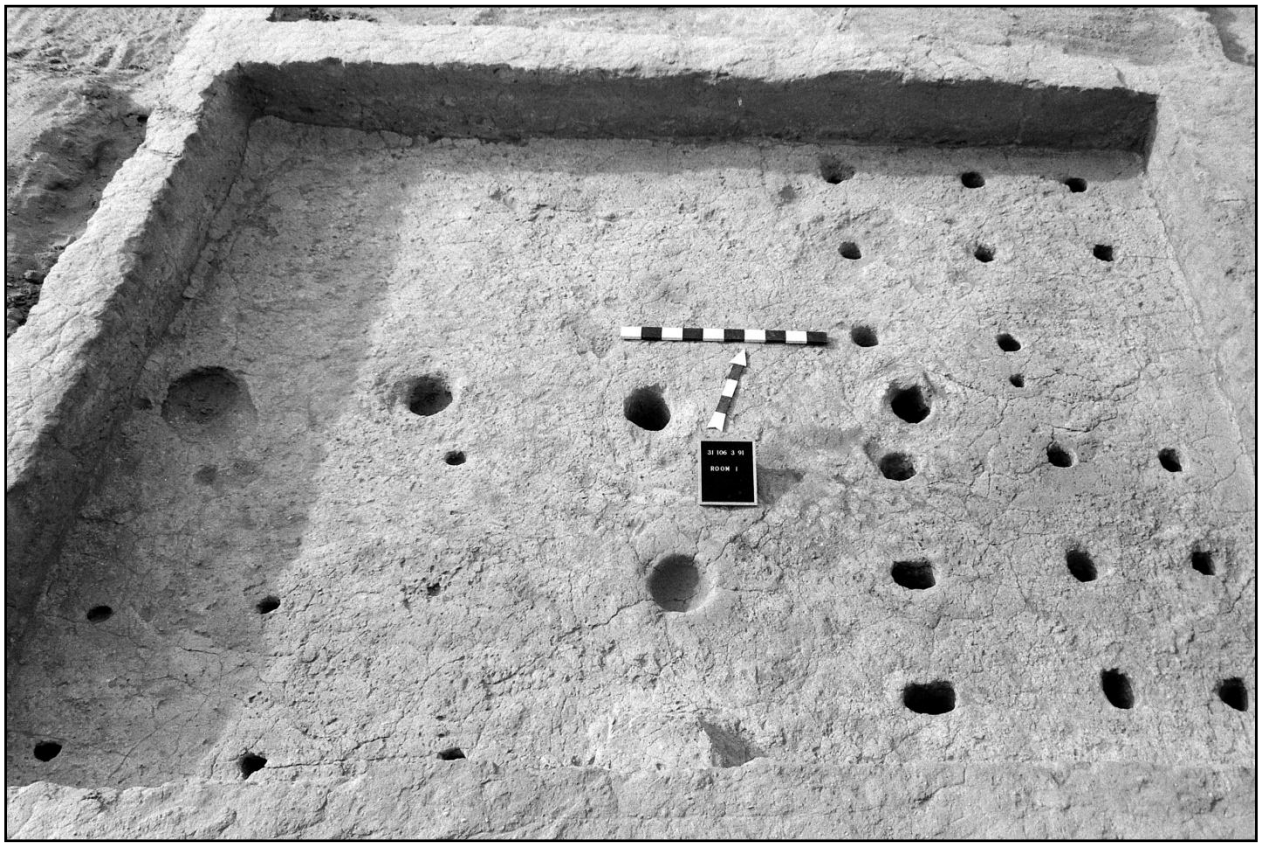


Figure 11. Room 1, looking north at excavated floor features.

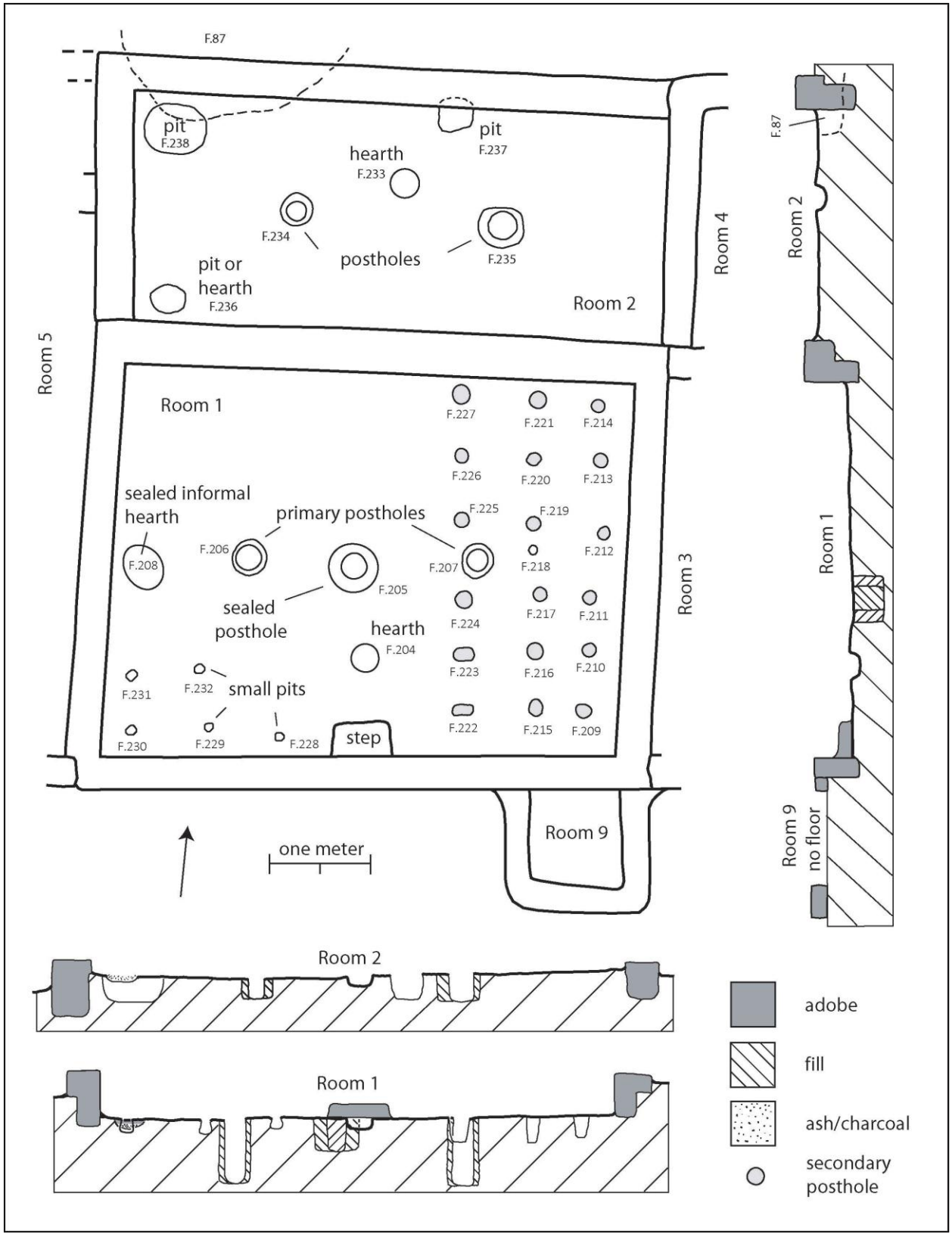


Figure 12. Rooms 1, 2 and 9, plans and cross-sections.

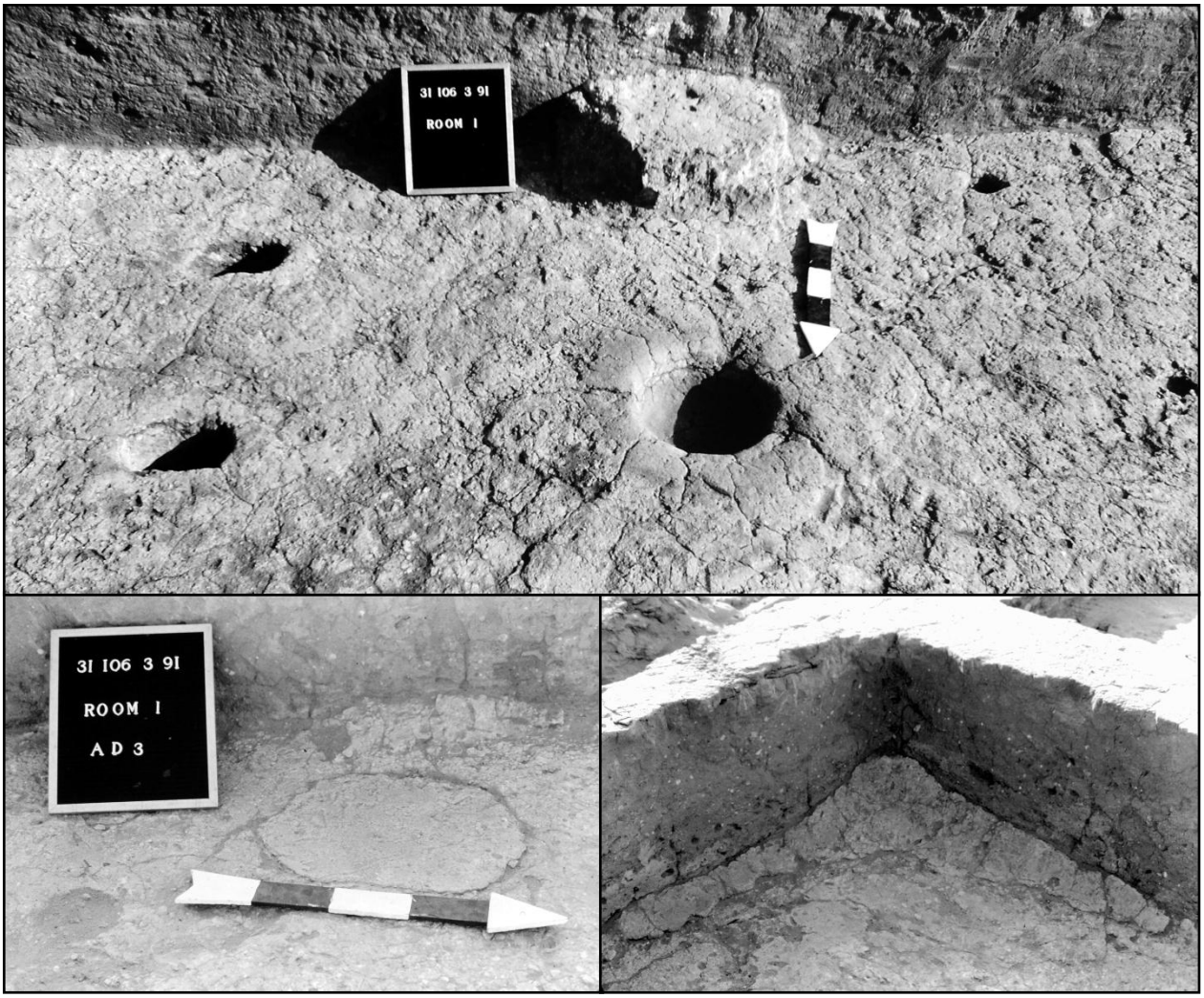


Figure 13. Room 1 floor features: *upper*, entry step, hearth, secondary postholes, and small pits; *lower left*, sealed informal hearth; *lower right*, caliche plaster in northwest corner

This sandy layer was 40-45 cm thick. A thin layer of ash and small pieces of charcoal rested on the floor, suggesting that the room had burned.

Walls: This room had been excavated 30-35 cm into the substrate and to a natural layer of caliche. A 20-22 cm wide wall of yellowish brown adobe with small gravel and caliche pebbles was then laid inside the excavation, with a foundation trench of 4-15 cm below the floor. Maximum surviving wall height was 49 cm, and walls appeared to have been laid in courses of 25-30 cm. The east wall and south walls were 35-36 cm wide, the north wall was 38-42 cm wide, and the west wall was 33-36 cm wide. The walls were smooth but not plastered. The lower 10-15 cm of the walls was blackened, perhaps with burning of the room.

Entry Step: Against the middle of the south wall, there is a step of adobe with a high caliche content (Figure 13). It is 60 cm in length along the wall, 36-37 cm wide, 14-15 cm high at the wall, and 12 cm in height on the north edge. Variation in the adobe suggests several repairs. Although evidence for a doorway could not be found, the presence of a step indicates its position in the south wall.

Roof: Burned roofing material was found in the fill just above the floor and in the south central portion of the room. This consisted of burned and matted dropseed grass stems, charred pieces of cottonwood and agave lechuguilla flowering stalks, and a few pieces of mesquite charcoal. All burned wood remains were small and provided no information on size or orientation of elements. There were no casts in adobe of roofing materials, and no definite evidence of the use of adobe to cover the roof.

Floor: The floor was a 2-4 cm layer of caliche and adobe, hard and well smoothed. The floor was plastered over the natural caliche layer and curved up to meet the walls. Additional caliche was also laid on the floor in the southwest and northwest corners and lapped up walls 13-16 cm (Figure 13).

Floor Features: Features are numerous for the floor of Room 1 and include postholes for primary supports, secondary support postholes, hearth, sealed informal hearth, and small pits. The basic attributes of these features are given in Table 2.

Hearth: A circular hearth (F.204) with vertical walls and a rounded bottom was located near the step and the middle of the south wall (Figure 13). It was lined with 2-4 cm of caliche and adobe that also formed a 9-16 cm wide rim that was only slightly higher than the floor. Although the sides and bottom were blackened, there was no ash or charcoal in this feature, only fill like the rest of the room.

Informal Hearth: An informal hearth (F.208) was situated near the center of the west wall (Figure 13). This basin-shaped feature was excavated into the caliche substrate, was unlined, and was capped or sealed with 7 cm of adobe and caliche. The bottom of this feature was fire-reddened, but the fill was brown sand with burned and unburned lumps of adobe.

Primary Postholes: In the center of Room 1 is an adobe and caliche-capped feature (F.205) that once may have held a 22-24 cm diameter post for support of the roof. It does not line up with the other two main roof supports, and the single post support was apparently replaced by a two post structure. The cap is 4 cm thick, and the fill of the socket was reddish brown sand with lumps of adobe. The packing for the post is brown adobe with caliche pebbles.

The roof was supported at the time it was burned by two large, 20-24 cm diameter posts along the central, east-west axis of the room. The holes (F.206 and F.207) for these posts were excavated 65-66 cm into caliche. Adobe had been packed around the posts, and burned cottonwood post remnants were located just below the floor level.

Secondary Postholes: Eighteen, regularly spaced, secondary postholes occupied the eastern third of Room 1. They ranged in diameter from 10 cm to 20 cm, and depths were between 18 cm and 29 cm. They were filled with trashy gray soil, and one (F.212) was capped with 3 cm of adobe. Four or fewer sherds were recovered from 12 of the features (F.209-213, F.213, F.217, F.221-222, and F.224-226). Two flakes were retrieved from F.222, and three flakes were noted for F.226. Additionally, a worked piece of turquoise, a chipped stone drill, and a possible polishing pebble were found in F.221, and another drill and a utilized core were located in F.222.

It would appear that these features were not use to hold posts to support roof beams, as they were filled with soil and trash before the room was burned. It is also possible that they were not all in use at the same time. However, the even spacing of these holes suggests that they were used in combination to support construction elements of a raised platform, storage racks, or perhaps benches or partitions.

Small pits: Near the center of the secondary postholes and the east primary posthole, there is a small pit (F.218) of non-specific function with a fill of gray soil. It is half the size of the secondary postholes

Table 2. Attributes of Room 1 floor features.

Feature Number	Feature Type	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile
204	hearth	27	26	11	circular	deep hemispherical
205	sealed primary posthole	24	22	32	circular	cylindrical, within 50 x 48 cm pit
206	primary posthole	24	23	65	circular	cylindrical, within 35 x 31 cm pit
207	primary posthole	21	20	66	circular	cylindrical, within 36 x 34 cm pit
208	sealed informal hearth	43	38	11	oval	basin-shaped
209	secondary posthole	16	13	20	circular	tapering, shallow rounded bottom
210	secondary posthole	13	12	18	circular	tapering, shallow rounded bottom
211	secondary posthole	12	12	23	circular	tapering, shallow rounded bottom
212	sealed secondary posthole	12	11	28	circular	tapering, shallow rounded bottom
213	secondary posthole	13	12	29	circular	tapering, shallow rounded bottom
214	secondary posthole	13	10	24	circular	tapering, shallow rounded bottom
215	secondary posthole	16	14	26	circular	tapering, shallow rounded bottom
216	secondary posthole	15	15	25	circular	tapering, shallow rounded bottom
217	secondary posthole	12	12	25	circular	tapering, shallow rounded bottom
218	secondary posthole	8	7	13	circular	straight sides, rounded bottom
219	secondary posthole	12	12	23	circular	tapering, shallow rounded bottom
220	secondary posthole	12	10	23	circular	tapering, shallow rounded bottom
221	secondary posthole	14	14	25	circular	tapering, shallow rounded bottom
222	secondary posthole	21	11	26	subrectangular	tapering, shallow rounded bottom
223	secondary posthole	20	13	24	oval	tapering, shallow rounded bottom
224	secondary posthole	18	15	24	circular	tapering, shallow rounded bottom
225	secondary posthole	15	14	25	circular	tapering, shallow rounded bottom
226	secondary posthole	12	12	22	circular	tapering, shallow rounded bottom
227	secondary posthole	16	18	26	circular	tapering, shallow rounded bottom
228	non-specific pit	9	8	11	circular	undercut to 11 x 9 cm, sloping sides, rounded bottom
229	non-specific pit	9	7	14	circular	undercut to 12 x 12 cm, sloping sides, rounded bottom
230	non-specific pit	10	8	13	circular	undercut to 13 x 11 cm, sloping sides, rounded bottom
231	non-specific pit	10	9	9	circular	undercut to 13 x 11 cm, sloping sides, rounded bottom
232	non-specific pit	9	7	13	circular	tapering, shallow rounded bottom

and likely had a different use. Similar small pits (F.228-232) are in the southwest corner of Room 1. They also have a fill of gray soil, and two have artifacts: four sherds in F.228 and a core in F.230. They appear to have been undercut, but show no definite evidence for use as loom anchor holes. There is some sand beneath the caliche and adobe floor in this corner, and walls of these pits were not easily defined.

Floor Material: Sherds, some of them burned, were somewhat numerous on the floor in the northeast quarter of the room, and there were also a few pieces of chipped stone. Other items of interest included an

unfinished turquoise pendent, a worked piece of chrysocolla, and an O*livella* shell bead in the northeast part of the room and a possible polishing pebble in the southeast corner.

Comments: Room 1 is a large domestic room and one of the first rooms constructed of the pueblo. Placement of the hearth and a step indicates an entry in the south wall, and the room has two major post supports for the roof. A sealed feature suggests that a single major post support may have first been used. There are numerous secondary postholes and small pits in the floor, and the arrangement of the secondary postholes hints that they may have anchored substantial furnishings. Room 6 has a similar arrangement of floor features. As with other surrounding rooms, Room 1 was burned with abandonment.

Room 2

Room 2 was added the north side of Room 1 and the west side of Room 4 and had been placed over an earlier feature (F.87) (Figures 12 and 14). Later, Room 5 was appended to the west. It was a small rectangular room, measured inside 5.29 m east-west and 2.26 m north-south, and had a floor area of 11.8 sq m. The area had been graded, and there was little soil over the room. Recent disturbance was also noted along the south wall, the eastern third of the room, and the northwest corner.

Fill: Soil depth within the room was 5-17 cm. At the top, the soil varied from reddish brown sand to light gray sandy loam with some charcoal, depending on extent of disturbance. Towards the floor, the soil became progressively darker, and a layer of dark gray, carbonaceous soil rested on the floor. The room had burned, and charcoal was fairly abundant.

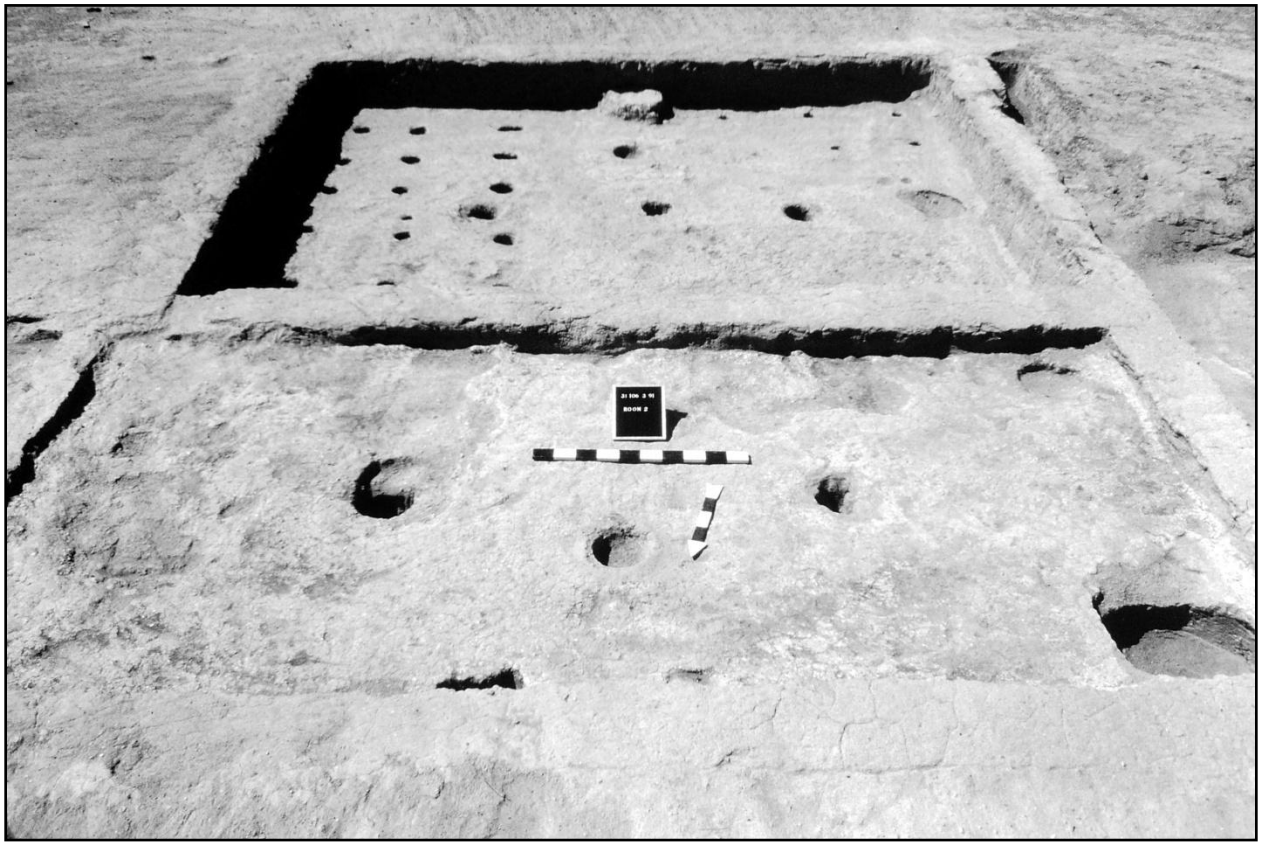


Figure 14. Room 2, looking south at excavated floor features. Room 1 is at top.

Walls: The walls of Room 2 are of a yellowish brown adobe, and wall height ranges from 3 cm to 17 cm. The adobe is smooth, but walls are not plastered. The common wall with Room 1 is described above, and the common wall with Room 4 is described under that room. The west wall is 36-37 cm wide and has a foundation trench that is 36 cm deep. The north wall is 36-38 cm wide and has a foundation trench that is 38 cm deep.

Roof: Burned beams from the roof were quite fragmented and with variable orientations, especially in disturbed areas. Smaller beams of 3-5 cm in diameter were generally oriented east-west or up to 45 degrees off east-west. Thus, smaller or secondary beams may have run east-west, such as in Room 4. Three larger beam fragments with diameters of 6-7 cm and lengths of 20-25 cm also had different orientations. Two were near the middle of the north wall and were oriented east-west, and the third was in the southwest corner and was oriented north-south. Cottonwood was used for beams, and agave lechuguilla flowering stalks made up the smaller elements. Matted on the central floor area were compressed stems of dropseed grass, some over beam fragments. No evidence was found of adobe covering the roof materials.

Floor: The floor was a hard, 1-4 cm thick layer of caliche and adobe. It was level and smooth and curved up to meet the walls. It had been disturbed in a number of areas, and shovel marks were visible in the floor in the northwest corner of the room. The floor was laid on the existing ground surface, as noted by an underlying, 0.5- 2 cm layer of gray sandy loam with very small bits of charcoal.

Floor Features: Room 2 floor features are a hearth, two primary postholes, and two non-specific small pits. A pit had also been excavated in the northwest corner by relic seekers.

Hearth: A formal hearth (F.233), lined with 2-3 cm of caliche and adobe, is just north of the center of the room. It has a deep, hemispherical shape and is 25 cm in diameter and 10 cm deep. The rim has been disturbed and is slightly higher than the surrounding floor. The fill of the hearth is the same as on the floor of the room.

Postholes: There are two primary postholes on the east-west axis of the room. The excavation for the east posthole (F.235) is 39-44 cm in diameter and terminates at the caliche layer at a depth of 28 cm. Adobe packing around a post then reduced the diameter to 24-25 cm. The west posthole (F.234) has a pit that is 31-33 cm in diameter and 20 cm deep, and the adobe packing suggests a post with a diameter of 16-19 cm. The upper fill of these features is a gray sandy loam with charcoal that grades into a brown sandy loam toward the bottom. A sherd and a cobble used as an abrader were found in the fill of the east posthole, and a flake was recovered from the west posthole. At the top of the west posthole remnants of a burned cottonwood post were encountered.

Small Pits: A roughly oval, shallow, unlined pit (F.236) is in the southwest corner. It measures 29 cm by 34 cm, with a depth of 3 cm on the north side and 7 cm on the south side. The pit bottom slopes to the south and has a steep south wall. The fill of this feature is the same as on the floor, a gray sandy loam with charcoal. An irregular, unlined pit (F.237) partially undercuts the north wall. It is 27 cm by 33 cm and 24 cm deep. The pit walls are steep and the bottom uneven. The feature has a gray sandy soil with charcoal and some caliche pebbles. Two sherds and a flake are recorded for this feature. Because of the disturbance of this room and the irregular form of this feature, it is quite possible that this feature is the result of pot hunting activity.

Floor Material: Aside from the ubiquitous sherds and chipped stone, there were few other items on the floor. These were a piece of red ochre, a questionable polishing pebble, and a metate fragment.

Comments: Although somewhat small in size, Room 2 has features common to domestic structures. However, its position to the rear of Room 1 would suggest that it may have had a more limited range of

activities. The hearth position could indicate that there may have been an entry in the north wall. But, there is little evidence of extramural activity north of the pueblo. Thus, the possibility exists that there may have been a doorway between Rooms 1 and 2. If so, Rooms 1 and 2 could be considered a suite of rooms for a domestic unit. A similar situation is seen for Rooms 3 and 4.

Room 3

Room 3 adjoins Room 1 and may have been constructed at the same time as or later than Room 1 (Figures 15 and 16). Room 4 was added to the north side of Room 3, and Room 6 was added to the east side of Room 3. Room 3 is a large rectangular room, measuring inside 4.78 m east-west and 3.76 m north-south. The floor area of the room is 17.6 sq m.

Room 3 lies over the demolished and leveled remains of Room 30. Room 3 walls follow the outline of Room 30, and the positions of floor features for these rooms overlap one another. It appears that the inhabitants of Room 30 demolished that structure and built Room 3 in its stead.

Fill: The fill of this room ranged from 7 cm to 16 cm in depth and was a gray sandy loam with some charcoal that transitioned to a dark gray soil with appreciable amounts of charcoal at the floor. Mechanical disturbance by earth moving equipment was noted on the surface, and subsurface disturbance

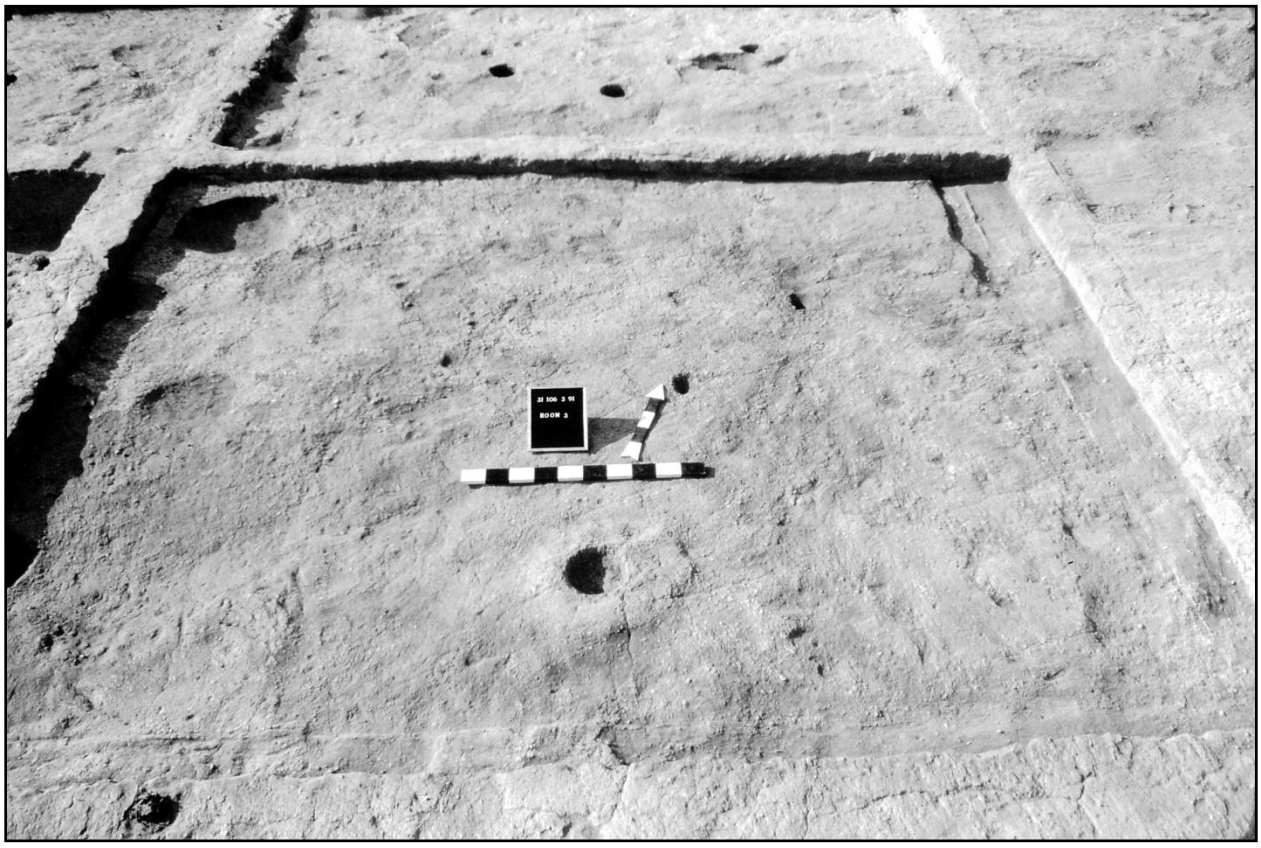


Figure 15. Room 3, looking north at excavated floor and hearth, prior to excavation of postholes. Note plastered pit walls of Room 30 that can be seen parallel to and inside the east and south walls of Room 3.

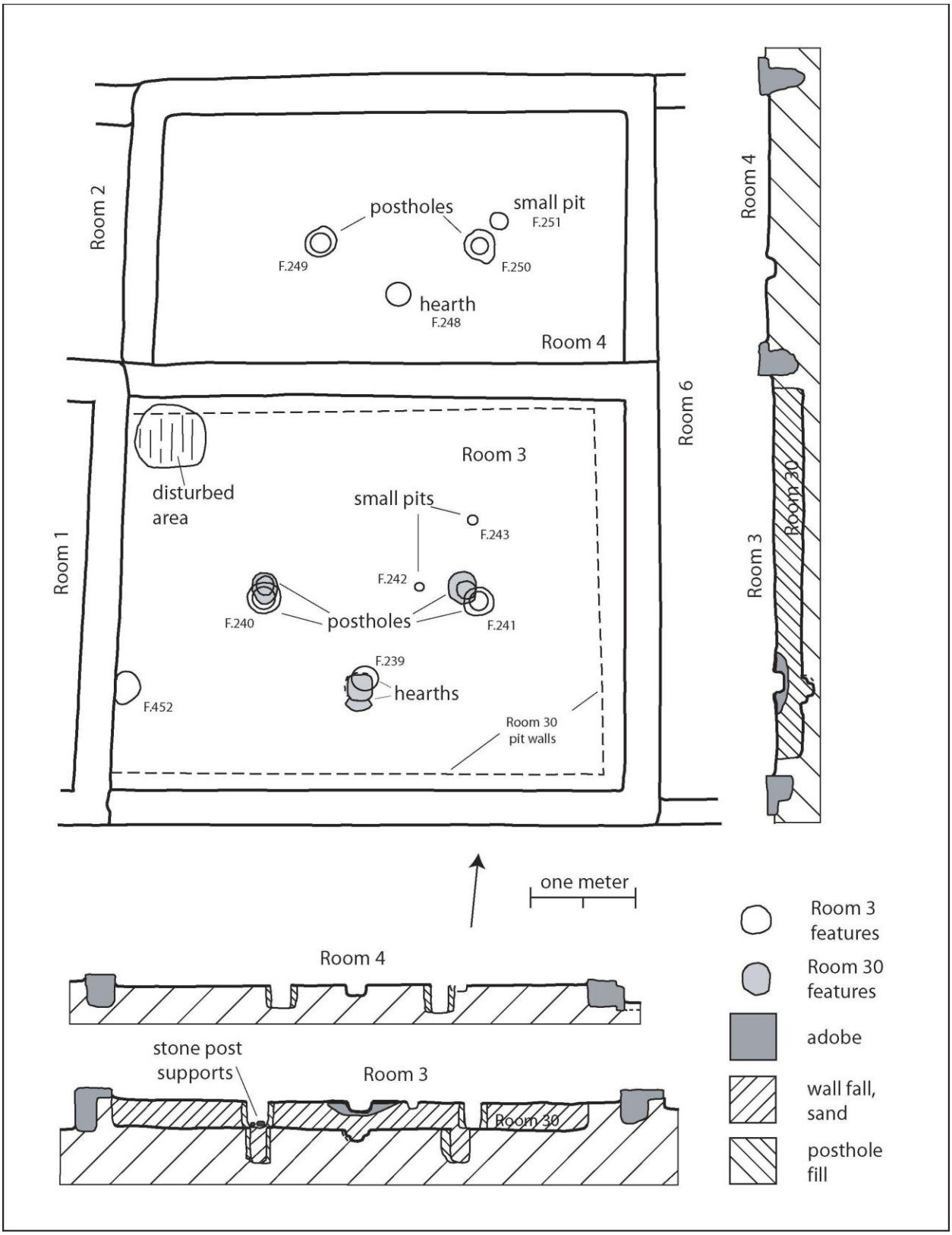


Figure 16. Rooms 3 and 4, plans and cross-sections.

was evident in the southern half of the room by layers or pockets of reddish brown sand. A sizeable hole had been dug into the northwest corner by relic seekers.

A curious pit (F.452) in the fill at the west wall and near its southern end contained numerous (1725) stacked sherds from much of a large El Paso Polychrome jar. Sherds of this vessel could not be matched with others from this room or elsewhere in the site. It remained a mystery as to where these sherds originated and why they had been reburied. The fill did not appear disturbed in the area of this feature, and it is possible that the feature is a post-abandonment deposit.

Walls: The north, east, and south walls of this room lie just outside the pit walls of Room 30 and are of a yellowish brown adobe with some gravel and caliche pebbles. Walls are eroded and reach a maximum height of 16 cm in the northeast corner. Wall widths are also uniform and measure 31-35 cm. These walls have foundation trenches that were excavated approximately some 23-26 cm below the ground surface. The insides of these walls are well-smoothed but not plastered. The western, common wall with Room 1 is also smooth and unplastered.

Entry: No entry to Room 3 or a connecting doorway to Room 4 could definitely be identified. However, the adobe in the middle of the north and south walls of Room 3 and adjacent floor areas of floor are more compact than elsewhere. It can be suggested that traffic in these areas compacted the soils. Thus, an entry may well have been in the south wall of Room 3 and opposite the hearth, and a doorway may have connected the two rooms and also opposite the hearth in Room 4.

Roof: Room 3 had burned and small fragments of beams were found throughout the room and with no particular alignment. Two larger, fragments of a beam were near the south wall and oriented just off east-west. A third beam fragment northeast of the east primary posthole was oriented northwest-southeast. Roof beams had diameters of 4-8 cm. Cottonwood appeared to be the wood used for beams, but small pieces of mesquite also found in the fill.

Mixed with the fragmented beams were smaller elements that were flowering stalks of agave lechuguilla, yucca, and sotol with diameters of 1.5-4 cm. As with the larger roof beams, these small stalks showed no particular orientation. A few pieces of stalk were observed resting on beam fragments. Grass stems were noted on the floor in various parts of the room and were another component of the roofing.

There was no layer of possible roof adobe above the burned roof debris. Burned pieces of adobe with plant impressions were also not seen.

Floor: Disturbance is noted for the southwestern and southeastern portions of the room. The floor is level and smooth where it has not been disturbed. It is a 2-4 cm thick layer of adobe with a moderate amount of caliche over fill of Room 30 and the ground surface. It was preserved well enough in the northwest corner to see that it curves up to meet the walls.

Floor Features: Features associated with the floor of Room 3 are a hearth, two primary postholes, and two small pits.

Hearth: A formal hearth (F.239) is located near the middle of the south wall and is bowl-shaped with a diameter of 23 cm and a depth of 9 cm. Like many other hearths, a basin-shaped depression was excavated through the floor plaster and then filled with a mixture of caliche and adobe to give a base for the hearth. The hearth was then cut from the base and lined with a finer mixture of caliche and adobe. The overall effect appears to be a 15-24 cm wide collar around the hearth (Figure 17). This collar is level with the floor at the edges and rises 1-2 cm to the rim of the hearth. This hearth may have been disturbed,

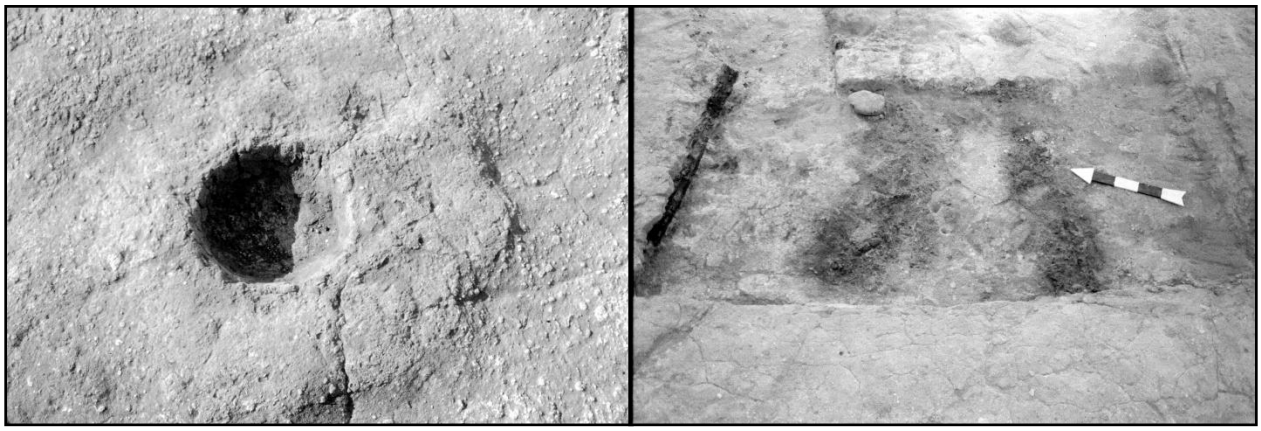


Figure 17. Rooms 3 and 4 features: *left*, Room 3 hearth with adobe collar; *right*, Room 4 burned roof beams at west end of room.

as part of the bottom of the hearth is missing. There was no ash in the hearth, only a gray sandy soil with some charcoal like the fill of the room.

Postholes: Two primary postholes were on the central, east-west axis of the room. Both had been excavated through the fill of Room 30 to the floor of that room. The west posthole (F.240) was 27-33 cm in diameter and 36 cm deep. A mano fragment, a hammerstone, and lumps of adobe were placed at the bottom of this posthole to provide support for the post, and adobe was packed around the post which had a diameter of about 19 cm. Burned fragments of the post were near the top of the posthole and identified as cottonwood. The east posthole (F.241) was 28-32 cm in diameter and had a depth of 35 cm. The adobe packing of this posthole indicated a post of about 15 cm in diameter. Both postholes had a fill like that of the room.

Small Pits: Two small, circular pits with tapering sides and rounded bottoms are located west (F.242) and north (F.243) of the east primary posthole. These non-specific pits are 6 cm deep and 9-10 cm in diameter and have a fill like that on the floor of the room.

Floor Material: There was little on the floor of this room. The few sherds and pieces of chipped stone were mostly on the floor in the northern half of the room. In the northwest corner, other items included a gypsum crystal, a hammerstone, and a core.

Comments: Room 3 is a large domestic room much like Room 1. They are of similar size and share a pattern of hearth and primary postholes. There is a southern entry for Room 1, and a southern entry is suspected for Room 3. Additionally, Rooms 1 and 3 have smaller rooms on their north sides, suggesting two room suites or households. Room 3 was built on the remains of Room 30 and at the same time or slightly later than Room 1.

Room 4

Room 4 abuts the north side of Room 3 (Figures 16 and 18). Room 2 was then added west of Room 4, and Room 6 was constructed on the east side of Rooms 3 and 4. Room 4 is small and rectangular and measures inside 4.52 m east-west and 2.39 m north-south. It has a floor area of 10.8 sq m.

Fill: No more than 10 cm of fill remained, and it was a gray sandy loam with a fair amount of charcoal, particularly on the floor. There had been some disturbance of the east half of the room, and reddish brown

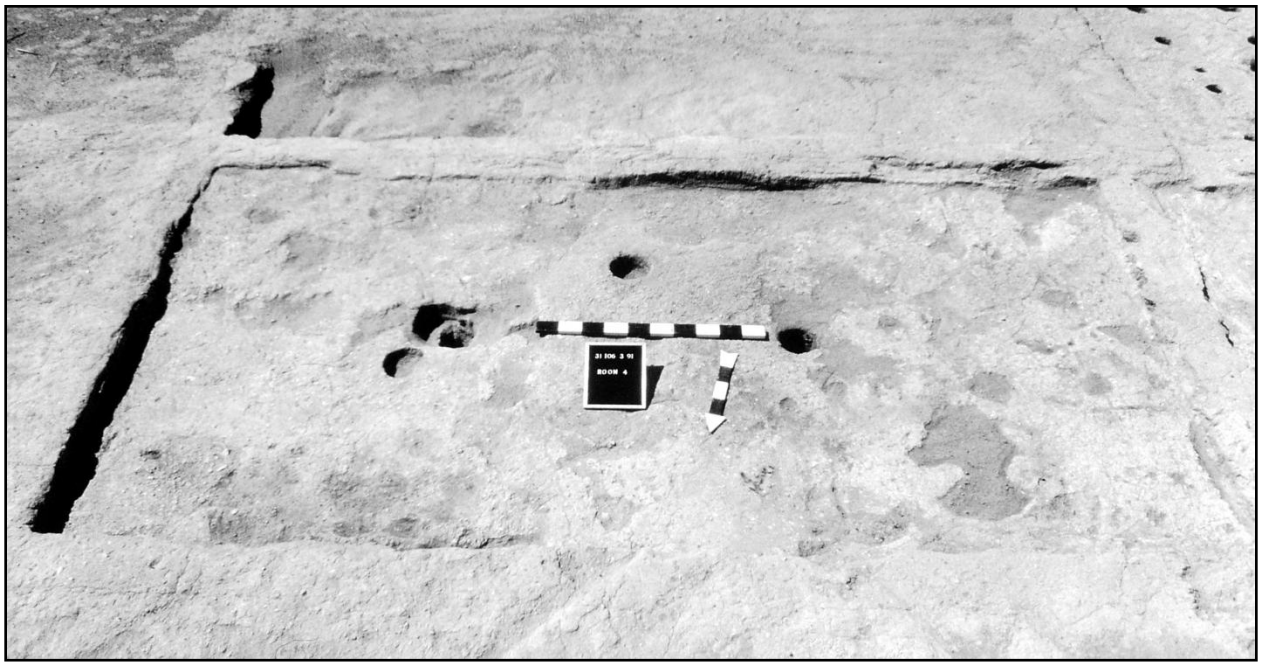


Figure 18. Room 4, looking south at excavated floor features.

sands were mixed with the darker fill. Some shovel marks were also visible in the floor in the eastern two-thirds of the room.

Walls: Walls were only 2-3 cm high in the southeast corner and up to 11 cm high in the middle of the north wall. The common wall with Room 3 was described above. The east, north, and west walls were bonded and of an unplastered yellow-brown adobe with some gravel and caliche pebbles. The east and west walls were 25-29 cm wide, and the north wall was 35-37 cm wide. Excavation below the floor and along the east wall revealed three short foundation trenches or piers that were 25-70 cm in length and separated by 35-60 cm of natural soil. Testing of the north and west walls indicated that foundation trenches were present but the number of piers was not ascertained. Depths of the foundation trenches were 25-28 cm.

Roof: The room had burned and considerable debris from the roof was on the floor. Roofing materials were undisturbed in the western quarter of the room where three cottonwood beams were reasonably intact on the floor (Figure 17). They were 8, 5, and 7 cm in diameter, and the longest measured beam was 1.75 m. These beams were oriented east-west and approximately 75 cm apart and with the northernmost beam near the north wall. Large pieces of charcoal suggested that a fourth beam may have been south of the other three beams and near the south wall. Other fragments of beams in other areas of the room showed no particular orientation.

Fragments of the flowering stalks of agave lechuguilla and yucca, pieces of reed, and grass stems occasionally rested on sections of burned beams and were found throughout the room. Unfortunately, there was no discernible orientation or obvious layering of these materials. Wall fall was noted in places above the roof material, and closing of the roof with adobe was indicated by two burned pieces of adobe with impressions of probable lechuguilla or yucca stalks.

Floor: The floor is a mixture of caliche and adobe, 2-4 cm thick, and curves upward at edges to meet walls. As with Room 2, the floor is over a 1-2 cm thick layer of gray sandy loam from earlier activity in the area.

Floor Features: A hearth, two postholes, a small pit were recorded for Room 4.

Hearth: A circular hearth (F.248) with strongly sloping sides and rounded bottom is located near the middle of the south wall where a doorway might have been. It is 20 cm in diameter and 10 cm deep and lined with 2-3 cm of caliche and adobe. The rim is rounded and even with the floor. It was found to contain gray soil like that on the floor.

Postholes: Two primary postholes were on the east-west axis of the room. These would have divided the room into thirds if beams ran north-south across posts in these features. Other roof timbers could then have been limited to 2 m or less in length if oriented east-west like the three beams found on the floor.

The west posthole (F.249) appears to have held an 18-19 cm diameter post, and fragments of the burned post were found near the top of the posthole. The posthole is oval, 29 by 34 cm, and has a depth of 22 cm. It also has straight sides and a flat bottom. Adobe was used as packing around the post. The fill of the posthole is a gray sandy loam.

The east posthole (F.250) is roughly round and 28-33 cm wide. It has slightly tapering sides and a flat bottom at a depth of 27 cm. Adobe fill around the post provides a cast of the post with an approximate diameter of 15-16 cm. Posthole fill is a gray sandy loam with some charcoal and a few lumps of adobe.

Small Pit: Located near the east posthole is a small non-specific pit (F.251). It is unlined and has a diameter of 17 cm and a depth of 6 cm. The sides are minimal but straight, and the bottom is a shallow basin. The fill of this feature is the same as that on the floor.

Floor Material: Besides a small number of sherds and a few pieces of chipped stone, the only object on the floor was a core that had also been used as a hammerstone. However, a number of items were in the roof fall and implied rooftop activity. These items were two hammerstones, a core, a passive abrader/rubbing stone, and two sherds with red ochre on one side.

Comments: Room 4 compares to Room 2 in size, features and proximity to a larger domestic room. Given the location and size of these two rooms, it is thought that they would have had more limited function than their larger domestic room counterparts. Together, the pairs of large and small rooms may have constituted suites of rooms for larger or extended households. It is also noted that Room 5 has a small room on its north side and that Room 10 is backed by a smaller room.

Room 5

Room 5 is an addition to the west side of Rooms 1 and 2 (Figures 19 and 20). West of Room 5 there is an unknown number of badly weathered rooms. It is the second largest room of the pueblo, measures inside 5.51 m north-south and 4.39 m east-west, and has a floor area of 24.2 sq m. Rooms 5 and 6 are the largest rooms in the pueblo and exhibit a four post pattern for roof support.

Fill: The upper 5-10 cm of fill in this room is a compact mixture of adobe, gray soil, and charcoal that appears to have been deposited from other rooms by earth moving equipment. Beneath this layer is reddish brown sand that gives way to pieces of wall fall and adobe near the walls. Finally, a 2-5 cm layer of gray, sandy loam soil with charcoal covers much of the floor. The fill in the southern third of the room and along the east wall has been disturbed, and the floor and features of these areas have also been impacted.

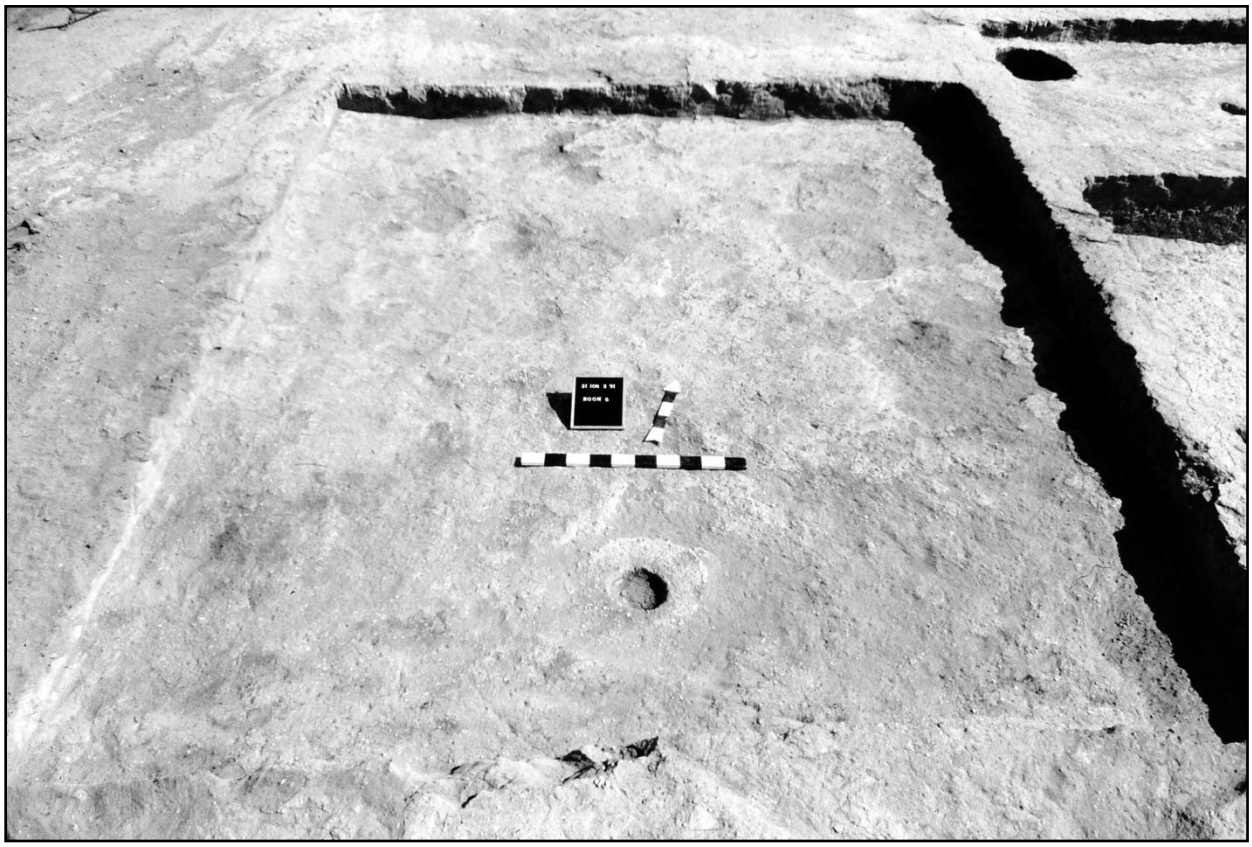


Figure 19. Room 5, looking north at excavated floor and hearth, prior to excavation of postholes.

Walls: The north, west, and south walls enclosing Room 5 are of an unplastered, yellowish brown adobe with some gravel and caliche pebbles. The west and south walls have widths of 26-29 cm and were laid in foundation trenches that are 16-20 cm deep. The north wall is 36-38 cm wide and has a 22 cm wide foundation that is up to 32 cm deep. The foundation trenches are at the perimeter of an excavation 13-16 cm below the surface for the floor of the room. Surviving wall height varies from 11 cm in the southwest corner to 30 cm in the northeast corner. The common walls with Rooms 1 and 2 have been detailed under those room descriptions.

Roof: The room had burned, and charred remains of cottonwood beams and stalks of agave lechuguilla were on the floor and in the fill. However, the charcoal was small and no particular orientation was observed for the roof elements. A few grass stems and one reed stem were also noted during excavation.

Floor: The undisturbed floor was smooth and hard and was a 2-4 cm layer of caliche and adobe. This plastered floor curved up at the edges to meet the wall.

Floor Features: Features identified for Room 5 were a hearth and four primary postholes. However, some areas were too eroded or disturbed to be certain that all features had been located.

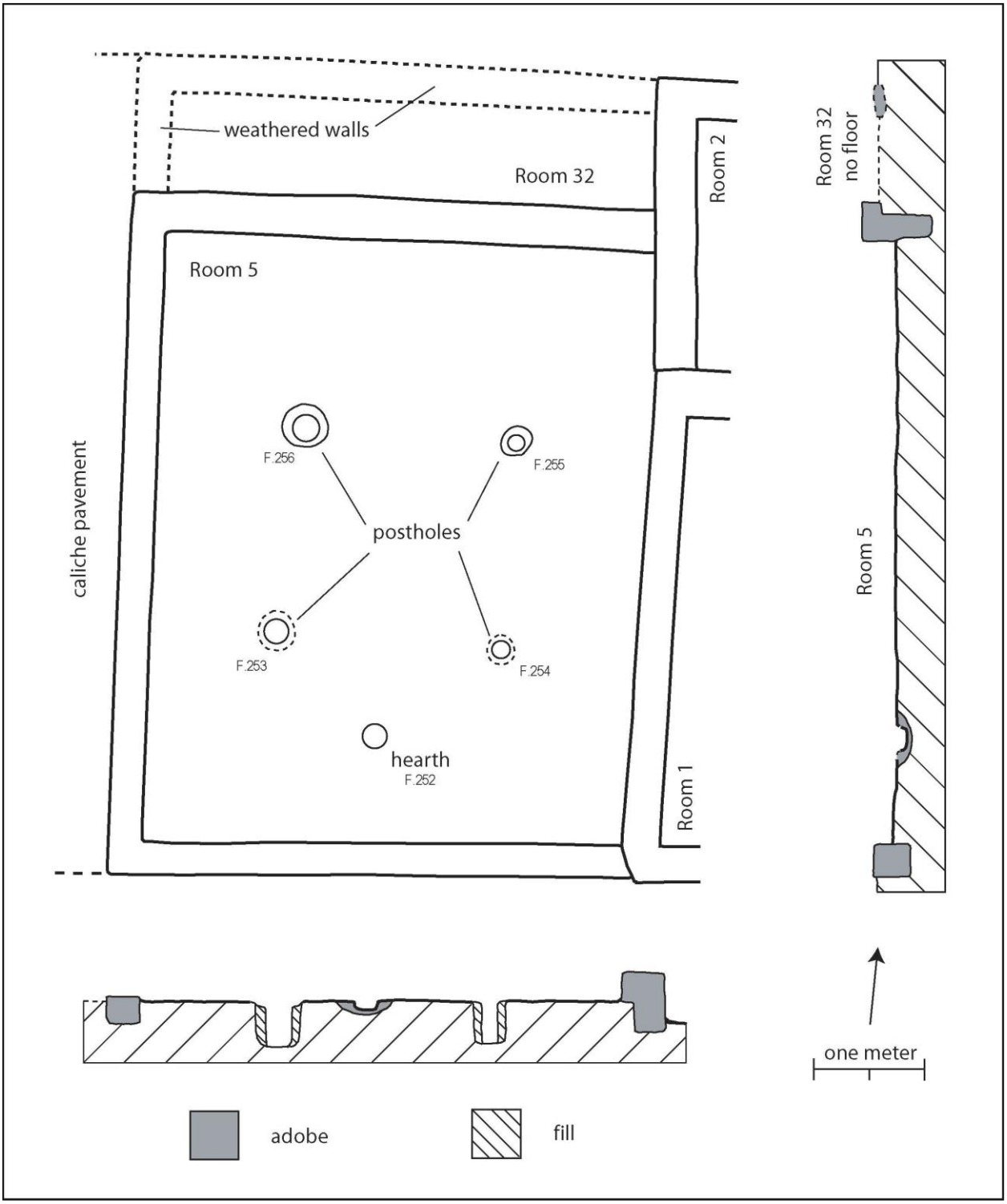


Figure 20. Rooms 5 and 32, plans and cross-sections.

Hearth: The hearth (F.252) is near the center of the south wall and disturbance has removed the rim of the hearth and upper part of the caliche and adobe base. A 50-56 cm diameter basin was excavated into the floor and filled with a mixture of caliche and adobe. The round bottom, straight sided hearth was

then sculpted in the caliche and adobe base and smoothed. The diameter of the hearth is 22-23 cm, and the extant depth is 6 cm, with an original depth of about 9-10 cm. The hearth fill is a mixture of disturbed soils, reddish brown and gray sands.

Postholes: Four primary postholes are in the center of the room. They are about 2 m apart, forming a rough square. The north postholes are best preserved, while the sides of the south postholes were poorly defined due to disturbance. The fill in the north postholes was a light gray sandy loam with some charcoal. The bottoms of the south postholes have a similar fill, but upper parts of these features have a mixture of reddish brown and gray sands and lumps of adobe. The adobe packing around the posts is in place in the north postholes but is present only in the lower part of the south postholes.

The southwest posthole (F.253) has a diameter of around 34-37 cm and a depth of 37 cm. The diameter of the hole for the post is 20-21 cm.

The southeast posthole (F.254) may have been 25-32 cm in diameter and has a depth of 36 cm. Post size for this feature appears to be 15-16 cm in diameter.

The northeast posthole (F.255) measures 23 by 30 cm and has adobe fill of 5-9 cm for a post of 12-13 cm. The depth of the posthole is 38 cm.

The northwest posthole (F.256) measures 37-41 cm in diameter and has a depth of 41 cm. The post impression formed by 8-11 cm of adobe packing is 19-21 cm in diameter. A turquoise stone pendant was recovered from the fill of this feature.

Floor Material: Objects of interest on the floor were an unfinished stone pendant and a scoria abrader. In the upper, disturbed fill of the room and against the west wall was a complete two-hand mano. This mano could have come from the floor of this room or had been moved from some other nearby room.

Comments: Room 5 is the largest of the domestic rooms and exceptional only in having a four posthole configuration rather than two. Perhaps, if the floor had been in better condition, other features might have been found. Joined to the north of Room 5 and west of Room 2 is Room 32. This small room may have provided additional space for the occupants of Room 5.

Room 6

Room 6 is the largest of the pueblo rooms and twice as large as the next largest room, Room 5. It has a floor area of 48.1 sq m and measures inside 7.75 m east-west and 6.20 m north-south. Room 6 was added to east sides of Rooms 3 and 4, and Room 7 is a later room to the east of Room 6 (Figures 21 and 24). With the large size of this room, it should not be surprising that there are a number of features and some that might reference the special nature of this room. Additionally, two floors are recognized for Room 6 (Figures 21, 22, 24 and 25). The lower floor covers six earlier, extramural features.

Fill: Depth of the fill was 20-23 cm, which is also the height of surviving walls. A compact yellowish brown adobe and brown sand was prevalent along walls and had the appearance of wall melt rather than fallen wall. In the center of the room, the fill was mostly reddish brown sand with some specks of charcoal and areas of gray sand and charcoal. Disturbance was noted by loose reddish brown sands and was concentrated in the southwest and southeast portions of the room. There was also some disturbance of the central and southwestern areas of the upper floor. The upper floor had a covering of 1-3 mm of carbonaceous soil, and above this layer was 1-4 cm of gray sandy loam with scattered charcoal. There was a layer of reddish brown sand between the floors, and the lower floor rested on a compact brown sandy loam with caliche pebbles.

Figure 21. Room 6, looking north at excavated features for the lower floor. Note earlier subfloor, extramural pits along north wall and exposed segmented foundation for north wall.

Walls: The north, east, and south walls are bonded and of a yellowish brown adobe with small gravel and caliche pebbles. The south wall ranges in thickness between 20 cm and 22 cm, the east wall has a thickness of 28 cm to 32 cm, and the north wall is 35-37 cm wide. All three walls have been constructed within an excavation for the lower floor. This base for the lower floor and walls is 13-15 cm below the old ground surface. Additionally, all three walls have a segmented or pier foundation of adobe. That is, the foundation trench is not continuous but broken into segments where the footings are 30-90 cm long and separated by 25-50 cm of undisturbed soil (Figure 23). The foundation trenches were excavated 13-24 cm below the lower floor and into caliche. Thus, these trenches are also some 26-39 cm below the old ground surface. The north wall has nine piers or segments of trenches, and the east south walls each have eight piers. Interior surfaces of the walls are smooth, and a 1-3 mm caliche plaster was noted in several areas and up to 15 cm above the lower floor. The common walls with Rooms 3 and 4 have previously been described.

The most southern hearth for Room 6 is near the middle of the south wall where a doorway might have been located. No evidence could be found of a doorway in the remaining adobe wall. However, a floor depression (F.263) near the wall and between the wall and the hearth may indicate traffic through an entry in that wall.

Roof: Room 6 had burned, and gray soil and charcoal were found over most of the upper floor. A large fragment of a cottonwood beam was recorded 55-60 cm from the west wall and 1 m to 1.3 m from the northwest corner. It was 7 cm in diameter, 31 cm long, and oriented north-south. Also, all of the charcoal identified for the upper floor is cottonwood with diameters of 4-8 cm. Burned grass stems were near the large beam fragment and noted in a few other areas of the room.

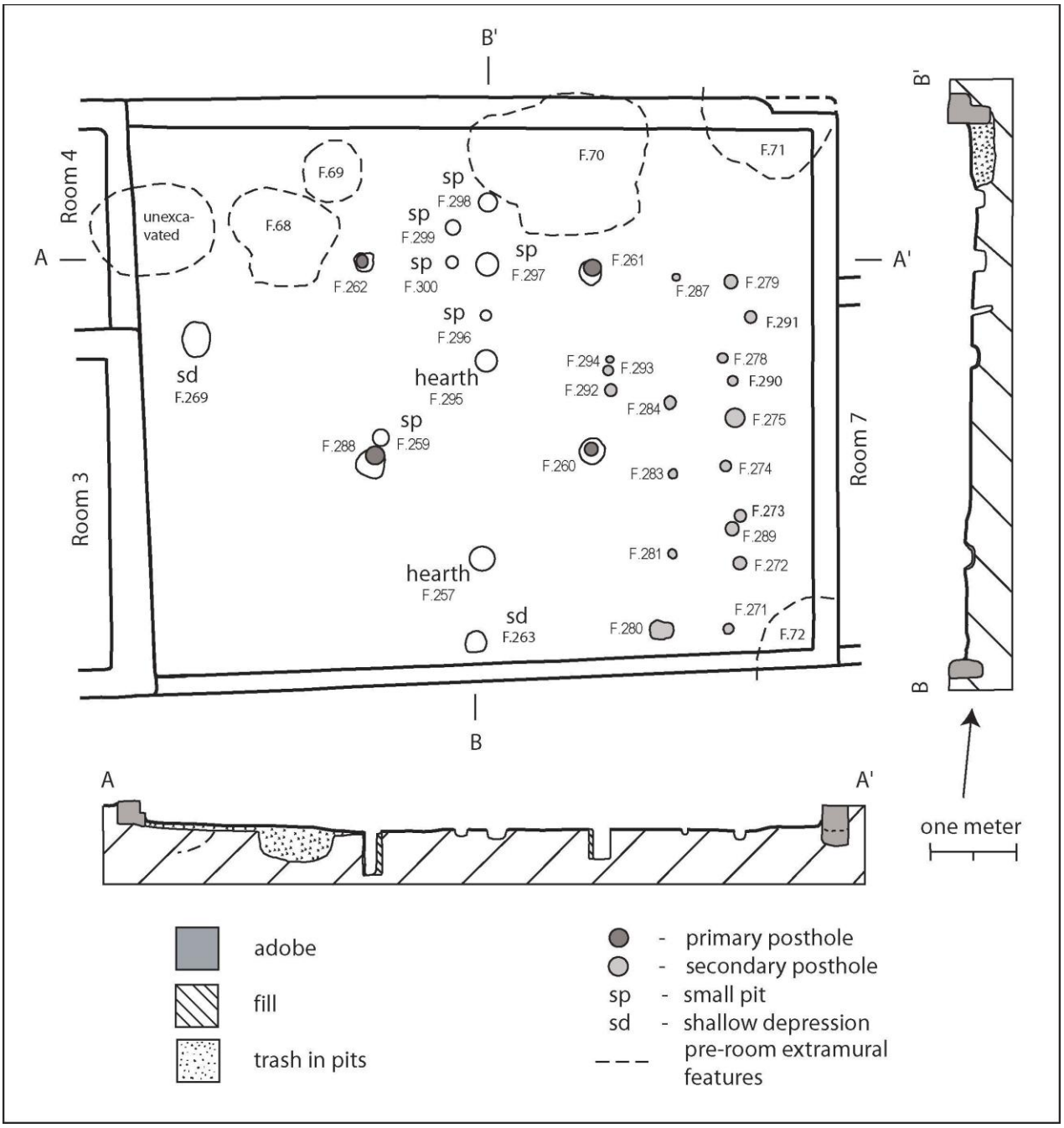


Figure 22. Rooms 6 lower floor, plan and cross-sections.

Lower Floor: The lower or first floor of Room 6 is a 2-4 cm hard packed and smoothed layer of caliche and adobe. The plaster curves upward to meet the walls, and floor slopes slightly to the center of the room. As previously noted, the base for the floor is an excavation some 13-15 cm below the old ground surface. The upper parts of a number of earlier extramural features had been removed with the excavation. The floor over the loose fill of these features is thin and not in good condition.

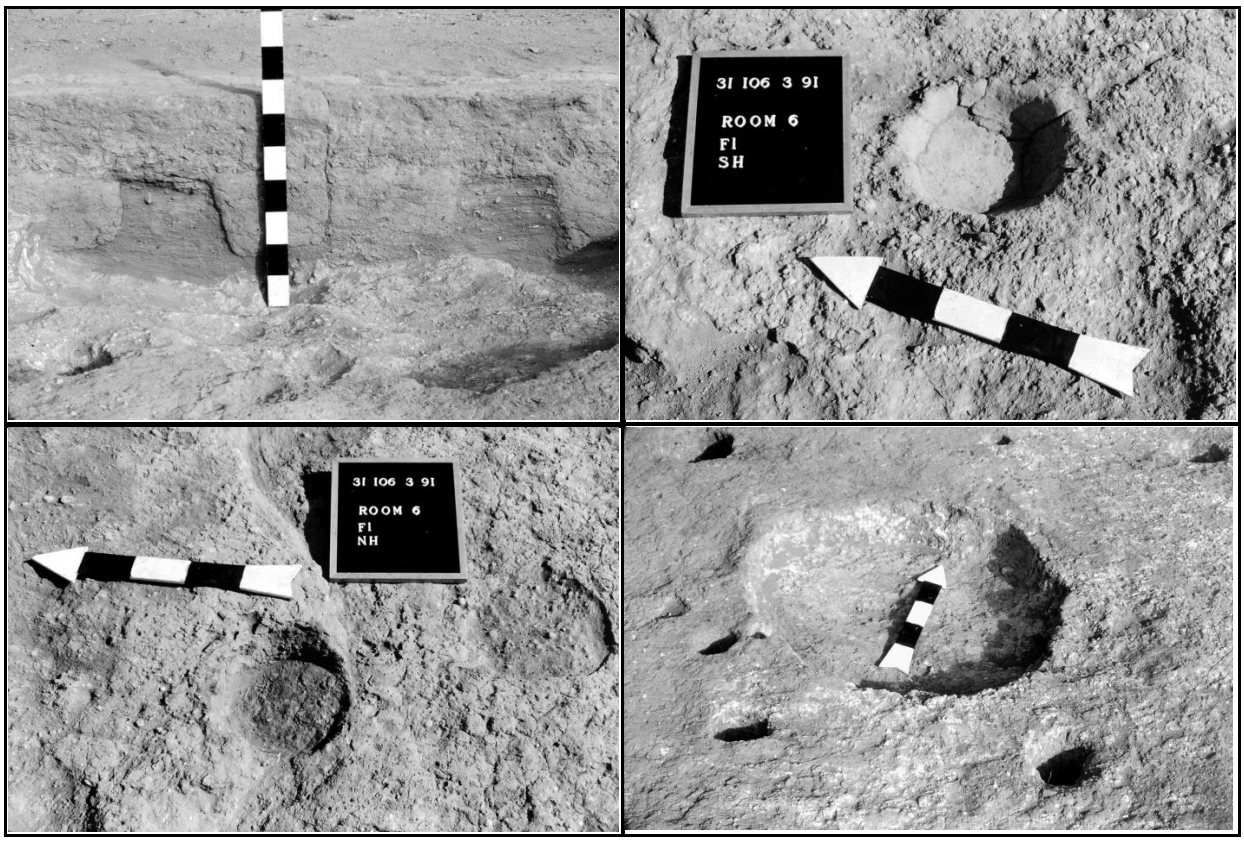


Figure 23. Room 6 features: *upper left*, segmented foundation of north wall; *upper right*, lower floor south hearth; *lower left*, sectioned upper floor north hearth to left and unexcavated lower floor lined, small pit to right; *lower right*, clay lined basin feature of upper floor and secondary postholes.

Lower Floor Features: A sizeable number of features are associated with the lower floor. They include two hearths, five small pits near the north-south axis of the room, another small pit, four primary postholes, 18 possible secondary postholes, and two shallow depressions (Figures 21 and 22). Attributes of these features and those of the upper floor are provided in Table 3.

Hearths: There are two formal hearths, a southern hearth (F.257) and a central hearth F.295) (Figure 23). Both are on the north-south axis of the room, lined with 2-3 cm of caliche and adobe, and with a rim flush with the floor. The southern hearth was apparently used throughout the life of the room, has a weathered or worn rim, and has a fill of gray sandy loam with specks of charcoal, a sherd, and two pieces of chipped stone. The central hearth was filled with reddish brown sand that also covered the floor and separated the two floors.

Primary Postholes: Four primary postholes define a square in the center of the room, some 2.25-2.5 m apart and 1.5-2.5 m from the nearest wall. They have been excavated into the caliche layer, have adobe fill to hold posts, and once held posts of 15-22 cm in diameter. An unburned remnant of a juniper post was found below floor level in the northwest posthole (F.262), the southwest posthole (F.288) and the northeast posthole (F.261) have a small number of charred pieces of cottonwood in them, and the southeast posthole (F.260) is noted as having a metate fragment at the base of the posthole and an abrading/rubbing stone as a possible wedge stone. All of the primary postholes contain light gray sand, small lumps of adobe and occasional small pieces of charcoal.

Table 3. Attributes of Room 6 floor features.

Feature Number	Feature Type	Floor	Length/ diameter (cm)	Width (cm)	Depth (cm)	Plan	Profile
257	hearth	lower & upper	26		8	circular	sloping sides, nearly flat bottom
258	sealed hearth	upper	24		9	circular	sloping sides, flat bottom
259	non-specific pit	lower	21		7	circular	basin-shaped
260	primary posthole	lower & upper	16		42	circular	cylindrical, within 30 x 28 cm pit
261	primary posthole	lower & upper	18	17	35	circular	cylindrical, within 27 x 24 cm pit
262	primary posthole	lower & upper	15		53	circular	cylindrical, within 29 x 24 cm pit
263	shallow depression	lower & upper	24	21	2	round with flat side	shallow basin
264	non-specific pit	upper	11		9	circular	slight taper, flat bottom
265	shallow depression	upper	28	17	3	oval	shallow basin
266	shallow depression	upper	22	17	3	oval	shallow basin
267	shallow depression	upper	21	16	4	oval	shallow basin
268	shallow depression	upper	19	18	6	irregular	shallow basin
269	depression	lower & upper	40	32	4	oval	shallow basin
270	sealed non-specific pit	upper	81-83		15	circular	basin-shaped
271	secondary posthole	lower & upper	11		21	circular	slight taper, rounded bottom
272	secondary posthole	lower & upper	14		16	circular	straight sides, flat bottom
273	secondary posthole	lower & upper	12	10	10	circular	straight sides, flat bottom
274	secondary posthole	lower & upper	11		10	circular	straight sides, flat bottom
275	secondary posthole	lower & upper	20		11	circular	straight sides, flat bottom
276	secondary posthole	upper	17	14	6	irregular	irregular sides and bottom
277	secondary posthole	upper	8		9	circular	slight taper, rounded bottom
278	secondary posthole	lower & upper	11	9	13	oval	slight taper, flat bottom
279	secondary posthole	lower & upper	16		16	circular	sloping sides, rounded bottom
280	secondary posthole	lower & upper	27	24	7	oval	sloping sides, shallow bottom
281	secondary posthole	lower & upper	10		18	circular	slight taper, rounded bottom
282	secondary posthole	upper	18	16	7	circular	slight taper, flat bottom
283	secondary posthole	lower	10		13	circular	slight taper, rounded bottom

Table 3. Continued.

Feature Number	Feature Type	Floor	Length/ diameter (cm)	Width (cm)	Depth (cm)	Plan	Profile
284	secondary posthole	lower & upper	12		26	circular	tapering to near point
285	secondary posthole	upper	7		10	circular	slight taper, flat bottom
286	secondary posthole	upper	10		11	circular	slight taper, rounded bottom
287	secondary posthole	lower & upper	8		11	circular	slight taper, flat bottom
288	primary posthole	lower & upper	22		30	circular	circular, within 37 x 33 cm pit
289	secondary posthole	lower	14		18	circular	slight taper, rounded bottom
290	secondary posthole	lower	10	8	9	circular	slight taper, rounded bottom
291	secondary posthole	lower	12		10	circular	slight taper, rounded bottom
292	secondary posthole	lower	12		22	circular	slight taper, rounded bottom
293	secondary posthole	lower	10		16	circular	slight taper, rounded bottom
294	secondary posthole	lower	7		12	circular	slight taper, rounded bottom
295	hearth	lower	25	23	6	circular	steep sides, shallow rounded bottom
296	non-specific pit	lower	10		20	circular	angled, straight sides, rounded bottom
297	non-specific pit	lower	25	23	12	circular	steeply sloping sides, flat bottom
298	non-specific pit	lower	20	17	10	circular	steeply sloping sides, flat bottom
299	non-specific pit	lower	15		9	circular	steeply sloping sides, rounded bottom
300	non-specific pit	lower	12		8	circular	sloping sides, rounded bottom

Secondary Posts: Secondary postholes are located in the eastern quarter of the room and are generally small in diameter and relatively shallow in depth (Figure 23). Of these features, there are 18 possible secondary postholes that may be associated with the lower floor. Seven of them (F.283 and F.289-F.294) are sealed by the plaster of the upper floor and definitely related to the lower floor. Four of them (F.271, F.272, F.280, and F.281) are in the southeast corner, were not covered by plaster from the upper floor, and may or may not have been in use throughout the life of the room. The other seven postholes (F.273-F.275, F.278, F.279, F.284, and F.287) penetrate the plaster of both floors. They may have been associated with both floors, or they may only have seen use with the upper floor.

Since some secondary postholes are certainly lower floor features and others are evident in the upper floor, it would seem that the use of these features spanned the use of both floors. Especially, this may be the case seeing as they form two principal rows of postholes paralleling the east wall. The fill of these postholes and those associated only with the upper floor is reddish brown sand with occasional specks of charcoal and not the gray sand and charcoal fill that covers the floor. The postholes in the lower floor were filled with sand before the upper floor was laid. The reddish brown sand in postholes

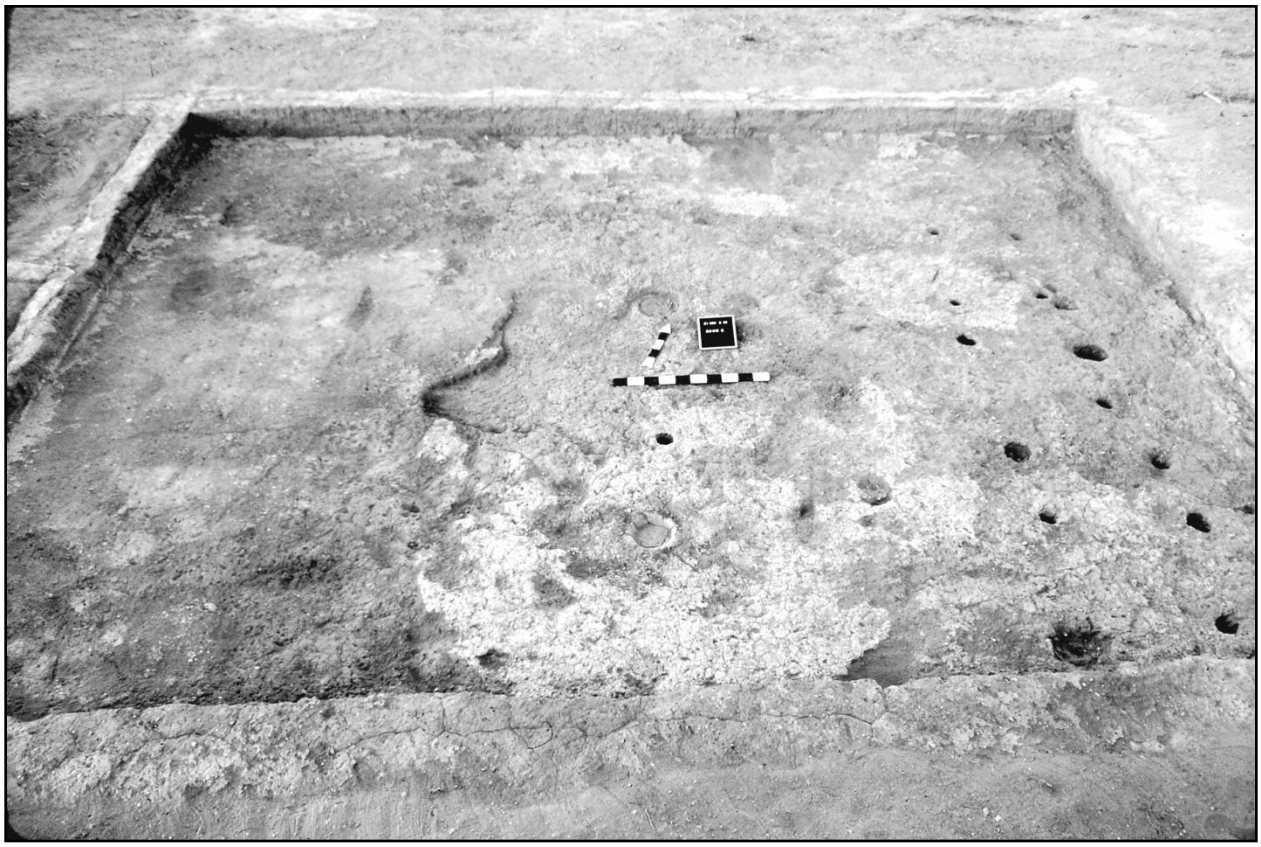


Figure 24. Room 6, looking north at excavated features for the upper floor. Primary postholes have not yet been exposed and part of the upper floor has been removed and shows the lower floor central hearth above the arrow.

that penetrate both floors and those in only the upper floor, however, would indicate that posts were not in these features at the time the room burned and that they no longer functioned as originally intended. As with the rows of secondary postholes in Room 1, the secondary postholes of Room 6 may not have held posts to support roof beams. Rather, they may have held posts to support furniture such as benches, racks, or platforms.

Small Pits: There are six small, non-specific pits in the lower floor. One (F.259) is a shallow basin next to the southwest primary posthole. The other five are north of the central hearth and along or near the north-south axis of the room. All six features had been filled with reddish brown sand before the upper floor was plastered.

Just 36 cm north of the central hearth is a 10 cm diameter and 20 cm deep hole (F.296) that curiously is angled toward the center of the room, possibly to hold something over the central hearth. Also along the north-south room axis are two small, circular, shallow pits (F.297 and F.298) lined with 1-2 cm of caliche and adobe. And, two more similar small and lined pits (F.299 and F.300) are nearby and to the west.

Shallow Depressions: A small, somewhat irregular, and 2 cm deep depression (F.263) is near the south wall and south of the south hearth. This depression may have been the result of traffic through an entry in the south wall opposite the south hearth. Similar depressions have been noted near the middle of south walls and opposite hearths in isolated Rooms 17 and 18. A larger and 4 cm deep depression or

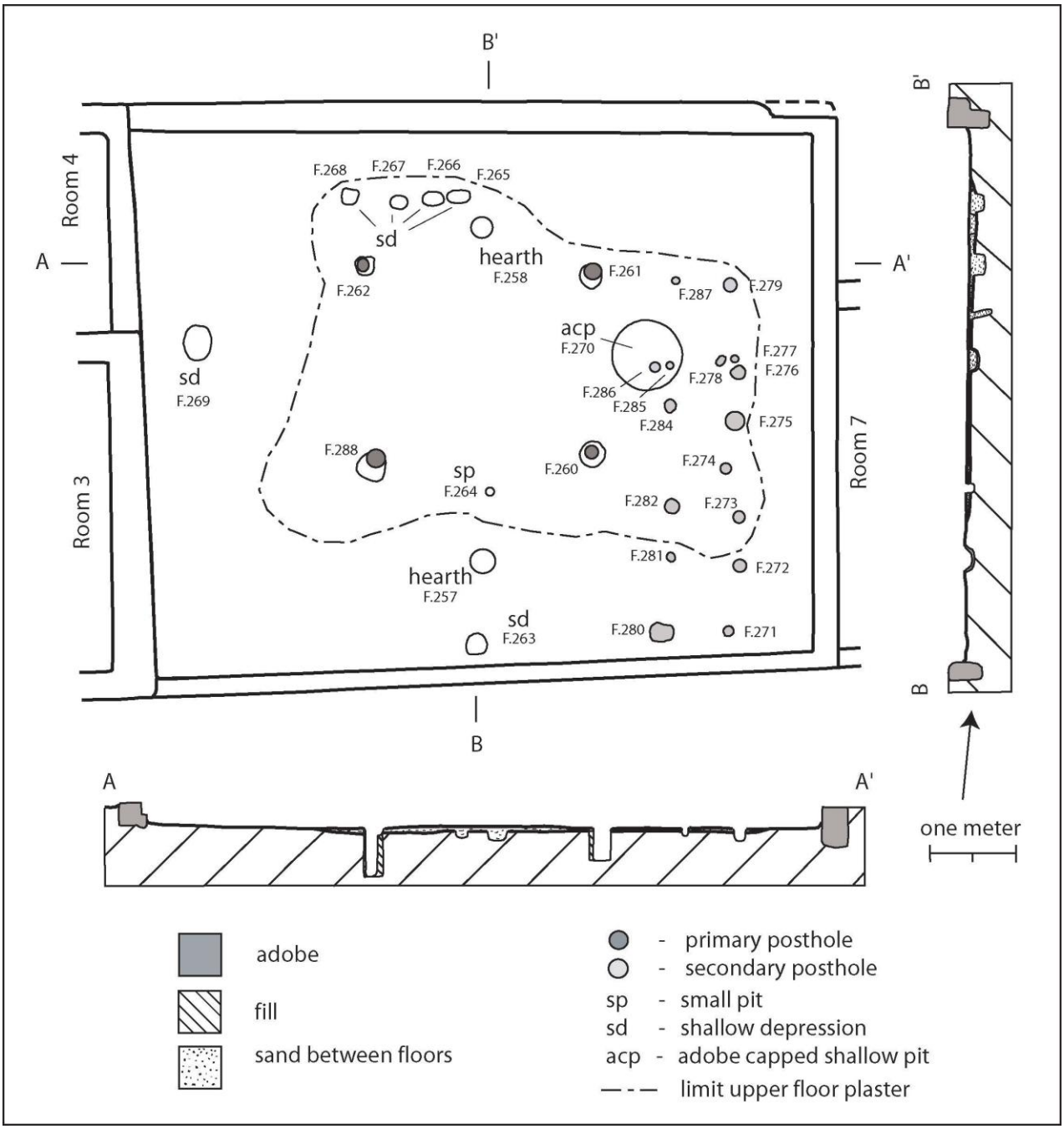


Figure 25. Room 6 upper floor, plan and cross-sections.

shallow basin (F.269) is near the center of the west wall but not in a position to be related to any entry. Its function is non-specific, and the fill is like that of the surrounding floor, a gray sandy soil with some charcoal.

Lower Floor Material: In addition to the few items mentioned for the south hearth and the southeast primary posthole, a small number of sherds and pieces of chipped stone and a mano fragment were recovered from the sandy fill between the floors.

Upper Floor: The upper floor of Room 6 covers only the central, depressed area of the room and creates a more level floor. The caliche and adobe floor is 4-5 cm thick and thins at the edges. Beneath this layer of plaster is as much as 6 cm of reddish brown sand that separates the two floors and also thins at the edges.

Upper Floor Features: The plaster of the upper floor is not a repair or rejuvenation of the lower floor. It is a new surface that covers a number of the lower floor features and has features of its own (Figures 24 and 25) (Table 3). Lower floor features that were not sealed or replaced include the southern hearth, the four primary postholes, the two shallow depressions near the south and west walls, four secondary postholes in the southeast corner, and probably some of the other secondary postholes. Five secondary postholes were added to those in the eastern part of the room, four shallow depressions appear near the north wall, a sealed basin-shaped pit is located in the eastern part of the room, and a hearth and small pit complete the set of features along the north-south axis of the room.

North Hearth: The central hearth of the lower floor had been covered by the upper floor, and the north hearth (F.258) was its replacement. It was a simple pit excavated in the upper floor and with the lower floor as its bottom and was lined with a thin, 0.5-1 cm plaster of caliche and adobe (Figure 23). It contained reddish brown sand and had a lens of dark soil at the top. This hearth was sealed with a 3 cm thick layer of adobe.

Secondary postholes: There are 16 secondary postholes that form two rows of the features paralleling the east wall. Eleven have been described above and include four postholes in the southeast corner and not covered by the upper floor and seven postholes that penetrate both floors. The other five secondary postholes (F.276, F.277, F.282, F.285, and F.286) have the lower floor as their bottom or do not completely penetrate the lower floor. As noted above, the fill of these features is reddish brown sand.

Small Pits: Less than a meter north of the south hearth and on the north-south axis is a small circular pit (F.264). It is unlined, has the lower floor as its bottom, and has a fill of light to dark gray sandy soil with small pieces of charcoal.

In the eastern part of the room, in the area of the secondary postholes, and between two of the primary postholes, there is a 15 cm deep, basin-shaped, non-specific pit (F.270) (Figure 23). It had been lined with 1-3 cm of mixed caliche and adobe and filled or capped with adobe. Two of the secondary postholes (F.285 and F.286) were dug into the fill and lining of this feature.

Shallow Depressions: Between the north hearth, northwest primary posthole, and the north wall, there are four depressions in a row. Three (F.265-F.267) are near one another and the north hearth and are circular and 3-4 cm deep. They are suggestive of pot rests for large jars. The other depression (F.268) is a bit west of the other three, somewhat irregular, and 6 cm deep.

Upper Floor Material: Sherds and pieces of chipped stone were moderate in number and mostly near the northwest and southeast corners. There were seven cores on this floor, a somewhat high number relative to the number of flakes recovered. A metate fragment and a mano fragment were also on the floor.

Comments: Room 6 has formal hearths, primary postholes, and other floor features that occur in other rooms that likely functioned as domiciles or as auxiliary rooms to domestic rooms. However, the large size of Room 6 sets it apart from other pueblo rooms. Also, the alignment of multiple hearths and small pits along or near the north axis is unique to Room 6. Finally, no other room has a group of depressions that resemble pot rests. Room 6 shares attributes with other very large pueblo rooms in the region that have variously been called ceremonial, clan, or communal rooms.

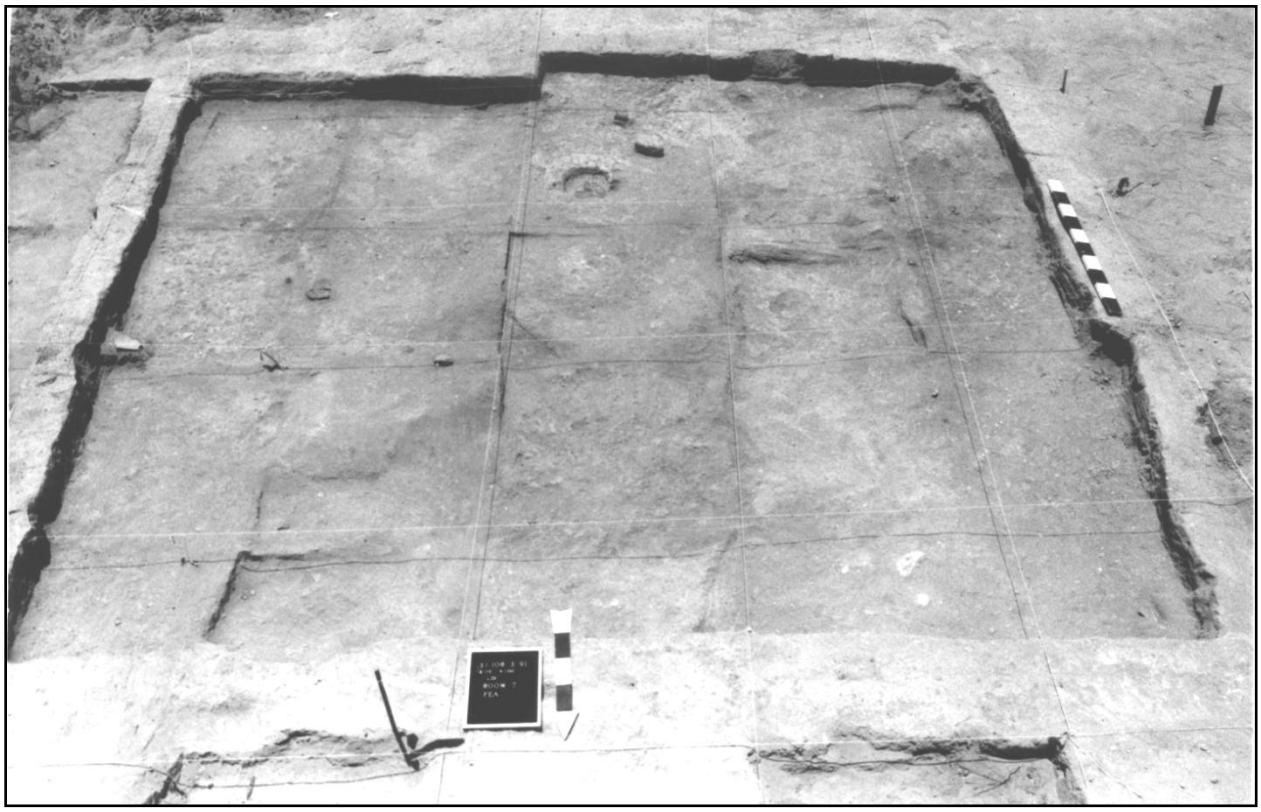


Figure 26. Room 7, looking north with floor level under excavation. Much of the floor is exposed, including the hearth.

Room 7

Room 7 is near the eastern end of the pueblo and was an addition to the east side of Room 6 (Figures 26 and 27). The north and south walls of Room 7 are bonded with those of Room 8 and indicate that Room 8 was added at the same time as Room 7. This room is of large size, has a floor area of 17.1 sq m, and measures 3.88 m north-south and 4.41 m east-west. Room size and floor features suggest Room 7 is a domestic room. There is no evidence that Room 7 burned.

Fill: Walls and room fill were covered with 1-3 cm of loose, reddish brown sand and then a compact, brown sandy loam with caliche pebbles. Recent historic debris was also in this surface layer. The fill of the room was a brown sandy loam with a few small pieces of charcoal and with areas of adobe wall fall or melt near the walls. Disturbance of the room was minimal and noted by reddish brown sands mixed with the lower room fill.

Walls: The north, east, and south walls enclosing Room 7 are a light brown adobe with a little gravel and caliche pebbles. They range in width from 20 cm to 26 cm, and the east wall abuts the north and south walls. Wall heights within the room are 14-16 cm. No plaster was found on the smooth walls.

The walls have foundation trenches, but there was no testing along the walls to ascertain their depth. A segmented foundation trench was revealed by erosion of the northeast corner of Room 8. This would suggest that the common north wall of Rooms 7 and 8, and perhaps all walls of Rooms 7 and 8, had a segmented foundation trench.

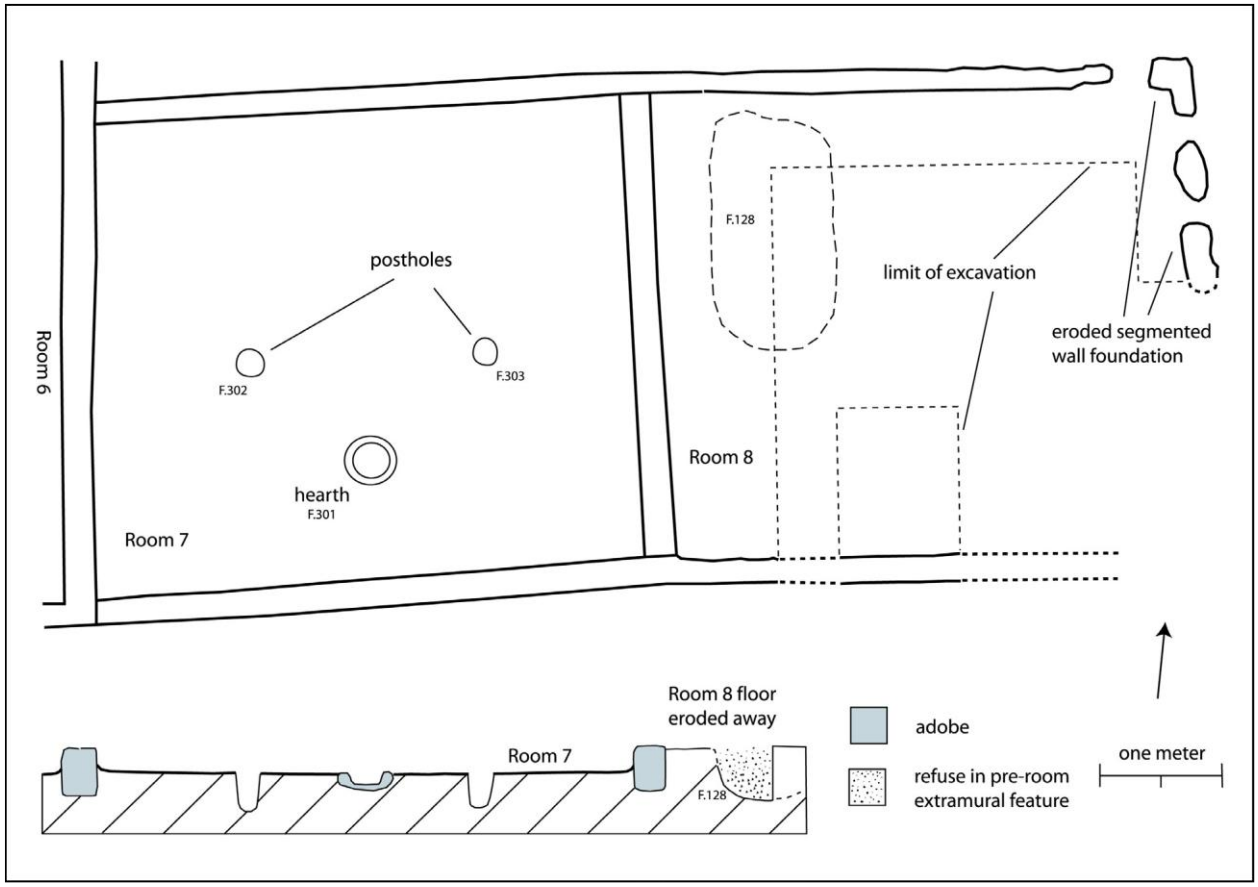


Figure 27. Room 7, plan and cross-section.

Floor: The floor is some 6-8 cm below the old ground surface and curves up to meet the walls. It is a mixture of caliche and adobe, 1-3 cm thick, smooth, and in relatively good condition over most of the room. However, the floor is missing or in poor condition in the northeast corner and various areas near the north wall where earlier extramural features are believed to lie below the room. Loose brown sand underlies most of these areas.

Floor Features: A hearth and two postholes were recorded for Room 7.

Hearth: The hearth (F.301) is near the middle of the south wall and is lined with 2-5 cm of caliche and adobe (Figure 28). It is 26-28 cm in diameter and 8 cm deep with strongly sloping sides and a shallow rounded bottom. It is surrounded by a 12-15 cm caliche and adobe collar that is about 1 cm higher than the floor. A portion of the collar and part of the bottom of the hearth are missing and suggest disturbance. The fill of the hearth is like that of the room, a brown sandy loam.

Postholes: Two primary postholes are on the east-west axis of the room. The west posthole (F.302) is 21 cm in diameter at the top and tapers to 13-14 cm at the bottom at a depth of 36 cm. The east posthole (F.303) is 21-22 cm in diameter at the top and tapers to 15 cm at the bottom at a depth of 27 cm. The fill of the postholes is brown sandy loam with occasional specks of charcoal.

Floor Material: A number of large fragments of El Paso Polychrome jars were near the middle of the north and east walls. Near the middle of the north wall, there were also two polishing pebbles, two possible polishing pebbles, a notched sherd scraper, and a large fragment of an El Paso Polychrome bowl.

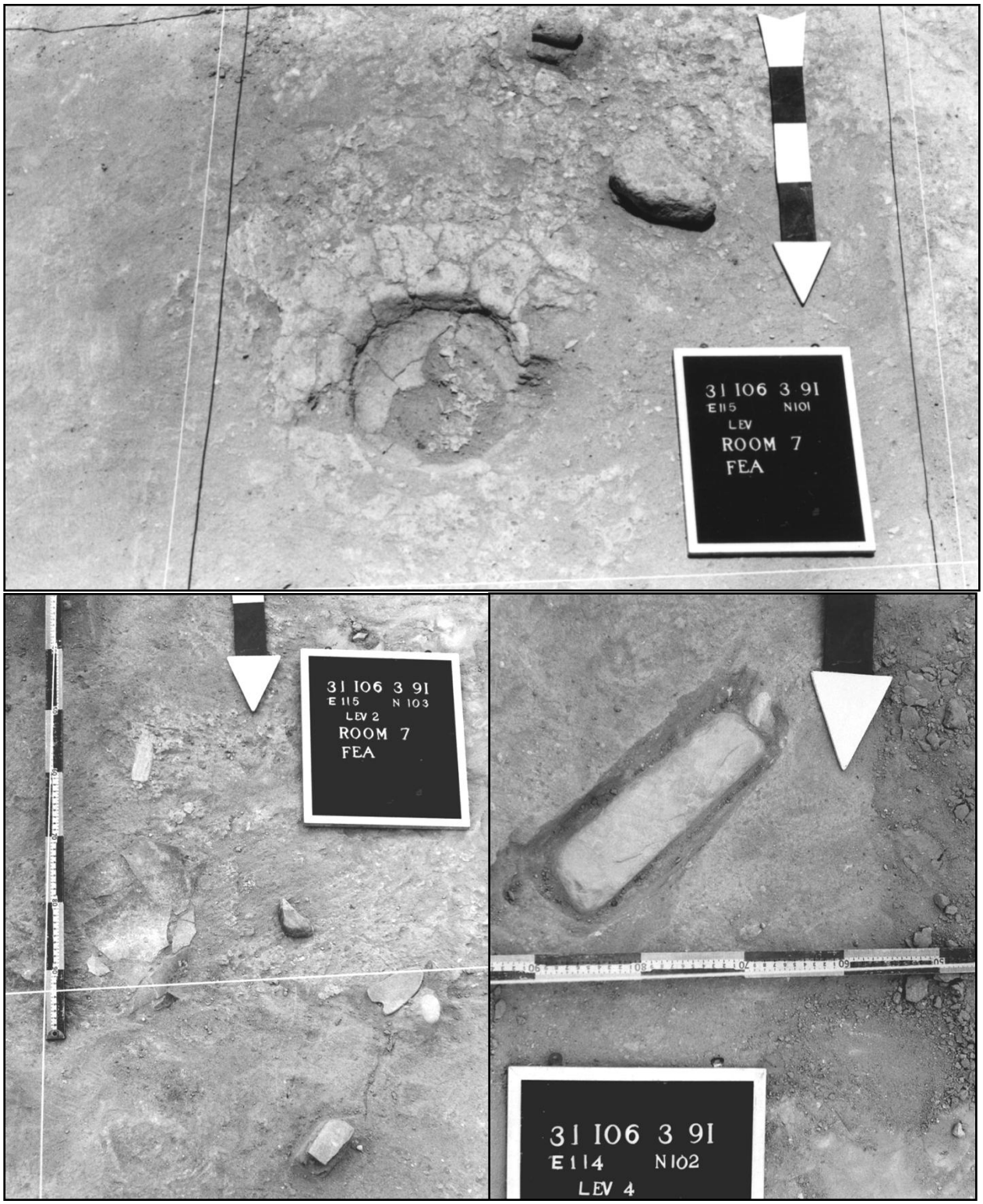


Figure 28. Room 7 hearth and floor artifacts: *top*, partially disturbed hearth; *lower left*, polishing stones, notched sherd scraper, and fragmented large sherd; *lower right*, pestle.

Between the hearth and the west wall, there were two pieces of yellow ochre, 2 hammerstones, and a large pestle (Figure 28). A small pestle or muller, a scoria abrader, and a rubbing stone were near the hearth, and a sherd palette with red pigment was near the center of the room. More items were found on the floor of Room 7 than any of the other pueblo rooms.

Comments: Room 7 is a domestic room similar in size and features to Rooms 1 and 3. Unlike rooms in the core of the pueblo, Room 7 was not burned, and a fair number of objects were left on the floor.

Room 8

Room 8 is the last room on the east end of the pueblo, with Room 7 to the west (Figure 27). This room and Room 7 were constructed at the same time, based on shared north and south walls and an interior wall dividing the two rooms. Room 8 measures 3.86 m north-south and 4.38 m east-west and has a floor area of about 16.7 sq m. This room has suffered from grading and slope erosion toward Highway 54. The southeast corner and much of the east wall are missing, and the floor has apparently eroded away.

Fill: Above the walls and the fill of the room, there was a layer of 3-13 cm of loose, light brown sand with small gravel and a few pebbles of caliche. The fill of the room was the natural substrate, with the exception of an earlier extramural feature (F.128) in the northwest corner.

Walls: The walls are 20-26 cm wide and are made of a light brown adobe with little gravel and caliche pebbles. The west wall of Room 8 abuts the shared north and south walls of Rooms 7 and 8, and the foundation at the northeast corner indicates that the east and north walls were bonded. Erosion of the northeast corner also reveals a segmented foundation trench. The depth of the short trenches for piers is 20-25 cm, based on limited testing along the north wall. Evidence of wall plaster was not observed.

Floor: No floor or evidence of floor features was found within the investigated areas of Room 8. If there was a plastered floor or earthen floor, it certainly was higher than the floor of Room 7 and disappeared with erosion and grading of the room. There is also the possibility that the room was not finished before abandonment of the pueblo.

Comments: Room 8 would appear to be a domestic room that has suffered from the elements and recent grading of the area. Lacking an identifiable floor or floor features, the possibility exists that the room was never finished.

Room 9

Room 9 abuts the south wall of Room 1 where it is joined by Room 3 (Figures 12 and 29). It is a very small room, measuring inside 93 cm north-south and 90 cm east-west and with a floor area of 0.8 sq m. The use of this room is problematical, either for storage or some special use.

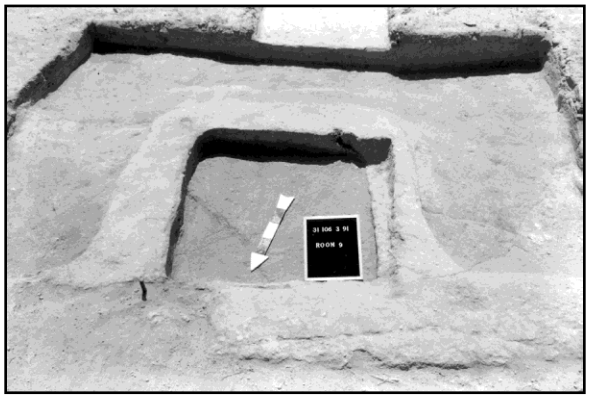


Figure 29. Room 9, looking south, south wall of Room 1 in foreground.

Fill: The fill of this room is a compact, brown sandy loam with some small gravel, overlain by a thin layer of reddish brown blow sand.

Walls: The walls enclosing the space are bonded, abut Room 1, and are 24-29 cm wide, and made of a light

brown adobe with caliche pebbles. They are 9-11 cm high and do not have foundation trenches. No wall plaster was evident.

Floor: There was no plastered floor for this room. Also, excavations were carried to 5-7 cm below the walls with out finding an identifiable floor surface. Presumably, the floor was simply the ground surface at the time the room was constructed.

Comments: The size of Room 9 is so small that it obviously is very different from any other of the rooms of the contiguous room pueblo. Only a single sherd was found within the room, and there were no floor or wall features. Thus, additional evidence as to its use is lacking. But, this room is not unique for this site. Analogous, structures are Room 24 and possibly Room 28. Here again, nothing within these other structures points to their specific use.

Room 10

This room is at the western end of the pueblo and is contiguous with Room 12 to the north and Room 14 to the west (Figure 30). It overlies isolated Room 15 and several earlier extramural features (F.53 and F.85). The inside dimensions of this room are approximately 3.95 m north-south and 4.05 m east-west, and the floor area is 16.1 sq m. Parts of two walls and a patch of flooring are all that remains of Room 10.

Fill: There is some mechanical disturbance of the northern part of the room, and the entire room has suffered from exposure to the elements. Loose, brown sand to sandy loam covers the room and floor to a depth of 3-10 cm. In some areas the soil has a light gray tint and a few specks of charcoal. Artifacts are relatively few in number, and none could definitely be associated with the floor.

Walls: There were no foundation trenches for the walls of Room 10. Only parts of the north and west walls survived. The north wall was up to 23 cm wide, and the west wall was 25 cm wide. Both walls were of a brown adobe with much caliche and were no higher than 3 cm. Erosion had taken the corners and any direct evidence of sequence of room construction.

Floor: The floor was found only in the southern half of the room. It was a weathered caliche and adobe layer 3-6 cm thick over natural soil and the fill of earlier features. This layer indicated the west and south bounds of the room. The eastern extent of the room was reasoned by the location of the east wall of Room 12.

Floor Features: No floor features could be located with the poor condition of the floor and general disturbance of the room.

Comments: The size and location of Room 10 would suggest that it is a domestic room. Like other rooms of similar size and along the south-facing side of the pueblo, a hearth, postholes, and floor features would have been expected. Unfortunately, conditions did not allow the identification of any features.

Room 12

Room 12 is near the west end of the pueblo room block and was added to the north side of Room 10 (Figures 30 and 31). This is a somewhat small room, measuring inside 1.95 m north-south and 4.13 m east-west and with a floor area of 8.1 sq m. The room has been subjected to grading and erosion. Still, portions of all four walls, much of the floor, and floor features are present. Room 12 was built over two earlier extramural features (F.54 and F.56).

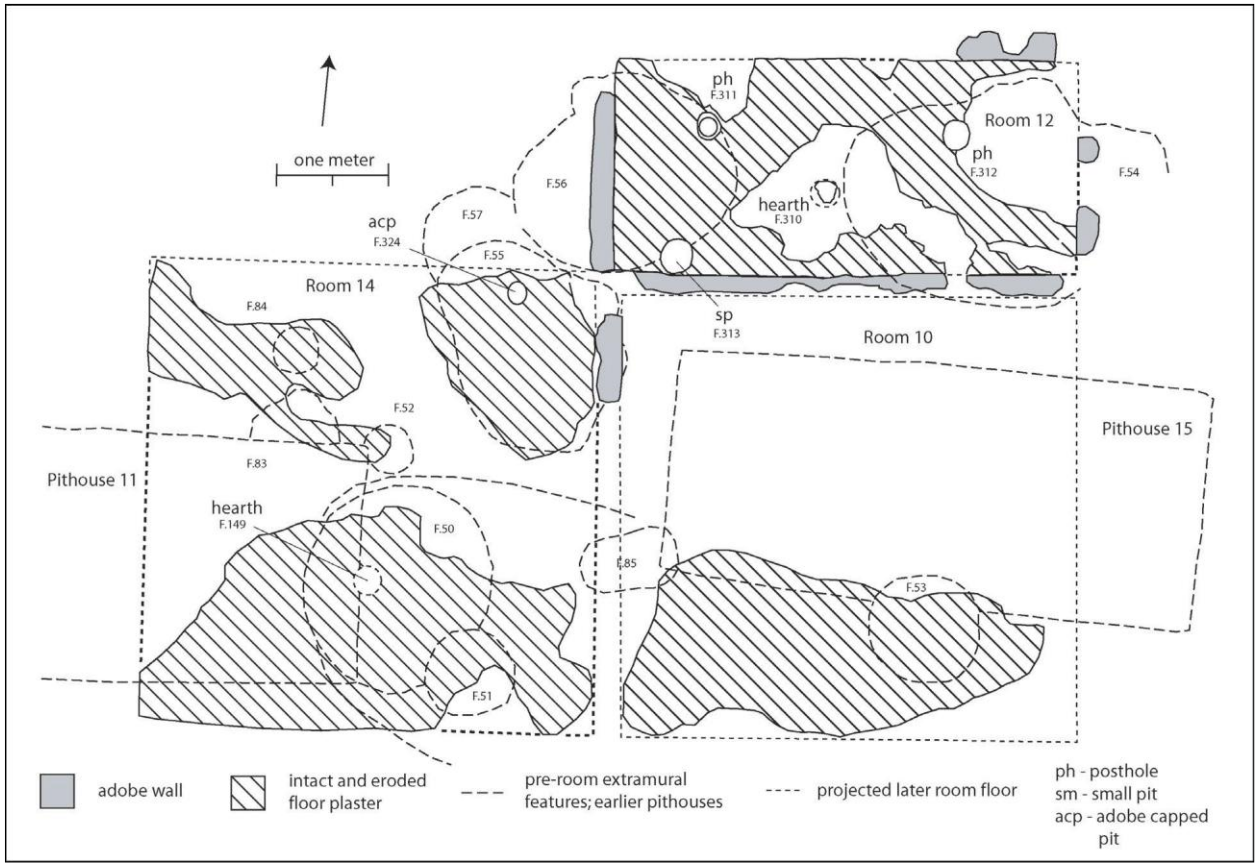


Figure 30. Rooms 10, 12 and 14, plan.

Fill: The upper fill is loose, reddish brown blow sand of 5-15 cm. The southwest corner and east half of the room are disturbed from pot hunting and have mixed soils. Undisturbed fill at floor level is loose to somewhat compact, sandy loam with a gray tint and 3-5 cm thick. In a few places there is gray soil and charcoal on the floor. This could suggest that the room burned, but there is so little charcoal that this seems unlikely.

Walls: The common wall with Room 10 has much caliche mixed with the adobe. Whereas, the brown adobe of the other three walls has very few caliche pebbles and would suggest that Room 12 was added on to Room 10. None of the walls are higher than 3 cm above the floor. The north wall is 27-28 cm wide, and the west wall is 22-25 cm wide. The width of the east wall is indeterminate. The east and south walls are without foundations, and the west wall has a foundation trench 35 cm deep. There is no evidence of wall plaster.

Floor: The floor is a layer of caliche and adobe up to 4 cm thick. In some places the floor is smooth, but most of the floor is either disturbed from pot hunting or weathered, broken and thin over earlier features. The plaster at the edges curves up to meet the walls.

Floor Features: Four features are recorded for the floor of Room 12. They are a hearth, two postholes, and a small pit.

Hearth: A 1-2 cm caliche and adobe-lined hearth (F.310) is in the center of the room and a bit closer to the south wall. The floor is disturbed around the hearth, and the rim and most of the sides of the hearth

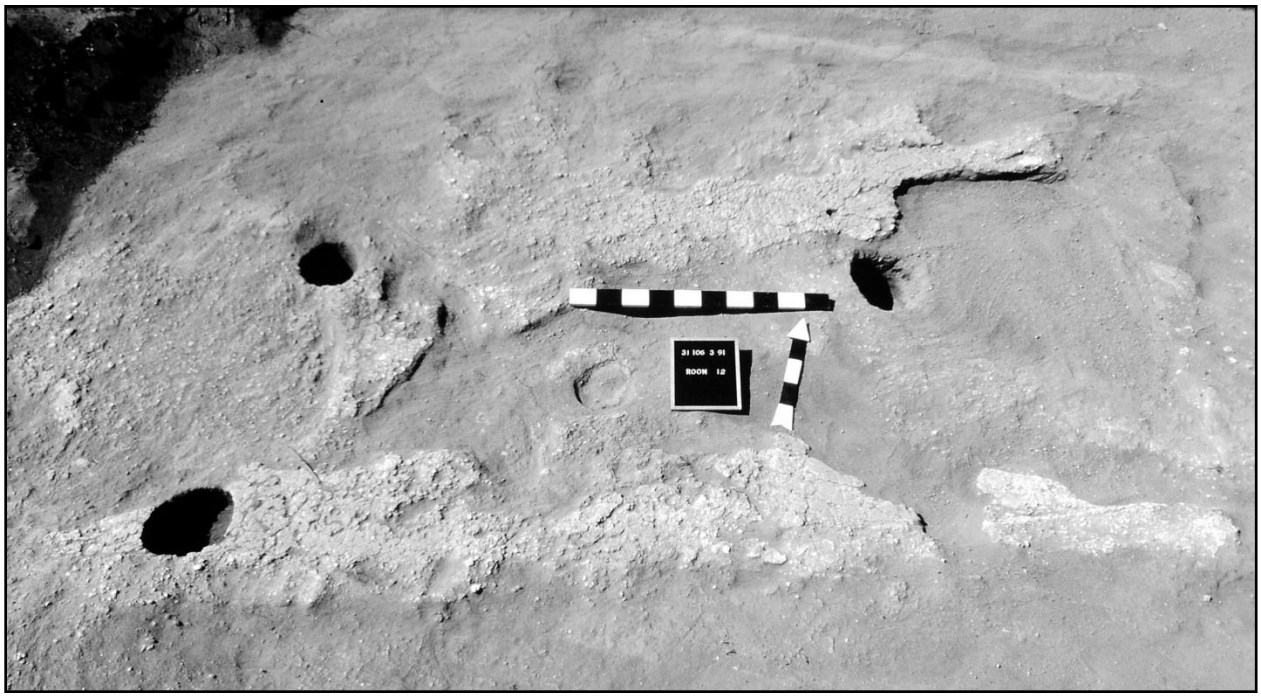


Figure 31. Room 12, looking north at excavated floor features.

are missing. It has a shallow rounded bottom and slightly sloping sides. It has a diameter of about 25 cm and a depth between 9 cm and 12 cm. A layer of white ash was found on the bottom.

Postholes: Two postholes were located between the central east-west axis of the room and the north wall. Both had been excavated into the fill of earlier, subfloor features. The west posthole (F.311) was 23-25 cm in diameter and 39 cm deep. It had been excavated into the caliche substrate and had a lining of adobe with some caliche to hold a post of about 15-16 cm in diameter. The fill of this feature was loose, reddish brown sandy loam. The east posthole (F.312) was poorly defined due to the collapse of fill of the earlier feature into the posthole. The pit for the posthole was 26-28 cm in diameter at the top and was excavated 42 cm deep and into the caliche substrate.

Small Pit: A small, unlined pit (F.313) was in the southwest corner. It was circular with a diameter of 28 cm and had vertical sides and a slightly convex bottom at a depth of 20 cm. The fill was loose, reddish brown sandy loam with a few caliche pebble and pieces of charcoal. No artifacts were found in this feature.

Floor Material: Almost all of the material from this room came from soils above the floor or from the east half of the room where refuse from the earlier extramural pit (F.54) was mixed with any potential material from the floor. No material could definitely be assigned to the occupation of Room 12.

Comments: Room 12 compares well with Rooms 2 and 4 in terms of size and location. Floor areas for these three rooms range between 8.1 sq m and 11.8 sq m. These rooms are also fronted by a larger domestic room of 16.1 sq m to 19.4 sq m. While floor features are similar for both the smaller and the larger rooms, it can be proffered that the small rooms had a more limited range of functions and likely in addition to those of the larger rooms. That is, the smaller "back" rooms may have been secondary to the larger "front" rooms, and two room suites may have defined some of the domestic units. Thus, Room 10 and 12 may have been one suite of rooms.

Room 14

Room 14 is the last room on the west end of the pueblo and shares a wall with Room 10 (Figure 30). It measures inside 4.15 m north-south and 4.03 m east-west and has a floor area of 16.7 sq m. It is underlain by isolated Room 11 and numerous earlier extramural features. As a result of grading and erosion, there is little that remains of the walls, and the floor is weathered and reduced.

Fill: The fill of the room is brown sand to sandy loam with a gray tint, up to 15 cm thick and ranging from loose to compact. Over the north part of the room is an additional 30 cm overburden of reddish brown sand from recent grading.

Walls: The walls do not have foundation trenches and have eroded away except for a short piece shared with Room 10. Room 14 probably abuts Room 10, but this cannot be confirmed in the absence of corner walls. No remnants of wall plaster were noted for Room 14.

Floor: The floor layer is a mixture of caliche and adobe up to 4 cm thick that rests on cultural debris and earlier features. The floor surface is weathered and rough, and the floor is broken or missing over subsurface features. The caliche floor defines the southern and western limits of the room, and the one piece of wall marks the eastern edge. However, the northern extent of the room is not certain but approximated by the extent of caliche flooring and the nearby corners of Rooms 10 and 12.

Floor Features: The condition of the floor and underlying deposits and features made the finding of floor features difficult. No postholes were located, but a small pit and a possible hearth were identified.

> Hearth: North of the middle of the south wall, is an area 25 cm in diameter of gray soil and burned adobe with flat and curved surfaces that appears to be the disturbed remains of a formal hearth (F.149).
>
> Small Pit: Near the northeast corner is an unlined, small pit (F.324) of non-specific function. It is oval, 17 cm by 13 cm, with straight sides. The feature bottoms out in the refuse of an earlier feature and has a depth of about 8 cm, indicated by an adobe and caliche cap of that thickness.

Floor Material: Artifacts could not definitely be associated with the floor because of disturbance and erosion of the floor and contamination with materials from underlying features.

Comments: Room 14 is the most western, identifiable room of the pueblo. Its size and location place it in the same category of domestic rooms as Rooms 1, 3, 7, 8, and 10. As with Room 10, Room 14 is in poor condition and is short of recognizable features and associated artifacts that would assist interpretation.

Room 30

Room 30 lies below Room 3 and is in the middle of the pueblo (Figures 32 and 34). It is rectangular and has a floor area of 15.8 sq m. Floor features also indicate that it is a domestic room. The dimensions inside are 4.56 m east-west and 3.46 north-south. Room 30 is the first room or one of the first rooms of the pueblo. It adjoins Room 1 to the west, and Room 3 was constructed over its demolished remains.

Fill: Room 30 was excavated some 30 cm into a compact reddish brown sandy loam and down to the underlying caliche layer. The bottom of the excavation was plastered with caliche, and above this floor the fill was adobe rubble capped with reddish brown to gray sands to provide a level surface for the floor of Room 3. The adobe rubble appeared to be wall fragments and exhibited flat and blackened surfaces. A few artifacts were in the sands at the top of this fill material. Few artifacts were found on the floor, and there was no ash or charcoal on the floor.

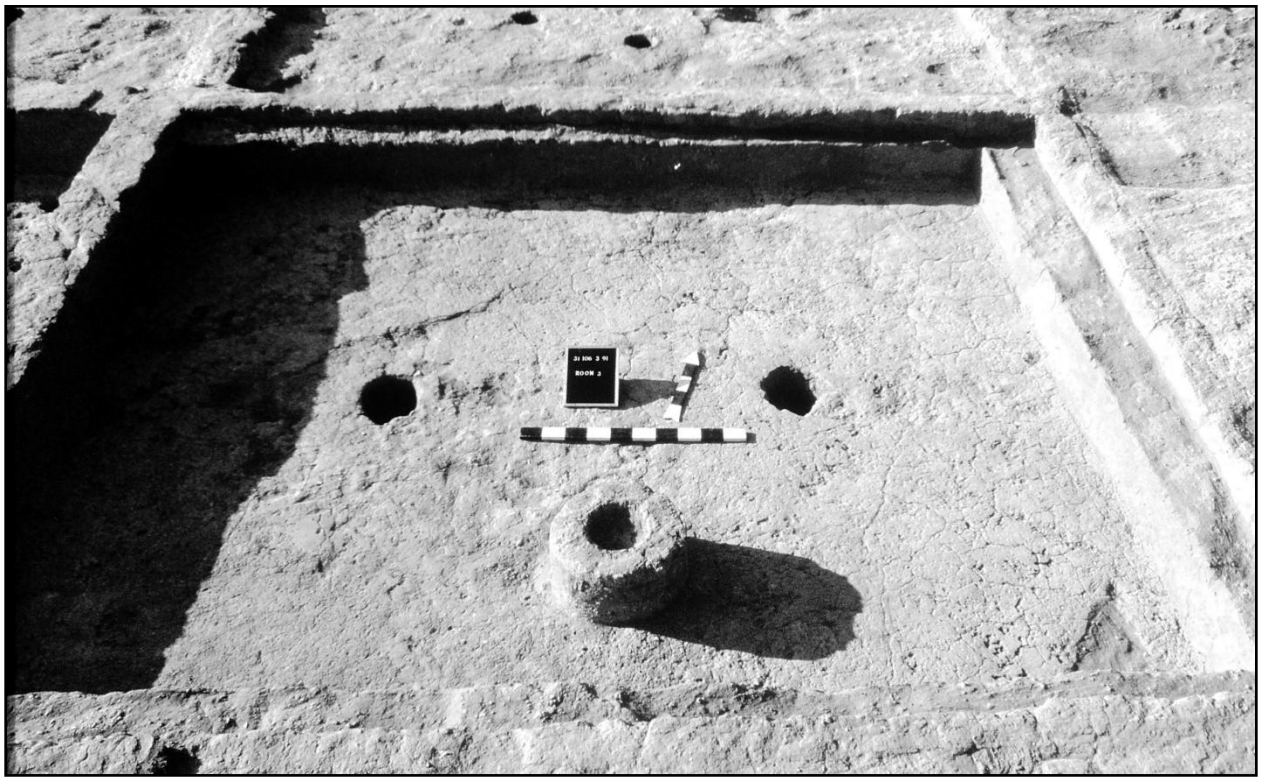


Figure 32. Room 30, looking north at excavated floor features. The pedestaled feature is the hearth for Room 3 and is above the hearth of Room 30.

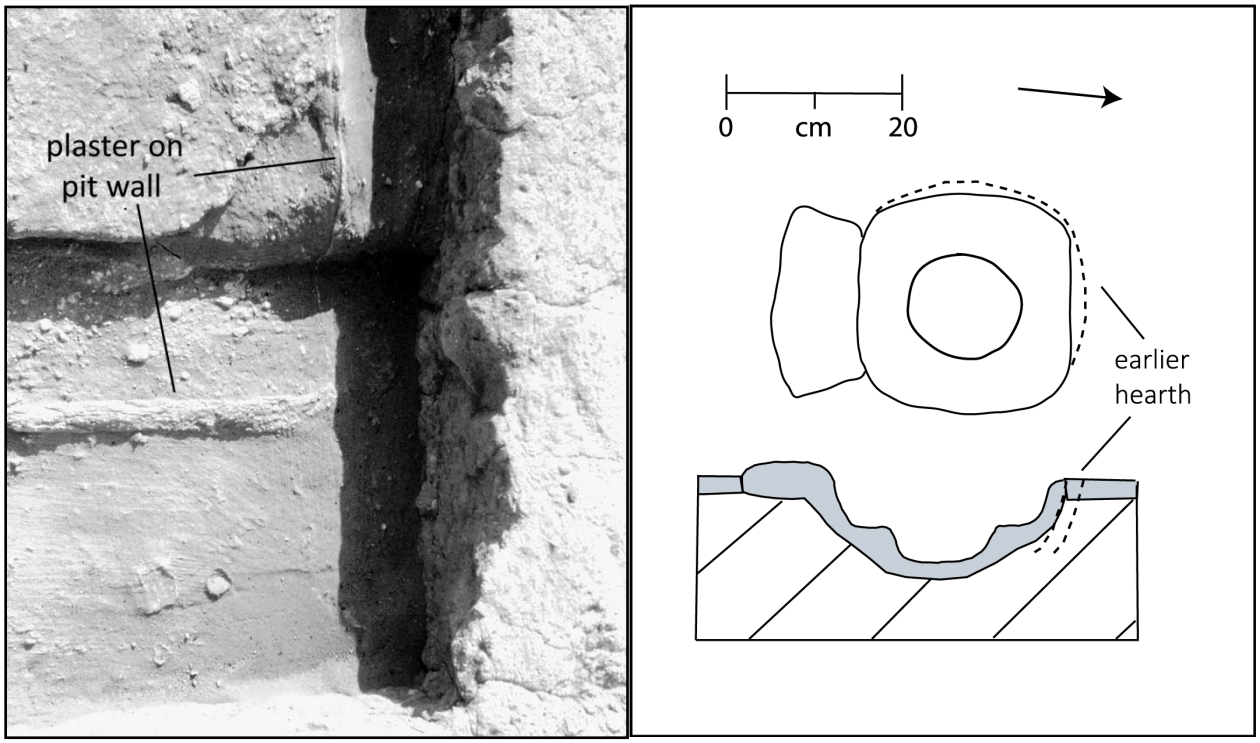


Figure 33. Room 30: *left*, plaster on pit walls of northeast corner; *right*, plan and cross section of hearth.

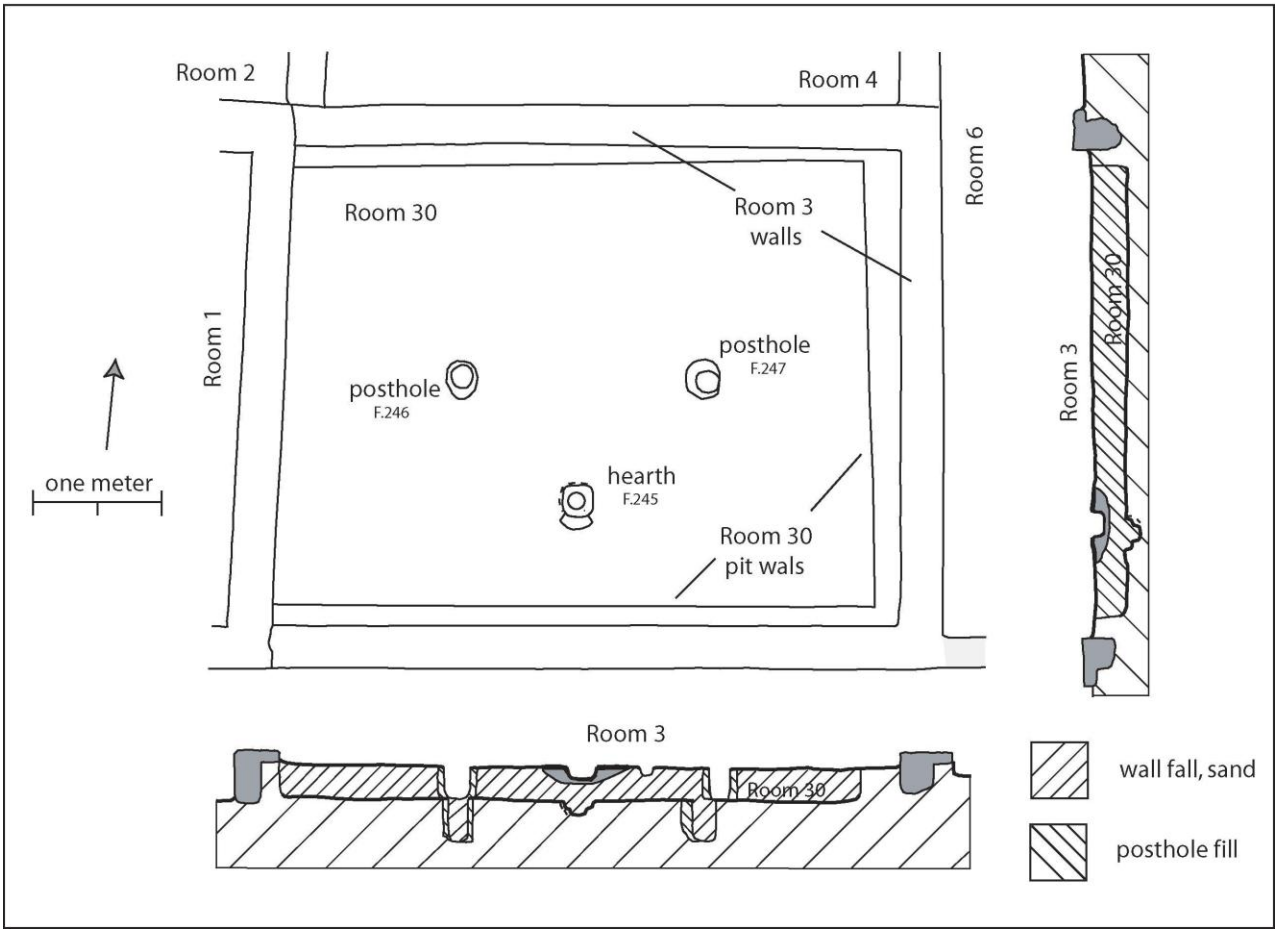


Figure 34. Room 30, plan and cross-sections.

Walls: The above ground walls were removed with the construction of Rooms 1 and 3, and debris from these walls most probably is the principal constituent of the structure's fill. The west pit wall shows 27 cm of exposed soils from the pit excavation and does not have any plaster left on it. Caliche plaster is present on the other three pit walls and varies in thickness. The north pit wall plaster is 0.5 cm thick, the east pit wall has plaster 2 cm thick, and the south pit wall has a 1 cm thick layer of plaster (Figure 33). No evidence for an entry could be found, but the location of the hearth suggests that it should have been on the south side.

Floor: The floor plaster is a mixture of caliche and adobe and is 2-3 cm in thickness. It is in good condition and curves up to meet the wall plaster.

Floor Features: Two superimposed hearths and two postholes were the only features for the floor of Room 30.

Hearths: A 27 cm diameter, circular hearth was near the center of the south wall. It had been lined with 2 cm of caliche and adobe and had a rim even with the floor. Only a portion of the west and north rim was intact, as this hearth had largely been demolished in the construction of a second hearth (F.245) (Figure 33). The later hearth was square with rounded corners and bowed sides and measured 24-25 cm across and 5-6 cm deep. The bottom of the hearth there was a bowl-shaped depression that was 12-13 cm diameter and 4 cm deep, and a 10 cm by 20 cm raised ledge was on the south side. This hearth was

lined with 2-4 cm of caliche and adobe, and the fill of the hearth was like that on the floor with adobe lumps, some sand, and one sherd.

Postholes: Two primary postholes were on the east-west axis of the room. Plaster around the posts and some of the packing material within the holes had been removed, probably when the posts were taken out. This resulted in features with large openings at the top and small, post-sized shapes at the bottom. The postholes were excavated into the underlying caliche layer, had a mixture of caliche and adobe for packing, and were filled with pieces of adobe and sand like the fill of the structure. The west posthole (F.246) measured 26 cm by 31 cm at the top, had a post diameter of 16-17 cm at the bottom, and was 35 cm deep. A shell pendant and a hammerstone were recovered from this feature. The east posthole was 27-32 cm in diameter at the top, had a post imprint in the bottom of 19 cm, and was 32 cm deep. A single sherd was found in this posthole.

Floor Material: Few artifacts were found in contact with the floor plaster. These included sherds and flakes and a small limestone abrader.

Comments: The size and features of Room 30 indicate that it is a domestic room. It is one of two deep sunken floor rooms of the pueblo. The other is Room 1 on the west side of Room 30. These two rooms may have been constructed at the same time or, more likely, Room 1 was built after Room 30. The walls of Room 30 do not have foundation trenches, whereas the walls of Room 1, Room 3, and other definitely later rooms north and east of Room 30 do have foundation trenches for walls. Also, Room 30 is a little smaller than Room 1 and adjacent corners do not align (see Figure 34). Given the differences in wall construction, Room 30 may have been the first room of the pueblo. Room 3 was constructed on the demolished remains of Room 30. Given the absence of debris on the floor or in the fill of Room 30, the construction of Rooms 1 and 3 appears to have followed quickly the razing of Room 30.

Room 30 has its apparent and perhaps short-lived start as an isolated structure, and it shares a number of traits with other isolated rooms at this site. However, one trait it does not share is room size. Room 30 is larger than any of the other isolated domestic and storage structures and compares well with habitation rooms of the pueblo.

Room 32

This is a weathered room north of Room 5 and west of Room 2 (Figure 20). Room 32 is a narrow room, measuring inside about 1.2 m north-south and 4.4 m east west. The floor area is also small, some 5.3 sq m. Given the location, shape, and small size of this room, it likely served as a storage room.

Fill: The uppermost soil is a laminated layer of brown sandy loam with a few caliche pebbles. This layer is 11 cm thick at the north wall of Room 5 and 6 cm thick above the north wall of Room 32. Within Room 32 there is a 4-6 cm layer of adobe with a few caliche pebbles over a 1 cm layer of laminated sands and silt over another 2-4 cm layer of adobe with a fair amount of caliche. These three layers dip slightly to the center of the room. The upper two layers appear to be deposits from erosion of walls. The lower adobe and caliche layer is thought to be the floor that is weathered and in poor condition. Below the floor layer is the natural substrate, a compact reddish brown sandy loam. Some charcoal, spots of gray soil, and a few artifacts occur in the top of the natural soil and reflect activity in the area prior to the construction of Room 32.

Walls: The north wall of Room 5 and the west wall of Room 2 respectfully provide the south and east walls of Room 32. The north wall of Room 32 is yellowish brown adobe with some caliche pebbles. It is quite weathered with a width of 30-32 cm, a rounded upper surface, and a rounded lower surface or bottom of the wall. The bottom of the wall is generally no deeper than the bottom of the floor level, but it could be

found as deep as 2 cm below the floor level. Thus, there is no foundation trench for the wall. The wall is weathered to the floor layer and ranges in thickness from 2 cm to 8 cm. It could be traced westward for almost 4.5 m where it disappears north of the northwest corner of Room 5. Presumably, the wall had turned south at that point to abut the northwest corner of Room 5.

Floor: As noted above, the floor is identified as a weathered 2-4 cm layer of adobe with caliche.

Floor Features: Examination of this room was limited to little more than two square meters. No floor features were encountered in the tested areas.

Comments: Room 32 is a narrow room and lacks a well-plastered floor. No floor features were located in the testing of this room, and few, if any, features might be expected in such a small room. Room 32 may best have functioned as a storage room, possibly associated with Room 5.

Eroded Pueblo Rooms

West of Rooms 5 and 32 and east of Rooms 10 and 12 is a large area where there once was one very large room or two to four moderate to large rooms (Figure 10). Unfortunately, grading and weathering of the area has left little evidence of walls with which to estimate the number of rooms and their size. Nevertheless, the investigation of this area does indicate that the pueblo included this area and rooms to the west.

Fill: A caliche layer is the principal feature of this area. A thin layer of light gray sandy loam with very little charcoal rests on the caliche layer, and above is up to 7 cm of reddish brown sand. Very few artifacts were recovered from these soils.

Walls: Well-defined walls could not be identified in the area. Rather, there are areas of yellowish brown adobe at the same elevation as the caliche layer or 1-3 cm above it. One area includes a few lumps of adobe suggesting a wall heading west from the southwest corner of Room 5. The better example is a linear feature of adobe that is a little over 6 m in length and about 30-32 cm wide and is oriented east-west from the northwest corner of Room 5. Wall foundations were not noted below the caliche layer, and walls for rooms in this area obviously have no foundations or very shallow foundations.

Floors: The caliche layer below the surface soils provides evidence for the former presence of plastered floors in the area. This layer is generally 1-3 cm thick but can be as thick as 7 cm depending on disturbance, erosion, and the presence of lower, earlier extramural features and Room 25. In some places it is a compact layer of caliche mixed with adobe. In most areas it is a thick layer of caliche pebbles with sandier soils. It is important to note that the southern boundary of this caliche layer corresponds with the southern walls of Rooms 5 and 10. Similarly, the northern boundary runs from the northern wall of Room 12 to the northern wall of Room 32 but is not as well defined.

Floor Features: There are only two features that were identified as associated with the caliche layer. Both are in the western half of the area of eroded rooms, and neither of these features help define rooms in the area. One is an unlined, basin-shaped pit (F.398) that is 27-28 cm in diameter and 6 cm deep and filled with a cap of caliche and adobe. The other is a possible posthole (F.397) that penetrates the caliche layer, is 22-24 cm in diameter and 18 cm deep, and is filled with gray sand and some charcoal.

Comments: The caliche layer and remnants of walls provide evidence that rooms once existed between the better-defined eastern and western rooms of the pueblo. The size and number of rooms, however, are unknown. Potentially, there could have been four rooms in the area, and this would bring the maximum number of contiguous rooms of the pueblo to 17.

Sequence of Room Construction

The pueblo began as one room and grew to as many as 15 to 17 rooms. The first room was replaced by two others and rooms were added to the east, west, and north of the two core rooms. The identification of a sequence of room additions was aided by patterns of abutment and bonding at wall junctures and corners and by the presence or absence of foundations for walls (Figure 35). Erosion and recent disturbances had impacted much of the pueblo and inferences on room additions are limited for the western half of the pueblo.

Room 30 could be called an isolated pit room or surface structure in the northern part of the site or Room 30 and Room 1 might have been the first rooms of the pueblo. Room 30 is documented as having had a 30 cm deep and square excavation for the room and plastered floor and pit walls. There are no foundations for walls, and the walls were intentionally removed for the construction of Rooms 1 and 3. The floor and walls of Room 30 are in very good condition and the use of this room seems to have been short-lived. Although the room does not appear to have been occupied long, it was occupied long enough for the hearth to be replaced by another more elaborate hearth. It is also thought that Room 30 was in use until it was demolished. There is no infilling of the room with erosion or a layer of sand or other materials on the floor that might be expected for an abandoned room. Rather, the walls have been collapsed onto the floor and up to the level of the floor for the superimposed Room 3.

The walls of Room 3 parallel and enclose the pit walls of Room 30, and the locations of the hearth and postholes of Room 3 are very nearly the same as those for Room 30. This would suggest that little or no time had lapsed between the demolition of Room 30 and the construction of Room 3 and that the inhabitants of Room 3 likely were responsible for the construction of Room 3.

The relationship of Room 1 to Room 30 is not so clear. The two rooms are of similar depth and look to share a common wall. Their north-south room widths at the common wall are different, and the walls of Room 30 would have abutted the east wall of Room 1 if the two rooms are contemporaneous. However, the walls of Room 1, Room 3, and the other rooms adjoining these two rooms have foundation trenches while those of Room 30 do not. This and the offset north and south walls would suggest that Room 30 was an earlier construction, perhaps with unstable walls, and that it was demolished and followed by the first rooms of the pueblo.

It is obvious that Room 3 was built upon the remnants of Room 30. The lower course of adobe for the north and south walls of Room 3 also abut the east wall of Room 1. Thus, it should follow that Room 3 was added to Room 1. However, the replacement of Room 30 by Room 3 is thought to have been a quick one. If so, and if Room 1 was not a contemporary room to Room 30, then both Room 1 and Room 3 most probably were constructed at the same time.

The above arguments lead to two possible scenarios. First, Room 30 is an isolated surface room that was demolished and replaced by a two room pueblo comprised of Rooms 1 and 3. Second, Room 1 is an isolated surface room to which Room 30 was added and later replaced by Room 3. Given the differences in wall construction between Rooms 1 and 3 and Room 30, and the alignment of walls for Rooms 1 and 3, the first scenario is preferred and is shown in Figure 35.

Room 4 was added to the north of Room 3, and this was followed by the addition of Room 2 to the north of Room 1 and west of Room 4. Both rooms had been constructed over an occupational surface and earlier extramural features. There is some evidence for a doorway between Rooms 3 and 4, and a single household may have occupied this two-room suite. Similarly, Rooms 1 and 2 may have been a two-room suite.

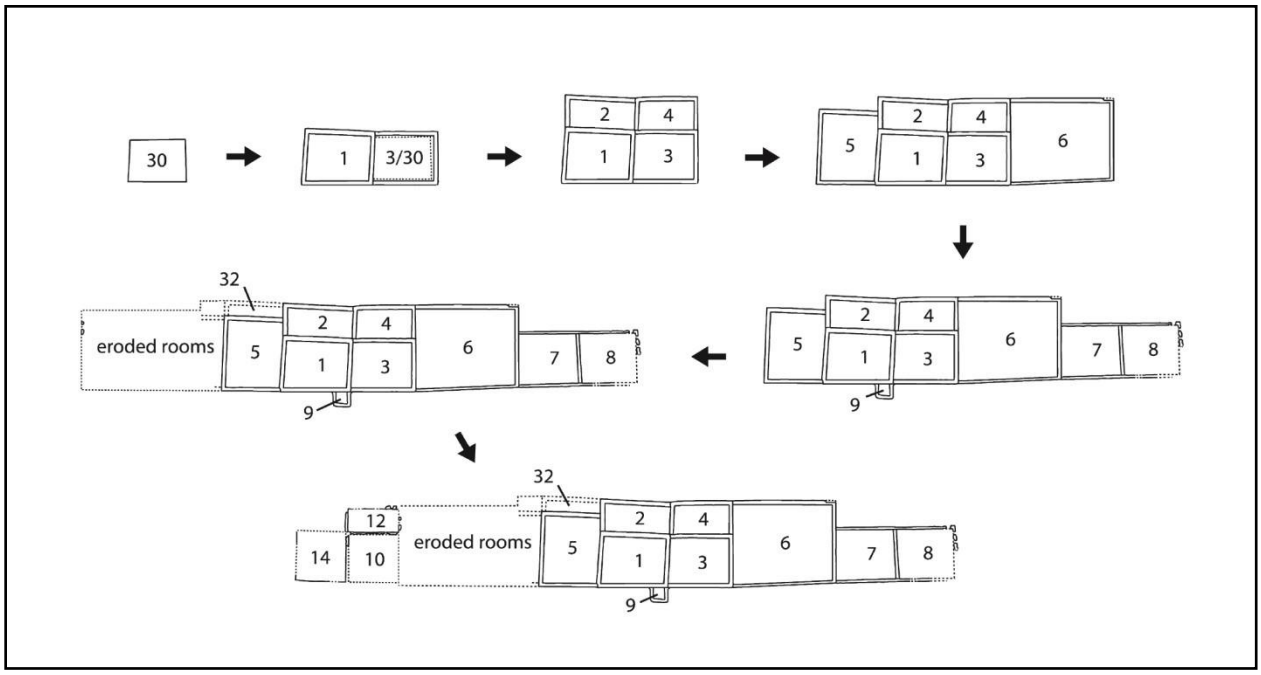


Figure 35. Room addition sequence for the pueblo room block.

The next event is the addition of Rooms 5 and 6 to the pueblo. Room 5 may have first been added to the west sides of Rooms 1 and 2. Then, the addition of Room 6 to the east side of Rooms 3 and 4 would have created a six-room pueblo. Large communal rooms like Room 6 are most common in pueblos of six or more rooms. Room 6 was constructed over a number of extramural features, but no earlier features were evidenced beneath the floor of Room 5.

Subsequent room additions could have been either to the east or to the west. The addition of Rooms 7 and 8 was over extramural features to the east of Room 6 and is shown in Figure 35. At this point the pueblo would consist of eight rooms, all of which have foundation trenches for walls. Room 9 is shown attached to the pueblo at this time, but it could have been added at any time to the south walls of Rooms 1 and 3. The walls of Room 9 have no foundations.

The manner in which rooms were added to the western half of the pueblo cannot be ascertained. Walls in this part of the pueblo lack foundations, many walls have not survived, and wall remnants are too eroded to provide information on wall abutment or bonding. Room 32 was constructed on the north side of Room 5, and an unknown number of rooms were added to west of Room 5 in the area of eroded rooms. Rooms in this area would have been over earlier extramural features and a deep pithouse. It is also possible that one of the rooms was another large room like Room 6. Finally, Rooms 10, 12 and 14 were built at the west end of the pueblo and over two isolated surface rooms and a number of extramural features. Rooms 5 and 32 and Rooms 10 and 12 are examples of other possible two-room suites.

The presence or absence of foundations for walls differentiates the eastern half of the pueblo from the western half. Rooms 1 through 8 have foundations for walls, and Rooms 4, 6, 7, and 8 are further distinguished by having tiered or segmented foundations. Excepting one wall of Room 12, the western rooms have no foundations. These architectural differences may mirror two supra-household social groups comparable to extended family households or lineages. Regrettably, the poor preservation of architectural feature in the western half of the pueblo does not permit further comparisons of the two halves of the pueblo.

Room 30 most probably, but not certainly, was an isolated surface room. It was also not the only isolated surface room or pithouse at the site of Firecracker Pueblo. There are another 19 of these rooms, and all appear to have been occupied before the pueblo. The relationships of these rooms to each other and the pueblo are pursued in the next chapter.

Evidence of Remodeling

There are relatively few instances of the remodeling or modification of architectural elements of rooms of the pueblo. Aside from demolition of Room 30 and the addition of rooms to the pueblo, remodeling was observed for seven rooms and includes the capping of features, the modification of roof supports, the rebuilding of one hearth, the resurfacing of one floor, and the excavation of small pits in floors.

A small pit in Room 14, another in the area of eroded rooms, an adobe-line basin and the north hearth in Room 6, and an informal hearth, a secondary posthole, and a primary posthole in Room 1 were capped with adobe or a mixture of adobe and caliche. Features no longer in use were likely capped to level floors and make spaces useable for other activities. The capping of the primary post hole in Room 1 also appears to have accompanied a change from a single primary roof support to two primary roof supports.

The formal, circular hearth in Room 30 was largely removed and replaced by a sub-rectangular hearth with a cup-shaped pit in the bottom.

The central and sagging floor area of Room 6 was resurfaced with a layer of adobe and caliche over sand. The new flooring covered a central hearth, small pits along the central axis of the room and a number of secondary postholes. This was followed with the addition of a north hearth, small pits along the central axis of the room, a number of depressions and secondary postholes, and an adobe-lined basin. It is surprising that more floors were not patched or resurfaced given the thinness of the floor plaster and the presence of earlier features beneath floors. The eroded and weathered floors in the western half of the pueblo may also have obscured any patches to those floors.

The floors of Rooms 2, 4, 6, 12, and 14 and the surface of the area of eroded rooms each have one small pit excavated into the floor, presumably for temporary storage or disposal of refuse. Two of these pits were later capped.

All in all, there is little evidence for the remodeling or modification of rooms of the pueblo. This would suggest that the occupation was relatively short-lived.

Floor Assemblages

A sizeable number of ceramic sherds, cores, and pieces of chipped stone debitage were found on preserved floors, within floor features, and in the fill on eroded floor surfaces of the pueblo. Ground stone, worked sherds, jewelry, and other objects total only 67. A brief inventory of items can be found in Table 4, along with the number of sherds and cores and debitage per square meter of floor or surface area. Included in Table 4 are assemblages from eroded and disturbed contexts. The eroded and weathered floors of Rooms 10 and 14 and the large area of eroded floors have assemblages that are not unlike those of better preserved rooms. That is, the average number of sherds and lithics per square meter are relatively low and there are few other items. However, Rooms 8 and 12 differ from the majority of other assemblages in having higher densities of sherds. The disturbance of Room 12 with pot hunting and the erosion of Room 8 down to earlier features have evidently mixed floor materials with those of other contexts.

Table 4. Floor Assemblages for Pueblo Rooms.

Room	Floor Area (sq m)	Sherds	Sherds (sq m)	Core & Debitage	Core & Debitage (sq m)	Lithic Tool	Abrader	Mano & Metate Fragment	Hammer - stone	Polishing Pebble	Worked Sherd	Other
1 - floor	19.4	413	21.3	18	0.9					2		1 turquoise pendant 1 worked turquoise 1 shell bead
1 - hearth				2								
1 - secondary posthole		22		7		2				1	1 plate	1 turquoise oval
2 - floor	11.8	35	3.0	3	0.2					1		1 piece red ochre
2 - primary posthole		1		1			1					
2 - pit		2		1								
3 - floor	17.6	126	7.2	6	0.3				1		1 disk	1 gypsum plaque
3 - primary posthole								1	1			
4 - floor	10.8	53	4.9	5	0.5				1			
4 - hearth		1										
5 - floor	24.2	131	5.4	14	0.6	1	1					1 sandstone pendant
5 - primary posthole				9								1 turquoise pendant
6 - upper floor	48.1	498	10.3	96	2.0	1		2			1 plate 1 disk	
6 - hearth		2		2								
6- primary posthole		2					1	1				
6 - secondary posthole		1										
6 - lower floor fill	22.2	81	3.6	15	0.7			1				
7 - floor	17.1	186	10.9	9	0.5		2		2	4	1 utilized sherd 2 palettes	2 pestles 2 pieces of limonite

Table 4. Continued.

Room	Floor Area (sq m)	Sherds	Sherds (sq m)	Core & Debitage	Core & Debitage (sq m)	Lithic Tool	Abrader	Mano & Metate Fragment	Hammer - stone	Polishing Pebble	Worked Sherd	Other
8 - fill*	16.7	103	12.9	5	0.6						1 palette	
9 - floor	0.8	1	1.2	0	0.0							
10 - floor fill	16.1	78	4.8	17	1.1	1			1			
12 - floor fill**	8.1	76	19.0	6	1.5						1 plate	
12 - primary posthole		1		2								
14 - floor fill	16.7	104	6.2	14	0.8	1						
14 - pit		5										
30 - floor	15.8	13	0.8	6	0.4	1	1					
30 - hearth		1										
30 - primary posthole		1							1			1 shell pendant
32 - fill*	5.3	38	9.5	0	0.0							
eroded rooms - fill	81.2	456	5.6	71	0.9		1				1 palette	

* Density calculations adjusted for limited testing of room.
** Density calculations based on area of undisturbed floor.

Little was found on the floor of Room 30. It appears that this room had been well-maintained and that nothing of value was left in the room before it was demolished prior to the construction of Room 3.

Rooms 9 and 32 are small rooms with only a few sherds within them. Lacking floor features, these rooms may have been non-domestic rooms used for storage or other limited purposes.

Room 6, the communal room, is the largest room and has multiple floor features. The fill between the lower and upper floors has relatively few sherds and lithics. The upper floor has a moderate density of sherds and a substantial number of flakes and cores. Refuse was apparently allowed to accumulate on the upper floor. Among the lithic items are a number of obsidian cores and flakes. Other items on the upper floor are comparable to those on presumed domestic rooms.

Rooms 1 through 5 and 7 are rooms of middle size, have a single formal hearth, and are viewed as habitation rooms. Excepting Rooms 1 and 7, there is a smattering of sherds, lithics, and other objects on floors.

Room 1 differs in having a sizeable number of sherds. The majority of these sherds were located in the northeastern quarter of the room, and may were burned when the room burned. As with Room 6, trash was permitted to accumulate before abandonment. Then again, ceramic material may have been stockpiled for other uses. At any rate, there is no evidence for the deposition of trash in the room following abandonment.

Room 7, unlike all other pueblo room assemblages, has noticeable de facto refuse. A sherd with limonite pigment, a sherd pottery scraper, a number of polishing pebbles, and pieces of limonite attest to pottery making at the site. Pestles, abraders, and hammerstones were also left on the floor, as well as six large and unmodified El Paso Polychrome sherds that may have been used as plates. The density of sherds suggests that some refuse was allowed to accumulate on the floor prior to abandonment.

Objects on the floors of pueblo rooms are neither numerous nor varied. They are primarily items discarded with abandonment of the pueblo. An exception is the occurrence of abraders, hammerstones, and ground stone fragments in postholes as shims or base supports for posts. Though few in number, turquoise and shell items on floors and within postholes may be related to ritual actions of dedication or termination of structures.

Room Function

The ascription of function to rooms follows that of elsewhere in the Southwest with the recognition of three functional room types: habitation, storage, and civic-ceremonial (Anyon and LeBlanc 1984; Hegmon et al. 2006; Hill 1970; Lightfoot 1994). Criteria used in differentiating room function often include room size, presence of hearths and other features, and floor assemblages. The identification of functional room types also aids the recognition of households and larger social groupings.

The most abundant room type is the habitation room. These are rooms with floor areas of 8.1 to 24.2 sq m and a single interior, formal hearth. Variable numbers and types of artifacts are additionally present on floors. Rooms 1 through 5, 7, 12, and 14 are the better preserved habitation rooms, but Rooms 8 and 10 are also probable habitation rooms where erosion has removed evidence of a hearth. There are two size categories for habitation rooms: Rooms 1, 3, 5, 7, 8, 10, and 14 at 16.1-24.2 sq m and Rooms 2, 4, and 12 at 8.1-11.8 sq m. The smaller rooms are on the north, back-side of larger habitation rooms (Figure 10). As previously noted, activities in the smaller rooms may have been limited by their size and together with larger rooms form pairs of rooms or room suites of a household. It has also been noted that differences in wall foundations between the eastern and western halves of the pueblo may reflect separate groupings of habitation rooms and, thus, households and perhaps extended families.

Rooms 9 and 32 are potential storage rooms. They are 0.8 and 5.3 sq m in size, respectively. Room 9 does not have a hearth, and Room 32 has no evidence of a hearth though it has suffered from erosion and only a portion of the room was tested. Only a few sherds were found in these rooms. Room 32 may be considered an ancillary room to Room 5, much like the abovementioned suites of rooms. Room 9 is a bit different and possibly may have had a more specialized function. Small rooms or rooms with bins of similar size to Room 9 have been recorded for the Well Site (O'Laughlin 1999) and for Alamogordo Site 1, House 2 (Lehmer 1948). It has been suggested that these small rooms could have been used in keeping turkeys or macaws (Gerald 1963; Lehmer 1948; Miller and Graves 2009). However, there is no direct evidence for aviculture in the Jornada, aside from unidentified eggshell in various contexts.

Room 6 is the largest room and has a floor area of 48.1 sq m. It also has a formal hearth near the south wall, an additional formal hearth for the upper and lower floors, and an alignment of features along the central axis of the room. This room is identified as a communal room. Large, El Paso phase rooms like Room 6 have also been called kivas, clan, and ceremonial rooms (see Marshall 1973; Miller and Graves 2009). Deposits of shell beads have been found below floors of some rooms, but no such caches were discovered at Firecracker Pueblo. Communal rooms occur in pueblos of about six rooms or more, and larger structures may have multiple communal rooms. Room 6 is certainly associated with the eastern half of the pueblo where walls have foundations. It may have been the only large, communal room. However, the havoc of erosion may have removed any sign of a communal room in the western half of the pueblo where walls are predominantly without foundations.

Room 6 is also noteworthy for the two linear arrangements of secondary postholes parallel and near the east wall. Room 1 has three such arrangements of secondary postholes. As noted in the summary on secondary postholes, linear arrangements of secondary postholes have been recorded for other communal rooms and large domestic rooms. This raises the question of whether Room 1 might have served some of the functions of a communal room before Room 6 was constructed. Miller and Graves (2009) have also similarly commented on the role of domestic rooms with linear arrangements of postholes.

Abandonment

Few items of any value were left on floors, and some secondary refuse appears to be present on a number of floors. This would suggest that abandonment of the pueblo was anticipated, planned, and not rapid (LaMotta and Schiffer 1999; Schiffer 1987). The limited de facto refuse would additionally support this view. Planned abandonment over a short period of time has also been inferred from floor assemblages of limited size and economic value for Madera Quemada Pueblo (Miller and Graves (2009) and La Cabraña Pueblo (Foster and Bradley 2021). The floors of Madera Quemada are said to have been relatively clean, and the average number of sherds per sq m of floor area is 40.3 based on total number of sherds for fill and floor contexts and size of the pueblo (Miller and Graves 2009:333, 348). The density of ceramics for combined fill and floor contexts is 12.3 sherds per sq m for Firecracker Pueblo. For La Cabraña, the density of floor ceramics is calculated at 10.0 sherds per sq m, and the density of fill ceramics is 27.9 sherds per sq m (Foster and Bradley 2021:49, 53). The respective floor and fill figures for Firecracker Pueblo are 7.5 sherds per sq m and 4.7 sherds per square m. The density figures for ceramics at Firecracker Pueblo are less than those of the other two Jornada pueblos. The accumulation of secondary refuse in some rooms at Firecracker Pueblo would appear to be comparable or less than that of the other two pueblos where planned abandonment has also been proffered.

The burning of support posts and roofing materials has been noted for Rooms 1 through 6. These rooms include the oldest core rooms of the pueblo and the large communal room. Debris from the burned roofs was found directly on floors, and the burning of the rooms is coincident with abandonment.

Relatively few burned rooms of Jornada pueblos have been reported. Catastrophically burned rooms with large floor assemblages including perishable items are noted for Embree and Robledo Mountain Pueblos (O'Laughlin 1985). Whereas, rooms with roofs apparently burned at the time of abandonment include Room 17, a communal room at Hot Wells Area 1 (Brook 1970; Lowry 2005), several rooms but not the communal room at Twelve Room House Ruin (Moore 1947), the communal room and several surrounding rooms at Madera Quemada (Miller and Graves 2009), and the largest and possible communal room and most other rooms of La Cabraña (Foster and Bradley 2012). Miller and Graves (2009) infer that the burning of rooms coincident with abandonment is an act of ritual termination and that it is associated with communal rooms. Excepting rooms with catastrophic burning events, the intentional burning of rooms with abandonment seems probable. The evidence for communal rooms as the focus of abandonment ritual is interesting but limited by the few known examples of burned rooms.

Miller and Graves (2009) have also promoted the proposition that some objects were deliberately placed on room floors and in floor features as part of ritual closure and abandonment. They report finding turquoise pendants and other pieces of worked turquoise in greater than expected numbers, as well as a small number of shell beads, fossils, pigments, and concretions, on floors and within floor features at Madera Quemada. It is of interest that none of these items were within the communal room.

Foster and Bradley (2021) also note the presence of non-utilitarian items on floors and within one sealed pit at La Cabraña. One of the larger rooms had a shell necklace with a turquoise pendant on the floor. A similar necklace was in another room. Other items on floors and within the pit include a gypsum pendant, a fluorite pendant, other minerals, fossils, concretions, turquoise pedants, and shell beads. Given that La Cabraña had burned, these items too may have been place as part of a termination ritual.

The pueblo of Firecracker has few items that could be considered votive or as having been placed as part of a dedication or termination ritual. A turquoise pendant, a piece of turquoise manufacturing debris, and a shell bead are on the floor in the northeast quarter of Room 1 where there is an accumulation of secondary refuse. An oval piece of turquoise was also found in the northeast quarter of Room 1 in a secondary posthole, and a turquoise pendant was recovered from a primary posthole in Room 5. Other miscellaneous items include a piece of red ochre on the floor of Room 2, a gypsum plaque on the floor of Room 3, an unfinished stone pendant on the floor of Room 5, and two pieces of limonite on the floor of Room 7 among items associated with pottery making. The aforementioned items and their contexts do not provide compelling evidence for their involvement in an abandonment ritual.

Miller and Graves (2009) comment that much of the turquoise from Madera Quemada comes from subfloor contexts, particularly postholes. In addition to the turquoise oval from a secondary posthole in Room 1, there is a turquoise pendant from the northwest primary posthole of Room 5. The condition of the postholes in Rooms 5 and 7 could indicate that posts had been removed at the time the rooms were abandoned and that the turquoise pendent may have been deposited in the posthole of Room 5 as part of an abandonment ritual.

An additional item is of interest, although it is not related to the burning and abandonment of the pueblo. This is a shell pendant that was found in the west primary posthole of Room 30. There was almost nothing on the floor of Room 30. The posts had been removed, and wall material deposited on the floor in preparation of the building of Room 3. Thus, the west primary posthole was sealed and there was little chance of floor material working its way into the posthole. The shell pendant could be an item of dedication for Room 30 or it could have been deposited when the room was demolished.

The placement of items during a ritual of closure is not well-supported by the evidence from the pueblo of Firecracker Pueblo. Still, the documentation of the probable planned abandonment of the pueblo and the burning of the communal room and other rooms adds to the information available for Jornada pueblos.

Finally, it is recalled that a pit in the fill of Room 3 was found to contain 1725 stacked sherds of an El Paso Polychrome jar. This is an obvious post-abandonment feature, but whether it is a prehistoric feature or a more recent deposit could not be determined from the condition of the feature.

CHAPTER 6
ISOLATED ROOMS

A large number of single-room structures have been excavated at Firecracker Pueblo. They are variable in form and size, have plastered floors, and include surface rooms, pit rooms, and deep pit rooms or pithouses. Miller and Kenmotsu (2004) refer to these El Paso phase structures as formal, noncontiguous rooms. For ease of discussion, they will simply be called isolated rooms.

A summary of the architectural details of isolated rooms is provided below and followed by descriptions of each of the rooms. The functions of isolated rooms are considered, and the abandonment and post-abandonment use of isolated rooms is examined. Efforts are expended on identifying coexistent structures and the sequence of occupation for the isolated rooms and the pueblo.

The Architecture of Isolated Rooms

Nineteen isolated rooms were recorded for Firecracker Pueblo (Figure 36). A twentieth isolated room may have been Room 30 in its early history, before it was leveled and superimposed by a pueblo room. Many of these rooms are in a linear arrangement beneath the pueblo and to the west of it. Four appear to form a compound in the southern part of the site. A few seem to not be directly associated with other structures.

Isolated rooms vary from square and rectangular to subrectangular and oval. There is also one round room. They tend to be smaller than pueblo rooms but exhibit a wide range of room size. Two were constructed on leveled surfaces, but the others are the result of excavation into the ground a few centimeters to over a meter in depth. The majority of isolated rooms have formal plastered hearths. Two and four post roof supports are present, but rooms generally lack post supports. Small pits may also occur in the floors of isolated rooms. As will be shown, the architectural variability expressed by these rooms encompasses that known for isolated rooms at other El Paso phase sites (see Chapter 3). The unusual aspect for Firecracker Pueblo is that there are so many isolated rooms.

The condition of these rooms follows that of the pueblo rooms. Several have been impacted by grading of the site which moved the upper fill of Room 13 about and opened Rooms 16, 17, and 23 to accelerated erosion. Past erosion has also removed the above ground walls from all but Rooms 24, 26, and 29. The floor had eroded away from Room 24, and the floors of Rrooms16, 19, and 23 were severely weathered. Trash had been deposited above Room 20, but none of the rooms were disturbed by pot hunters.

Walls

Basal portions of walls are documented for only Rooms 24, 26, and 29. Room 24 has shallow foundation trenches for walls, and it is the below ground portions of walls that survived for this room. Room 29 has wide, 34-38 cm walls, and the thick walls undoubtedly aided their preservation as they have no foundations. Room 26 has two short remnants of walls. The walls of this room do not have foundations and are only 14 cm wide. The other 15 isolated rooms do not have foundation trenches for walls, and erosion has removed all traces of walls and reduced the height of pit walls. Excepting Rooms 24 and 29 where floors are on the ground surface, excavations of variable depth provide the lower walls of the isolated structures and the base for floors (Table 5).

The poor preservation of adobe walls is not uncommon for isolated rooms and pueblos of the El Paso phase. Walls with foundation trenches and wide walls generally preserve better than narrow walls and walls without foundations. The better condition of the walls in the eastern rooms as compared to the western rooms of the pueblo of this site is a good example of this effect. Above ground walls on the edges

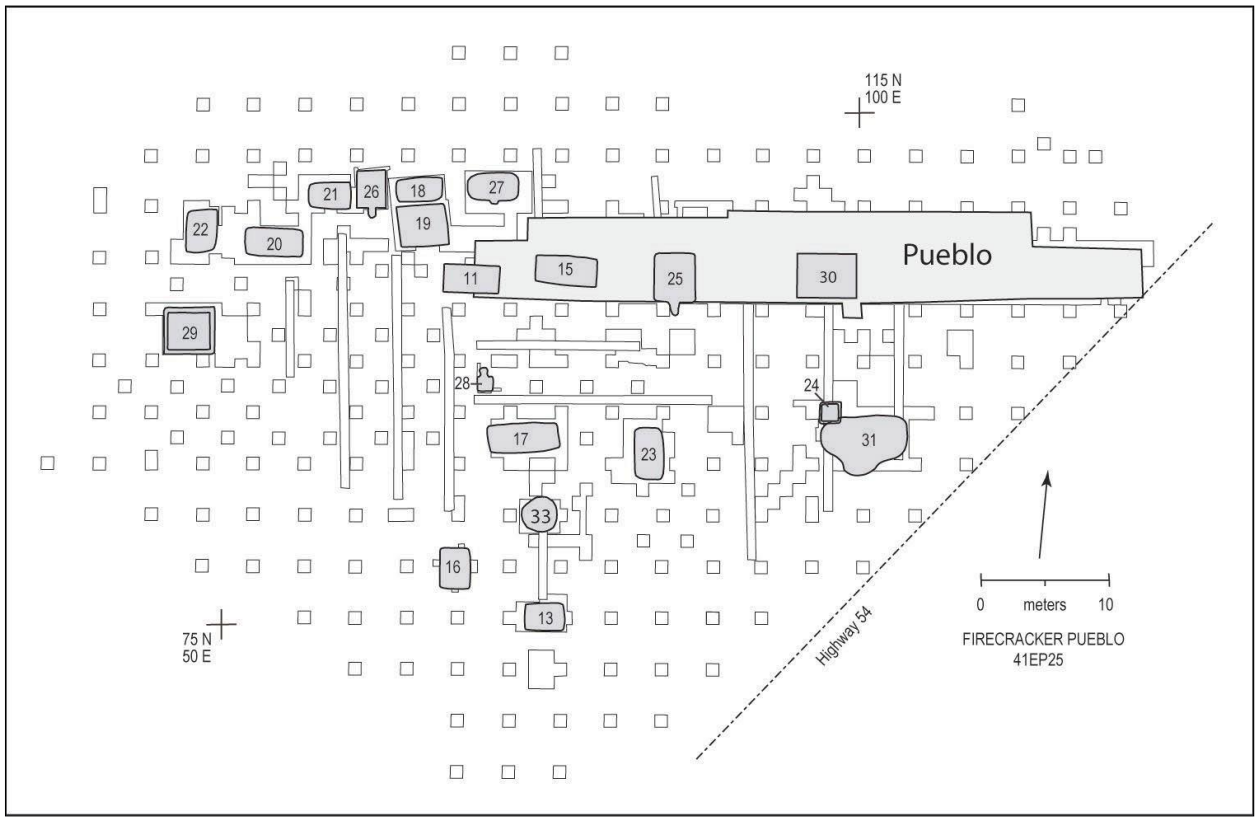


Figure 36. Map of isolated structures, the pueblo, and areas of excavation.

of excavations for rooms are also prone to collapse and enhanced erosion with the slumping of pit walls. Thus, the lack of identifiable walls for most of the isolated rooms at Firecracker Pueblo is not surprising.

Only one of the isolated rooms has a foundation for walls. This might indicate a shortcut or smaller investment of energy in habitations where the occupation was seasonal or anticipated to be short-term. Wall width may also vary with length of occupation. Unfortunately, walls have survived for only three of the rooms and vary in their widths. There are other elements of architect that may reflect on length of occupation and that will be considered shortly.

Wall plaster was found in a number of the isolated rooms. Rooms 13, 20, and 27 were plastered with a thin layer of caliche. Rooms 22 and 25 were deep, and Room 22 had a layer of adobe and caliche plaster while Room 25 was plastered with adobe. The pit walls and the inside and outside of above ground wall remnants of Room 26 were plastered with adobe. Room 28 was unplastered, and Room 29 had smooth but unplastered walls. There was no evidence for wall plaster for the other rooms.

Remains of entries were identified for a number of rooms and have sills that range between 50 and 60 cm. Floor depressions were noted near the doorways for Rooms 17, 18, and 19, and these rooms also have exterior pads of caliche at the entry. Room 27 also has a pad of caliche on the exterior and a low step or ramp within the structure and below the entry. Rooms 22 and 28 have eroded step entries into these deeper rooms. Room 26 has a better preserved step entry with sidewalls of the entry showing plaster. Room 25, the deepest room, has a remarkable step entry with plastered sidewalls and an adobe step on the floor below the wall (see Figure 60). Finally, Room 31 is unusual in having an apparent antechamber

Table 5. Attributes of Isolated Rooms.

Room	Floor Area (sq m)	Wall Width (cm)	Floor Depth (cm)	Primary Support	Secondary Support	Formal Hearth	Other Floor Features
11	9.6	unknown	12-15+	2		2	1 small pit
13	6.9	unknown	4-18+		6	1	1 adobe-lined pit 2 small pits
15	9.8	unknown	17+	2		1	1 small pit
16	7.5	unknown	3+			1	
17	10.9	unknown	9+			1	south entry 1 depression
18	6.3	unknown	20-22			1	south entry 1 small pit 2 depressions
19	11.8	unknown	unknown	unknown	unknown	unknown	north entry I informal hearth 1 depression
20	9.3	unknown	5-10+		10	1	2 small pits
21	6.2	unknown	7-15+	4		1	
22	7.5	unknown	ca 95				1 small pit 3 depressions
23	ca 10	unknown	unknown	unknown	unknown	1?	
24	1.4	17-21	0				wall foundation depth 7 cm
25	10.6	unknown	135	4		1	south entry step
26	6.1	14	28	2		1	south entry 1 informal hearth 1 small pit
27	7.4	unknown	15+			1	south entry step
28	1.3	unknown	80-84				north entry
29	9.5	34-38	0	1	5	2	1 hearth superimposed on earlier hearth 2 small pits
31	22.1	unknown	25	10			south antechamber 1 informal hearth 9 small pits 20 depressions
33	6.1	unknown	53			1	1 small pit 1 depression

through which entry to the structure may have been gained (see Figure 70). Excepting Room 22 which has no floor hearth, rooms with documented entries have formal hearths located nearest to and centering on the wall with the entry. It can be assumed that hearth location tells the location of an entry when there is no other physical evidence.

Roofs and Primary Roof Supports

Rooms 13 and 20 had burned and provide some information on roof materials but little on the arrangements of those materials. Burned lechuguilla and yucca stalks and dropseed grass stems were found in both rooms, as well as cottonwood and mesquite charcoal. Only small pieces of beams were retrieved, and the only measurable piece was cottonwood with a 4-5 cm diameter from Room 13. Room 13 also had some burned adobe above the other roof materials. A few of the stalks in Room 20 were oriented perpendicular to the long axis of the room. Otherwise, there was no particular orientation of the roofing elements. The materials used in roof construction for these two rooms were much like those used in the roofs of burned rooms of the pueblo.

Few of the isolated rooms have primary roof supports. Most rooms are narrow with widths of 2.4 m or less and could have been spanned with beams without the need of substantial support posts and possibly with somewhat shorter or smaller beams. The source of timbers for posts and roofing would have been the Franklin Mountains some 10 km to the west. The construction of narrow rooms may have lessened the cost of acquiring materials for habitations anticipated to be short-term.

There are seven isolated rooms with primary roof supports, and they vary in the number and arrangement of supports. Rooms 11 and 15 are long, narrow rooms with two primary roof supports along the east-west central axis of the rooms, and Room 26 also has two primary roof supports but the room is closer to square. Room 25 is a square room with four primary postholes in a rectangular pattern. Two post and four post patterns are common for rooms of the El Paso phase.

Room 21 is unusual with four postholes in a row near the west wall, possibly to address issues with walls. Room 29 is also unusual in that this square room has only a single primary roof support near the middle of one wall. Room 31 is most intriguing. It is a large subrectangular room with three postholes across the western third of the room and seven postholes or post sockets and miscellaneous depressions between the room and an apparent antechamber. The wall between the main room and the antechamber may have simply been a timbered wall or perhaps a timber and adobe wall.

Floors

The floors of most isolated rooms are much like those of the pueblo. They are a hard, smooth surface of caliche or a mixture of caliche and adobe up to 4 cm in thickness that has been laid on the leveled surface of a room excavation and that curves upward to meet pit walls. Rooms 22, 28, 31, and 33 differ in that the rooms have been excavated into the caliche substrate which was simply leveled for the floor in Rooms 28 and 33 or packed and smoothed for the floors of Rooms 22 and 31. Erosion has taken the floor of Room 24, but evidence suggests that it may have been an earthen floor like the similarly small-sized Room 9 of the pueblo. Room 26 is noted as having three floors. The first floor is a typical caliche floor, but the upper two floors are compact surfaces that are thought to be post-abandonment activity surfaces.

The caliche and adobe plastered floors in Rooms 13, 15, and 18 is thickest around the hearth and tapered toward walls farthest from the hearth. Areas of thin plastered floor in these rooms tend to be uneven and not very smooth and have the appearance of heavy use. Actual degradation of floor plaster from traffic and activities is noted for Room 11 where the floor shows wear around the south hearth and presumed entry to the room. Patching or replastering of floors is not noted for any of the isolated rooms.

Hearths

Rooms 22, 24, and 28 do not have hearths and are likely storage rooms. Room 19 is an eroded room with an informal hearth on the weathered floor. However, it is possible that this hearth post-dates the occupation of the room. Room 31 also has an informal hearth on the floor and near a southern entry to an antechamber. Room 31 is a large room, and the absence of a formal hearth for this room is unusual. A basin-shaped pit excavated into the caliche substrate/floor served as a hearth for Room 33. All of the other isolated rooms have formal hearths with adobe and caliche plaster.

Formal hearths are lined with caliche and a little adobe. They are predominantly circular with steep to sloping walls and rounded bottoms, much like the hearths of the pueblo. The exceptions are the east hearth in Room 11 with a flat bottom and a square hearth with rounded corners in Room18. Rims of most hearths are level with or slightly above the surrounding floor. Most hearths also have a collar of caliche and adobe that extends 4-14 cm out from the rim. The hearth in Room 13 and the south hearth in Room 29 have collars that are 0.5-1.5 cm higher than the surrounding floor, and the collar for the hearth in Room 20 is raised 4 cm. A little ash was found in the bottoms of hearths in Rooms 17, 25, and 26. The fill of other hearths was observed to be the same as that on the floors of the rooms. Also, the south hearth in Room 29 was rebuilt at some point over the earlier circular hearth.

Seven rooms have evidence of doorways, and the hearths in these rooms are nearest the center of the wall with the entry. Hearth location is thought to be a good indicator of where doorways once were present. For the 11 isolated rooms with a single formal hearth, eight are near the south walls, and one hearth is associated with north, east, and west walls. The prevalence of formal hearths and entries on the south sides of rooms is also common for contiguous room pueblos. Rooms 11 and 29 each have two hearths, one near the south wall and one near the east wall. Evidence for entries could not be found for these rooms and it is not known if the locations for entries were changed or hearth location was modified for some reason. The last active hearth is the east hearth in Room 11 and the south hearth in Room 29.

A group of five rooms in the southern part of the site appear to form a compound (Figure 36). The hearths in four rooms are associated with different walls. Room 17 has a hearth near the south wall, Room 16 has a hearth near the north wall, and Room 13 has a hearth near the east wall. Room 23 has suffered from erosion and pieces of burned hearth plaster suggest that the hearth was near the west wall. Hearth location would indicate that entries were toward a common area of the compound that would include Room 33 where the hearth is near the center of the room. It is also of interest that Rooms 16 and 23 have a north-south orientation rather than the typical east-west orientation. Thus, long axes of rooms face the common area.

Secondary Postholes

Rooms 13, 20, 29, and 31 have between five and 10 small pits or depressions of uncertain use but that once may have held secondary roof supports or posts for room furnishings such as racks or bins. A number of the small pits in Room 13 are uncertain and may be nothing more than rodent disturbance. For the first three rooms, these small pits have diameters between 7 and 15 cm and depths between 5 and 28 cm. The features of Room 31 are depressions of 7 to 14 cm in width and 7 cm or less in depth. The fill of these features is much like that on the floors of the rooms. One small pit in Room 20 and two in Room 29 had been capped with adobe. Thus, not all features were likely in use at the same time.

Rooms 13 and 29 do not have an obvious pattern to the arrangement of these small pits. This is also true for some of these features in Rooms 20 and 31; however, there are linear arrangements of small pits in these rooms that could suggest secondary post supports for roofs. Room 20 has four small pits in a line and

following the east-west axis of the room, and Room 31 has five small pits in a north-south line in the eastern part of the room that mirror suspected postholes in the western part of the room.

Small Pits and Depressions

There are 20 small, unlined, non-specific pits within 10 of the isolated rooms. Nine of them are recorded for Room 31 while other rooms only have one or two pits. They are mostly basin-shaped, and there are three pits with slightly undercut sides. Smaller pits are 11 to 24 cm in width and 9-20 cm deep, and larger pits are 28 to 73 cm in width and 9 to 30 cm in depth. Excepting Room 31 for the moment, over half of the pits are capped with adobe. Larger pits tend to be located in corners and along walls away from entries and may have been used for storage. The pit in the northwest corner of Room 15 is noted as having cached within it a mortar, pestle, abrader, and hammerstone. Smaller features favor room centers. In particular, the small pits in Rooms 26 and 29 are in the centers of the rooms and not far from the hearth. Ash and charcoal was found in the pit in Room 29, suggesting its use as an ash pit. Capped pits are mostly filled with adobe, while open pits have the same fill as on room floors.

The nine pits in Room 31 are in the center of the room and along the south wall and divider between the main room and the possible antechamber. Smaller pits are within the central part of the room, while larger pits that include two undercut pits are along the south wall and divider. The fill in these features varies with the fill on the floor of the structure. Room 31 is a large isolated room and possibly a communal room. Communal rooms within pueblos generally have pits and other features along a north-south axis of a room, and it is noted that two of the small pits are aligned on the north-south axis along with an informal hearth and possible doorway.

An unusual adobe-lined pit is in the floor and slightly into the center of the wall opposite the hearth in Room 13. It is oval and with adobe plaster that raises the feature 3 cm higher than the floor and with a collar that extends out onto the floor. There is no evidence that this feature was used as a hearth and it contained a variety of items that included a piece of sandstone, a sherd, a core, and some adobe.

Seven of the isolated rooms have shallow depressions of various sorts. Room 18 has a sizable depression with two parallel troughs that looks to be the result of an overturned trough metate. Room 22 has three small depressions that may or may not be where secondary posts rested on the floor. Room 31 has two, 23 to 33cm wide depressions that are 3-4 cm deep and that may be pot rests. Pot rests are also noted for the pueblo communal room. Depressions are located between hearths and entries in Rooms 17 and 18, inside and next to the entry in Room 19, and in the antechamber and presumed entry of Room 31. A sizeable depression is also between the hearth and south wall of Room 33. One of the large pits noted above is fairly shallow, capped, and between the hearth and suspected entry in Room 20. Some of these entry associated features may be the result of traffic, but some may have been intentional constructions for unknown purpose.

Room Descriptions

Architectural details of isolated rooms are given here and by room number in the order of their excavation. Following these room descriptions, floor assemblage composition, the functions of isolated rooms, abandonment, and post-abandonment use of rooms are discussed. An understanding of the sequence of room occupation is then attempted. The number of isolated rooms is considerable (Figure 36), and identifying contemporaneous isolated rooms is not easy. Other data are brought to bear on this question, including the superpositioning of structures and extramural features, spatial relationships between structures and extramural features, and the distribution of trash and matched fragments of the same ceramic vessel.

Room 11

Room 11 lies below the later pueblo Room 14 and is part of a linear arrangement of isolated structures in the northwestern part of the site (Figure 36). It is rectangular with nearly square corners and is oriented east-west (Figures 37 and 38). Interior dimensions of this domestic structure are 2.18 m by 4.30 m, and it has a floor area of 9.6 sq m. In spite of the intrusion of later features and the presence of earlier subfloor features, the floor of this structure was well-preserved.

Fill: A brown loamy soil with a light gray tint and small pieces of charcoal and caliche pebbles makes up the shallow fill of this structure.

Cut into a portion of the northeast corner is the overlying F.52, a small and non-specific pit. And, a short distance to the west is F.83, a lens of charcoal and burned adobe over the north wall. Both of these features are in a layer below Room 14.

Walls: The surviving walls of Room 11 are 12-15 cm high and are the face of the excavation into a natural, reddish brown sandy loam. Plaster was not found on any of the pit walls, and no evidence remains of the above ground superstructure. While hearth locations might indicate southern or eastern entries, no such entries could be found in the surviving walls.

Floor: The floor is plastered with up to 2 cm of adobe with a high caliche content that curves up to meet walls of the pit excavation. This floor, however, is degraded or worn in the apparent high traffic area around the south hearth and presumed entry and the west-central portion of the structure. Gray ash was noted on the floor in three areas around the south hearth.

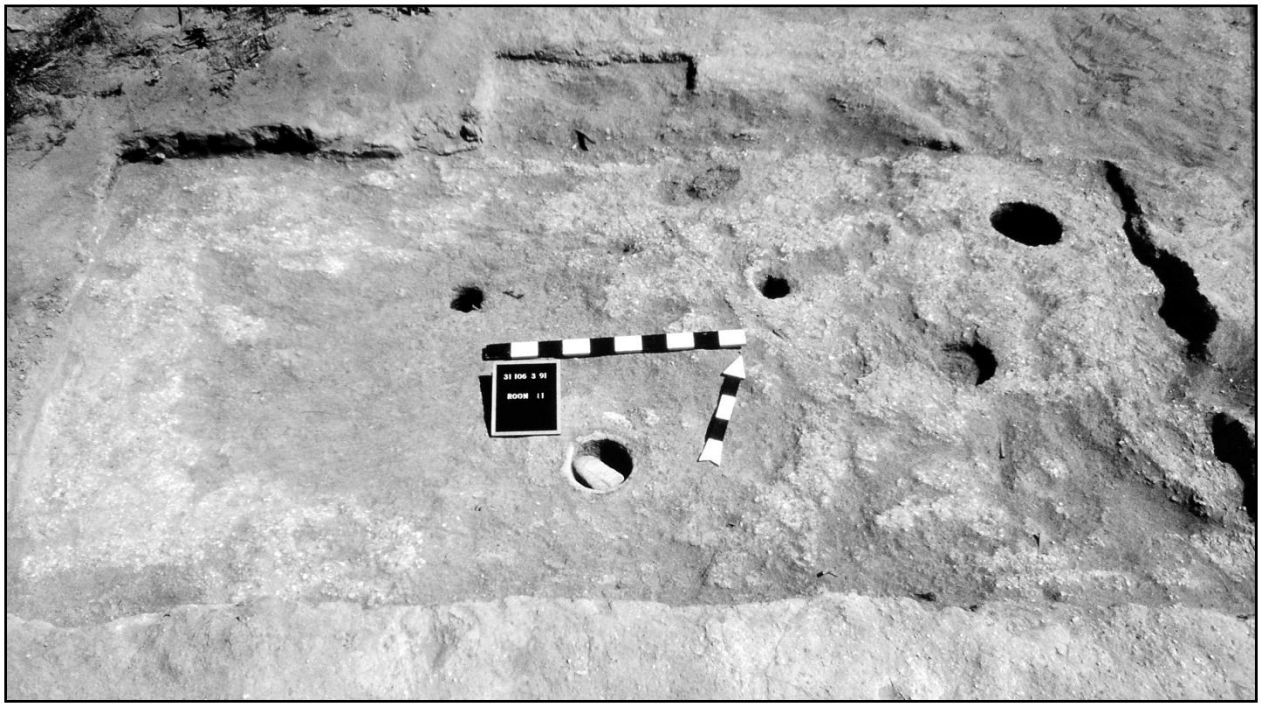


Figure 37. Room 11, looking north at excavated floor features. Note the two manos in the south hearth, the worn floor around the same hearth and west-central portion of the floor, and the broken floor in the southeast corner above an earlier pit.

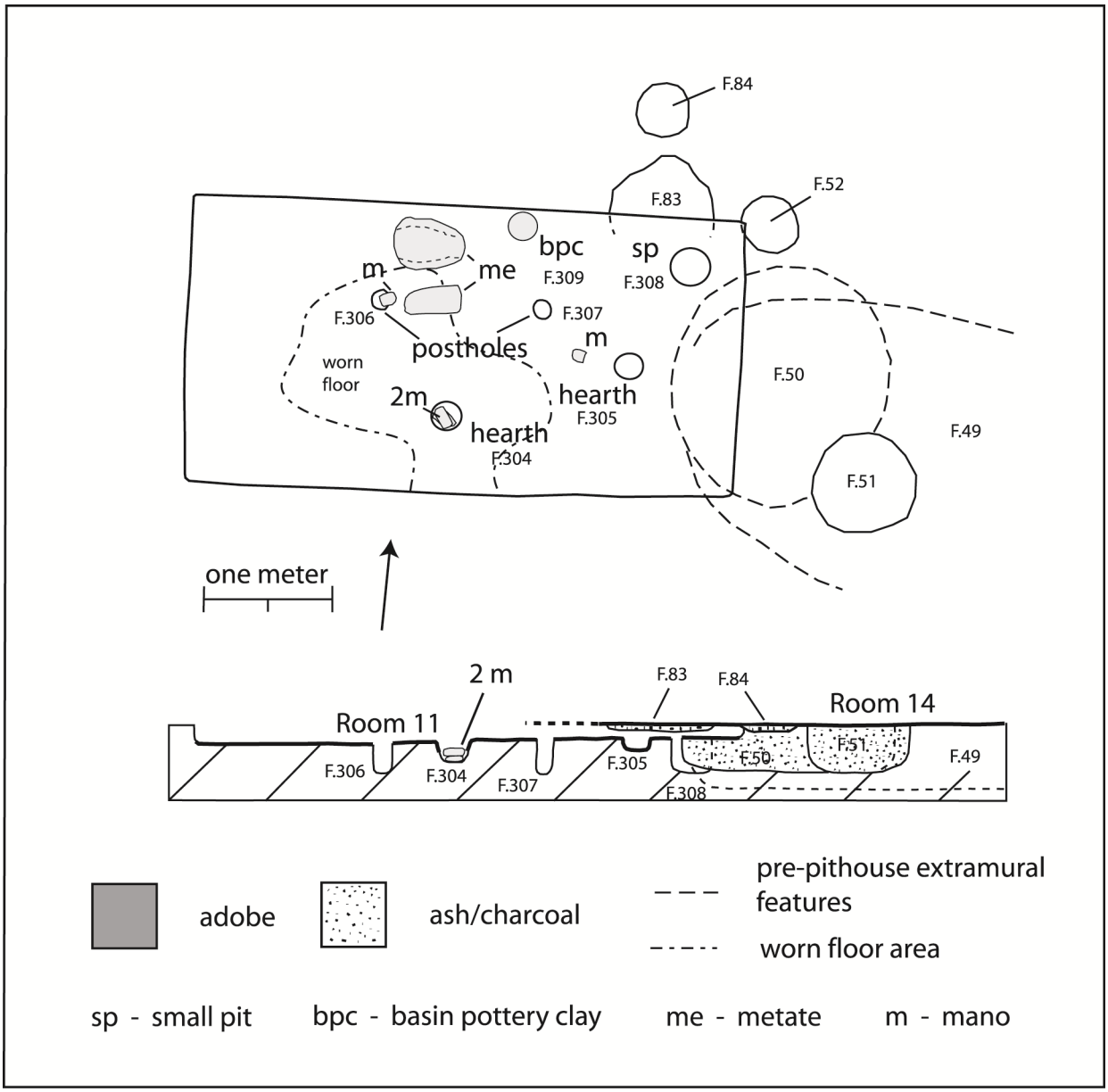


Figure 38. Room 11, plan and section.

Floor Features: Floor features include two small postholes, two adobe-lined hearths, and a small, non-specific pit.

South Hearth: This hearth (F.304) is near the center of the south wall and has a diameter of 22 cm, with a rim flush with the floor and straight sides rounding at the bottom (Figure 39). It is lined with a blackened and up to 1 cm thick layer of caliche and adobe and was once about 9 cm deep. The bottom has been broken away to produce a 16 cm deep pit. Two manos rested on the bottom of this feature and the fill was grayish brown sand with some charcoal.

East Hearth: Located near the center of the east wall, this hearth (F.305) is 23 cm in diameter and 9 cm deep. The walls slope steeply to a flat bottom, and the rim is flush with the floor. It is plastered with 1

cm of adobe and caliche that is fire-blackened and contained only grayish brown soil with specks of charcoal.

Postholes: Two small postholes are located near the east-west axis of the room. Both are straight-sided, have rounded bottoms, and are excavated down to the subsurface caliche layer. The western posthole (F.306) is 13-14 cm in diameter and 24 cm deep, and the eastern posthole (F.307) is 13-15 cm in diameter and 28 cm deep. The fill of these features was like the fill of the structure.

Small Pit: A circular, unlined pit (F.308) of 28-31 cm in diameter and non-specific function was located in the northeast corner. It has straight sides, a rounded bottom and was cut into the underlying caliche to a depth of 28 cm. This unlined pit has a fill of brown sandy loam with specks of charcoal and a few small pieces of burned adobe.

Floor Materials: Unlike most isolated structures and pueblo rooms, Room 11 had a number of floor artifacts (Figure 39). In addition to the two manos in the south hearth, two other manos (one also showing use as a pestle), a trough metate, and a slab metate were on the floor in the central area of the structure. Other smaller artifacts included a piece of specular hematite and a hammerstone in each of the northwest and southwest quadrants of the structure and a scoria abrader, a possible polishing pebble, a piece of malachite and two fragments of clay with basketry impressions in the southeast corner. Thirty-nine large flakes were near the south hearth, and three large sherds of an El Paso Polychrome bowl were around the east hearth.

A curious feature is present next to and near the center of the north wall. Resting on a thin layer of ash on the floor, it consists of a very shallow basin of clay some 24 cm in diameter, 1.5-2 cm in thickness and 1.5 cm in depth. The clay is yellowish brown in color, is tempered with crushed rock, and has the appearance of potter's clay. The thickness of this clay basin and non-smoothed surfaces argues against the remains of an unfired vessel. However, it could be the remains of the bottom of a large and unfinished jar or, possibly, a support for vessels during their manufacture. The clay is also similar in appearance to the clay of the unfired bowl found in Room 26.

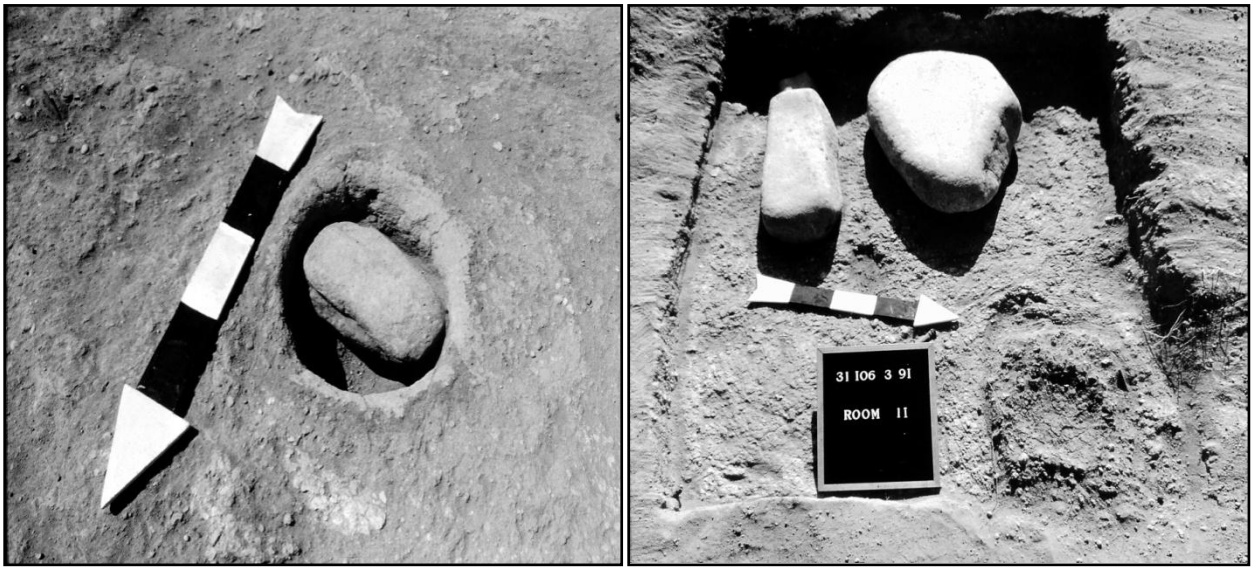


Figure 39. Room 11 floor materials: *left*, two manos in south hearth; *right*, basin of potter's clay and two metates next to north wall.

Comments: Room 11 is remarkable for the variety of artifacts on the floor that suggest a range of domestic activities. No other isolated structure or pueblo room has a comparable floor assemblage. The presence of grinding implements could also suggest that they were cached for some anticipated future use. A similar cache of stone implements is noted for Room 15.

Room 13

This structure is located in the southern part of the site where five isolated rooms form a cluster separate from others (Figure 36). It measures 3.13 m by 2.33 m, has a floor area of 6.9 sq m, and is oriented east-west. This rectangular room has outward bowing pit walls and slightly rounded corners. The hearth is situated closest to the east wall, suggesting a possible east entry (Figures 40 and 41). In spite of grading of the area, the structure is well-preserved.

Fill: Excavation revealed some 22 cm of recent, reddish brown sands with some glass and Styrofoam over a dark gray loam with much charcoal inside the room. The area had been graded, but the structure did not appear to have been exposed for long.

The upper fill within the structure was a 2-6 cm layer of the dark gray loam with pieces of charcoal, occasional stems of dropseed grass, numerous loose common beans in the northeast corner, and maize cob fragments and kernels mostly in the central and northern part of the room (Figure 41). Mixed with this layer and mostly below it, there was a 2-4 cm deposit of brown to reddish brown, soft adobe. Together, these two layers made up the remains of a burned roof.

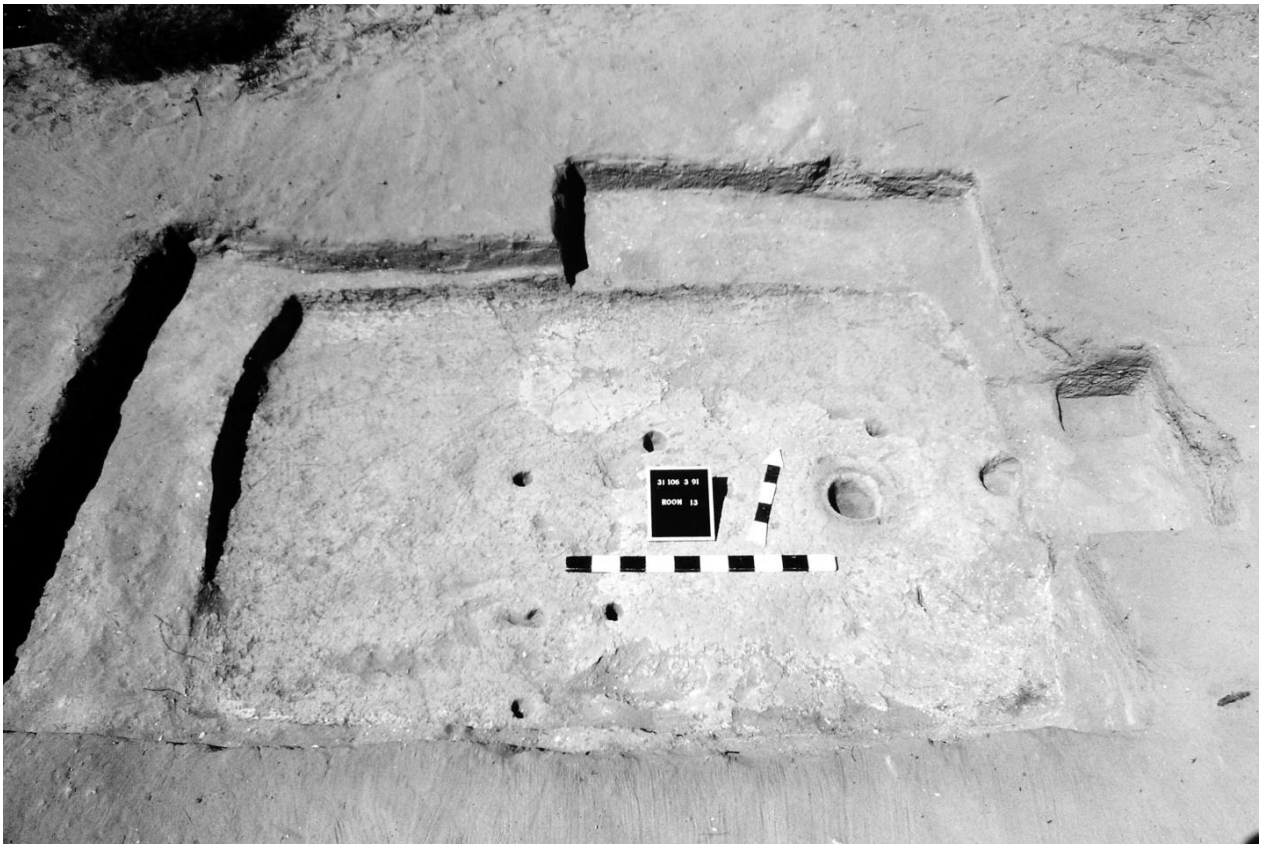


Figure 40. Room 13, looking north at excavated floor features prior to the excavation of two capped subfloor pits. Note the better condition of the floor plaster around the hearth.

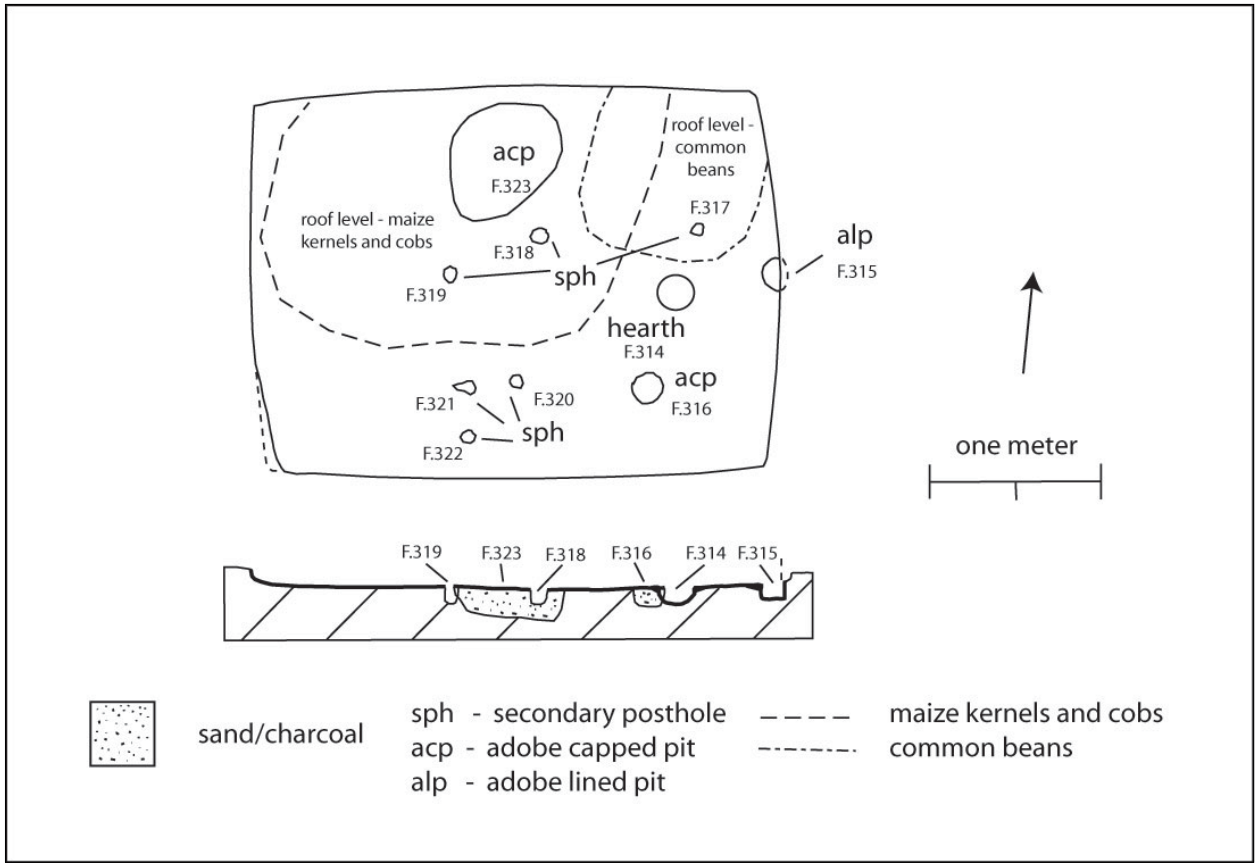


Figure 41. Room 13, plan and cross section.

The lower fill beneath the roof material was a soft, dark sandy loam of some 2-6 cm over 0.5-1 cm of ash on the floor. Charcoal was scattered in the lower fill, and there were patches of burned dropseed stems in the southeast and southwest corners. Common beans were again common in the northeast corner. However, maize cob fragments and kernels were scattered throughout the fill but were fewer in number than in the upper fill. Neither beans nor maize were definitely associated with the floor, though a few items were found in contact with the floor. In addition to maize and beans, fragments of gourd rind were noted in the lower fill.

Walls: The surviving walls of Room 13 are 4-18 cm in height and are very slightly outward leaning surfaces of the pit excavation into a reddish brown sandy loam. No evidence of adobe walls or posts for a jacal structure could be found. The pit walls are plastered with 1-3 mm of caliche that laps on to the floor plaster. Hearth location suggests an east entry, but no trace of an entry could be identified in the low remaining wall.

Roof: There were no intact portions of the roof or large pieces of beams. The charcoal, however, indicates that cottonwood and perhaps mesquite comprised the heavier elements, with the largest observed diameter being no more than 3 cm. Lechuguilla and yucca stalks made up the lighter elements, and dropseed grass was likely used to cap the structural elements. On top of the framework, a layer of adobe was apparently added. However, the few bits of burned adobe in the fill of the structure showed no impressions of roofing materials.

Floor: The floor was packed adobe and caliche. Around the hearth it was 1-3 cm thick, smooth, and in good condition. Elsewhere, it was 1 cm or less, worn, and showing the underlying substrate (Figure 40). The floor sloped a bit from the center of the room to the corners, and the floor plaster curved to meet the walls.

The smooth and thick plaster around the hearth and eastern part of the room may well be the result of adding new plaster to a worn floor. However, only a single layer of plaster was observed and the lined features show no repair or modification.

Floor features: Room 13 has a variety of floor features. There is a hearth near the center of the east wall where there is an adobe-lined pit. There are also six possible secondary postholes and two adobe-capped pits.

Hearth: The hearth (F.314) is 17-18 cm in diameter and 9 cm deep with slightly sloping sides and a rounded bottom. It has a lining of 1-1.5 cm of adobe and caliche. The rim is 0.5-1 cm higher than the surrounding floor and is finished with adobe and caliche 1-3 cm thick and up to 14 cm from the lip. The fill of the hearth is the same as the lower fill of the room, a dark gray sandy soil with scattered bits of charcoal.

Adobe-lined Pit: Near the center of the east wall and extending a little into it, there is an oval, adobe-lined pit (F.315). It is 17 by 21 cm in plan and 8 cm deep and has vertical sides and a nearly flat bottom. The brown adobe that lines the pit and forms the rim of the feature extends 10-14 cm out over the plastered floor and gives a 3 cm slope to the rim from the floor. The upper fill of this pit has 3-4 cm of gray soil and charcoal like the lower fill of the structure. This is followed by a tabular piece of sandstone, a core, a sherd, and some brown adobe. The bottom of the pit has a small amount of ash over a thin layer of a brown sandy loam. Although this pit is lined with adobe, there is no indication of it ever having been used as a heating feature.

Secondary Postholes: A total of six small pits or possible secondary postholes were noted. F.320 was the most definite. It was cylindrical with a tapered bottom, was 7-8 cm in diameter and 9 cm deep, and had a fill of dark gray soil with some charcoal. The other five questionable postholes were difficult to define, had dark gray soil only for the first 1-2 cm and then a reddish brown sandy loam. All of these features were possibly the result of rodent or root disturbance. Four of these had diameters of 7-8 cm and depths of 5-9 cm. The fifth (F.321) had an elongated opening of 9 by 11 cm and a depth of 10 cm. The side walls and bottoms of these five questionable postholes were uncertain. One sherd was present in F.317, and a single flake was retrieved from F.321.

Adobe-capped Pits: There are two capped and unlined pits in the floor of this structure. F.316 is in the southeast corner of the structure, is circular with a diameter of 18-19 cm, and has sides sloping to a shallow rounded bottom at a depth of 9-10 cm. The bottom has 1-2 cm of brown sandy loam with specks of charcoal and one sherd. Above this layer is a cap of 8 cm of brown adobe finished at floor level. F.323 is near the center of the north wall, is basin-shaped with irregular sides and bottom, has a 65 by 73 cm caliche cap that is 0.5-1.5 cm thick, and has a depth of 16-22 cm. The fill of this pit is a brown sandy loam like the substrate, only softer. One sherd, one flake, and a few pieces of charcoal were recovered from this feature.

Floor Materials: Although Room 13 burned, there were few artifacts on the floor. Aside from a core and fragment of ground stone, there was only an occasional sherd or flake. Even the burned perishable materials appeared to be associated with the roof.

Roof Materials: Mention has been made of the common beans, maize cob fragments and kernels, and gourd fragments associated with the burned roof. Other items mixed with the burned materials include an *Olivella*

shell bead, a projectile point and two ground stone fragments that appear to be part of the same quartzite lapstone. The ground stone fragment on the floor also appears to be part of the quartzite lapstone.

Grading of the area is believed to have pushed the upper fill of Room 13 and some of the burned roof debris to the north and south of the room. With respect to specimens collected during excavation, the total number of cultivated beans and maize kernels found in the room is 9,498 and represents 93.9% of common beans and maize kernels from the site. Beans and maize kernels are also fairly numerous in disturbed soils within 8 m to the north and 7 m to the south of Room 13 and constitute 64.6% of beans and maize kernels for macrofloral specimens at the site and outside of Room 13. It is believed that the beans and maize kernels from these disturbed soils are from Room 13. Additionally, an area of dark, disturbed soils above extramural feature F.117 and isolated Room 33 produced a high number of maize kernels and beans, and above F.117 there was found a concentration of burned ornaments that are thought to have come from the layer of burned roofing in Room 13. The ornaments include 53 tubular, fossil branch coral beads, 10 *Olivella* shell beads, seven shell disk beads, five bone rings, and one quartzite pendant. An obsidian projectile point was nearby in the same soil.

Comments: Room 13 is a burned isolated structure and appears to have been used in its final days for storage or drying and processing of crops. Maize cobs with kernels and loose cultivated beans were recovered in the fill and in association with roof materials. It would seem that these crops were either on the roof, suspended from the roof, or both. Given the burning of the structure, the lack of artifacts on the floor follows its apparent non-domestic use. Also, the capping of floor pits may have facilitated its storage function. However, the plastered floor and floor features would indicate that it was first used for habitation.

There is also the possibility that the burning of Room 13 was intentional and part of an abandonment ritual. The beans, maize, projectile points, and ornaments may have been offerings associated with ritual closure of the structure.

Room 15

Room 15 is at the eastern end of a linear arrangement of isolated structures and is superimposed by Room 10 of the pueblo (Figure 36). It is rectangular with square to slightly rounded corners, measures 4.76 m by 2.12 m, and has a floor area of 9.8 sq m (Figures 42 and 43). The orientation of the structure is east-west. Little remains of the pit walls, but the floor is in fairly good condition. This structure rests on an earlier pit (F.53). Lying on top of the southwestern corner is F.85, an informal hearth with ash and charcoal.

Fill: The fill of this structure was largely a gray sandy soil with little charcoal and few artifacts. Recent and small areas of disturbance had brown sand. A darker, 1-3 cm layer of sand with little charcoal covered the floor.

Walls: This structure was excavated into a somewhat compact reddish brown sandy loam. The pit walls of the southeastern corner have a remaining height of 17 cm. While in the northwest corner, the walls have been reduced to the floor level. No evidence of adobe walls or exterior posts could be found, and there is no indication that the pit walls had been plastered. Similarly, no entry to the structure was located. Though, an entry in the south wall would be suggested by the location of the hearth.

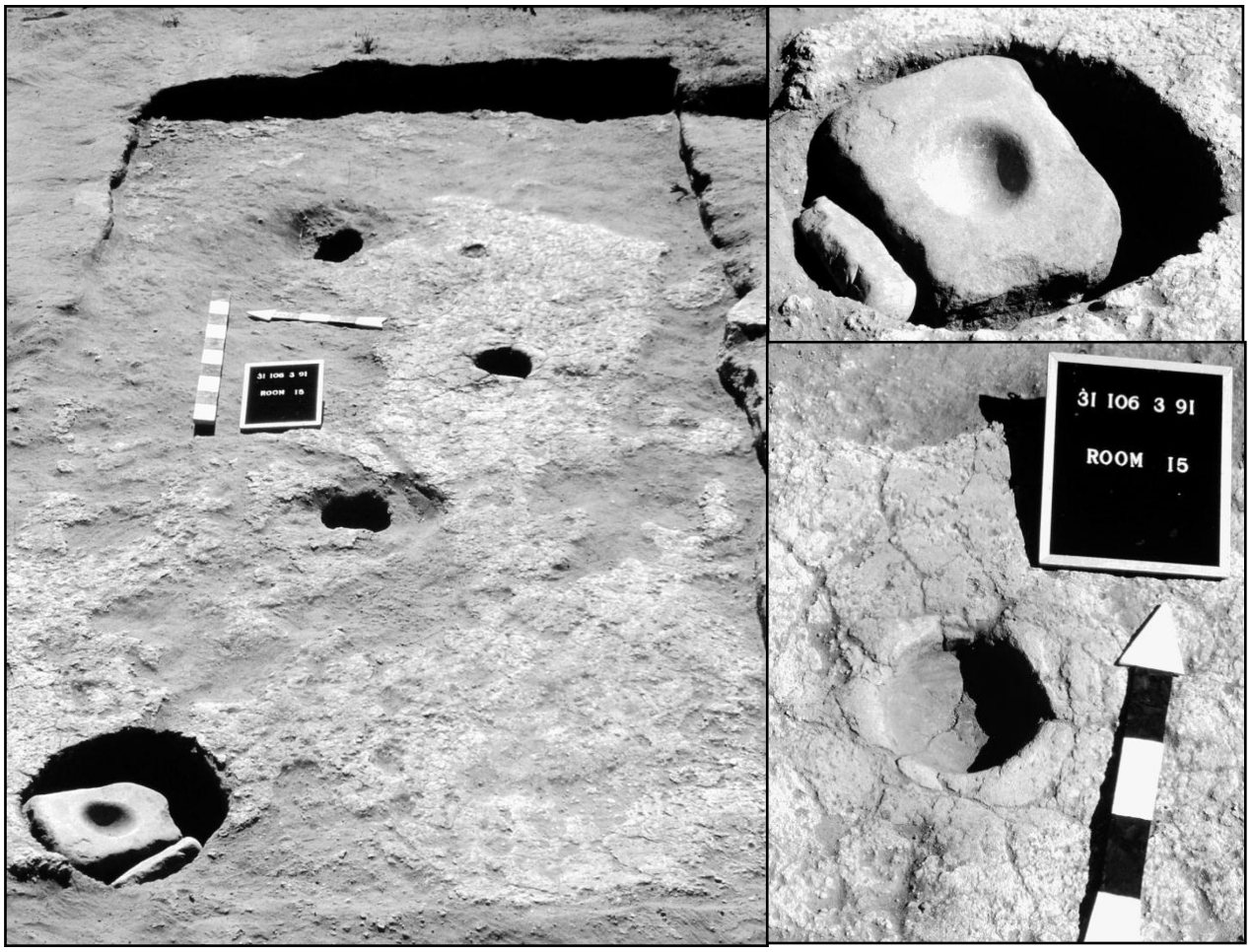


Figure 42. Room 15: *left*, looking east at excavated floor features: *lower right*, hearth; *upper right*, mortar and pestle in subfloor pit.

Floor: The floor is smoothly packed caliche. It is 3 cm thick near the hearth and thins to 1 cm towards the east, north and west pit walls where it shows some wear. The floor plaster curves to meet the walls, and the floor slopes slightly to the center of the structure.

Floor Features: A hearth, two postholes, and a small pit were recorded for this structure.

Hearth: The hearth (F.325) falls on the north-south axis of the structure and closer to the southern pit wall. It has nearly straight sides and a shallow, rounded bottom, measuring 18-19 cm in diameter and 11 cm deep (Figure 42). It is lined with 2-5 cm of adobe with caliche, and has a collar up to 6 cm wide and flush with the floor. The sides of the hearth were blackened, but it contained only dark sand and a little charcoal like the soil on the floor.

Postholes: There are two questionable postholes near the east-west center line of the room. Both have a fill of brown sandy loam with a few specks of charcoal. This fill soil is similar to the substrate, and a cylindrical form is uncertain. The west posthole (F.326) is 17-20 cm in diameter and 27 cm deep. The east posthole (F.327) is 18-20 cm in diameter and 19 cm deep, and two sherds were also found in its fill.

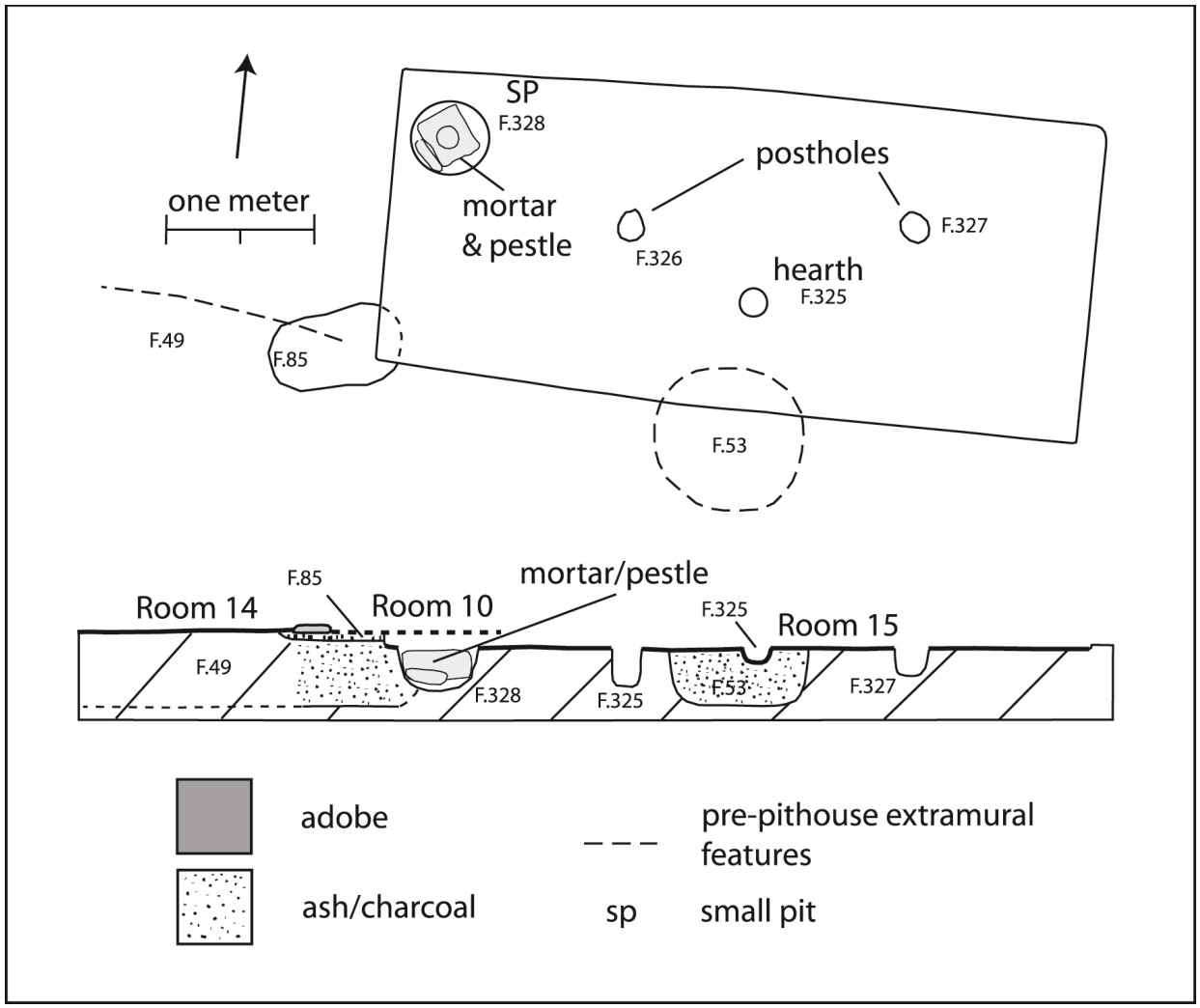


Figure 43. Room 15, plan and cross section.

Small Pit: A basin-shaped, unlined pit (F.328) with a diameter of 50-51 cm and depth of 30 cm was situated in the northwest corner. There was 5 cm of dark gray soil with charcoal on the bottom, and the sides of the pit were tinted red, possibly from the burning of the room. Above this soil, a hammerstone, a fragment of a sandstone abrader, a pestle, and a mortar had been placed in the pit (Figure 42). Brown sand, caliche pebbles, and some charcoal surrounded these objects.

Floor Materials: Besides the stone objects in the pit, there was little to note of materials on the floor. In addition to a few scattered sherds and flakes, there was a drill, a core, and the midshaft of a bone awl.

*Comment*s: Room 15 shares a number of features with other domestic structures at this site, including a plastered floor, hearth, and comparable floor area. As with Room 11, this structure stands out from others by the caching of ground stone tools for presumed use at another time. Room 15 may also have burned as seeds and stems of dropseed grass, possibly from the roof, were found in a flotation sample from the floor, as well as flotation samples from the hearth and floor pit. Mesquite and datil seeds and bottle gourd fragments were also recovered from the samples.

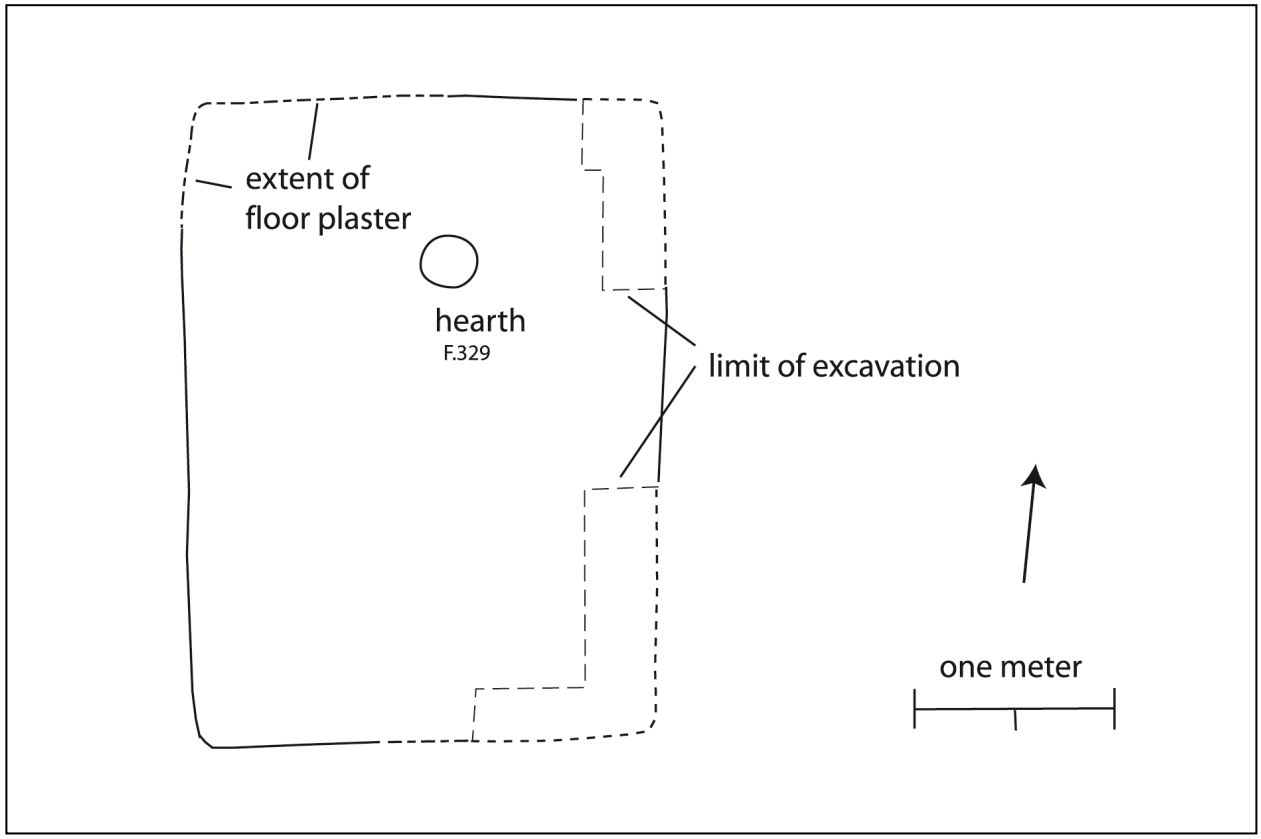


Figure 44. Room 16, plan.

Room 16

This room is the westernmost structure of the group of five isolated structures in the southern part of the site that includes Rooms 13, 17, 23, and 33 (Figure 36). It is rectangular with slightly rounded corners, oriented north-south, and measures 3.23 m by 2.40 m with an area of 7.5 sq m (Figure 44). Grading of the area around this structure and subsequent erosion left little more than the floor.

Fill: The soil above this structure had been graded to within 2-3 cm of the floor. Wind erosion then concentrated pebbles at this surface, upon which 30 cm of aeolian sands accumulated to a depth of 30 cm. The remaining fill on the floor was a light gray sandy loam with a few specks of charcoal.

Walls: The pit walls were difficult to define due to their reduced height of no more than 3 cm. Indeed, the north and east wall locations were suggested only by the extent of the floor plaster. No wall plaster was noted, nor any indication of adobe walls or other wall construction. Given the location of the hearth, an entry in the north wall is likely. Though, this cannot be confirmed as too little of the north pit wall survived.

Floor: The floor is not in much better condition than the walls. It is packed adobe and caliche some 1-3 cm thick. However, it is so worn or weathered that no smooth surfaces could be found and the granular caliche formed a pebbled surface in contrast to the adobe.

Floor Feature: A hearth (F.329) is the only floor feature that was recorded for this structure. It is located near the center of the north wall and is lined with caliche that is 1-1.5 cm thick. The diameter of this circular hearth is 23 cm, and the wall slope toward the bottom. The bottom, however, is missing at a depth of 9 cm.

A collar of caliche and adobe up to 4 cm wide is around the rim of the hearth. Like the floor, the collar and rim show wear or erosion, but the rim appears to have been just slightly higher than the floor. The fill of this feature was the same as on the floor of the room.

Floor Materials: A small number of sherds and flakes were in the fill on the floor. The only other object was a core.

Comments: Although Room 16 is not well-preserved, it does have the form, size, and hearth of other domestic structures.

Room 17

This structure is the northernmost of a group of five isolated rooms in the southern part of the site (Figure 36). It is a long and narrow, rectangular structure, with dimensions of 5.47 m by 2.18 m and an area of 10.9 sq m (Figures 45 and 46). Orientation of the structure is east-west. It was found to be in fair condition and with few floor features.

Fill: Two strata were recognized: an upper layer of loose, reddish brown aeolian sand some 3-11 cm in thickness; and a lower layer of light to dark gray sandy soil with occasional pieces of charcoal, a fair number of artifacts, and a thickness of 6-9 cm. On top of this dark soil were two patches of caliche. The dark soil helped define the extent of the room and rested on the floor.

Walls: This structure had been excavated into the compact, reddish brown sandy loam substrate. However, wall faces of the excavation were not clearly evident and their locations were determined largely by the extent of the caliche floor and the gray soil of the fill. The depth of the gray soil would indicate that the excavation was at least 9 cm. No wall plaster was observed, and no adobe wall stubs or exterior postholes were noted. However, caliche was found in the upper fill and scattered up to 3 m south of the structure and could have been material eroded from upper walls of the structure.

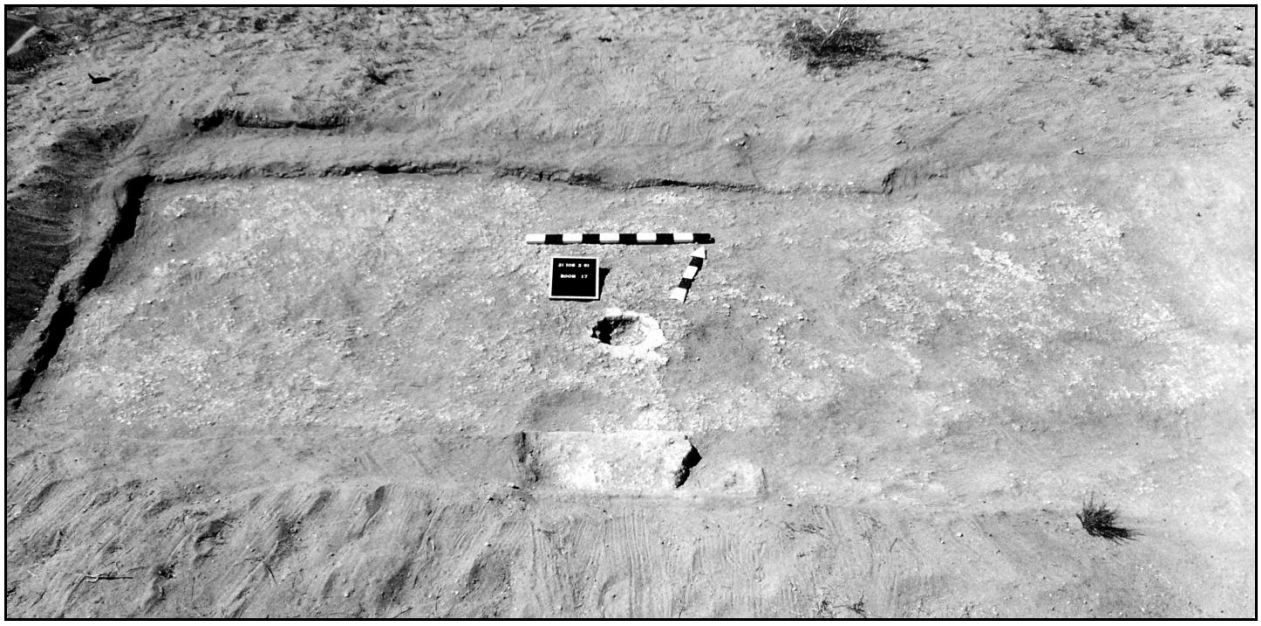


Figure 45. Room 17, looking north at excavated floor features. Note the plastered entry in south wall.

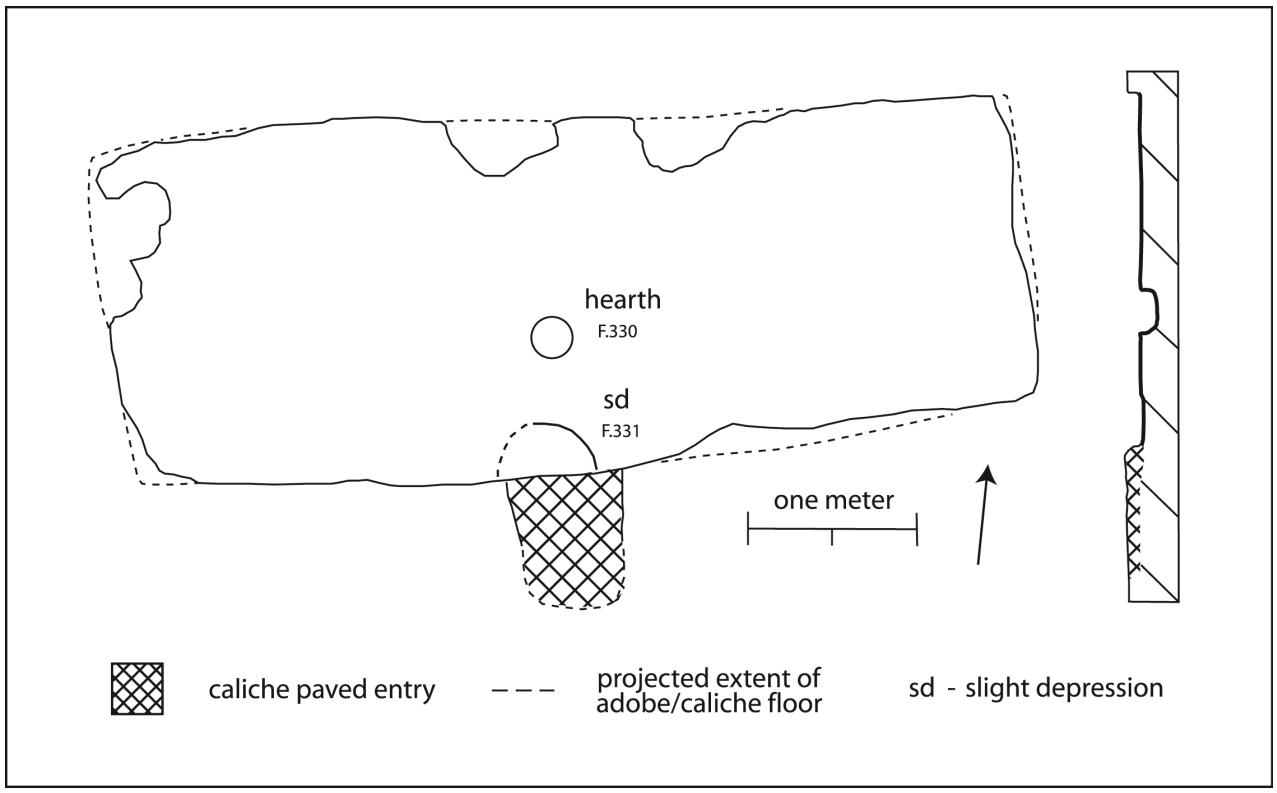


Figure 46. Room 17, plan and cross section.

Entry: An area of caliche plaster near the center of the south pit wall and extending southward from that wall appears to be the sill of an entry. At the north end, the caliche is 6cm thick and forms part of the south pit wall. At the south end, the caliche thins to 1-2 cm at a distance of 80 cm from the south pit wall.

The sill is 7-8 cm above the floor, and the width of the caliche at the south pit wall is 59 cm. Un-fortunately, this feature is too weathered to give an accurate width of the entry, and there are no intact side walls. The caliche for the entry sill was laid in an excavation into the substrate. A similar entry is noted for Room 18.

Floor: The floor was in fair condition, showing wear and/or erosion. The caliche plaster was 0.5-1.5 cm thick and missing in areas of plant and rodent disturbance.

Floor Features: A hearth and a shallow depression are the only noted features for this structure.

Hearth: The hearth (F.330) is in the center of the structure, closer to the south pit wall than the north pit wall, and opposite the presumed entry. It is circular and 25-26 cm in diameter, has slightly sloping wall, and has a shallow rounded bottom at 19-20 cm. Adobe and caliche line the hearth to a thickness of 3 cm, and there is a collar of the adobe and caliche that surrounds the hearth as much as 11 cm from the rim. The rim is flush with the floor. Gray ash and some small charcoal are noted as the fill of the hearth.

Small Depression: A semicircular depression (F.331) with a flat bottom and steep sides is against the south pit wall between the hearth and the entry. It measures 59 cm at its widest and 3 cm deep with the same fill as the lower fill of the room. It has a weathered 0.5 cm lining of caliche. The location of this feature would suggest a function in conjunction with the entry, though the actual use is elusive.

Floor Material: A fair number of sherds and flakes were found in the dark soil layer on the floor. A few items were found in contact with the floor. They included an *Olivella* shell bead just northwest of the hearth, a projectile point east of the hearth, and sherds of a partial, small bowl southeast of the hearth.

Comments: Room 17 is one of the larger isolated rooms. It is noteworthy for the arrangement of features relating to the probable entry. The lack of other features in the structure could suggest that it was not occupied for long.

Room 18

Room 18 is located near the center of a linear arrangement of individual rooms in the northwestern part of the site (Figure 36). It is also part of a group of closely spaced structures that include Rooms 19, 21 and 26. Room 18 is rectangular in shape, 3.70 m by 1.94 m, has a floor area of 6.3 sq m, and is oriented east-west (Figures 47 and 48). Rodents had disturbed the floor plaster in areas, and the pit walls are in poor condition. Otherwise, features are well-preserved in this small structure.

Fill: A 5-25 cm layer of reddish brown blow sand covered the area. Beneath this, the fill of the structure was a trashy deposit of brown to light gray sandy loam with scattered caliche pebbles and some charcoal and burned adobe. Separate events of dumping are suggested by one area of ash and charcoal and another of unburned lumps of adobe, ash and charcoal. Artifacts were fairly abundant in this fill. Resting on the floor was a 0.5-2.5 cm layer of gray sandy soil with specks of charcoal.

Walls: Remnants of pit walls were found for the north and east pit walls, but walls of the pit excavation could not definitely be located elsewhere. As with other sunken floor rooms, the excavation for this structure is into a compact sandy loam that slumps easily and suffers from wind and rain erosion. The surface of the natural soil around the structure suggests that the pit walls may have once been 20-22 cm high.

No evidence of wall plaster was seen. And, remains of adobe walls were not recorded. However, a compact brown sandy loam with caliche pebbles was found around the perimeter of the structure and could have been adobe melt from walls.

> Entry: Midway along the south wall and opposite the hearth is an apparent entry to the structure. Caliche slopes up from the floor and then provides a threshold surface 5-8cm above the floor of Room 18. It is 49 cm wide and continues south 30 cm where it joins the floor plaster of Room 19. Thus, this caliche pavement may be the threshold for a doorway between the two rooms or separate entries of the structures. The feature is too weathered to give an accurate width or any notion of side walls. If there was a doorway between the structures, a common wall would have been a minimum of 28 cm wide and possibly as wide as 50 cm. Again, no evidence of an adobe wall or walls could be found.

Floor: The central floor area has a caliche and adobe plaster that is up to 3 cm thick and in good condition. Elsewhere, the floor plaster is 1-1.5 cm thick and shows wear and weathering. A similar situation is also noted for Room 13. It looks very much like both floors could have been replastered. However, there was no indication of layered flooring or modified features in either room.

Floor Features: Four features are recorded for the floor and are a hearth, two shallow depressions, and an adobe-capped pit.

Figure 47. Room 18, looking south at excavated floor features prior to excavation of capped subfloor pit. Note the plastered entry in south wall and partially exposed floor of Room 19 to the south of the entry.

Hearth: The hearth (F.332) is in the center of the floor and closest to the south wall and entry. It is roughly square with rounded corners, slightly sloping sides and a shallow rounded bottom. It measures 23 cm by 23 cm and is 9 cm deep. The lining is a caliche and adobe mixture of 1.5-3 cm in thickness, the rim is flush with the floor, and a caliche/adobe collar surrounds the rim and out 8-10 cm onto the floor. The fill was gray sand with some charcoal.

Shallow Depressions: Near the south wall and the entry is a shallow depression (F.333) with a caliche lining like the floor. It is 3 cm deep and measures 11 cm by 24 cm. A similar depression is on the other side of the entry in Room 19 and a depression is associated with the entry for Room 17. These depressions do not appear to have resulted from wear, but their use is unknown.

West of the hearth is a second and unusual depression (F.337). It is roughly oval and 39 cm by 51 cm with a maximum depth of 2.5 cm for two troughs, one on each of the long sides. This depression may be the result of an overturned trough metate resting on the floor.

Adobe-capped pit: A small and unlined pit (F.335) is north of the hearth, measures 32 cm by 45 cm at the top, and is 25 cm deep. It has vertical sides and a flat bottom and was filled with loose to compact brown sandy loam soil with a few specks of charcoal and no artifacts. A thin 1 cm layer of adobe and caliche appeared to cap this feature.

Floor Materials: The gray sandy soil on the floor appeared to be from trash deposition, as with the fill above the floor. Numerous sherds and flakes were in this fill. On the floor was a fragment of a sandstone abrader, but the association is problematic.

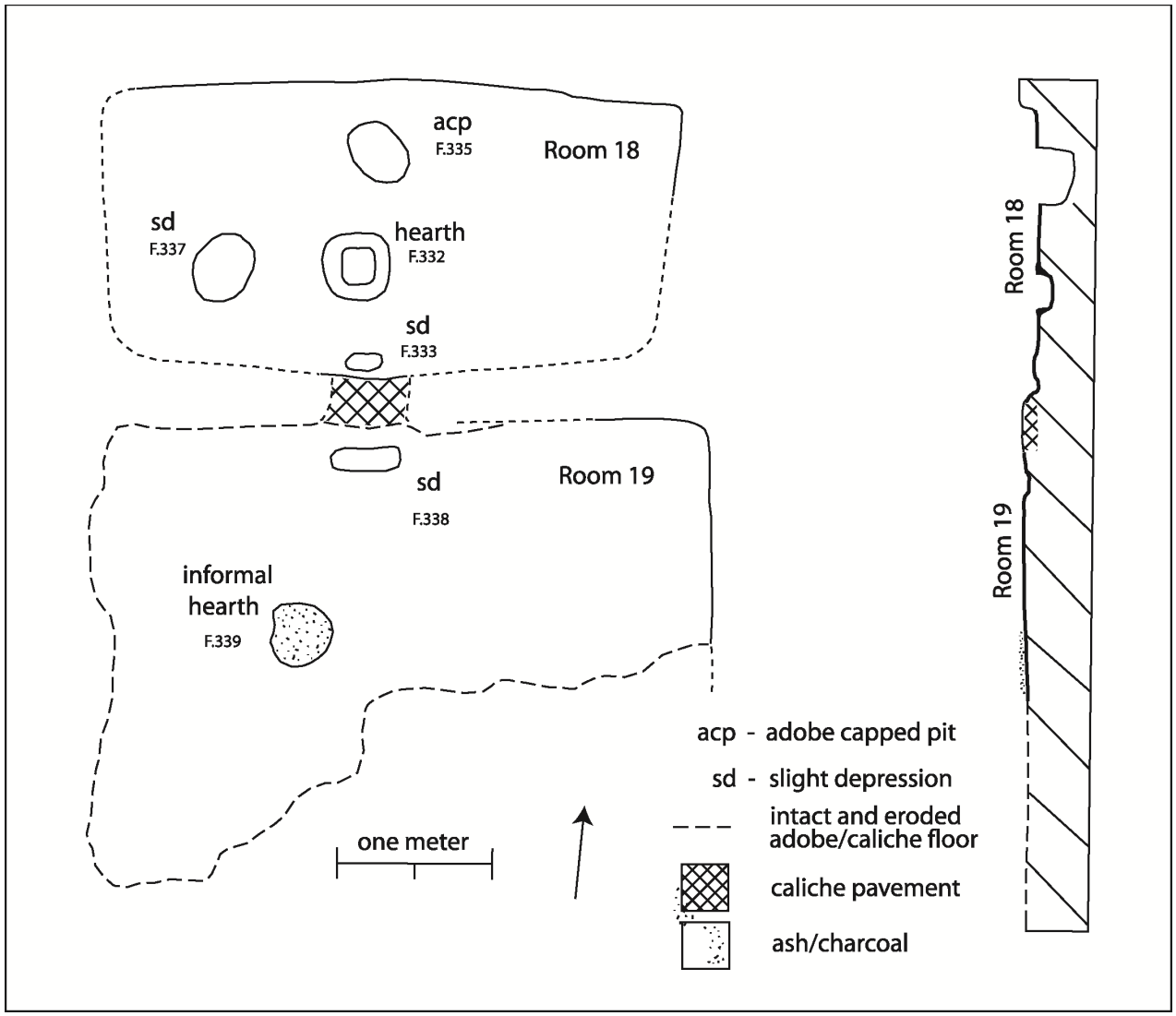


Figure 48. Rooms 18 and 19, plans and cross sections.

Comments: Room 18 has floor features that would suggest that it was a domestic structure. It also has a caliche paved entry similar to the one for Room 17. However, it seems to share the entry with the larger Room 19 with which it is aligned. Given its smaller size and questionable attachment to Room 19, Room 18 may have had a more limited use than the larger structure.

Room 19

This structure is immediately south of Room 18 and near the center of a linear alignment of isolated structures in the northwestern portion of the site (Figure 36). It is in poor condition with about half of the floor remaining. It is rectangular in outline, some 4 m east-west, and approximately 2.95 m north-south (Figure 48). The floor area is about 11.8 sq m, making Room 19 one of the larger individual rooms.

Fill: Three layers were defined. The upper layer was reddish brown aeolian sand, 5-14 cm in thickness. Beneath this layer, there was 3-14 cm of brown to light gray sandy loam with caliche pebbles, some charcoal, and few artifacts. The lowest layer was 3-4 cm in thickness and covers the floor of Room 19. It

was a light gray sandy soil with spots of ash, a fair amount of charcoal, and a few sherds and flakes. This layer appeared to be trash on the weathered floor.

Walls: No intact walls could be found for this structure. The sandy loam substrate did not withstand the elements and later activity in the area following abandonment of the structure. Floor plaster did indicate where pit walls had been for the northeast corner and that the corner was rounded. Fill over the structure suggested a depth of perhaps 14 cm for the pit excavation for the room.

Entry: A caliche plastered surface occurs in the middle of the north wall and extends to Room 18. It is 49 cm wide surface that is weathered and shows no side walls or door frame. As described for Room 18, this is an entry for Room 19 and appears to have been a doorway to Room 18. Lacking evidence for above ground walls, it cannot be said that these structures had a common wall or separate and close walls.

Floor: The floor is best preserved in the northeast corner where the caliche and adobe plaster was smooth and 3 cm thick. In this corner, the floor plaster curves up at the base of where the pit walls had been. Outward from the northeast corner, the plaster is weathered and thins to nothing. Still, the approximate west wall of the structure is suggested by the remaining plaster. However, much of the floor is missing for the southern part of the structure.

Floor Features: Surviving floor features are a shallow depression and an informal hearth. Other features may not have been identified in the areas of the most weathered floor plaster. It could also be argued that a formal hearth and entry would have been in the southern and missing part of the room.

Shallow Depression: Associated with the northern entry is a shallow depression (F.338) in the caliche floor that is 16 cm by 45 cm and 2.5 cm deep. The function of this feature is unknown, but similar depressions are associated with entries in Rooms 17 and 18.

Informal Hearth: An informal hearth was located on the floor plaster and evident as a fire-reddened area, some 45 cm in diameter, with ash and charcoal above the fire-reddened area. Although this feature is on the room floor, it could be a post-abandonment feature. The deposition of trash on the floor leaves this question open.

Floor Materials: Trash covered the floor of this structure, and no floor assemblage was identifiable.

Comments: It is unfortunate that more of this large isolated room did not survive. The alignment and common entries of Rooms 18 and 19 is unique for the isolated structures of this site. However, it does repeat a pattern of large rooms backed by smaller rooms for contiguous room pueblos of the region and as seen in the pairings of Rooms 1 and 2, 3 and 4, 5 and 32, and 10 and 12 of Firecracker Pueblo.

Room 20

Room 20 is near the western end of a linear arrangement of individual rooms in the northwest part of the site (Figure 36). It is rectangular in shape with rounded corners, is 4.49 m east-west and 2.07 m north-south, and has a floor area of 9.3 sq m (Figures 49 and 51). The floor is in good condition, but little of the pit walls remain. This structure had also burned.

Fill: A 2-5 cm layer of reddish brown aeolian sand covered the area of Room 20. Below this was a mixed layer of mostly dark soils of 5-12 cm in thickness. Much of this layer was loose, light gray sandy loam with charcoal and some gravel and with areas of dark gray soil and charcoal. Other parts of this layer were a compact light gray sandy loam with some charcoal around areas of a compact brown loamy soil

Figure 49. Room 20, looking north at excavated floor features.

and caliche plaster that could have been wall fall. Few artifacts were recovered from this layer. There was also recent disturbance of this level, evident by fragments of glass and scattered bones of a calf.

The floor layer was a 3-7 cm in thickness and was a dark gray sandy loam with much charcoal. Caliche plaster was also found scattered in this fill. On the floor in the eastern third of the room were remnants of the burned roof that included flowering stalks of yucca and lechuguilla and dropseed grass. Many of the stalk fragments were oriented north-south, apparently light elements spanning the narrow room width.

Walls: Room 20 was excavated into the reddish brown loam substrate at least 10 cm, based on the highest surviving wall. The pit walls were 5-10 cm in height, except in the southwest corner where they were completely eroded down to the floor. Patches of caliche plaster were still on the pit walls and were 2-5 mm in thickness. No stubs of adobe walls or postholes of jacal construction were found. Weathered adobe walls, however, were indicated by the presence of caliche pebbles in the soil around the structure.

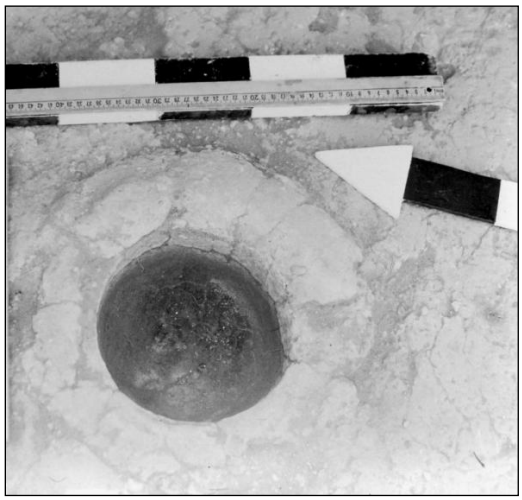


Figure 50. Room 20, hearth.

Floor: The floor is a 2-4 cm plaster layer of caliche and some adobe. It is level, curves up to meet the pit walls, and shows signs of having been burned.

Floor Features: A number of features are present for the floor of Room 20 and include a hearth, two adobe-capped pits, and 10 small pits or secondary postholes, one of which was capped.

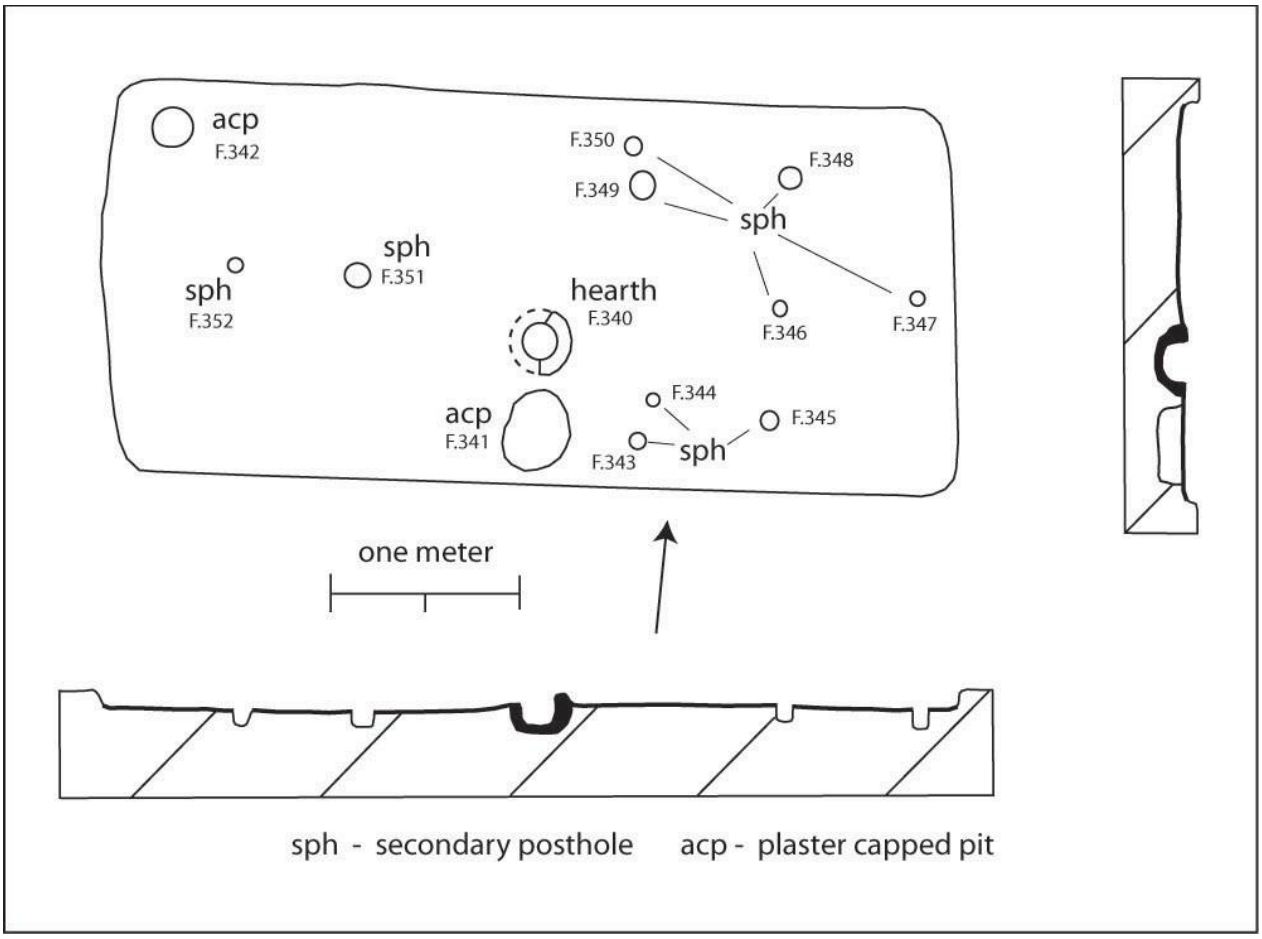


Figure 51. Room 20, plan and cross sections.

Hearth: The hearth (F.340) is in the center of the room and closest to the south pit wall. It is lined with 2 cm of adobe and caliche, is 19 cm in diameter and 12 m deep, and has vertical sides and a rounded bottom. Surrounding the hearth is a raised and rounded collar of adobe and caliche. Less than half of the collar is intact and is 9 cm wide and 4 cm high. The hearth is blackened and contained the same soil as on the floor of the structure.

Adobe-capped Pits: Located between the hearth and the south pit wall is a pit (F.341) with a compact brown loam fill or cap that shows specks of charcoal. It measures 35cm by 42 cm, is 13 cm deep, and is unlined with sloping walls and a flat bottom. This non-specific pit may have been situated just inside of a possible south entry. A number of other isolated rooms have features between a hearth and an entry or are associated with an entry.

The other adobe and caliche-capped pit (F.342) is in the northwest corner. This non-specific feature is unlined, has an 8 cm thick cap of adobe and caliche, and is 20-23 cm in diameter and about 20 cm deep. The pit sides are vertical and the bottom could not be defined. It contained a light gray sandy loam with small bits of charcoal and two pieces of chipped stone.

Secondary Postholes: A total of 10 small pits or secondary postholes were recorded for the floor of Room 20, the majority in the eastern half of the structure. They are cylindrical with depths of 8-14 cm. Most are 7-10 cm in diameter. F.351 and F.349 have diameters respectfully of 12 cm and 13 cm. F.351

is also capped with 2 cm of adobe. Six have a fill of gray sand and charcoal, while a brown sandy loam with specks of charcoal filled F.343, F.346, F.348, and F.351. A burned *Olivella* shell bead was recovered from the top of F.343. Four of these features are along the central east-west axis of the room, suggesting that they are secondary postholes. The other small pits could also have held posts for room furnishings such as racks or bins.

Floor Materials: Items of interest from the floor of Room 20 include the burned *Olivella* shell bead in F.343, as well as three other burned shell beads, two in the southwest quarter of the structure and the third near F.345. A projectile point was recovered southwest of the hearth, and 11 small pieces of chrysocolla were found near the center of the north wall. Additionally, a burned cob of maize with kernels was found on the floor in the southeast corner. Perhaps, these items are part of a closing ceremony for this structure. Also of interest is an obsidian cruciform from the fill of the structure a few centimeters above the floor.

Comments: Room 20 had burned, but the event is believed to have been coincident with abandonment or sometime after. Objects of domestic function were not in situ on the floor. Shell jewelry, pieces of chrysocolla, a projectile point, and a burned ear of maize on the floor suggest a possible closing ceremony. Otherwise, this room shows a variety of features one might associate with a domestic structure.

Room 21

Located in the northwestern portion of the site and in a linear arrangement of individual rooms, this structure almost abuts Room 26 to the east (Figure 36). Perhaps, no more than 15 cm separated the walls of these structures. As a result, the east pit wall is straight and parallels the wall of Room 26. Whereas, the west pit wall bows outward (Figures 52 and 53). Otherwise, Room 21 is rectangular with rounded corners and oriented east-west, measures 3.22 m by 2.04 m, and has a floor area of 6.2 sq m. Pit walls have suffered from erosion. However, the floor is in good condition with relatively little disturbance.

Fill: Some 2-12 cm of reddish aeolian sand was above this structure. The fill of this room was 13-21 cm of a fairly uniform brown to reddish brown sand with scattered small pieces of charcoal and caliche pebbles. Here and there, thin lenses of light gray soil with some charcoal were present. Sherds and flakes were fairly abundant, suggesting trash deposition in the general area. There was no indication that the structure had burned.

Walls: Pit walls were weathered, and no caliche plaster was observed. Height of the remaining pit walls was 7-15 cm. Around the outside of the structure, caliche pebbles were scattered, and patches of caliche up to 1 cm thick were noted. This caliche had possibly derived from upper weathered walls of the structure.

Floor: The floor is a well-plastered 1-3 cm layer of caliche and adobe. The floor slopes slightly to the west and curves up to meet pit walls.

Floor Features: A hearth and four apparent postholes were recorded for this room.

Hearth: A hearth (F.353) is located in the center of the structure and closest to the south pit wall where an entry might have been. It is 17 cm in diameter and 10 cm deep with nearly vertical walls and a rounded bottom. The lining is 2 cm of caliche and adobe plaster, and the rim has a 1-3 cm thick plastered collar that is 8-10 cm wide and slopes to the surrounding floor. The hearth is blackened, but the contents are same as the fill of the room.

Figure 52. Room 21, looking north at excavated floor features.

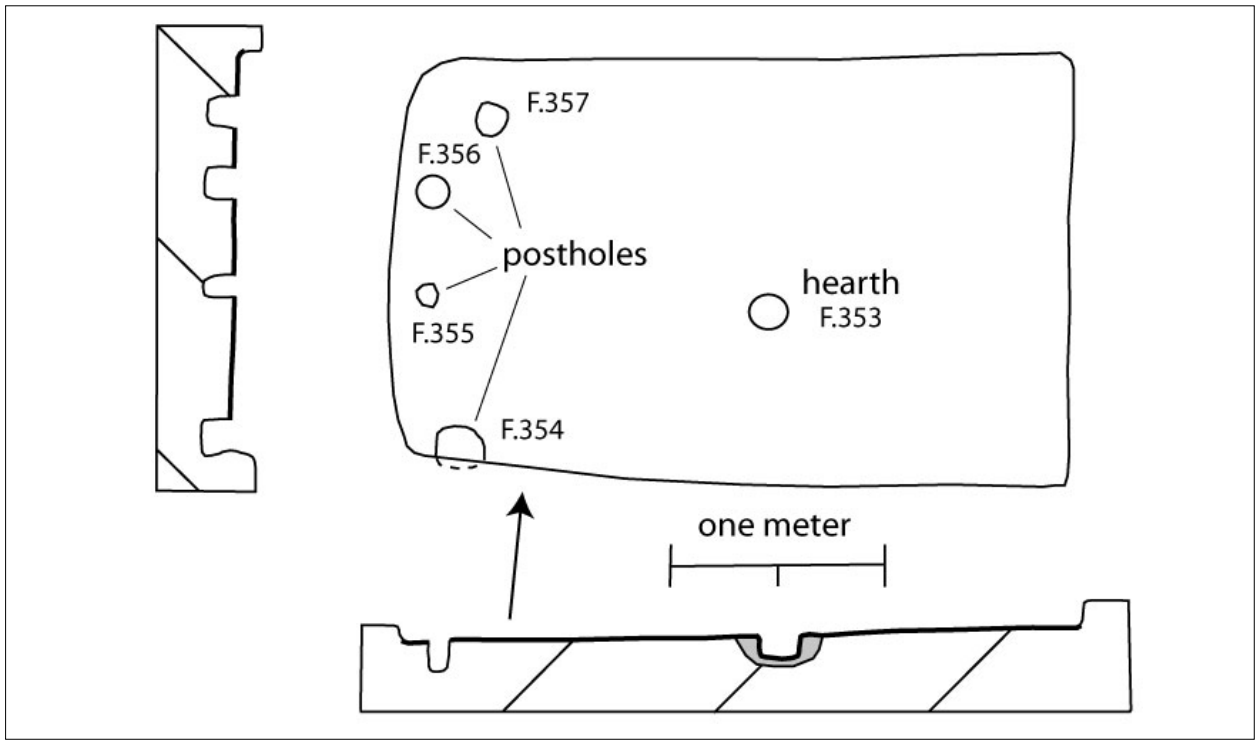


Figure 53. Room 21, plan and cross sections.

Postholes: Four postholes are near the west pit wall, are cylindrical in shape, and terminate at a compact soil at 14 cm. F.354 has dimensions of 15 cm by 22 cm, F.355 has a diameter of 9-10 cm, F.356 is 15

cm in diameter, and F.357 has a diameter of 19-21 cm. All four postholes have a brown sandy soil with charcoal specks like the fill of the room. Evidence of packing materials around posts was not found. Given the spacing of these features and their proximity to the western pit wall, they are best interpreted as postholes. However, this arrangement is unusual for most postholes are generally placed along axes of structures or in each quadrant. Perhaps these features held posts to support a weakened west wall or roof in that area.

Floor Materials: No objects were found in direct association with the floor. However, two pieces of shell, a fossil bead, and a drill were in the fill immediately above the floor.

Comments: Room 21 is small but has hearth suggestive of a domicile. Unfortunately, nothing was found on the floor that would aid in assigning function. The shape of the room is unusual and conditioned in part by the nearness to Room 26. Also, the arrangement of postholes along the western pit wall is unique, and their use may have been something other than just support for the roof.

Room 22

This structure is the westernmost isolated room in an alignment of rooms in the northwestern sector of the site (Figure 36). Lacking a hearth, this deep sunken floor room appears to have been used for storage. It is rectangular with rounded corners, oriented north-south, has dimensions of 3.32 m by 2.41 m, and has a floor area of 7.5 sq m (Figures 54 and 55). The floor and lower pit walls are in good condition, and trash had been deposited in much of the structure.

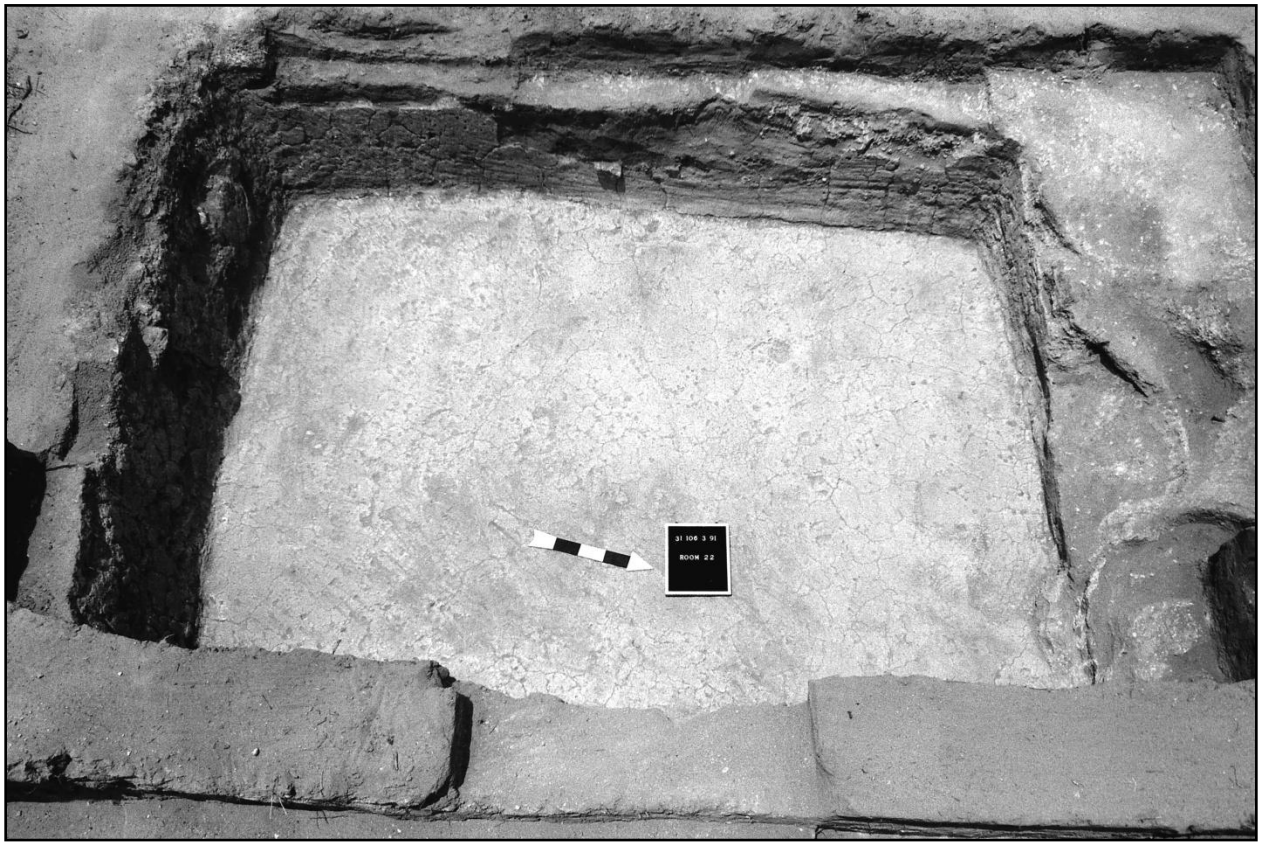


Figure 54. Room 22, looking west at excavated floor.

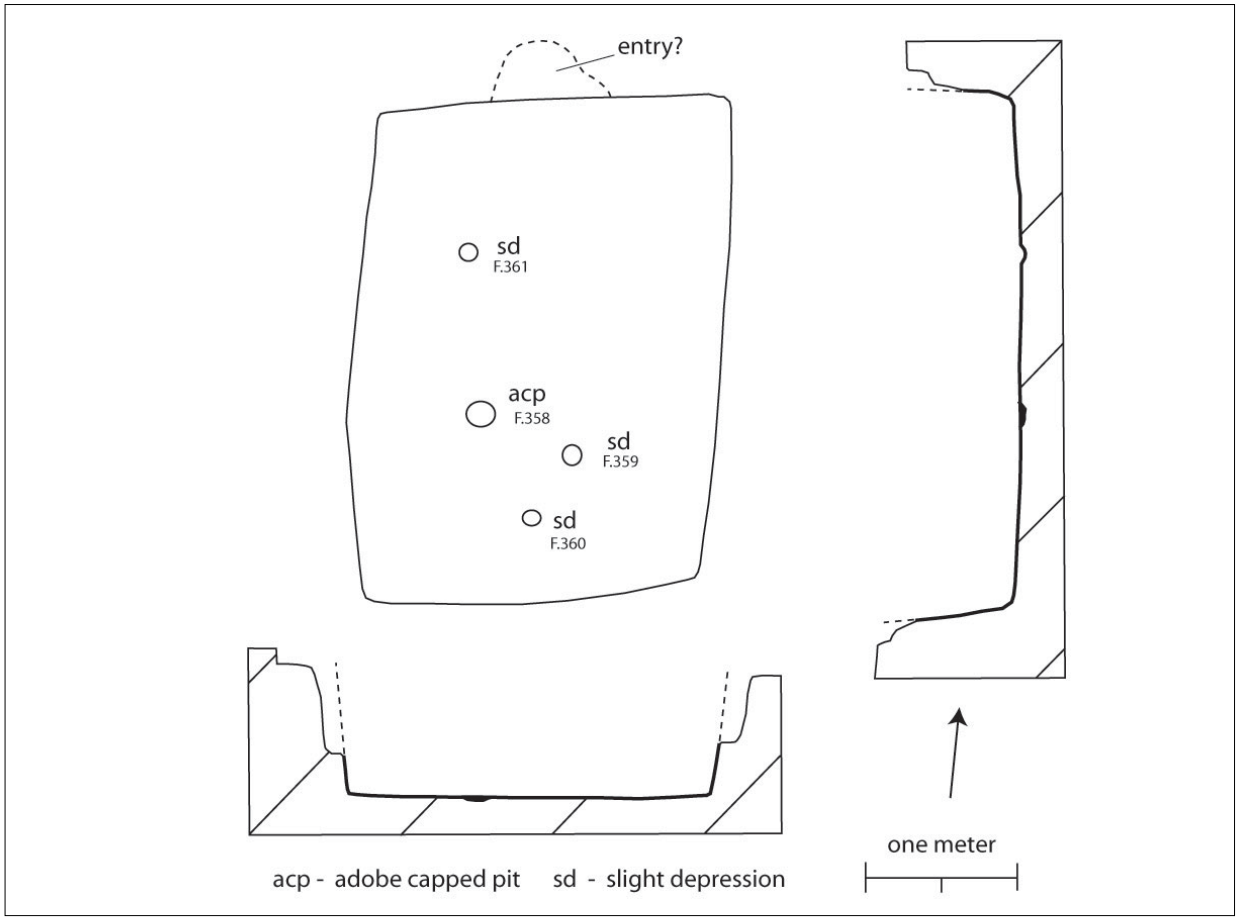


Figure 55. Room 22, plan and cross sections.

Fill: Reddish brown dune sand covered the structure to a depth of 20-33 cm. Below this surface layer, the fill of the structure was comprised of alternating layers of compact brown sandy loam with caliche and layers of ashy soil or dark gray soil with much charcoal. Sherds, lithics, and a variety of other objects were found throughout the fill, and trash deposition appeared to have been mostly from the southeast corner. The depth of this fill ranged from 68 cm to 87 cm.

Walls: This structure was excavated through a compact brown sandy loam and into the underlying layer of caliche. Depth of the original excavation was about 95 cm. Surviving wall heights ranged from 22 cm to 80 cm, with walls sloping slightly outward. An adobe and caliche plaster on the pit walls reached as high as 76 cm in the southeast corner. The wall plaster as 1-3 cm thick and curved out and onto the floor of the pithouse. Although the fill had layers of adobe and caliche, no above ground walls were in place.

The pit wall was lowest midway along the north pit wall. At 22 cm above the floor, the fill extended into a recessed area 39 cm deep and 80 cm wide and with a somewhat steep slope. Erosion or disturbance may account for this feature; however, the location midway along the wall suggests that it may be a weathered entry similar to those for Rooms 25 and 26.

Floor: The floor of this room is simply hard packed and smoothed caliche of the substrate into which the structure was excavated.

Floor Features: A small, capped pit and three small depressions are the only floor features encountered.

Adobe-Capped Pit: A small, non-specific pit (F.358), 16 cm in diameter and 5 cm deep, was located near the center of the structure and was filled with caliche and adobe.

Small Depressions: Two small depressions are in the southern part of the pithouse, and a third is in the northern part. F.359 is 13-14 cm in diameter and 4 cm deep, F.360 is 11 cm in diameter and 2 cm deep, and F.361 is 11-13 cm in diameter and 2 cm deep. These basin-shaped depressions may have been the locations of secondary posts to support a sagging roof.

Floor Material: There was considerable secondary refuse on the floor. However, no artifacts could be directly associated with the floor.

Comments: The absence of a hearth and objects indicative of domestic activities would indicate that this structure was used for storage. It is also one the deeper structures, with well-preserved wall plaster. There may have been an entry on the north side of the structure, and the floor is the natural caliche layer. Both of these conditions are unusual for isolated rooms at this site.

Room 23

Room 23 is the easternmost room of a group of five isolated rooms in the southern part of the site that include Room 13, 16, 23, and 33 (Figure 36). This structure is in an area that had been graded and suffers from exposure and weathering. Additionally, the floor has slumped and deteriorated over earlier pits (F.103, F.104, and F.381). The extent of the caliche floor plaster and a bit of preserved floor indicate a rectangular structure that was oriented north-south with a length of over 3 m and a width over 2 m (Figure 56).

Fill: Recent sand and gravel covered the area to a depth of 3-5 cm. Below the surface soils, a brown to light gray sandy loam with small and scattered pieces of charcoal and a thickness of 2-6 cm rested on the remnants of the floor. Few artifacts were in this soil.

Walls: Any surface walls and walls of a pit excavation have vanished with disturbance and erosion of the area. A bowed south pit wall is indicated by a defined edge of floor plaster, and the excavation for the structure was probably minimal.

Floor: The general area of the floor is shown by a 1-3 cm layer of caliche that is weathered and discontinuous in areas, especially above earlier pits. At the southern end of this caliche pavement, the plaster is smooth and rises 1-2 cm along where the south pit wall would have been.

Floor Features: There were no floor features that could be defined. However, just west of the caliche pavement there is an area of burned adobe with a high caliche content that looks like adobe from a lined hearth. If this is from a disturbed hearth in Room 23, then the hearth was likely near the west pit wall.

Floor Material: Given the disturbance and erosion of the structure, materials could not be definitely associated with the floor.

Comments: The condition of this structure does not warrant much interpretation. The size and shape of the structure is like many of the other isolated rooms. Its location and orientation is interesting and complements those of Rooms 13, 16, and 17. Together, they appear to form a group of structures facing a common central area.

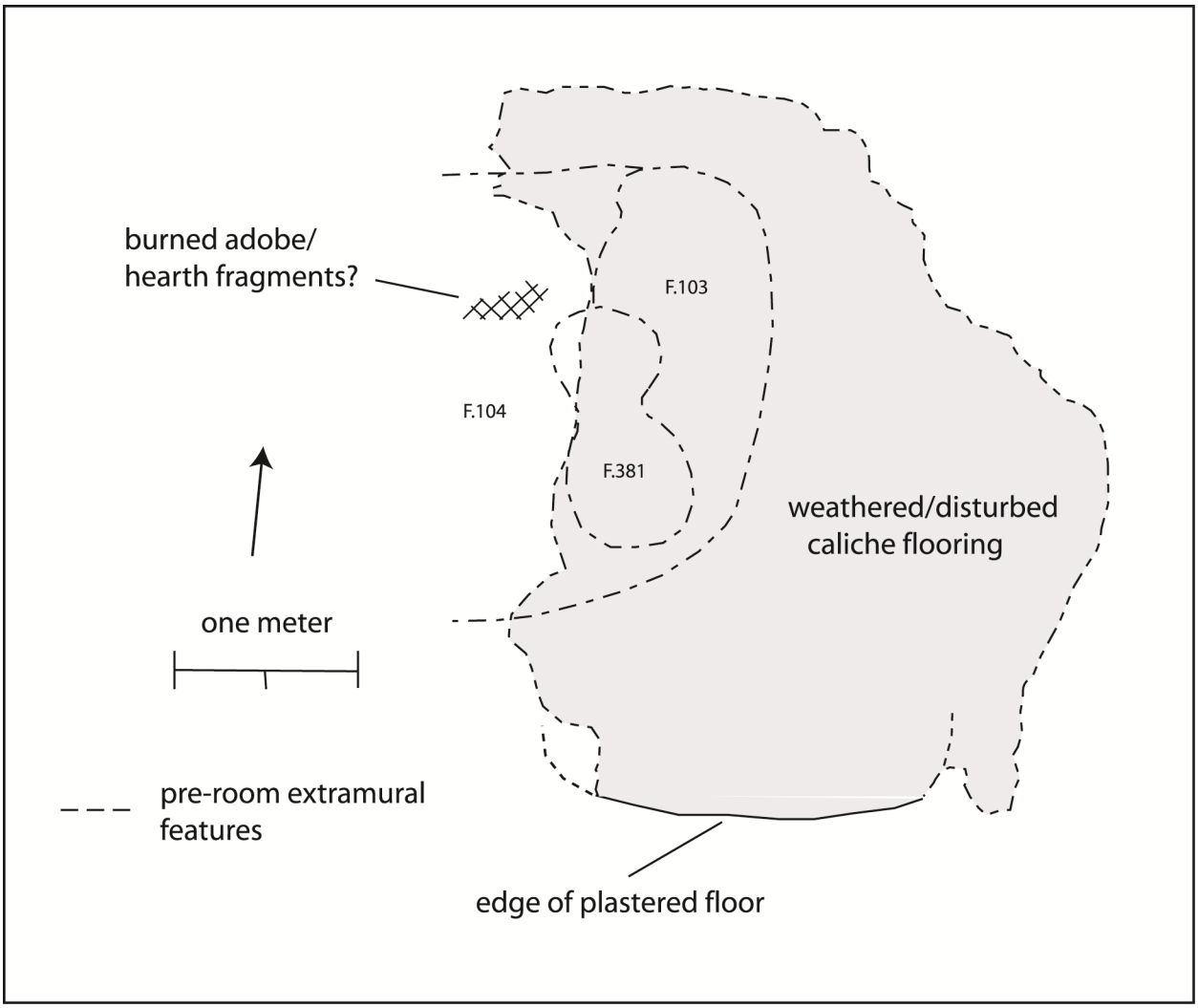


Figure 56. Room 23, plan.

Room 24

Room 24 is an isolated room about 8 m south of Room 1 of the pueblo (Figure 36). It has a square form and preserved adobe walls, and it overlies a number of extramural features and Room 31 (Figure 57). Room 24 has inside dimensions of 1.23 m north-south and 1.17 east-west and a floor area of 1.4 sq m. This isolated room is similar to Room 9 of the pueblo in size and construction and was likely used for storage or some special function. A later extramural feature (F.140) had been cut into the upper part of the northeast corner.

Fill: Loose, light brown sand was over the room to a thickness of 3-7 cm. Below this surface layer and both inside and outside the room was a compact, brown sandy loam with some gravel and a few specks of charcoal at the top. This layer was 14-16 cm thick and rested on caliche.

Walls: The walls are made of a light brown adobe with small gravel and a few caliche pebbles. Wall widths range from 17 cm to 21 cm, and all corners are bonded. The walls are actually what remain of foundations that have been weathered to the same top level of the surrounding compact soils. The trenches for

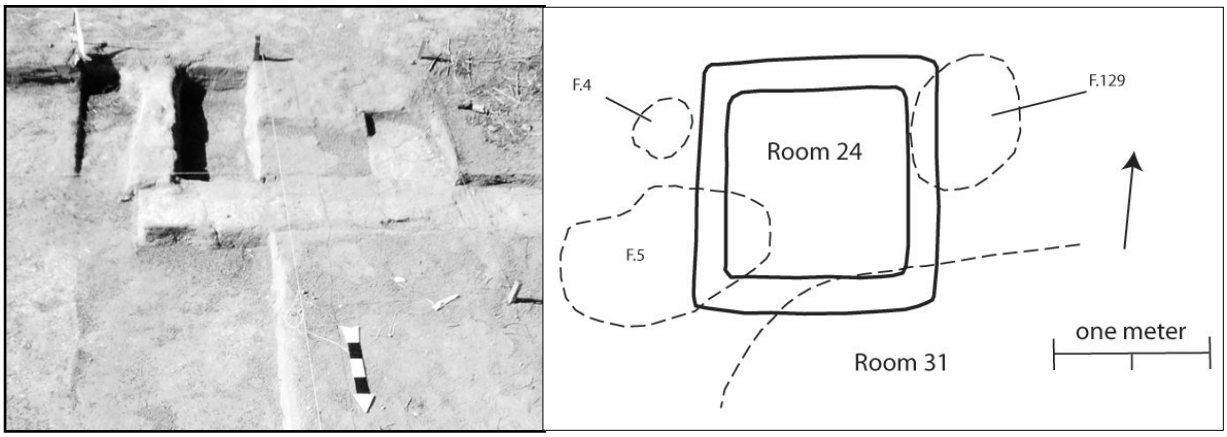


Figure 57. Room 24: *left*, under excavation and showing foundations of three walls; *right*, plan.

these foundations had been excavated minimally the surviving depth of the compact soils and to the lower caliche layer. There is no suggestion of wall plaster.

Floor: The upper walls and floor have been eroded away. There is also no evidence of a weathered caliche floor, such as concentrations of caliche pebbles in the surface soils. Most probably, this room had an earthen floor like Room 9.

Comments: The most noteworthy feature of Rooms 24 and Room 9 is their small size. They are bin-like in size but not interior to rooms. Rather, they are bin-like features outside of rooms, and one is even isolated from other rooms. Storage is an obvious function for such small spaces, but a more specialized use is possible. As with Room 9, Room 24 has no wall or floor features or artifacts that could help one understand these rooms.

Room 25

This deep structure is located beneath the eroded portion of the pueblo, between Rooms 5 and 10 (Figure 36). It is almost square, measures 3.47 m north-south and 3.13 m east-west, and has a floor area of 10.6 sq m (Figures 58 and 59). Room 25 is a domestic structure with floor features not noted in the other isolated rooms but not unusual for pueblo rooms of the region. In particular, it has four primary roof supports and a step against the south pit wall.

Fill: Room 25 is the deepest of the isolated rooms and was excavated through 40-55 cm of a compact, brown sandy loam and then 75-83 cm of caliche to a depth of 1.35 m. The upper 25-40 cm of the pit excavation had eroded into the structure, and there are five principal layers of fill. The uppermost first layer begins with the eroded caliche floors of the pueblo and ranges in depth from 8 cm near the pit walls to 20 cm in the center of the pithouse. It is a loose to compact reddish brown sand with few artifacts. The second layer also dips from 30 cm at the pit walls to 60 cm in the center of the pithouse. This layer evidences numerous episodes of trash disposal, with four sublayers of ash and charcoal and many small lenses of charcoal in a light gray sandy loam. Numerous artifacts and bone were recovered from this layer. The third layer is a 5-10 cm thick layer of reddish brown sand with some charcoal and few artifacts. The fourth layer ranges from 60 cm at the pit walls to 40 cm in the center of the structure. This layer is comprised largely of caliche with some brown sand and appears to have been an intentional in-filling of the pithouse. The lowest level is reddish brown sand covering the floor to a depth of 1-2 cm following abandonment.

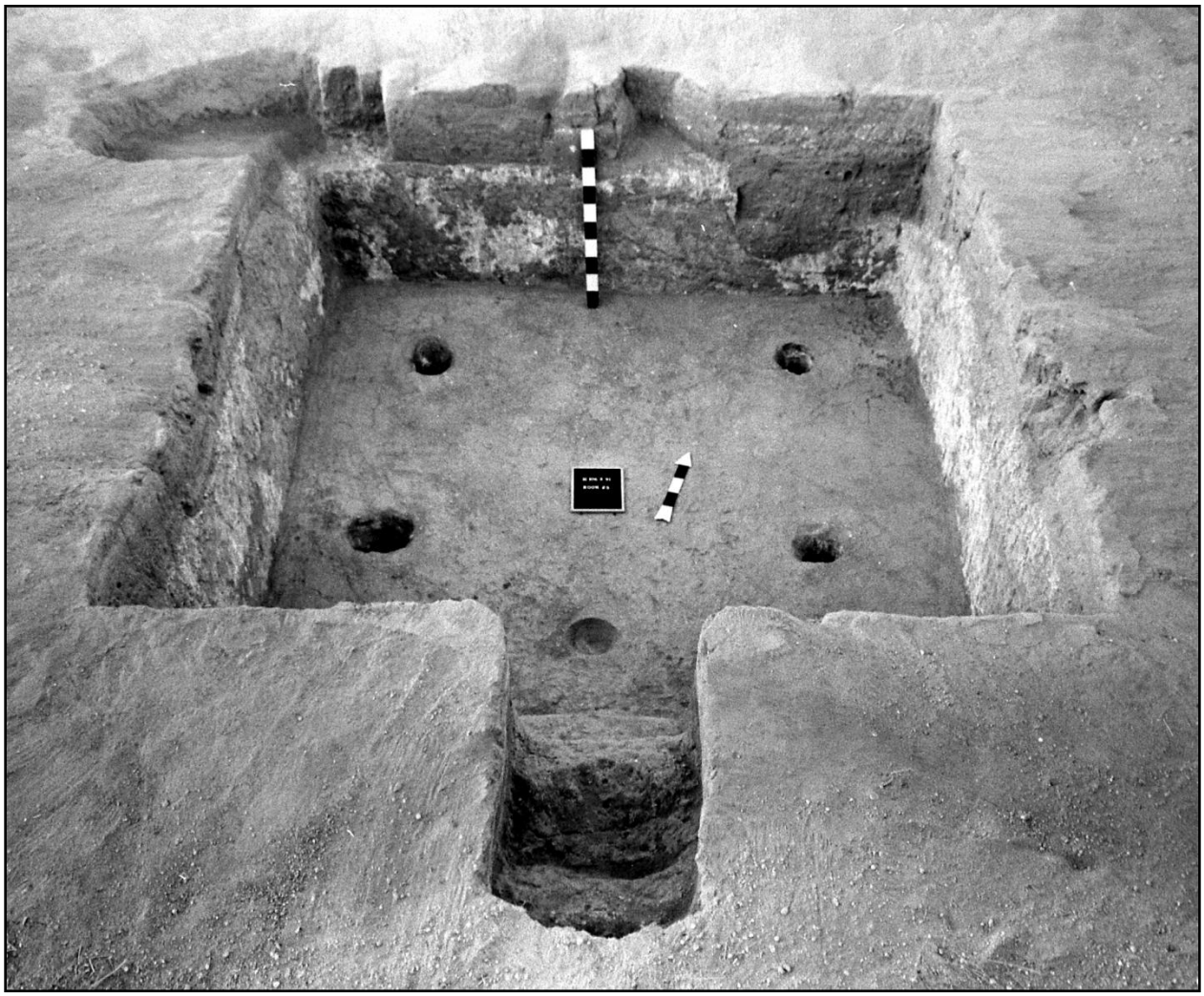


Figure 58. Room 25, looking north at excavated floor features.

Walls: The walls of the excavation slope slightly outwards, some 5 cm for the 1.35 m depth. Pit walls were plastered with 1 cm of brown adobe, and the plaster survives to 73-91 cm above the floor.

Entry: In the middle of the south pit wall is a stepped entry with several steps before reaching the interior (Figure 60). The entry is 58 cm wide at the pit wall and 55 cm near the south end and has a wall opening 35 cm above a step within the pithouse. The side walls of the entry were plastered with 1 cm of adobe, and the floor of the entry is the natural caliche and compact, sandy loam substrate. The south end of the entry could only be approximated due to soil erosion.

Floor: The floor is plastered with 1-3 cm of caliche and adobe over a thin layer of brown sand that covers the caliche base of the excavation for the pit room. The floor plaster curves at pit walls to meet the wall plaster.

Floor Features: Floor features for this structure are a hearth, four postholes, and an adobe step.

Hearth: The hearth F.362) is located near the center of the south pit wall and opposite the stepped entry. It is bowl-shaped, lined with 1 cm of caliche and adobe, and has a rim flush with the floor.

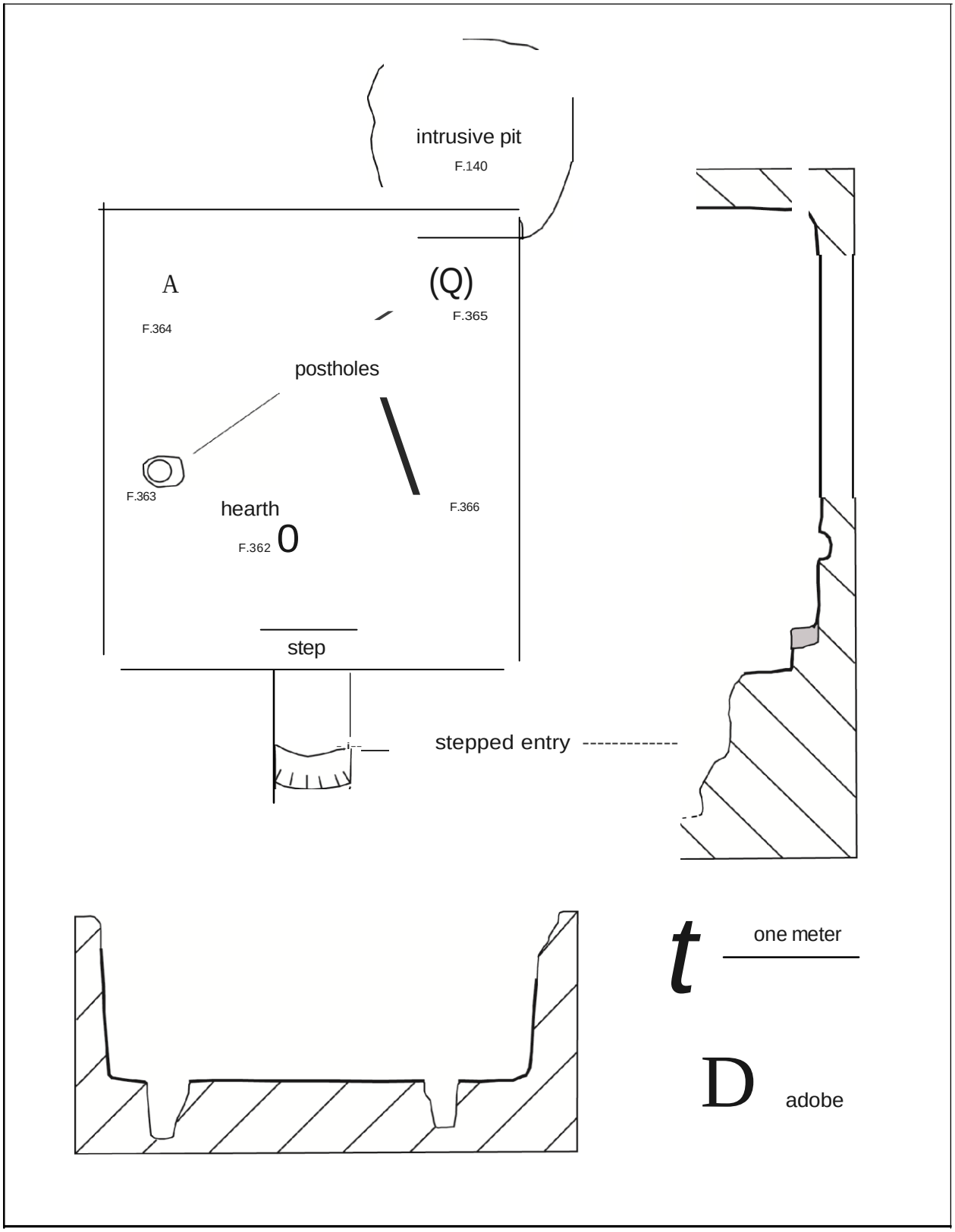


Figure 59. Room 25, plan and cross sections.

Figure 60. Room 25, looking south at stepped entry and hearth.

The hearth is 21-22 cm in diameter and 7 cm deep. It was filled with reddish brown sand, with a thin layer of ash on the bottom.

Postholes: This structure has a four post pattern of roof supports. One is near each of the northeast and northwest corners, and two near the center of the pithouse. The postholes are round to oval at the top and taper to round bottoms at depths of 31-44 cm. Widths at the top are between 20 cm and 31 cm. The diameter at the bottom and a better indicator of post size is 17 cm for F.363, 17 cm for F.364, 11 cm for F.365, and 16 cm for F.366. Side walls and the bottoms are natural caliche. The fill was reddish brown sand with lumps of caliche at the top. Packing materials for the posts were not observed. The posts were evidently removed with abandonment of the structure.

Adobe step: Associated with the southern stepped entry is a block of adobe and caliche against the south pit wall below the opening for the entry (Figure 60). Half of this block is natural caliche or caliche resting on the caliche substrate. The other half toward the center of the room is adobe on the caliche substrate. All surfaces of the step are plastered with brown adobe. The step is 72 cm long, 30-33 cm wide and 22 cm high.

Subfloor Features: Beneath the plastered floor and on the surface of the excavation into the caliche substrate are two depressions with gray sand. F.367 is in the southwest corner, measures 12-15 cm in diameter and 1.5 cm deep. F.368 is in the center of the pithouse and is 15-16 cm in diameter and 3 cm deep. These do not appear to be hearths but do show some activity in the excavation before the floor was plastered.

Floor Material: The only objects on the floor were four modified sherds. One was a large disk or vessel cover, one was used as a palette for red ochre and as a scraper, and the last two had also been used as scrapers. Three of these objects were fragmented and with pieces in different parts of the pithouse. Perhaps, pottery making was one of the last activities performed in this structure.

Comments: Room 25 is a well-preserved domestic structure with well-plastered floor and pit walls. The stepped entry on the south side of the pithouse and the adobe step inside on the floor would have been necessary with the depth of the room. Roof entries with ladders are not indicated with any of the structures, and a similar entry is recorded for Room 26. This is the only isolated room with four primary postholes. For other isolated structures with postholes, there are generally only two on the long axis of the structure. Even for the pueblo rooms, a four posthole pattern is noted for only two rooms that are much larger than Room 25.

Room 26

Room 26 is near the center of a linear arrangement of isolated structures in the northwestern part of the site and within the group of four closely spaced individual rooms (Figure 36). It has features of a domestic structure and is small with a floor area of 6.1 sq m (Figures 61 and 62). A somewhat square structure, it measures inside 2.79 m north-south and 2.24 m east-west. Room 26 has a somewhat complex history with three floors. F.18, a later extramural feature, cuts the upper part of the southeast corner.

Fill: Reddish brown dune sand covers Room 26 to a depth of 3-9 cm. Below these recent sands is Floor 3, a thin caliche layer with 1 cm or less of gray sand, a little charcoal, and few artifacts on top of the caliche. The fill below Floor 3 is a 22-27 cm thick layer of reddish brown sand with a few caliche pebbles and very few artifacts. It would appear that these sands accumulated while the structure was not in use. These sands also extend into an entry on the south side of the structure where caliche pebbles occur with a higher concentration. The next lower layer is a gray sandy soil of 2-3 cm that rests on Floor 2 and has a little charcoal and few artifacts. Floor 2 is actually the compacted surface of the soil on Floor 1. This soil is a brown to light gray sandy loam with caliche pebbles, scattered pieces of charcoal, and a depth of 3-5 cm. The structure was excavated into the caliche substrate, and the plaster of Floor 1 is laid on the natural caliche.

Walls: The pit excavation appears to have been 28 cm below the surface. The pit walls are plastered with 1-3 cm of brown adobe that exhibits horizontal smoothing marks. Room 26 is one of three isolated structures with remains of the above ground walls. A section of the west wall is 14 cm wide and has a remaining height of 4 cm, and a portion of the east wall is also 14 cm wide and 7 cm high. Both sections are a brown adobe with caliche pebbles and rest on the ground surface. The interior wall plaster continues onto these wall remnants, and the exterior of the wall segments have 1 cm of brown adobe plaster.

Entry: An entry is located in the middle of the south pit wall and includes a step and ramp addition on the exterior. At the pit wall, the opening for the entry is 15 cm above the floor and 53 cm wide. Only 13 cm of this entry survives and shows a shallow, rounded threshold. Plaster from the pit walls curves into this entry for a few centimeters and then is eroded away. Outside the structure, the entry ramp extends for some 80 cm to where it would have stepped up between 10 cm and 20 cm to the old ground surface. The exterior ramp also widens to as much as 61 cm and was excavated into a compact brown sandy loam.

Floor 1: This is the lowest and first floor in the structure and is a 1-2 cm thick layer of caliche with adobe over the natural caliche substrate. It is smooth and curves up to meet the wall plaster.

Floor 1 Features: The floor features include a hearth, two primary postholes, and a small pit.

Hearth: A basin-shaped, 1-1.5 cm caliche -lined hearth (F.369) is near the south wall and in front of the entry. It is 27 cm in diameter and 14 cm deep and has a rim flush with the floor. A small amount of ash was found on the bottom of this blackened hearth, and the rest of the fill was noted as being the same as on the floor. At some point, possibly following abandonment, the north side of the hearth was disturbed by an 18 cm by 20 cm and 4 cm deep pit. Within the hearth and just into the pit disturbance were found a hammerstone, a polishing pebble, 10 sherds of an El Paso Polychrome jar, a lump of potter's clay, and 10 fragments of an unfired clay bowl with yellow ochre on the inside surface.

Postholes: Two primary postholes are situated on the east-west axis of the structure. The excavated holes are larger at the top, approach the size of posts at the bottom and are 55 cm deep into the natural caliche. Burned adobe, caliche, and a brown sandy loam soil were used as packing around the posts.

Figure 61. Room 26, looking north at excavated features of Floor 1.

Floor plaster covers the excavations and packing material, and casts of the posts were partially in place.

The west posthole (F.370) is 26-28 cm in diameter at the top and has a 11 cm diameter post, and the east posthole (F.371) is 31-33 cm in diameter at the top and shows a post of 14 cm. The bottom 15-20 cm of fill in the postholes is gray sand with some charcoal, and the upper fill is the same as on Floor 1. Four sherds were found in the bottom of the east posthole. Both posts may have been removed before the later activity associated with Floor 1 and certainly before the use of the upper floors.

Small Pit: A small, non-specific pit (F.372) is in the center of the floor between the two primary postholes. It is unlined, 11 cm in diameter at the top, 6 cm in diameter at the rounded bottom, and 15 cm deep. The fill is the same as on the floor of the room.

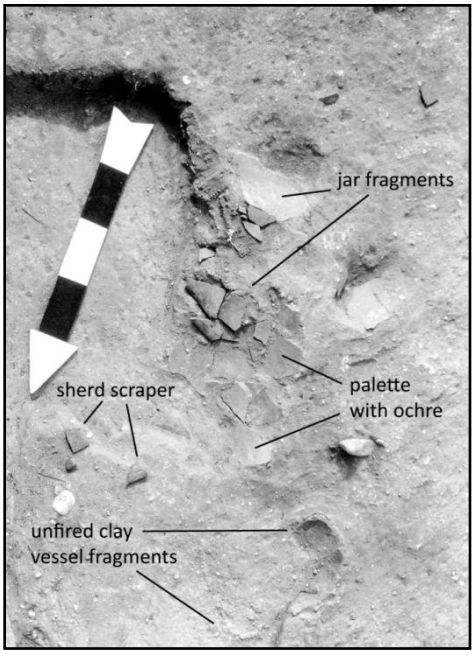


Figure 62. Room 26, objects in the northeast corner of Floor 1.

Floor 1 Materials: The northeast corner of Floor 1 of the room has a number of objects related to those within the hearth. They include a number of sherds of an El Paso Polychrome jar that appear to be from the same jar as the sherds in the hearth and

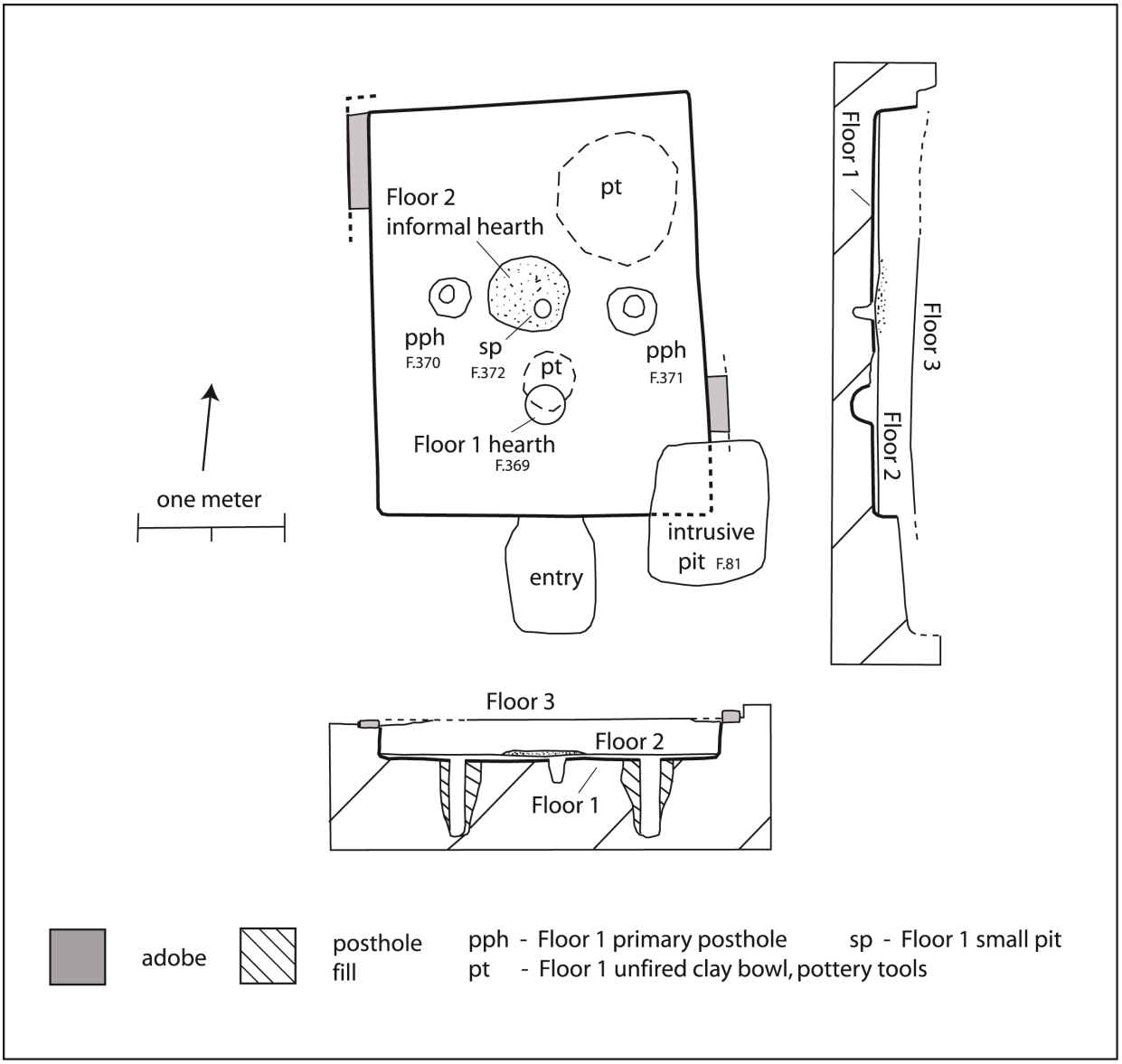


Figure 63. Room 26, plan and cross sections.

about one-half of an unfired clay bowl that may be the same unfired bowl as in the hearth. The same area also has a sherd with the concave side used as a palette to hold yellow ochre, a sherd scraper, and potter's clay. Three small pieces of the clay show that the clay was once on a plain weave mat, possibly of sotol leaves. Pottery manufacture is indicated by the materials in the hearth and northeast corner. This may have been one of the last activities when the structure was first occupied or an activity shortly after the structure was abandoned.

Floor 2: As noted earlier, Floor 2 is a compacted soil surface or activity surface and not a formal plastered floor. There is no evidence that the posts of Floor 1 were still in place, and the soil beneath this surface appears to be post-abandonment in-fill from eroding walls and windblown sands. Thus, a roof may no longer have been in place.

Floor 2 Feature: An informal hearth (F.373) is the only feature on this activity surface. It is in the center of the room, is a fire-reddened area, has a diameter of 50-55 cm, and slopes to a 2 cm depth in the middle. A lens of gray sand and charcoal is above the fire-reddened surface with a thickness of 5 cm in the center.

Floor 2 Materials: A few sherds and lithics were associated with this surface. The only object of note is a piece of limonite that possibly derived from the lower Floor 1.

Floor 3: Floor 3 is the uppermost floor and is an even but weathered surface of 2-3 mm of caliche pebbles. This surface disappears before contacting any pit walls, and no features were encountered for this surface. It would appear that this was a prepared floor; however, the thin layer of caliche hints that little effort was expended in its construction. The presence of this floor suggests that the structure might have been refurbished and that a new roof was added. The function of the structure at this time may have been storage as features are absent for Floor 3.

Floor 3 Materials: The soil over this floor yielded a few sherds and flakes and one hammerstone. However, the thin and weathered deposits question the association of the artifacts with the floor. They could have been from a diminished trash layer in the structure.

Comments: The use of Room 26 varied with time. Its first use was as a domestic structure with a hearth, post supports, and a stepped entry. Pottery manufacture was also recorded by the artifacts associated with the first floor. The structure was abandoned for some time, and soil accumulated on the first floor. Activity within the pithouse then produced a compact surface, and a fire had been built on this surface. The activity represented by Floor 2 appeared limited. Soil again accumulated within the structure and entry. And finally, another caliche floor was laid to likely use the structure for storage.

Room 27

Room 27 is a rectangular structure with rounded corners and the long axis running east-west (Figures 64 and 65). It is 3.78 m east-west and 2.06 m north-south and has a floor area of 7.4 sq m. This structure has an unusual ramp or step entry on the south side and a hearth nearby. Room 27 is located near the east end of aligned isolated structures in the northwestern part of the site (Figure 36).

Fill: A sand dune is above the room. The sand is reddish brown and braided and is 25-35 cm in thickness above remains of the structure. Aeolian sands also fill much of the room. Below these sands, a trash deposit extends from outside the south pit wall throughout most of the room and covers the floor. This

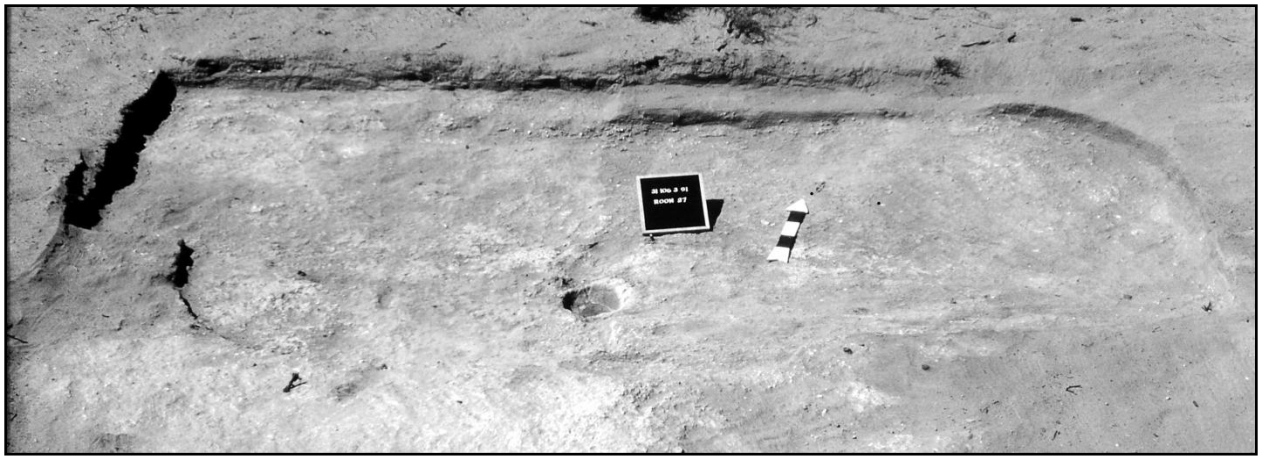


Figure 64. Room 27, looking north at excavated floor features.

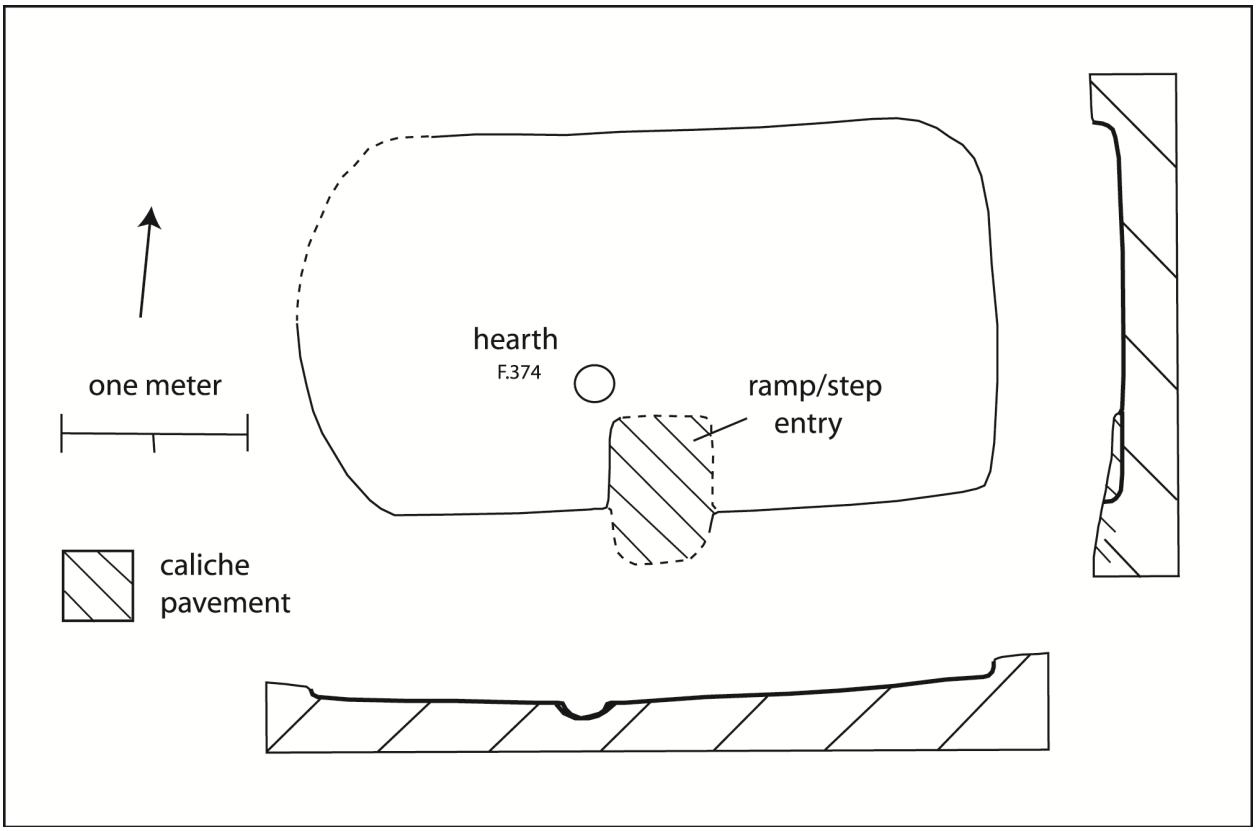


Figure 65. Room 27, plan and cross sections.

deposit of gray sand, charcoal, and artifacts is 10 cm thick along the south pit wall and thins to 1 cm along the north pit wall.

Walls: Pit walls are weathered, and extant pit walls are no more than 15 cm high, suggesting a shallow excavation for this structure. Remnants of a caliche plaster were observed in the southwest corner, but the original thickness is indeterminate.

Entry: An interior step or ramp is present against the center of the south pit wall. This feature is eroded, is only 3-5 cm high at the south end where it meets the south pit wall, and slopes to meet the floor at the north end. The length is 54 cm and the width is 48 cm. It is made of caliche and some adobe and is unplastered. Caliche continues 30 cm south of the pit wall, defining a 6-7 cm depression that is likely a step entry from the old ground surface.

Floor: The floor is a 0.5-2.5 cm thick layer of high caliche content adobe on the natural brown sandy loam soil. In places, the plaster curves up to meet the pit walls.

Floor Feature: Aside from the entry step or ramp, the only floor feature is a basin-shaped, formal hearth (F.374). It is 22-23 cm in diameter, 9 cm deep, and lined with 2-3 cm of caliche and adobe. A collar of the same material and 4-6 cm wide is flush with the floor. The fill of this hearth is the same as the trash deposit on the floor. The location of the hearth is somewhat unusual. It is near the entry, as expected, but not aligned with it.

Floor Materials: A trash deposit was on the floor, and no objects could be associated with its use.

Comments: Room 27 appears to be a domestic structure, given its size and the presence of a hearth. It is otherwise unremarkable, aside from the large step or ramp entry within the room.

Room 28

Room 28 is most unusual. It is very small, measuring 1.11 m by 1.22 m, with a floor area of only 1.3 sq m (Figure 66). It is also somewhat deep and has a stepped entry on the north side. Perhaps, this structure was used for storage. It is located in the center of the site and cannot be associated easily with other structures (Figure 36).

Fill: There is a 5 cm layer of soft, reddish brown sand over the area. Below this the sand is more compact and has some charcoal and artifacts to 35 cm below the surface. At this depth, the pit walls of the feature are apparent and the fill becomes a series of alternating layers of trash and reddish brown sand with some charcoal. The trash layers are gray sand with ash, charcoal, and artifacts. At about 89 cm below the surface, there is a 0.5-2 cm layer of reddish brown sand on the floor of the feature. This feature was excavated 53 cm into the natural caliche.

Walls: The excavation for this square feature appears to have been 80-84 cm below the old ground surface. The pit walls were unplastered.

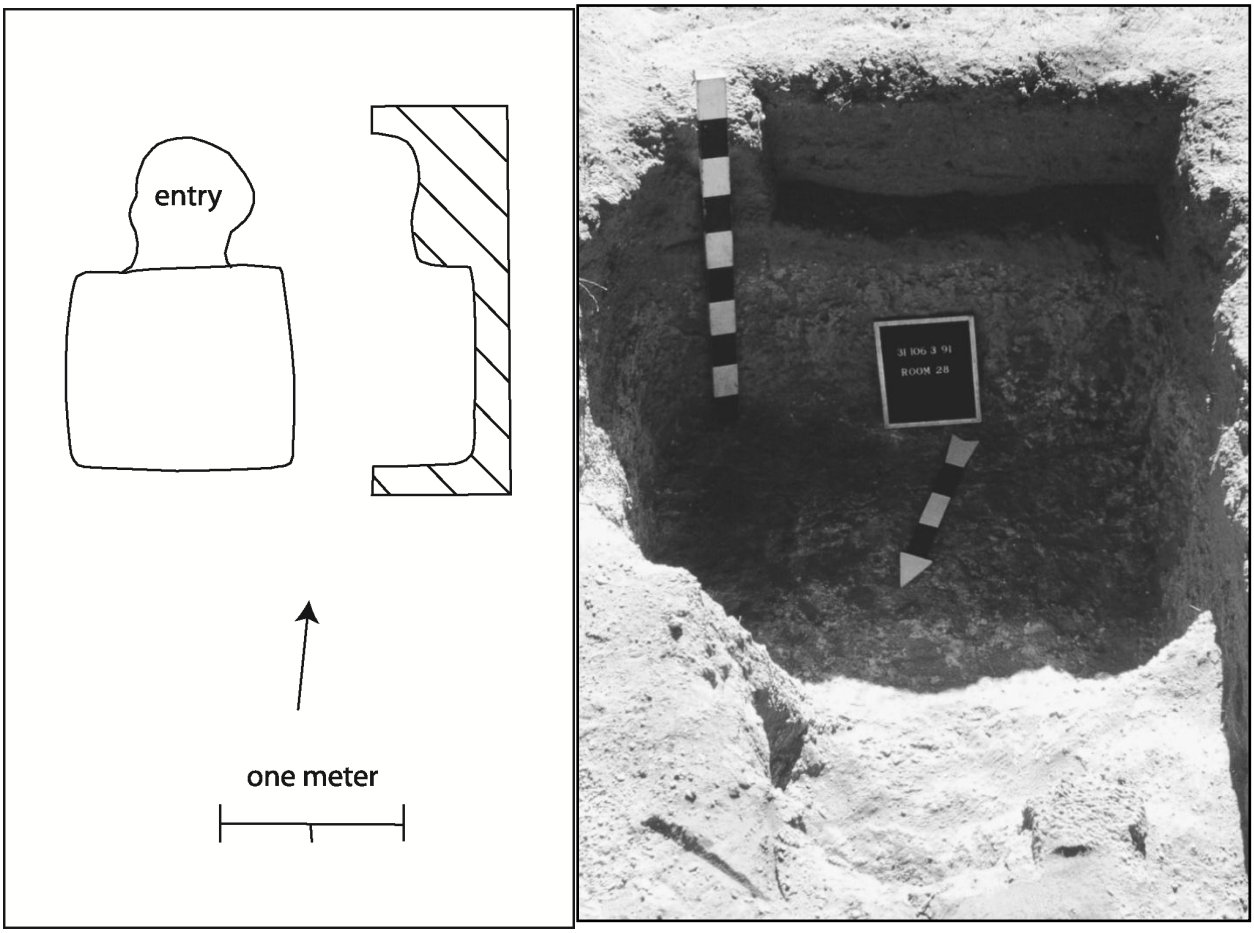


Figure 66. Room 28: *left*, plan and cross section; *right*, looking south at excavated floor.

Entry: A keyhole-shaped entry is on the north side of the feature. It extends 70 cm north of the north pit wall, has a maximum width of 66 cm, and a minimum width of 52 cm. It has a deep basin shape where it cuts the north pit wall at 30 cm above the floor, and the bottom of the entry is 17-21 cm below the old ground surface. As per the pit walls, the entry is not plastered.

Floor: The floor is the level, excavated surface into the natural caliche and has no associated features.

Floor Materials: The fill on the floor was devoid of artifacts.

Comments: This feature shares little in common with other isolated rooms at this site or elsewhere in the region. If it were not for the square shape and stepped entry, it would have been classed as an extramural storage pit. Nothing was found that would define the nature of the superstructure, and it is presumed to have been minimal.

Room 29

Room 29 is an isolated structure located near the western limit of the site and south of the west end of the linear arrangement of isolated rooms (Figure 36). It has good adobe walls and is square with a floor area of 9.5 sq m and inside measurements of 2.88 m north-south and 3.31 m east-west (Figures 67 and 68). This is a domestic room with a variety of floor features.

Fill: Reddish brown blow sand with some small gravel covers the area to a thickness of 7-20 cm above the room. Below this layer and within and around the room, there is a thin, 1.5 cm or less layer of apparent wall melt that is light brown adobe with caliche pebbles. The next layer within Room 29 is 12-17 cm thick and is reddish brown sand with specks of charcoal and a considerable quantity of small and large pieces of wall. Wall fragments are concentrated along the east, north and west walls, as well as along the exterior of all walls. Many of the pieces of wall adobe have a flat surface that is sooted. Fragments of wall are also found on the floor which is covered with 3-5 cm of brown to light gray loamy sand with occasional small pieces of charcoal.

Walls: The walls are of light brown adobe with high caliche content and are 34-38 cm wide. All corners are bonded, and interior walls are well-smoothed and sooted but unplastered. Very little is left of walls in the southwest corner, and the maximum height of walls is 19 cm. Although the walls are fairly high, no evidence of an entry could be found. The walls rest on the natural ground surface with no evidence of wall foundation trenches.

Floor: The floor is a thin and even layer of caliche that is 1 cm to 1.5 cm thick. It is in good condition, excepting areas of plant or animal disturbance. The caliche floor sits on an excavated surface that varies from 4 cm to 15 cm below the undulating ground surface and the adobe walls. The caliche plaster of the floor rounds the corners of the floor and pit wall junctures and continues upward to cover the exposed soils of the pit walls.

Floor Features: There are a number of features in this relatively small room. They include two hearths, a primary posthole, five secondary postholes, and two small pits.

South Hearth: This hearth (F.391) is in the center of the room and closest to the south wall. It is circular with steep walls and a slightly rounded bottom and is lined with adobe with high caliche content. It is 23-25 cm in diameter and 12 cm deep and is surrounded by a 10-12 cm collar of the mixed adobe and caliche that is 1 cm higher than the floor and well-smoothed. The hearth is blackened, but the fill is loose, brown loamy sand like that on the floor.

Figure 67. Room 29, looking north at floor and excavated south hearth.

The south hearth is a replacement of an earlier circular hearth. Only a small portion of the curved edge of the hearth survives along the west side of the south hearth. The earlier hearth has a blackened caliche and adobe lining, is flush with the floor, and lacks a collar.

East Hearth: The east hearth (F.392) is circular and flush with the floor, lined with about 1 cm of adobe and caliche, and capped with 1-1.5 cm of adobe with some caliche. It is bowl-shaped and has a diameter of 23-25 cm and a depth of 9 cm. Below the cap, the fill is a brown sandy loam with some caliche.

Primary Posthole: A single, 37 cm deep pit may be a primary posthole (F.389) for Room 29. It is on the north-south axis of the room and close to the north wall. The diameter of the pit at the opening is 33-35 cm, and the pit tapers to a rounded bottom with a diameter of 19-20 cm. The fill of this feature is the same as the room, brown loamy sand with pieces of wall adobe. The size of this feature suggests that it might have been a posthole. However, the placement of this feature is unusual, and definite evidence of the former presence of a post is lacking. Then again, the more definite characteristics of a posthole may have been obliterated with removal of the post. On the south side of this feature and extending into it is a small depression that is 11 cm by 21 cm and 9 cm deep. This depression has a fill of gray sand with some charcoal.

Secondary Postholes: There are five small pits in the western half of this sunken floor room that may have served as secondary postholes. All are unlined and filled with reddish brown sand. F.385 and F.386 each have one piece of charcoal, and F.386 has one sherd. There is an adobe cap of 3 cm over F.385, and F.386 has an adobe cap of 2 cm. The diameters of F.383-F.385 are 9-11 cm, and depths for these three features are respectively 20 cm, 16 cm and 15 cm. F.386 has a diameter of 12-13 cm and a depth of 28 cm, and F.387 has a diameter of 13-15 cm and a depth of 23 cm. These features taper slightly to rounded bottoms. F.385 is angled to the northwest, F.386 angles to the north, and F.387 is angled to the northeast.

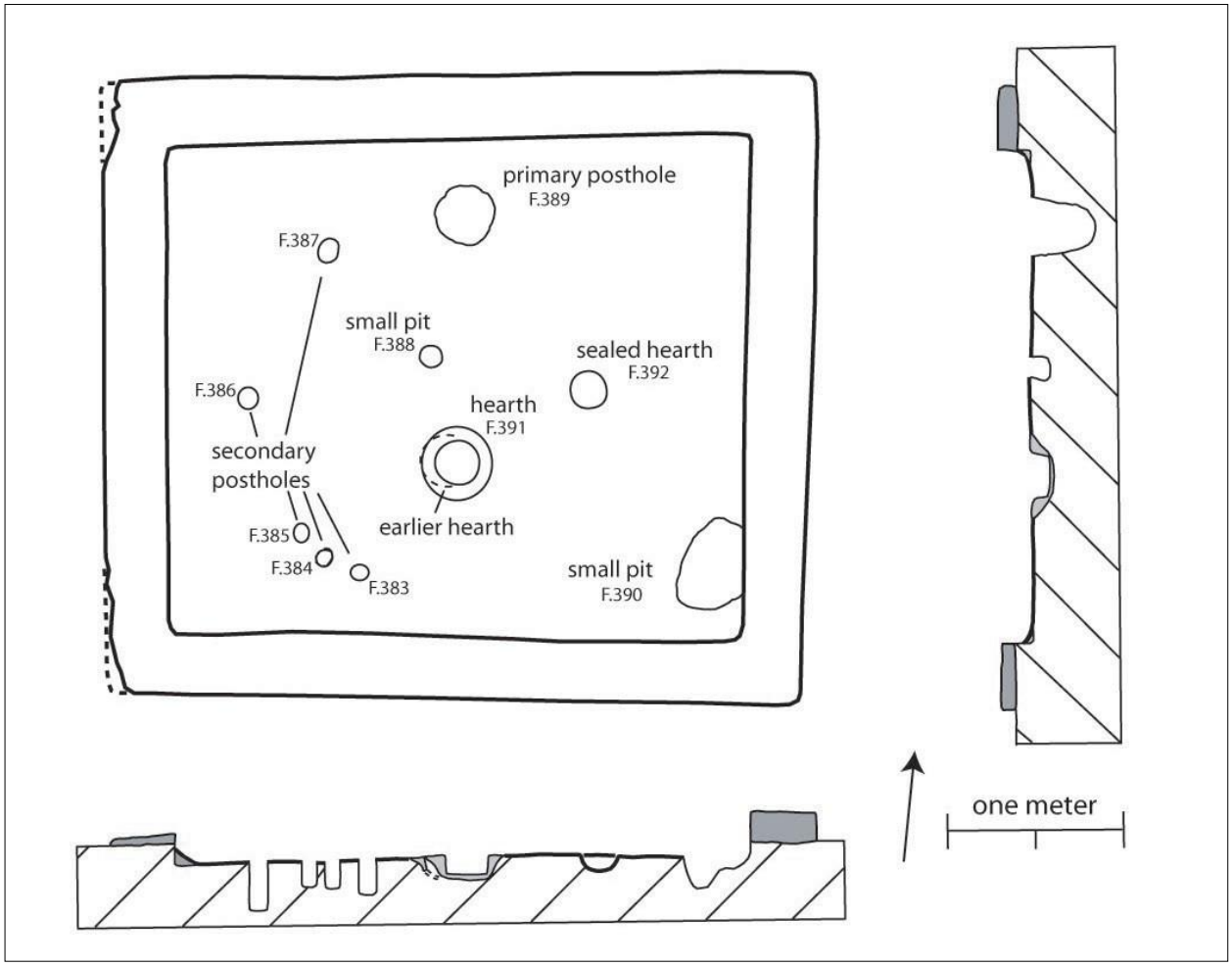


Figure 68. Room 29, plan and cross sections.

Small Pit: Near the center of the room is an unlined, small pit (F.388) with a fill of ashy gray sand with small bits of charcoal. This feature has a diameter of 12-13 cm at the top and a depth of 11 cm. It has a rounded bottom and straight sides that are slightly undercut on one side. This possible ash pit is just north of the south hearth.

Another unlined, small pit (F.390) is in the southeast corner. It measures 35 cm by 53 cm and has a depth of 18 cm. The sides slope to an irregular rounded bottom. Fill of this feature is loose brown sand with pieces of wall adobe. A mano fragment is the only item recovered from this feature.

Floor Material: A few sherds and pieces of chipped stone were on the floor, and a cobble abrader was on the floor in the northeast corner.

Comments: Room 29 has the best preserved walls of any of the isolated, sunken floor rooms and serves as a good example of wall construction for isolated dwellings. It also shows modifications that may or may not be related to episodic habitation.

Near the south wall and presumed entry to the room was a circular hearth. This hearth was replaced with another hearth with a large collar.

At one point, there was a hearth near the east wall and possibly an entry in the east wall. East of the structure is an activity surface with a number of hearths and other features. This hearth was later sealed.

There were five possible secondary postholes. They were not all in use at the same time, as two were sealed. These features had perhaps been used to hold posts to support the roof or maybe racks or other interior furnishings.

The changes in hearth location, use and disuse, the variation in number of secondary postholes in use, and the possible alternation of entry location certainly indicate a varied use of Room 29. It is also conceivable that such modifications could accompany intermittent use of the structure.

Room 31

Room 31 is south of the pueblo and overlain in part by the isolated Room 24 (Figure 36). This structure is the largest of the isolated rooms and has an unusual form. The principal part of the structure has a subrectangular shape, measures 6.68 m by 3.20 m, and has a floor area of 18.9 sq m (Figures 69 and 70). On the south side of the structure is a roughly oval, apparent entry or antechamber that is 2.72 m by 1.36 m and has an area of 3.2 sq m.

Room 31 was not in very good condition. Test squares excavated in the area failed to identify the structure. This was largely because of numerous later features and trash deposition within the structure masking its form. The floor of this structure was finally recognized in the walls of two backhoe trenches that were dug near the end of work at the site.

Fill: Reddish brown aeolian sands with a depth of 2-11 cm cover the area of Room 31. Below the surface sands are three principal layers of soil. The first layer varies from a compact to a loose sandy loam that varies from brown to light gray with scattered charcoal and few to moderate artifacts. This deposit slopes from west to east and has depths of 15 cm to 26 cm. Below this layer, there is a 4-8 cm deposit of gray sand and ash with charcoal, bone, and numerous artifacts. This layer also slopes to the east, is 7 cm above the floor at west end of the structures, and meets the floor near the east-central area of the structure. The third layer is brown sand with scattered caliche pebbles, little charcoal, and very few artifacts that covers the floor from the center of the structure to the west pit wall. Maximum depth of this layer is 7 cm along the west pit wall. All three layers spill from the main structure into the entry/antechamber and have thicknesses near the maximum observed for each layer in the main portion of the structure. The brown sand on the floors of the structure and the entry/antechamber would suggest post-abandonment accumulation of blow sands and perhaps abandonment of the site. After some time, however, the structure and area above the reduced remains was used for trash disposal and other activities.

Numerous extramural features were recorded in the vicinity of Room 31 and in the fill or cut into pit walls. These include hearths, roasting pits, possible storage pits, and nonspecific pits filled with trash. There were 13 features in the fill and cut into pit walls. Some of these features disturbed pit walls in the southwest and northeast parts of the structure, adding to the difficulty of following the pit walls.

Walls: The excavation for the main room of the structure had a maximum observed depth of 25 cm, and the entry/antechamber was deeper and a portion of the surviving pit wall was 35 cm high. These excavations went through a compact brown sandy loam and penetrated the caliche substrate as much as 15 cm in the main chamber and 25 cm in the entry/antechamber. There was no plaster on the pit walls, and no plaster debris was observed in the fill. Adobe walls were no longer in place. Occasional lumps of adobe and lenses of adobe in the fill may have been from walls.

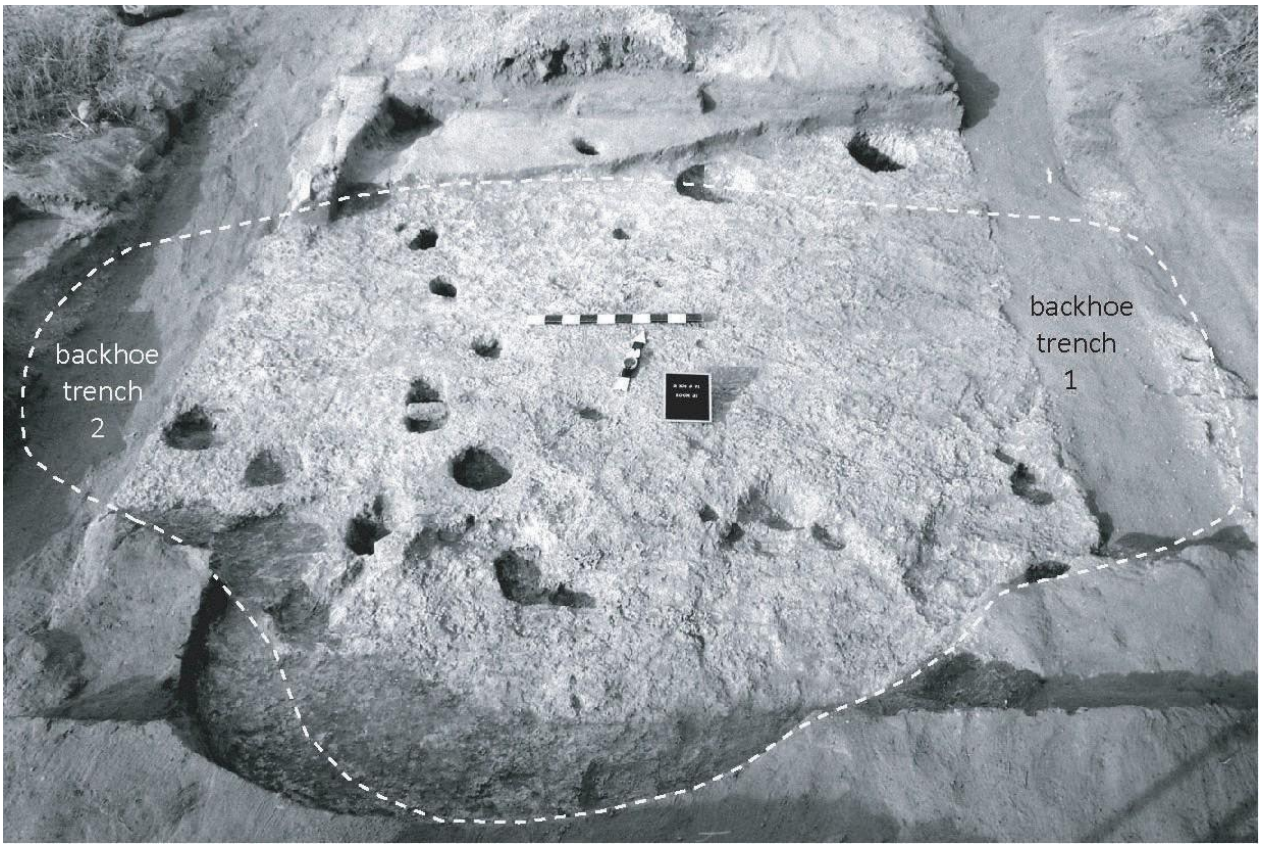


Figure 69. Room 31, looking north at excavated floor features. Dotted line follows actual or projected outline of structure

Entry/Antechamber: As noted earlier, there is an unusual addition to the middle of the south side of the structure. It is where one might expect an entry for there is an informal hearth just to the north inside the main room. Also, the step down between the main room and this feature is well-defined, mid-way along the south wall of the main room and between F.171 and F.165. This may indicate where the doorway was located. However, this feature is much different from other observed isolated room entries. It is much wider than the other recorded entries. And, it is deeper than the floor of the room. Other entries are higher than the room floor. Given the large size and perhaps special nature of this isolated structure, a larger entry may have been useful.

There is no evidence to say that this feature was roofed, but subfloor features suggest a possible post wall between the main part of the structure and this southern entry or possible antechamber. Given the relatively small size of this feature and if exterior walls were made of adobe, other post supports may not have been required.

Floors: The room floor is level and curves upward to meet the east, north, and west pit walls. Along the southern part of the room, the floor drops away to the lower floor of the entry/antechamber. The floor in the entry/antechamber is also level, excepting a 5 cm deep depression (F.448). This depression lines up with the presumed doorway between the main room and the entry/antechamber and the informal hearth and may indicate where an entry was located from outside into the entry/antechamber.

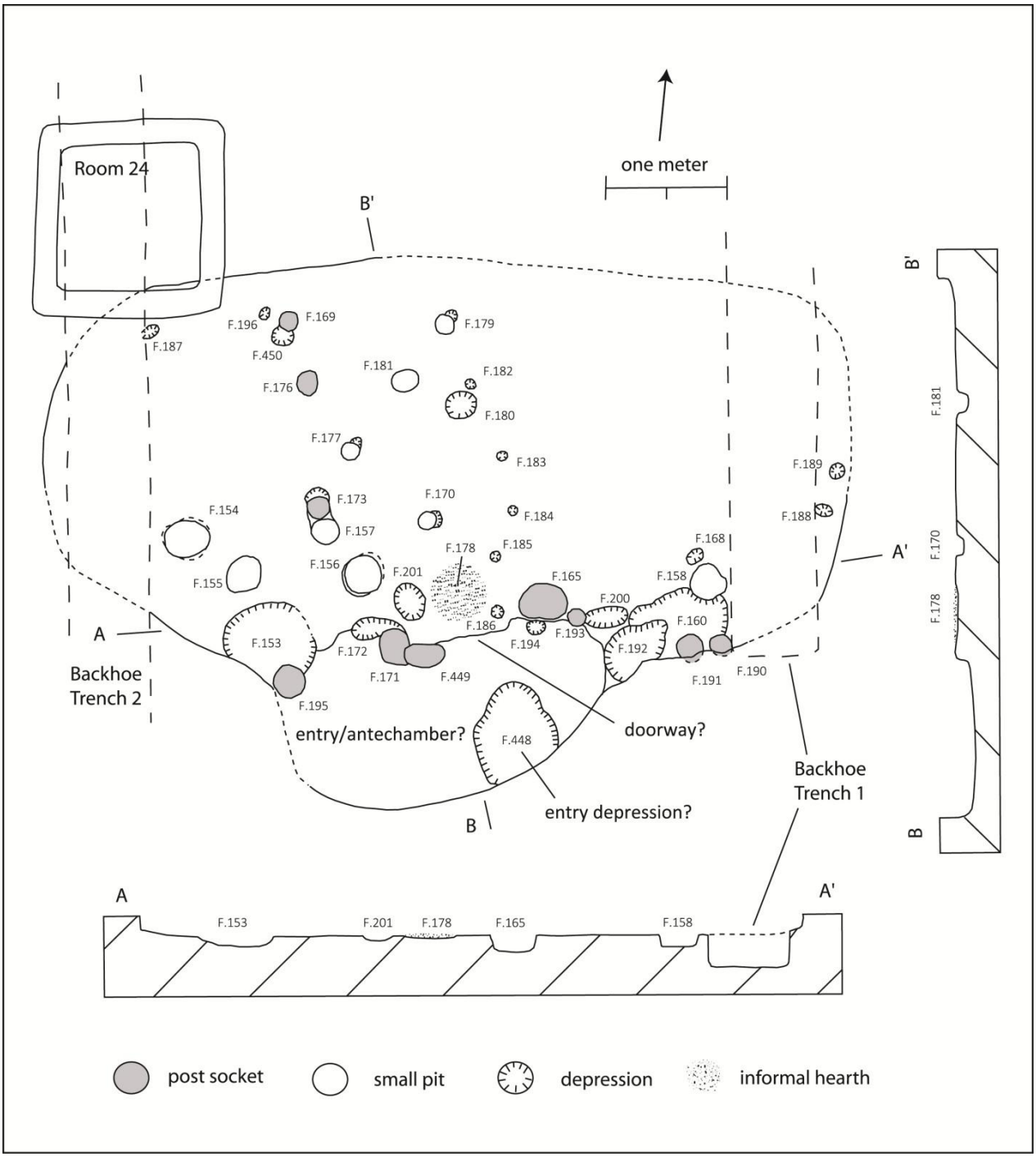


Figure 70. Room 31, plan and cross sections.

The floors of the main room and the entry/antechamber are nothing more than the hard packed surfaces of the excavations into caliche. They are smooth in places and weathered or worn looking in other areas.

Floor Features: The floor of the entry/antechamber has a depression (F.448) marking a possible entry and is described above. The floor of the pithouse has a large number of features. These include an informal hearth, possible post sockets, small to large depressions, and non-specific pits. The smaller depressions in

the central and eastern areas of the room and F.179 have a fill like the overlying trash layer, light gray sand and small pieces of charcoal. The fill of other features is brown sand with caliche pebbles and specks of charcoal and is the same as the soil on the floor in the western portion of the structure. Other attributes of these features are provided in Table 6.

Informal Hearth: An informal hearth (F.178) is located on the north-south axis of the main room and just north of the step down to the entry/antechamber. It is roughly circular and is a shallow, 2 cm deep basin in the caliche. The bottom is fire-reddened, and the fill is gray sand and ash.

Postholes and Associated Depressions: Between the floor of the main room and the floor of the entry/antechamber, there is a possible step down between F.165 and F.171 and a series of lesser drops, postholes, and depressions on either side. There are five depressions of variable size that are present in slopes between the upper room floor and the lower entry/antechamber. Two are on the west side (F.153, F.172), and three are on the east side (F.160, F.192, F.200). These sloping surfaces may possibly be other passages between posts separating the room and the entry/antechamber. Features that may have once held posts are either small, single post-sized holes or larger holes that may have held multiple posts or were enlarged with post removal. The smaller postholes are F.190, F.191, and F.193 and have depths of 5-15 cm. The larger features are F.165, F.171, F.195, and F.449 and have depths of 8-31 cm. No burned posts, casts of posts, or definite remnants of packing materials were found. However, the arrangement of these features suggests that they held posts that were placed between the main room and the entry/antechamber in lieu of an adobe wall. A depression (F.194) may also have held a secondary post.

Other Postholes: There are three postholes (F.169, F.173, and F.176) that are aligned north-south in the west-central portion of the pithouse. They range in depth from 16 cm to 23 cm and would have been important supports for a structure of this size. There is often symmetry in the placement of postholes within isolated rooms and pueblo rooms, and one might have expected similar postholes in the east-central portion of the main room.

Small Depressions: There are 10 depressions with widths between 7 cm and 14 cm and depths of 7 cm or less. The function of these small depressions is uncertain, but a number of them may note the former locations of secondary supports to possibly shore up the roof. In particular, there is the more or less north-south alignment of F.182, F.183, F.184, F.185, and F.186. These features mirror the alignment in the west-central portion of the main room, and this adds to their interpretation as sockets for secondary posts.

Large Depressions: Two depressions (F.180 and F.201) on the floor of the main room are larger than the small ones mentioned above. They are 23-33 cm across and 3-4 cm deep. Perhaps, these functioned as pot rests.

Small Pits: Nine pits of non-specific function are located in the southwest, southeast, and central parts of the room. They tend to be circular with steep sides and rounded bottoms. Most are shallow with depths of 6 cm to 9 cm, excepting F.156 with a depth of 16 cm. The four larger pits have dimensions between 28 cm and 38 cm, and two (F.154 and F.156) have undercut side walls. The smaller pits are between 15 cm and 24 cm across. Two of the smaller pits (F.170 and F.181) are aligned on the central axis of the main room with the informal hearth, the step down, and the depression in the entry/antechamber that may mark the exterior entrance. Large communal or ceremonial rooms in pueblos often have features along the central north-south axis in addition to a formal hearth. This is also seen in Room 6 of the pueblo at this site. Thus, a parallel may be drawn in the use of this large isolated structure and the large rooms of pueblos.

Table 6. Attributes of Room 31 features.

Feature Number	Feature Type	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile
178	informal hearth	51	42	2	circular	shallow basin
153	depression	75	65	3-9	circular	strongly to slightly sloping sides, irregular level bottom
160	depression	79	35	6	irregular	sloping sides, irregular level bottom
168	depression	14	11	4	oval	straight to sloping walls, shallow rounded bottom
172	depression	45	17	1-9	irregular	strongly to slightly sloping sides, shallow rounded bottom
180	depression	26	23	3	oval	shallow basin
182	depression	7	7	2	circular	straight to sloping walls, roughly level bottom
183	depression	8	8	2	circular	straight to sloping walls, roughly level bottom
184	depression	7	7	1	circular	straight to sloping walls, roughly level bottom
185	depression	9	9	3	circular	straight to sloping walls, roughly level bottom
186	depression	10	10	5	circular	straight to sloping walls, roughly level bottom
187	depression	13	8	3	oval	shallow basin
188	depression	14	12	7	oval	sloping sides, level bottom
189	depression	13	11	5	oval	shallow basin
192	depression	40	50	1-12	irregular	strongly to slightly sloping sides, irregular level bottom
194	depression	13	13	1-2	circular	shallow basin
196	depression	10	7	3	oval	shallow basin
200	depression	28	21	4	oval	sloping sides, rounded bottom
201	depression	33	24	4	oval	shallow basin
449	depression	80	69	5	irregular	sloping sides, irregular level bottom
450	depression	10	15	7	circular	sloping walls to F.169
154	non-specific pit	38	33	8	oval	straight to 1-3 cm undercut sides, shallow rounded bottom
155	non-specific pit	27	28	6	circular	basin-shaped
156	non-specific pit	31	31	16	circular	1-4 cm undercut sides, shallow rounded bottom
157	non-specific pit	24	22	8	circular	straight sides, level bottom
158	non-specific pit	29	28	9	irregular	vertical sides, flat bottom
170	non-specific pit	17	15	6	circular	basin-shaped
177	non-specific pit	17	16	9	circular	straight to sloping walls, shallow rounded bottom
179	non-specific pit	15	15	7	circular	basin-shaped
181	non-specific pit	19	18	9	circular	straight to sloping walls, shallow rounded bottom
165	posthole	34	28	13	circular	sloping sides, rounded bottom

Table 6. Continued.

Feature Number	Feature Type	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile
169	posthole	14	14	16	circular	straight walls, rounded bottom
171	posthole	30	28	22	circular	straight walls, rounded bottom
173	posthole	17	15	23	circular	straight walls, rounded bottom
176	posthole	20	16	18	oval	strongly sloping sides, shallow rounded bottom
190	posthole	20	20	5	circular	straight to sloping walls, flat bottom
191	posthole	26	23	11	circular	straight to sloping walls, rounded bottom
193	posthole	19	15	15	oval	straight to sloping walls, flat bottom
195	posthole	31	29	8	circular	strongly sloping sides, shallow rounded bottom
449	posthole	30	19	31	oval	straight to sloping walls, shallow rounded bottom

Floor Material: A large number of artifacts and bones were found in the fill of Room 31, but little could be associated with the floor of this structure. Artifacts with a floor context are two ground stone fragments and a few sherds and flakes which may also be post-occupational debris.

Comments: Room 31 is the largest of the isolated structures. It is subrectangular in form like other isolated rooms, but it differs in lacking a formal, plastered hearth and having a large entry/antechamber and possible post wall divider. It is also at a distance from the other isolated structures. Given its large size and unusual attributes, this structure may have had a function different from isolated, domestic and/or storage rooms. It may have functioned like the large rooms in pueblos of the region and been a communal or ceremonial structure.

Room 33

Room 33 is in the center of the group of five isolated rooms in the southern part of the site (Figure 36). It is a small, circular room measuring 2.68-2.80 m in diameter and having a floor area of 6.1 sq m (Figures 71 and 72). It has a simple hearth in the floor and a floor depression. Near the end of the life of this feature, a small pit was also excavated in the floor. Room 33 was discovered during backhoe trenching.

Fill: The area above Room 33 was covered with up to 19 cm of recent sands. Beneath the surface sands was an irregular 10 cm layer of gray sand with some charcoal and a few artifacts that had been pushed into the area by grading. The fill of Room 33 was a loose, brown sand with a few scattered pieces of charcoal. Resting on the floor was a 1 -3 cm layer of gray sand with scattered pieces of charcoal and a few pieces of burned adobe. However, there was no indication that the structure had burned.

Walls: The floor of this feature was 48 cm below the old ground surface. Pit walls survived to a height of 39 cm on the northwest side but diminished to as little as 8 cm on the southeast side. There was no plaster on the pit walls and no evidence of wall plaster in the fill. Any above ground walls had eroded away and no obvious wall material was in the fill. There was a depression in the floor between the hearth and the south wall, suggesting a possible entry in the south wall. The surviving height of the south wall, however, was too low to confirm an entry.

Floor: The floor had been excavated 5-15 cm into the caliche substrate. The floor surface dipped to the center of the feature and was smooth but unplastered.

Floor Features: Room 33 has a hearth, a depression, and a small pit.

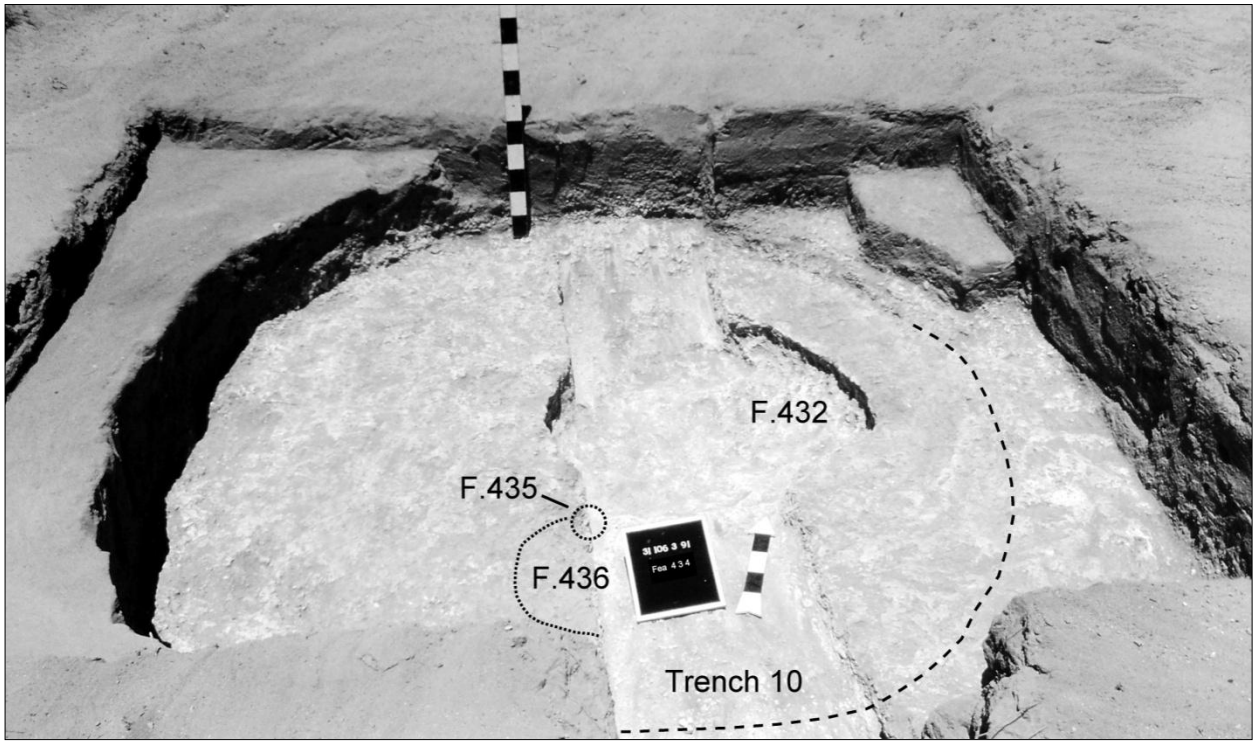


Figure 71. Room 33, looking north at excavated features.

Hearth: An apparent hearth (F.435) was largely removed by the backhoe trench. It appears to have been basin-shaped, about 26 cm in diameter, and over 3 cm deep. It is an unlined pit with blackened walls just south of the center of the room. The hearth fill was the same as on the floor, gray sand. Ash is on the floor on the north side of the hearth.

Depression: A 0.5-1 cm depression (F.436) is on the south side of the hearth. It has a length of 68 cm and has been truncated by the backhoe trench. Adobe lines this depression and is 0.5-1.5 cm in thickness. As with other depressions in other structures, this depression is between the hearth and a wall and may have been associated with an entry.

Small Pit: An unlined, basin-shaped pit (F.432) in the northeast quarter of the room is 0.96-1.11 m in diameter and 28 cm deep. Digging stick marks are present on the side walls. This feature was cut into the floor shortly before the use of Room 33 ended and was then filled with a compact brown sand.

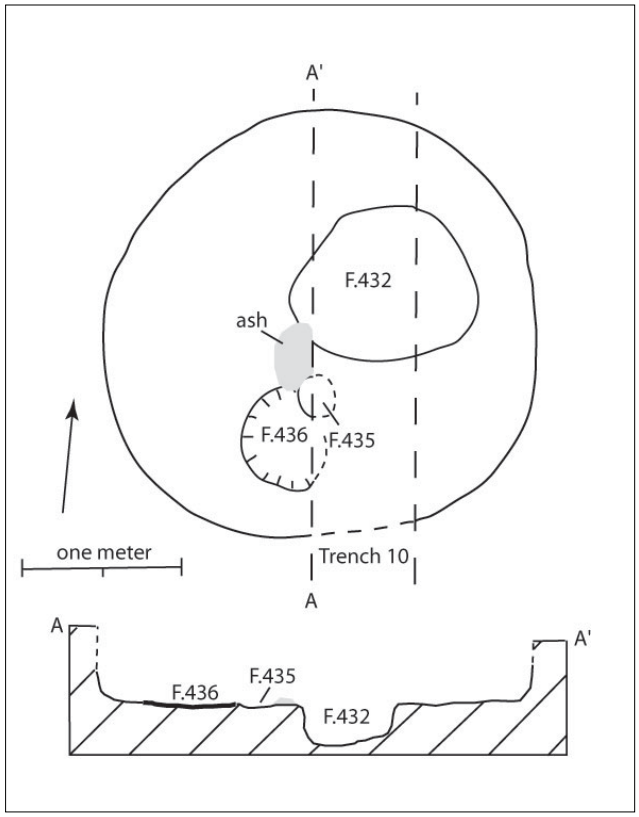


Figure 72. Room 33, plan and cross section.

Floor Material: One sherd and a few flakes were all that was found on the floor.

Comments: This feature is somewhat problematic. A round feature of this size would not be out of place among storage pits at this site. However, the paired floor hearth and depression on the south side of this feature follows the pairing of hearths and depressions in isolated rooms. The round plan of Room 33 is most unusual for an El Paso phase structure. Indeed, only one other round structure is known for the Pueblo period (White1965), and it may date to the Dona Ana phase. The small size of this feature, the unplastered floor and hearth, and the round form would suggest that this feature might be a storage room or an atypical storage pit. The location of this feature in the middle of the four isolated structures in the southern part of the site does intimate a special relationship between it and the other rooms.

Sequence of Occupation

The many isolated rooms and their spatial distribution questions the contemporaneous occupation of the isolated rooms and their relationship to the pueblo. Grading of the site, erosion of surface soils, and the lack of stratified occupational deposits complicate the issue. However, the nonrandom distribution of isolated rooms, the overlapping of rooms and features, the distribution of trash within and around rooms, and the spread of sherds from the same vessel provide clues to the occupational history of the site. Five different occupations are recognized (Figure 73). They vary in ease of definition, and the placement of some rooms in the sequence could be debated. Nevertheless, it should be apparent that there was more than one occupation of this site and that occupations differed in their intensity.

The first and earliest occupation is thought to be the isolated rooms that form a linear pattern in the northwestern portion of the site. Rooms 18, 19, 20, 21, 22, 26, and 27 are included in this occupation (Figure 73), and Rooms 18, 19, 21, and 26 have an intimate close spacing. Room 20 is offset somewhat to the southwest, and Room 22 is oriented north-south and sets a boundary on the west side of this group of rooms. A somewhat enclosed space is suggested by the arrangement of Rooms 19, 20, 21, 22, and 26. None of these rooms overlie other rooms or extramural features, hinting that there is no earlier occupation in this area. A limited occupation is also implied by the relatively few extramural features around these rooms. Following abandonment, two or three episodes of use of the area within Room 26 is noted, and an extramural feature was cut through the corner of Room 26. Additionally, secondary trash was deposited in the area and specifically within Rooms 18, 21, 22, and 27. Sherds from the trash in Rooms 18, 21, and 22 have been matched with ones from rooms of the pueblo and extramural features and intimate that much of the trash in isolated rooms of this first occupation was deposited during occupation of the pueblo.

The next or second occupation is believed to have been Rooms 11 and 15 (Figure 73). These rooms align with those of the first occupation which may have been in ruin but still visible and part of the landscape. The close spacing of these occupations could also imply a close social relationship and perhaps a history of land tenure. Rooms 11 and 15 differ in details of the architecture from rooms of the first occupation. More importantly, both rooms have been cut into earlier extramural features that are most likely associated with the first occupation. A number of items are recorded for the floors of these rooms. These include manos, metates, a mortar, and a pestle that may have been too heavy to transport an anticipated distance following abandonment of the rooms. No such materials were found on the floors of the first occupation. Room 11 also has a basin of potter's clay on the floor, and it is wondered whether there is a connection to the reuse of Room 26 and the unfired bowl and pottery tools therein. A number of extramural features and a layer of trash are above Rooms 11 and 15, and above all of this are Rooms 10 and 14 of the pueblo. As with the first occupation, the trash and features above these two rooms are attributed to the pueblo occupation.

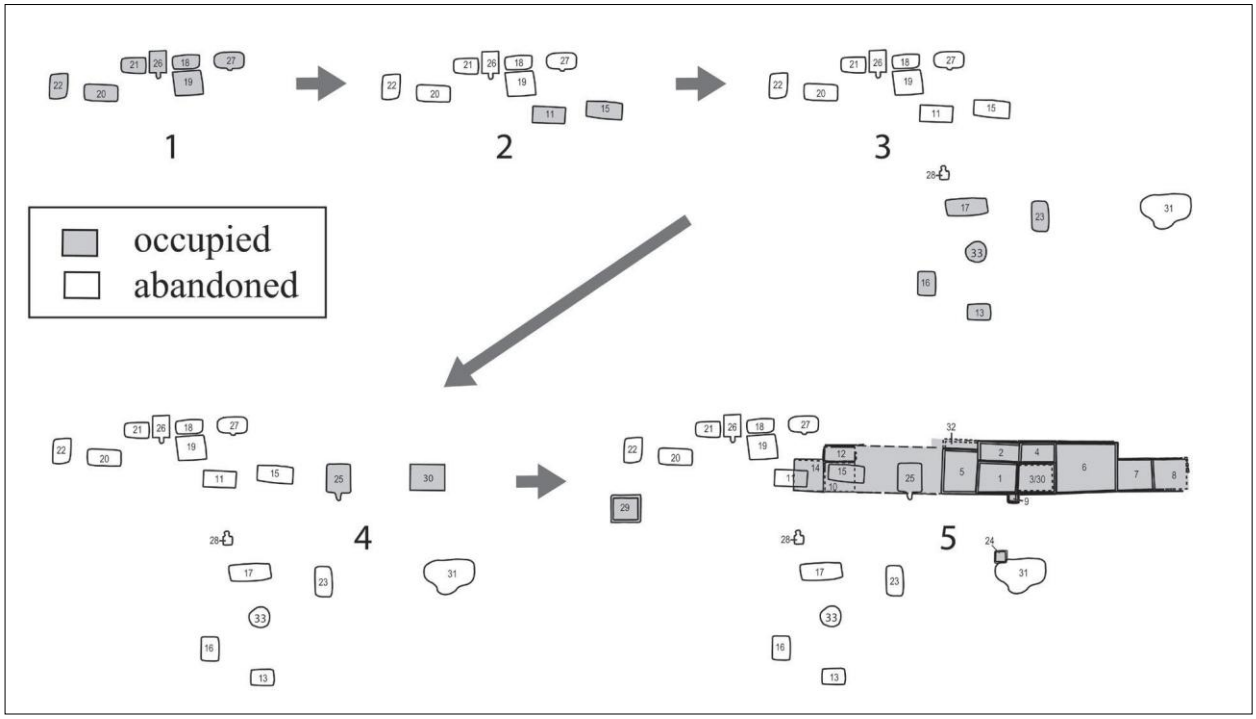


Figure 73. Site occupation sequence: *upper left*, first; *lower right*, last.

The third occupation is noted for the southern part of the site and includes Rooms 13, 16, 17, 23, and 33 (Figure 13). Rooms 16 and 23 depart from the usual orientation of east-west room orientations to north-south orientations, and with Rooms 13 and 17 form an informal courtyard centering on Room 33, a possible storage room or large storage pit. Room 23 was placed over several extramural pits, presumably from the earlier occupations. There are relatively few features near the rooms of this occupation, and trash is in well-defined areas and mostly south of the rooms. None of the rooms have been intruded upon by other features or rooms, and trash has not accumulated in these rooms with the exception of some refuse in the fill of Room 17 possibly from the later pueblo occupation.

The fourth occupation is seen as being comprised of two rooms, Rooms 25 and 30 (Figure 73). Both rooms have been excavated into the caliche substrate, and there is no evidence of underlying features or rooms. These rooms continue the pattern of aligned rooms and occupations as noted for the first two occupations. As noted in the next occupation, the southern pit walls of these rooms are also aligned with the southern walls of the pueblo. Room 30, as described in the previous chapter, is either the first room or one of the first two rooms of the pueblo. The posts of this room had been removed, and the walls were collapsed within the room. Room 3 of the pueblo was then constructed over the leveled remains of Room 30. It is thought that Room 25 was likely occupied at the same time as Room 30. These rooms are aligned with one another, and both are fairly sizeable rectangular rooms. Room 25 also has a history not unlike that of Room 30. The posts had been removed, a very small amount of sand accumulated, and then Room 25 was half-filled with caliche, perhaps from the excavation of Room 30 and/or Room 1 of the pueblo. This was followed by the deposition of a considerable amount of secondary refuse from the pueblo occupation. There were a number of matches of sherds from the same vessels from Room 25 with sherds from the floors of the pueblo, the trash layer above Rooms 11 and 15, extramural features on the south side of the pueblo, and elsewhere in the site. Later, an extramural pit was cut through the northeast corner of Room 25 and rooms of the pueblo were built over it. Rooms 25 and 30 are well-constructed rooms whose use was purposely terminated with changing circumstances and the building of a substantial and more permanent structure of contiguous rooms.

The fifth and final occupation is reasoned to be the occupation of the pueblo and two isolated rooms, Rooms 24 and 29 (Figure 73). The pueblo has been described in the previous chapter. On the whole, rooms of the pueblo are larger and with heavier walls than the isolated rooms. As rooms were added to the pueblo they covered extramural features and trash associated with pueblo, as well isolated rooms that include Rooms 11, 15 25, and 30. There are no trash deposits within the pueblo rooms. Aside from the questionable deposit of sherds of an El Paso Polychrome jar in the fill of Room 3, there are no post-abandonment features cut into or overlying the pueblo. The spatial distribution of refuse, matched sherds, and extramural features indicate an intensive occupation of some duration.

Rooms 24 and 29 are seen as part of the occupation of the pueblo. Room 24 is 8 m south of the pueblo and the similarly sized Room 9. Beneath Room 24 are several extramural features, trash, and Room 31. A sherd from Room 24 matches a sherd from Room 4 of the pueblo, and trash below Room 24 and within Room 31 is attributed to the pueblo occupation. Room 29 is on the western edge of the site. It neither overlies nor is overlain by other rooms, features, or trash deposits. A sherd from Room 29 matches with another in the pueblo occupation trash within Room 31, and a sherd from an activity surface next to the outer east wall of Room 29 matches with one from Room 3. Rooms 24 and 24, unlike the majority of isolated rooms and like the pueblo rooms, have intact adobe walls or foundations for walls.

Rooms 28 and 31 are shown in Figure 73 as having been abandoned by the time of the third occupation of the pueblo. Both rooms contain secondary refuse from the pueblo occupation, and Room 31 has numerous post-occupation features within the fill and is superimposed by Room 24. Room 28 is 6 m south of Room 11 and may have been in use during the second occupation or possibly the first occupation. Room 31 cannot be associated with any pre-pueblo occupation and may represent a separate occupation or, perhaps, another occupation that was obliterated by the construction of the pueblo. There is no evidential connection between these rooms and other isolated rooms of the earlier occupations

Evidence of Remodeling

Changes in the architectural features of isolated rooms are comparatively few in number and generally follow those of the pueblo. Room 25, as with Room 30, may have been intentionally raised and partially back-filled in advance of the construction of rooms of the pueblo. Other modifications to rooms are along the lines of maintenance or adjustments in the use of space. These include possible replastering of floors, the refurbishing or movement of hearths, and the excavation and capping of small pits.

Rooms 13 and 18 have thicker and better surfaced floor areas in the center of these rooms and around their hearths. This could be the result of resurfacing or replastering the central floor areas of these rooms. However, layers of plaster and edges of new and old plaster could not be detected. The differences in appearance may simply be a reflection of the variation in floor stability with floor thickness.

The rebuilding or movement of hearths is noted for several rooms. Movements of hearths may well have been accompanied with a change in entry, but erosion has taken any evidence of entries for these rooms. Room 29 has three hearths. The first is near the south wall and was probably replaced by a hearth near the east wall. The east hearth was capped, and a new hearth was constructed over the earlier south hearth. The building of a hearth over an earlier hearth in Room 30 was also noted in the previous chapter. In room 11, the south hearth was supplanted by a hearth near the east wall. The south hearth had the bottom broken out of it, and it was used to cache two manos.

Small pits are present in the floors of most rooms. Some may have been used for storage, but variation in the size of pits would suggest multiple uses. For example, the pit in the floor of Room 15 has the size and form of a possible storage pit, and with abandonment of the structure a number of objects were cached within it. Pits were apparently excavated into floors when needed, tend to be in corners or along walls, and

are predominantly unlined. Some have also been capped with plaster as the use of floors changed. Six capped small pits are recorded for Rooms, 13, 18, 20, and 22.

Floor Assemblages

Floor assemblages for isolated rooms correspond well with those of rooms of the pueblo and have a domestic character. Ceramics and debitage are ubiquitous, and ground and chipped stone tools, worked sherds, jewelry, and other objects are present (Table 7). Floor assemblages could not be defined for Rooms 22, 24, and 28 where either erosion had removed the floor or trash was deposited directly on the floor. Room 19 has also suffered from erosion, and the assemblage from this room has likely been altered by the elements. The assemblages of Rooms 21, 23, and 31 potentially include other materials with erosion and disturbance of Room 23 and trash disposal within Rooms 21 and 31. These rooms have high densities of ceramics and debitage compared to the other rooms.

Isolated rooms unaffected by erosion or subsequent trash deposition are domestic rooms with formal hearths and have floor assemblages that are largely of the same character. That is, they have small numbers of sherds and lithics and few other objects. There are, of course, exceptions. Room 17 has a sizeable number of sherds, cores, debitage, ground stone fragments, and other objects suggesting that trash was allowed to accumulate on the floor prior to abandonment of the structure. Rooms 11, 15, and 26 have a variety of de facto objects left with the termination of the use of the rooms. These include ground stone, hammerstones, polishing pebbles, worked sherds, an unfired clay bowl, and potter's clay. Shell beads, pieces of chrysocolla, a projectile point, and an obsidian cruciform are associated with the floor of Room 20, and a shell bead, a piece of specular hematite, and a projectile point are from the roof layer of Room 13. Both of these rooms had burned, and the objects may be connected to rituals of room termination. A few shell beads and a projectile point were also found in Rooms 17 and 21.

Room 31 is a large room that possibly may have served as a communal room. The fill on the floor of this room most probably includes later trash. Nevertheless, nothing was found on the floor that would suggest a function for this room that was different from the domestic rooms. There certainly are no minerals, fossils, or shell and turquoise jewelry items recorded for the floor of this structure.

Room 22 is a small room that may have served as a storage room. Rooms 24 and 28 are very small rooms that may also have served as storage rooms or some other non-domestic function. Unfortunately, floor assemblages could not be identified for these isolated rooms.

Room Function

Isolated rooms vary in size, shape, depth, and presence of a hearth, other floor features, floor plaster, wall plaster, and roof supports. In general, isolated rooms tend to be smaller than rooms of contiguous room pueblos and show a lesser expenditure of labor in construction indicative of short-term occupation. Walls are less substantial, roof supports are infrequent, some floors are not plastered, walls may not be plastered, and formal hearths may not be present. It has been suggested that small isolated rooms are seasonally occupied field houses (Batcho et al. 1985; Browning et al. 1992). However, the many isolated rooms and multiple occupations of Firecracker Pueblo suggest that the roles of these structures in the settlement system are not easily subsumed under the category of field house. This topic will be taken up in the concluding chapter of this report. For the present, the function of isolated rooms will be explored largely along the same lines as for rooms of the pueblo in the preceding chapter. That is, a characterization of their attributes following the common Southwestern triad of habitation, storage, and civic/ceremonial rooms.

Table 7. Floor Assemblages for Isolated Rooms.

Room	Floor Area (sq m)	Sherds	Sherds (sq m)	Cores & Debitage	Cores & Debitage (sq m)	Lithic Tool	Ground Stone	Hammer-stone	Polishing Pebble	Worked Sherd	Other
11 - floor	9.6	75	7.8	39	4.1		2 metates 1 mano 1 mano/pestle 1 abrader	2	1		2 basket marked clay 1 potter's clay basin 2 specular hematite 1 malachite
11 - south hearth							2 manos				
11 - primary posthole		2									
13 - roof		63		10		1	2 ground stone frag.				1 shell bead 1 specular hematite 1 projectile point
13 - floor	6.9	28	4.1	6	0.9		2 ground stone frag.				
13 - lined pit		2		1							
13 – secondary posthole		1									
13 - pits		2									
15 - floor	9.8	42	4.3	18	1.8	1			1		1 bone awl fragment
15 - primary posthole		2									
15 - pit		1					1 mortar 1 pestle 1 ground stone frag.	1			
16 - floor	7.5	35	4.7	6	0.8	1					
17 - floor	10.9	179	16.4	31	2.8		1 abrader 3 ground stone frag.			1 scoop	1 shell bead 1 projectile point
18 - floor	6.3	38	6.0	51	8.1		1 abrader 1 ground stone frag.			1 palette	
19 - floor	11.8	76	6.4	10	0.9					1 palette	
20 - floor	9.3	4	0.4	23	2.5						3 shell beads 11 chrysocolla 1 projectile point
20 - posthole											1 shell bead

Table 7. Continued.

Room	Floor Area (sq m)	Sherds	Sherds (sq m)	Cores & Debitage	Cores & Debitage (sq m)	Lithic Tool	Ground Stone	Hammer-stone	Polishing Pebble	Worked Sherd	Other
20 - above floor											1 obsidian cruciform
21 - floor	6.2	260	41.9	74	11.9	1	1 ground stone frag.	1		6 palettes	2 shell beads 1 fossil bead
21 - hearth		1									
22 - no assemblage	7.5										
23 - floor fill	ca 10	303	30.3	12	1.2						
24 - no assemblage	1.4										
25 - floor	10.6	24	2.3	4	0.4				1	1 disk 3 utilized sherds	
26 - floor 1	6.1	101	16.6	4	0.7				1	1 plate 1 utilized sherd	3 mat impressed clay 63 unfired clay bowl 1 potter's clay
26 - floor 1 hearth		10		1				1	1		10 unfired clay bowl 1 potter's clay
26 - primary posthole		4									
26 - floor 2		28	4.6	3	0.5						1 limonite
26 - floor 3		62	10.2	18	2.9			1			
27 - floor	7.4	24	3.2	18	2.4	1					
28 – no assemblage	1.3										
29 - floor	9.5	38	4.0	31	3.3	5	1 abrader		1	1 palette	
29 - pit							1 ground stone frag.				
31 – floor fill	22.1	407	18.4	171	7.7	1	1 ground stone frag.			1 palette	
31 - postholes		10		7							
31 - pits		19		9			1 ground stone frag.				
31 - depressions		34		28							
33 - floor	6.0	1	0.2	4	0.7						
33 - pit		10									

Isolated rooms that may have functioned as storage rooms are Rooms 22, 24, 28, and 33. These rooms lack plastered floors and hearths; however, the floors of Rooms 22, 28, and 33 have been excavated into the indurated caliche layer. Room 24 is a square surface room believed to have been in use during the pueblo occupation and is similar to Room 9 of the pueblo. Both rooms have floor areas less than 1.5 sq m and do not have features or assemblages that would clearly define their use. Their small size suggests that they were used for storage, but others have suggested that small enclosures could have been used in aviculture (see Miller and Graves 2009). Room 28 is small in size like Rooms 9 and 24 but is a deep pit room with a step entry. Room 22 is a deep pithouse that is rectangular in shape with plastered walls, a probable step entry, and a floor area of 7.5 sq m. Although different in size, the absence of hearths would suggest that Rooms 22 and 28 were used for storage. Room 22 has a greater storage capacity than Room 28, and the investment in construction would indicate a longer period of intended use. Room 33 is a circular feature excavated into the caliche layer and has a floor area of 6.1 sq m. It also has an unlined pit used as a hearth. If it were not for the hearth, this feature would have classed as a large extramural storage pit. It may be that this feature has a complex history that first was storage and later incorporated other activities.

Room 31 is at the other end of the size spectrum at 22.1 sq m. This is a subrectangular pit room with a floor area of 18.9 sq m and an unusual antechamber/entry on its south side. The floor has been excavated into the caliche but is unplastered. Walls are also unplastered, and postholes occur in the main room and along the division between the main room and the antechamber/entry. There is no formal hearth. Instead, there is a burned area with ash and charcoal near the center of the south wall. Room 31 is larger than the other isolated rooms at this site. This has raised the question as to whether it might have been a communal room. However, it is not spatially associated with other isolated rooms and the architecture reveals a low labor investment that suggests an intended short-term occupation. Additionally, features such as subfloor bead caches and multiple hearths are missing from this room, and there is no unusual number of shell and turquoise items, minerals, or fossils within the room and no evidence of a ritual closure. All things considered, Room 31 may perhaps best be viewed as a large isolated habitation utilized by a large household or extended family household.

Isolated rooms that are seen as habitation rooms number 14. They have plastered floors, formal hearths, and floor areas of 6.1 to 11.8 sq m. Floor depths range from a few centimeters to over a meter, and wall plaster was found in less than half of the rooms. None of these rooms have foundations for walls, and remnants of aboveground walls were located for only two rooms. Smaller rooms tend to be subrectangular to rectangular and larger rooms are often square. Postholes are more common in larger rooms, and pits and other floor features are relatively few in number and variably represented. Floor assemblages are unremarkable aside from de facto refuse from pottery manufacture in Room 26 and a variety of objects, mostly ground stone, left or cached in Rooms 11 and 15. Habitation rooms may also have been used for some storage of foodstuffs as indicated by the quantity of burned beans and maize in the roof level and on the floor of Room 13.

There are three exceptions or additions to the above patterns for habitation rooms. They include Rooms 31 and 33 that have been mentioned above and Room 30. Room 31 has an informal hearth and is a large room with a floor area of 22.1 sq m. Room 33 has an unlined hearth and a round form of 6.1 sq m. Room 30 is a separate construction from the overlying Room 3. It is square, has a formal hearth, and is large at 15.8 sq m. The issue with Room 30 is whether it was an isolated habitation room that was leveled for construction of the pueblo or whether it was one of the first two rooms of the pueblo.

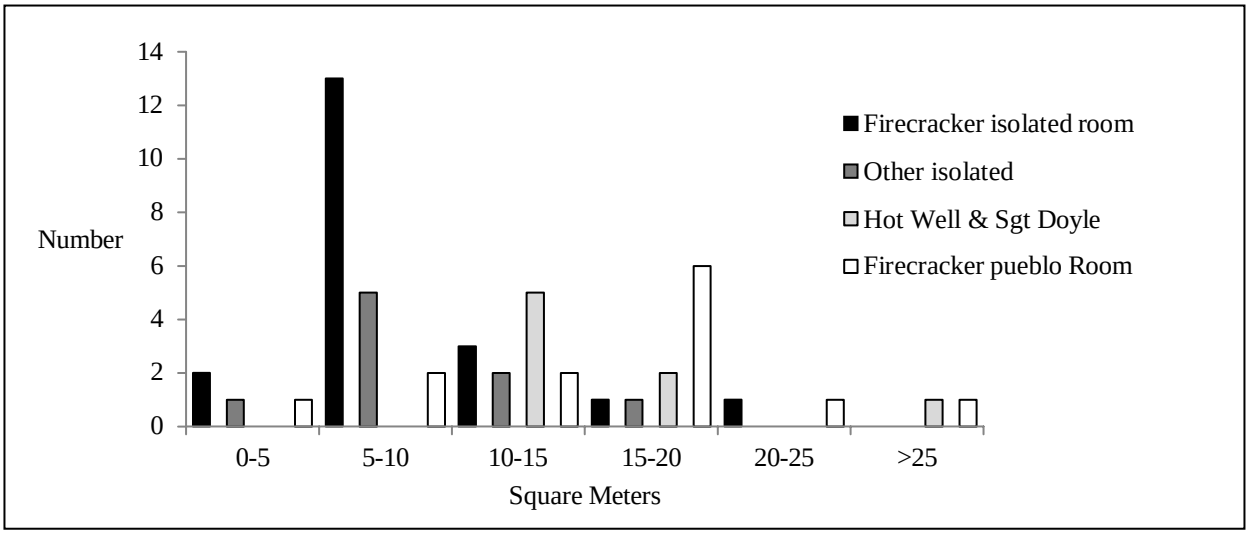


Figure 74. Floor areas for isolated and pueblo rooms at Firecracker Pueblo and isolated rooms from other sites.

Floor areas of isolated rooms (including Room 30) and pueblo rooms at Firecracker pueblo are compared with those of other isolated rooms of the El Paso phase in Figure 74. The other isolated rooms included in this comparison are single rooms at the Sarge Site (Brook 1967a), EPAS 95 (Brook 1969), the Pronto Site (Brook 1980b), Three Lakes Pueblo (O'Laughlin 1975), and Dona Ana County Airport (Batcho et al. 1985), multiple rooms at 41EP2724 (O'Laughlin and Martin 1990), and multiple rooms adjacent to contiguous room pueblos at the Hot Well Site (Lowry 2005) and the Sgt Doyle Site (Green 1969).

Isolated rooms at Firecracker Pueblo have a skewed distribution of floor area and are predominantly in the range of 5-10 sq m. Isolated rooms from sites other than Hot Well and Sgt Doyle exhibit a comparable distribution. However, isolated rooms at Hot Well and Sgt Doyle are inclined to be larger and have a peak at 10-15 sq m. They also have extant adobe walls, and foundation trenches are noted for walls that were sectioned. Excavations at both of these sites by the El Paso Archaeological Society were focused on rooms with walls exposed on the surface. Thus, there is a bias toward more substantial and larger rooms at Hot Well and Sgt Doyle. It should be said that the isolated room of over 25 sq m is from Sgt Doyle. Only the walls and no floor were found for this structure, and it is possible two rooms are represented and that only the exterior walls survived.

The rooms for the pueblo of Firecracker Pueblo are noticeably larger with most in the 15-20 sq m range. This is a linear pueblo with some rooms backed by rooms of about half the size and together forming two-room suites. Rooms which have not suffered from erosion have formal hearths, excepting the two smallest rooms that may have been storage rooms. Storage rooms are uncommon for El Paso phase pueblos and are small rooms without hearths that often back larger rooms (Lehmer 1948; Miller and Graves 2009; Moore 1947; Lowry 2005). Larger habitation rooms with formal hearths are the predominant architectural form and can be described as multi-functional and as giving evidence of a wide variety of uses, including storage (O'Laughlin 1985b). Two-room suites expand the available space for activities with expanding households or with an extension of the anticipated length of occupation. The same may be said for storage rooms.

Isolated habitation rooms are smaller and show a lesser investment in construction than pueblo habitation rooms. Their intended use is of shorter duration and activities within structures are limited by space. Variability in size likely mirrors the foreseen length of occupation. And, the smaller the room, the more restricted the activities become, and storage, particularly of foodstuffs, may have been difficult in smaller

rooms. If an occupation is lengthened and storage becomes a concern, storage pits could have been the solution. Nonetheless, isolated storage rooms were also employed at Firecracker Pueblo. Rooms 22, 28, and 33 are associated with occupations of the isolated habitation rooms and, like storage pits, are deep rooms. Isolated storage rooms have not been recorded for any other site of the El Paso phase, and, as with isolated habitation rooms, there is still much to be learned.

Abandonment

A number of the isolated rooms have been exposed to the elements or have later secondary trash deposits on the floor and in the fill and are not treated here. Nevertheless, the other isolated rooms generally display planned abandonment with few items of economic value remaining on floors (LaMotta and Schiffer 1999; Schiffer 1987). Outliers are Rooms 11, 15, and 26 with de facto refuse and Rooms 13 and 20 with possible evidence of ritual abandonment.

Rooms 11 and 15 comprise one of the occupations of isolated rooms at this site. Found on the floor of Room 11 were metates, manos, an abrader, hammerstones, numerous flakes, large sherds, minerals, and a basin of potter's clay. The floor assemblage from Room 15 includes a mortar, a pestle, and a hammerstone cached in a pit. The vacated objects on the floors of these rooms would suggest a rapid and planned abandonment, an intention of returning and reoccupying the rooms, or a movement too distant to accommodate the additional weight.

Room 26 appears to have undergone a planned abandonment that was followed with use of the possibly uninhabited room for pottery making. A pit had been dug into the side of the formal hearth and within it and the floor fill are fragments of an unfired and partially painted bowl, lumps of potter's clay, polishing pebbles, and a sherd scraper. Potter's clay was also found on the floor of Room 11 and hints that the occupants of Room 11 may have also used the then abandoned Room 26. Considerable de facto refuse was recorded for only Rooms 11, 15, and 26 and suggests coincident abandonment under the constraints listed above for Rooms 11 and 15.

Ritual termination of structures is not well-documented for the Jornada region. The burning of communal rooms and surrounding rooms and even whole pueblos may be part of abandonment ceremonies, and shell and turquoise jewelry, minerals, and fossils on pueblo floors and within floor features of burned rooms may also be objects integral to retirement rituals (Foster and Bradley 2021; Miller and Graves 2009). The ritual closure of the pueblo of Firecracker Pueblo could be another example with burned rooms and objects possibly associated with formal termination of the pueblo. For isolated rooms, Rooms 13 and 20 bear evidence of possible ritual closure.

Room 13 is a small isolated room that had burned and is notable for the amount of burned beans, maize, and gourd in the fill above the floor and in the roof level. Within the roof level are an *Olivella* shell bead and a projectile point. Grading had pushed some of the roof debris away from the room, and it has been argued that other burned items clustered with burned beans and maize in a disturbed deposit came from the roof level of Room 13. These include 17 *Olivella* shell beads, 53 tubular branch coral beads, fragments of five bone rings, a quartzite pendant, and an obsidian projectile point. The burning of Room 13 is not seen as accidental as there are no de facto objects on the floor, and the aforementioned items of the roof level may have been intentionally placed during a closing ceremony. An alternative and speculative explanation would be that the burning of Room 13 was accidental and consumed a considerable quantity of beans and maize. The jewelry and other items from the roof level may have been incorporated in the roof during construction as dedication objects or may have simply been hanging from the roof or on wall pegs and burned accidentally. The intentional burning of foodstuffs with abandonment of a structure has not been reported elsewhere for the Jornada.

Room 20 is a medium-sized isolated room that had also burned. A burned maize cob with kernels, four *Olivella* shell beads, 11 pieces of chrysocolla, and a projectile point were recovered from the floor and one small pit. An obsidian cruciform was also found in the floor fill. Aside from these items, only a few sherds and pieces of chipped stone were retrieved from the floor. A planned abandonment of the room is indicated and was apparently accompanied by the placement of select items and burning of the room.

Room 30 is a deep pit room and possible isolated room that was demolished in order to construct the overlying Room 3 of the pueblo. As pointed out in the previous chapter on the pueblo, this room provides another possible example of ritual closure. Following the removal of a post, a *Glycymeris* shell pendant had been placed in the posthole. The walls of the room were then collapsed on to the floor.

CHAPTER 7
ARTIFACT DISTRIBUTIONS AND EXTRAMURAL FEATURES

The investigation of the area around the pueblo was accomplished by the systematic excavation of one meter squares and expanded excavations in areas of interest. While not a unique approach, this endeavor stands as the only thorough study of extramural areas for an El Paso phase site with a contiguous room pueblo. Numerous isolated rooms were identified through this effort and have been described in the previous chapter. Consideration is given here to the distribution of artifacts and features, and the description of the many extramural features.

Spatial Distribution of Artifacts

The distribution of artifacts is visualized through contour mapping of the density per square meter of combined numbers of ceramics and lithics (Figure 75). Ceramics and lithics are the two most common artifact classes and comprise over 99% of the artifacts at this site. Two contexts are included in the density measures: the weathered occupational surface of the site (the Q3/Q4 interface) and the fill of rooms. These two contexts provide the clearest expression of the spatial distribution of secondary refuse.

Some 19,070 items are used in computing density figures. In general, ceramics and lithics covary across the site. There are, however, differences in their relative distributions for various contexts that will be considered shortly. For surface artifacts, ceramics constitute 83% of the assemblage. Ceramics make up a lesser 65% of the assemblage for the fill of rooms. It should be noted that only the upper fill of the two deep isolated rooms, Rooms 22 and 25, are represented in the density measures.

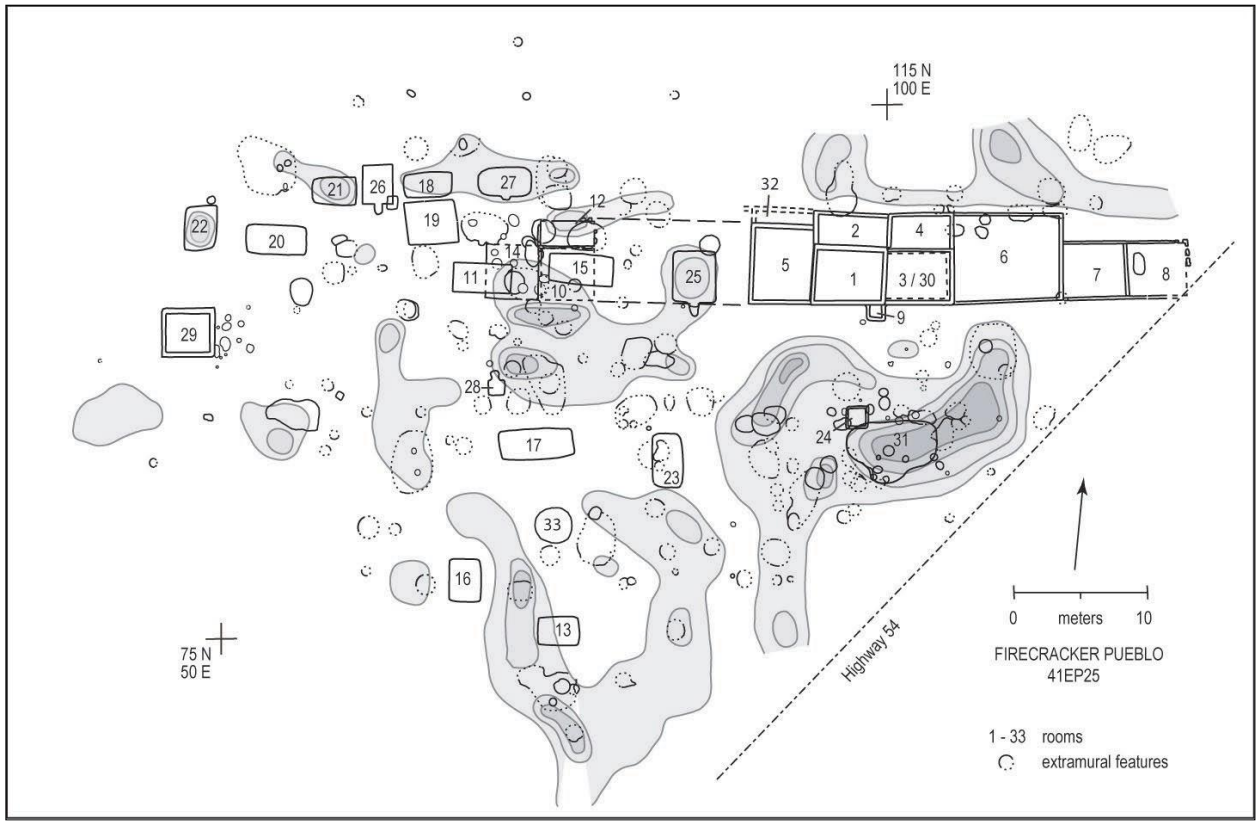


Figure 75. Distribution of ceramics and lithics. Contour interval is 20 artifacts per square meter.

The pueblo and a number of the isolated rooms exhibit low densities of artifacts in room fill and around rooms (Figure 75). This would indicate maintenance of rooms and exterior areas in front of room entrances where refuse is removed to accommodate multiple uses of spaces. Areas with higher densities of artifacts largely surround the pueblo and reflect the more intense, longer-lived, and/or larger occupation of the pueblo.

Some trash occurs on the north side of the pueblo, but the highest density of materials is in front of Rooms 1, 3, 5, and 6 and starting at about three to five meters south of the rooms. More refuse may have been south and east of Rooms 7 and 8 and removed with construction of the highway. To the west, refuse continues and arcs to the northwest over isolated Rooms 11 and 15 and beneath pueblo Rooms 10, 12, and 14 and the eroded portion of the pueblo. Obviously, secondary refuse accumulated in this area over the older isolated rooms and before the western rooms of the pueblo were built. Concomitant with the buildup of refuse west of the first rooms of the pueblo is the in-filling of isolated Room 25 with considerable trash. A fair amount of trash is found over isolated Rooms 18, 21, and 27 and was dumped in isolated Room 22. This probably follows the build out of the western rooms of the pueblo.

A little trash is located southwest and southeast of isolated Room 29 and could be associated with the occupation of this room. Also, light areas of refuse south of the linear arrangement of isolated rooms in the northwest part of the site likely include materials from those occupations. Short-lived occupations are suggested by the lower densities of artifacts in this part of the site.

The southern portion of the site evidences disturbance of some deposits with grading. A southward distortion of the contours is noted for the trash deposit in front of the first rooms of the pueblo. Similarly, some material was moved both north and south short distances around isolated Rooms 13 and 33. Nevertheless, a distinct arc of refuse is seen east of Room 16 and south of Rooms 13 and 23. Trash additionally occurs west and north of Room 17. Areas around the isolated rooms of the southern group of isolated rooms are mostly free of trash. The exception is Room 13 where grading has somewhat obscured the pattern.

Patterns in the distribution of artifacts are further evaluated through examination of the locations of sherds of the same ceramic vessel. Matching sherds of intrusive wares and rim sherds of El Paso Polychrome were recorded for 56 vessels, and sherds of the same vessel were noted as having as many as eight different locations. Sherds which could be physically joined were found primarily within rooms or extramural features. Few of the matched sherds are from extramural trash deposits. The presence of matched sherds within extramural features also calls for a look at their distribution.

A summary of the distribution of matched sherds is shown in Figure 76. The plan of the entire site shows the heavy influence of the pueblo occupation and the distribution of matched sherds mirrors the noted distribution of secondary refuse. Sherds from floors of rooms of the pueblo and isolated Room 29 and the weathered floor/fill of isolated Room 24 are matched with numerous extramural features from northeast of the pueblo, to in front of the pueblo, and finally arcing northwest and under the western rooms of the pueblo. They also are found in scattered features west and south west of the pueblo, within the fill of isolated Rooms 18, 21, 22, 25, 28, 31, and within a trash layer below Room 14 and above Room 11. These findings help support the contemporaneous occupation of the pueblo and Rooms 24 and 29, the earlier occupations of isolated rooms in the northwest part of the site, and the contemporaneous use of many of the extramural features by occupants of the pueblo. Extramural features with matched sherds tend to be larger, refuse-filled features and are mostly within the bounds of the arcing distribution of refuse associated with the pueblo. Just as earlier isolated rooms have matched sherds within their fill, extramural features with matched sherds in the western and southern sections of the sites may have first been used by earlier occupations.

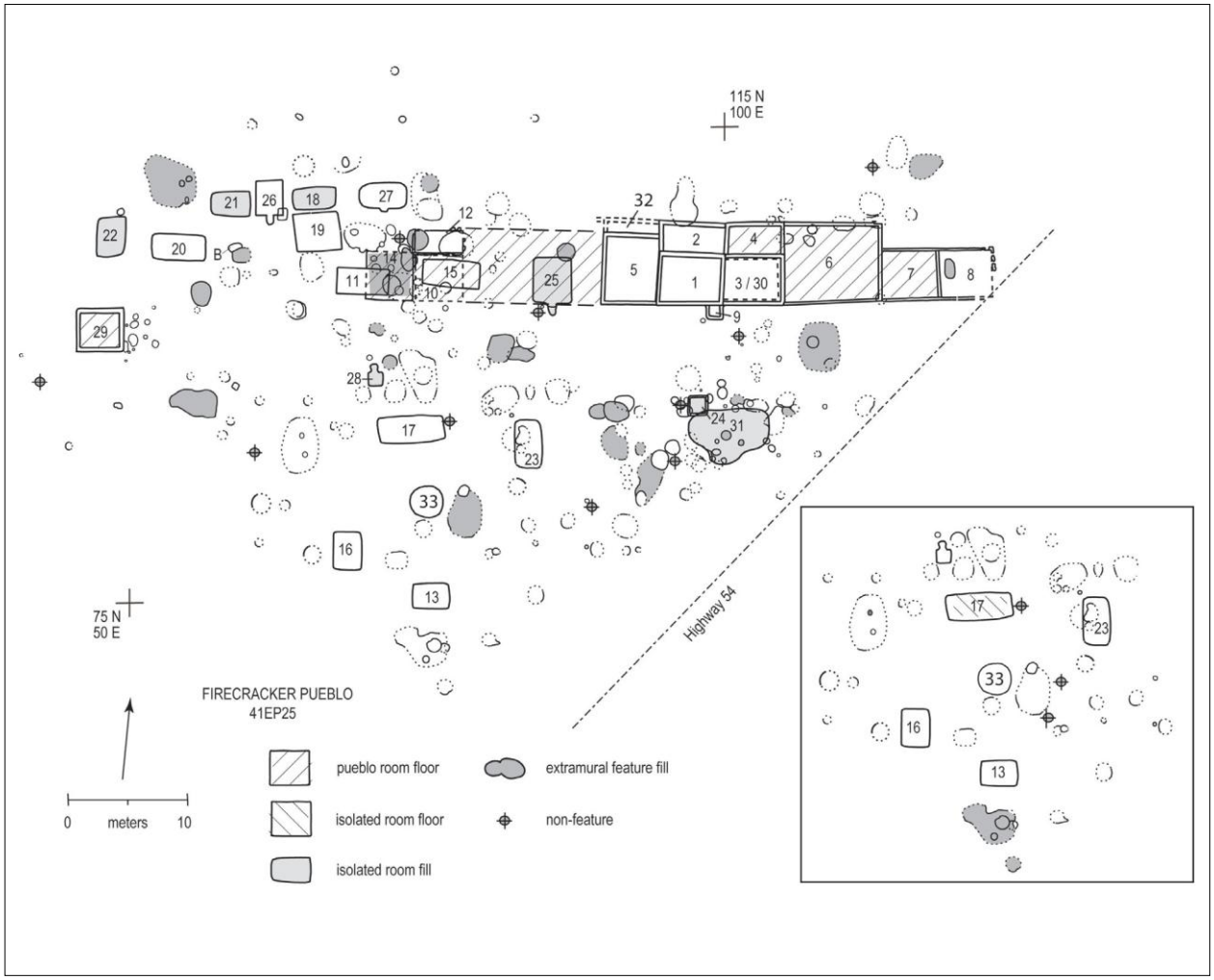


Figure 76. Distribution of sherds from same vessels. Inset for matches to Room 17 floor.

The only isolated room with floor sherds matching ones in other locations is Room 17. The inset in Figure 76 shows matches with sherds in surface refuse as well as with extramural features south of Room 13 and one, small feature west of Room 17. None of the rooms in the southern group of isolated rooms have matches with sherds of the pueblo occupation.

The concentration of surface artifacts and features near structures is a common finding for Formative period sites and has been detailed at other El Paso phase sites with isolated rooms (see Condon et al. 2010; O'Laughlin and Martin 1990). The pertinent observations for Firecracker Pueblo are the documentation of the intensity of the pueblo occupation, the association of many of the extramural features with the pueblo occupation, and the demonstration that isolated rooms are earlier than the pueblo occupation or, in the case of Rooms 24 and 29, that they are coeval.

Artifact Distributions and Context

Artifacts are not randomly distributed at Firecracker Pueblo. As can be seen in Table 8, the floors of rooms and the fill of rooms of the pueblo have many fewer artifacts than the fill of isolated rooms and extramural features and general surface refuse. Indeed, the greatest accumulation of materials is within the numerous and different extramural features.

Table 8. Numbers of Artifacts by Class for Site Contexts.

Artifact Class	Pueblo Room Floor	Pueblo Room Fill	Isolated Room Floor	Isolated Room Fill	Extramural Feature	Surface Refuse	Total
Sherd	2392 ++	1631 ++	1823	9489 - -	17285 - -	7622 ++	40242
Modified Sherd	14	39 ++	22	123	199	60 -	457
Debitage	279 - -	149 - -	605	4085 ++	7297 ++	1606 - -	14021
Core	16	8	11	42	102	37	216
Edge Modified Flake	4	4	6	33 +	35 -	16	98
Biface & Projectile point	1		4	27 ++	18 -	6	56
Hammerstone	6	4	6	6 - -	39 +	7	68
Metate, Mano, Mortar, Pestle	9 ++	4	11 ++	4 - -	35	11	74
Abrader	6	9 ++	10 ++	23	29 - -	16	93
Mineral, Crystal, Pigment	4	1	15 ++	16	17 -	1 - -	54
Shell	1	1	9 ++	20	24	5	60
Turquoise	4 ++	1		3	7	1	16
Total	2735	1850	2525	13865	25088	9389	55452

++ or - - significantly higher or lower than expected count at p = 0.01, adjusted standardized residual
+ or - significantly higher or lower than expected count at p = 0.05, adjusted standardized residual

The contributions of various artifact classes to assemblages also vary by context. In order to better demonstrate the differences between contexts, the table of artifact classes and contexts was subjected to a Chi-square test with analysis using adjusted standardized residuals to compensate for row and column differences in sample size. The pluses and minuses for numbers of artifacts in Table 8 indicate significantly higher or lower numbers than would be expected if artifacts were randomly distributed. Small numbers of stone ornaments and bone artifacts are not included in this table. In addition, 1725 sherds of jar from feature F.452 in fill of Room 3 but of uncertain origin, a concentration of 76 ornaments in a disturbed area north of isolated Room 13, and 116 pieces of specular hematite in extramural feature F.87 were excluded because of the bias they would introduce.

Contextual differences in artifact classes can be attributed principally to disposal or discard and abandonment behaviors (following LaMotta and Schiffer 1999; Schlanger and Wilshusen 1993; Stevenson 1982). Deposits on room floors likely include a mix of de facto and primary refuse with contrasts between pueblo and isolated room inventories possibly influenced by conditions of abandonment. The fill of isolated rooms, the fill of many extramural features, and surface deposits are primarily secondary refuse. However, the treatment of secondary refuse varies by context.

Secondary refuse on the surface of the site has lower than expected values for all artifact classes with the exception of ceramic sherds. Three classes also have significantly lower numbers of items. As refuse on the surface of the site, artifact classes have likely been depleted with scavenging and reuse. Sherds have a significantly higher number than expected. This may be attributed to an elevated number with traffic and exposure. Surface sherds are the smallest for all contexts and average 2.1 grams per sherd.

Inventories for pueblo room floors and the fill of pueblo rooms are similar to one another but differ from other contexts largely in having significantly higher numbers of sherds and lower numbers of debitage. However, the observed numbers of artifacts are relatively few for the number of rooms and comparable to floors of isolated rooms. The significantly lower than expected numbers of debitage would suggest the cleaning of pueblo rooms and the discard of these materials elsewhere. Even so, the significantly higher than expected numbers of sherds and ground stone indicate that something else is at play. Ground stone items on floors are de facto refuse. That is, items left in place with abandonment of the pueblo. Large sherds were found on the floors of Rooms 6 and 7 and in a corner of Room 1. This may also be de facto refuse or it may be secondary refuse that was allowed to accumulate with an anticipated and unhurried abandonment. The average weight of a sherd is 2.7 grams for both floor and fill of pueblo rooms and close to the sherd weight for extramural features with secondary trash. Artifacts mixed with burned roof material in Room 4 suggests some roof-top activity for the pueblo and implies that room fill includes items once on roofs and that this may account for the likeness of inventories for pueblo room floors and the fill of pueblo rooms.

Artifact classes for the floors of isolated rooms are mostly unremarkable in that they do not vary far from expected numbers. The average weight for a sherd is 2.3 grams and smaller than other contexts with the exception of surface refuse. The number of artifacts from floors of isolated rooms is relatively small for the number of rooms. Together, the average sherd weight and number of artifacts would indicate regular maintenance of floors prior to abandonment. The higher than expected number of ground stone items is due to the metates and manos left on the floor of Room 11 and the mortar and pestle possibly cached in Room 15. Abraders also occur with a higher than expected value. The abandonment of ground stone and abraders in these rooms may have been conditioned by a long distance change in residence or possibly by an anticipated return or reoccupation. Little de facto refuse was found on the floors of other isolated rooms, and abandonment seems to have been planned, perhaps with a short distance move.

Pigments, minerals, crystals and shell jewelry occur on isolated room floors in higher than expected numbers. Turquoise is also observed in a higher than expected number for pueblo room floors. However, the cell values for turquoise are very small and the results should be viewed with caution. Nevertheless, it has been inferred that certain of these materials could have been placed as part of rituals of abandonment.

Artifact assemblages are similar for the fill of isolated rooms and extramural features with significantly lower numbers of sherds and higher numbers of debitage than expected. Secondary refuse is common in extramural features and conspicuous for the fill of a number of the isolated rooms. The combination of isolated rooms with and without trash in the fill has presumably contributed to the differences between these two contexts. Additionally, the nature of trash accumulation for these contexts is also variable. Larger extramural features exhibit episodic events of trash disposal, sometimes with periods of infilling with sands. Smaller extramural features lack clear trash deposits, and much of the material in these features appears to have come from the natural filling of features with secondary refuse on surrounding surfaces. Isolated rooms with trash in the fill also seem to have experienced differences in the rate of trash deposition and the source of materials. Isolated Rooms 18, 21 and 31 are shallow isolated rooms and have poorly defined strata of trash and variable additions of secondary trash from surrounding surfaces. Isolated Rooms 22, 25, and 28 are deep rooms with well-defined and thick strata suggesting a fairly rapid buildup of deposits. The average weight of sherds follows the suggested patterns of trash disposal. Though their numbers are lower

than expected, larger sherds are associated with intentional trash deposition in isolated rooms and extramural features. Isolated rooms without obvious trash deposits have an average sherd weight of 2.3 grams, the same as for the floors of isolated rooms. Isolated rooms with secondary trash in the fill have a larger average sherd weight of 3.1 grams. Room 22, a deep isolated room with considerable trash is noteworthy with sherds having an average weight of 5.3 grams. Extramural features have variable inputs and sources of secondary refuse and have a moderately high average sherd weight of 3.0 grams.

Secondary refuse in the fill of isolated rooms and extramural features displays higher than expected numbers for debitage. Maintenance of room floors and some exterior spaces presumably resulted in the elevated numbers for chipped stone debris in abandoned rooms and extramural features. The numbers for other artifact classes generally do no range far from expected values. The most curious variances are the high number of edge modified flakes, bifaces, and projectile points for the fill of isolated rooms and the less than expected number of chipped stone tools for extramural features. Why these contexts exhibit these differences in chipped stone tools between each other and other contexts is unknown and further exaggerated by noting that over 50% of the projectile points from this site were retrieved from the fill of isolated rooms.

Extramural features have a number of pieces of ground stone that is only slightly lower than the expected value. However, some of the ground stone comes from caches in several of the larger pits and adds to the evidence of abandonment behavior. These and other features are described below.

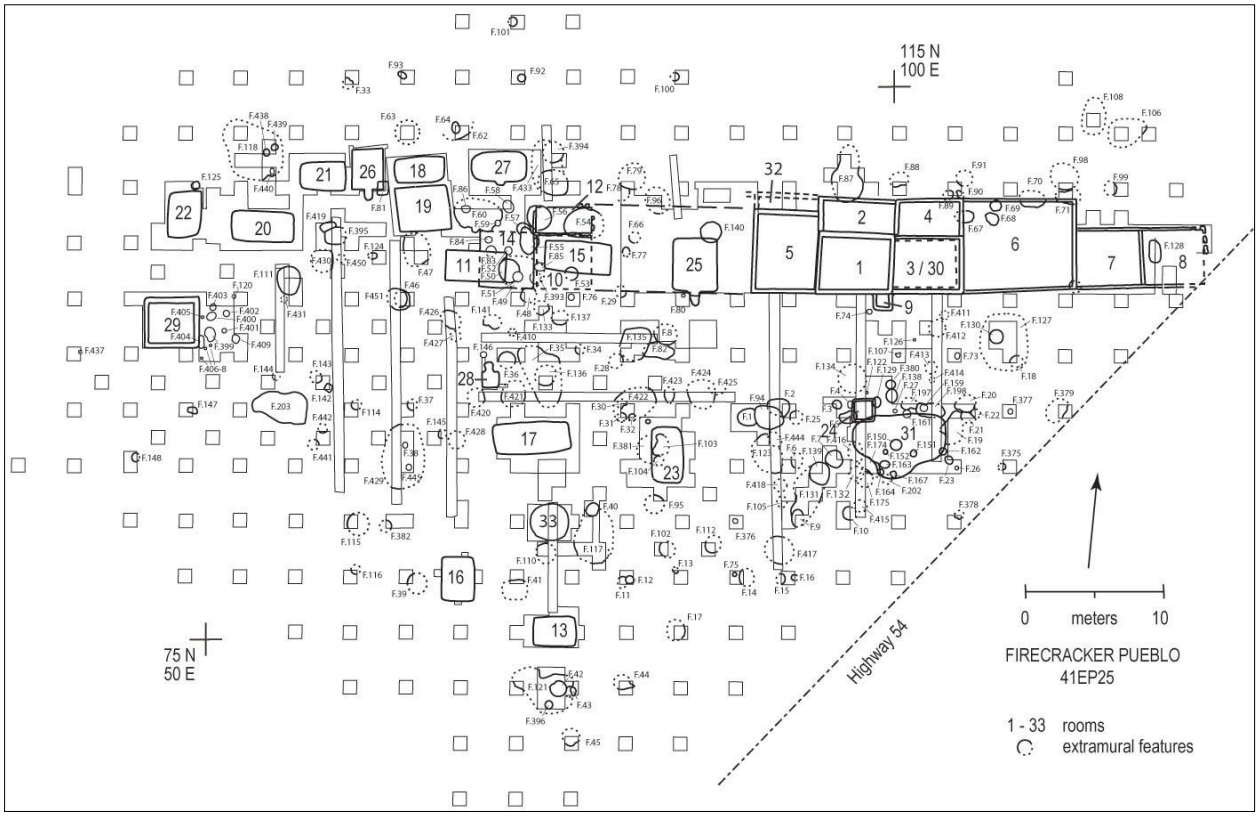


Figure 77. Extramural features with feature numbers.

Extramural Features

Extramural features are numerous and varied. They are found throughout the site but their spatial distribution suggests that most are associated with the pueblo occupation. They include postholes, thermal features, apparent barrow pits, possible storage pits, a burial, and non-specific features of unknown use. Potential water catchment features have been reported at earlier sites (Railey 2002; Scarborough 1988, 2001). However, no cisterns or pits that collected surface water could be identified at this site. The systematic investigation of areas around structures has revealed 217 features, and their assigned numbers and distribution are shown in Figure 77. Features are likely to have been removed with highway construction, and others are certainly in unexcavated areas.

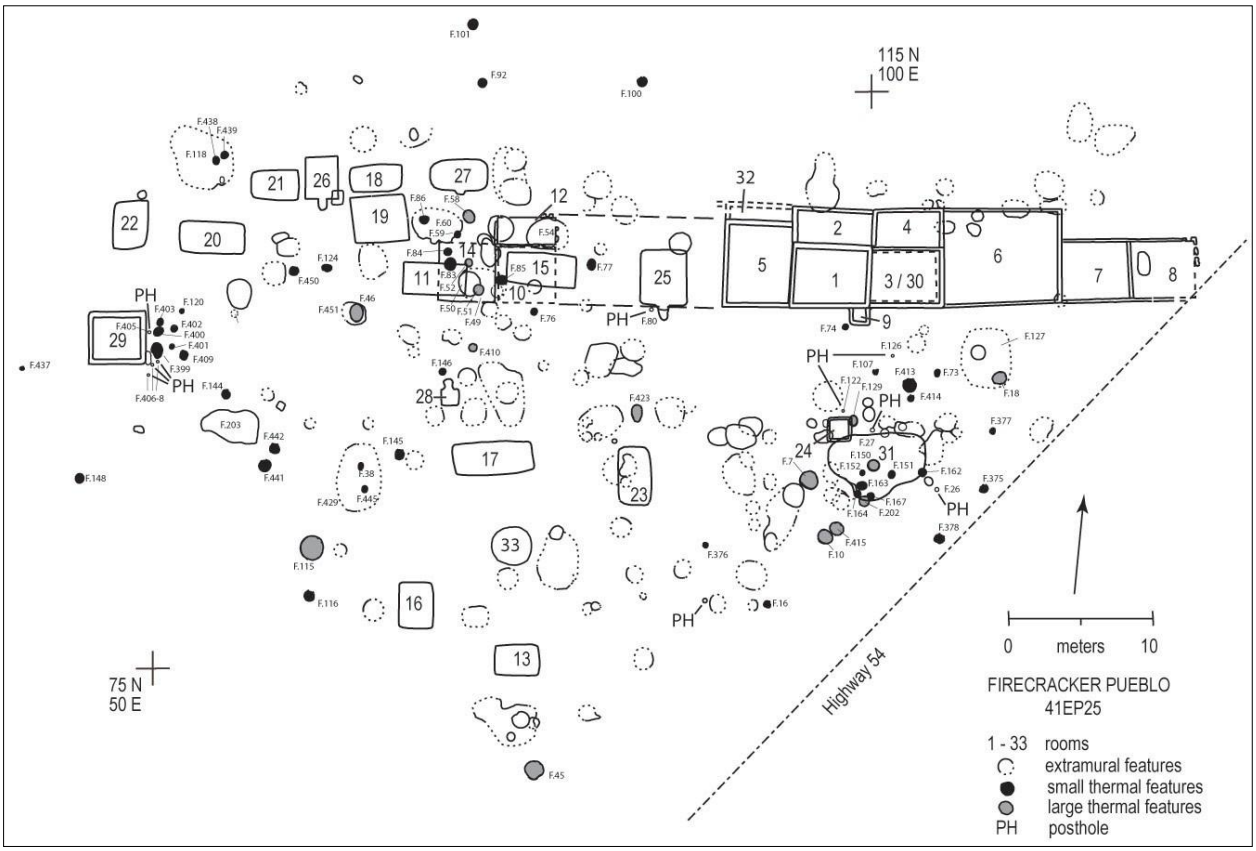


Figure 78. Distribution of postholes and thermal features.

Postholes

Ten extramural features have been identified as postholes. They are small and generally cylindrical features that measure 9-25 cm in diameter and 10-27 cm in depth (Appendix A.1). Four postholes (F.405-408) have a fill of brown sand and are in an activity area along the east side of Room 29 (Figure 78). One (F.80) is near the south wall of the eroded portion of the pueblo and has a gray sand fill. Another (F.75) is on the southeastern periphery of the site and has gray sand with one sherd. The remaining postholes are south of the center of the pueblo and near an area with a concentration of extramural features. Two (F.122 and F.126) have a fill of gray sand. F.26 has a gray sand fill with five sherds and one flake, and F.27 has a gray trashy fill with six sherds, three flakes, one maize cob cupule, seven mesquite seeds, two prickly pear seeds, and a shell disk bead.

Postholes along the east side of Room 29 and near the southern walls of the pueblo may have held supports for roofed shelters or ramadas. The same may be true of the other postholes. Then again, they may have held posts for racks or other furniture. Unfortunately, the few postholes found in the interval testing of exterior areas do not provide sufficient patterning to more accurately describe the facilities of which they were a part.

Thermal Features

Extramural features recognized as thermal features are fairly numerous and total 62. They include lenses of burned material and thermal features with an underlying pit. They have been partitioned for discussion into small and large thermal features, though there is some overlap in their widths. Thermal features are oval to circular in plan, and examples of plans and profiles of thermal features are shown in Figure 79.

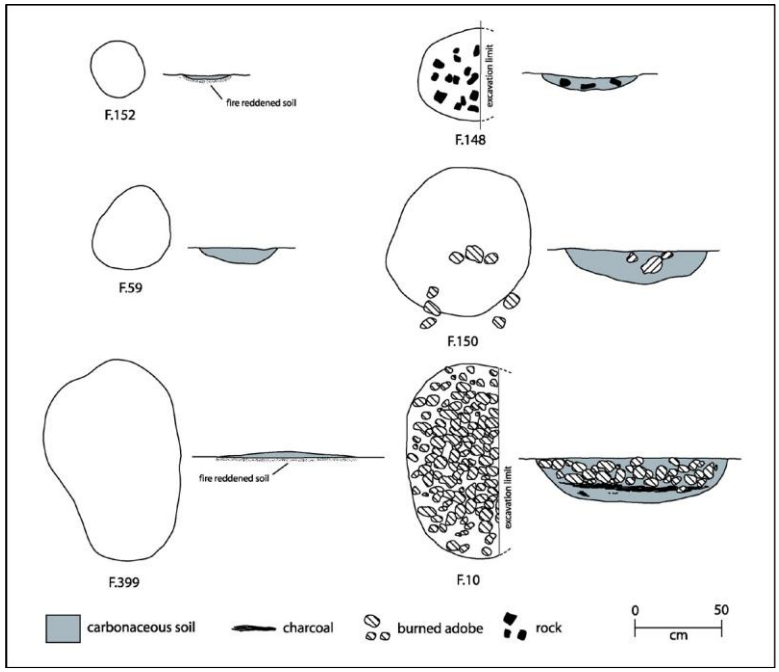


Figure 79. Small and large thermal features, exemplary plans and profiles: *small*, F.59, F.148, F.152 and F.399; *large*, F.10 and F.150.

There are 47 small thermal features (appendix A.2). These features are noted as having dark carbonaceous to ashy soils with variable amounts of charcoal often over fire-reddened or blackened soils. Twenty-three of these features are thin, 2-8 cm lenses of ash and/or charcoal. They range from 22 to 116 cm in width, with probable dispersion of the un-contained burned materials of the larger features. The other twenty-four small thermal features are basin-shaped or flat bottom pit features with shallow depths of 12 cm or less and widths of 21 cm to an estimated 90 cm. A little secondary refuse has worked its way into 17 of the small thermal features. Maize cob frag-ments are present in seven of these features and may reflect the use of cobs for fuel. Mesquite is the pre-dominant fuel for thermal features.

It is presumed that most, if not all, small thermal features are hearths. They could have been used for warmth, cooking with vessels, roasting foods directly on coals or with spits, and other miscellaneous activities. Shallow thermal features like these, however, are not well-suited for processing some foods, such as leaf succulents, that require long cooking times (Black et al. 1997; Condon et al. 2007).

Extramural features categorized as large thermal features are deeper and predominantly larger than the small thermal features (Appendix A.3). These 15 features have depths of 13 cm to 37 cm and range in width from 52 cm to an estimated 160 cm. As with small thermal features, large thermal features contain carbonaceous soils and some charcoal, and fragments of maize cobs in three features may be from their use as fuel. Other macrofloral remains from large thermal features provide no definite indication of the function of these features but include maize kernels, common beans, and mesquite seeds in feature F.45 and a piece of a datil fruit in feature F.115. Faunal remains occur in three features, and F.150 has 82 pieces of bone with 68 calcined or burned. The bone may have been calcined or burned when discarded following a meal

or it could be secondary refuse. Secondary refuse is common in the pits of these features and is present in 10 of the 12 investigated features.

Large thermal features could include roasting pits or ovens, as well as general hearths. The depth and steep walls of these features would serve to retain heat longer than the more open and shallow, small thermal features (Black et al. 1997; Condon et al. 2007). Thus, some of these features potentially could have been used to cook game, roast green corn, and process the crowns, stalks, and fruits of leaf succulents and the stems and buds of various stem succulents. The processing of leaf and stem succulents would have been limited or incidental to other subsistence activities. Leaf and stem succulents are best found at a distance to the west of the site on the bajadas and slopes of the Franklin Mountains.

The occasional processing of leaf and stem succulents or any activity requiring the retention of heat for an extended period of time would have been facilitated with the addition of heating elements. Ethnographic accounts abound with descriptions of the use of heated rocks in covered and uncovered pits (see Basehart 1974; Bell and Castetter 1941; Castetter and Underhill 1935; Castetter et al. 1938). Large fire-cracked rock features that are interpreted as having been used to process agave and sotol are found on the edges of the Franklin Mountains, and smaller thermal features also have fire-cracked rock (Hard 1983b, Miller 1989; O'Laughlin 1979, 1980). As one moves out to inner basins, thermal features tend to be small and rock becomes unavailable and is replaced with nodules of caliche or nothing at all (Condon et al. 2007; Lukowski and Stuart 1996; O'Laughlin et al. 1988; Railey 2002; Whalen 1980).

Firecracker Pueblo is in an environment where neither rock nor caliche is readily available for heating elements. Alluvium with cobbles is no closer than about six kilometers west of the site, and the caliche layer of the La Mesa surface is buried by soils in the site vicinity. Although a number of pits were dug into the caliche layer to presumably acquire caliche to plaster floors and walls, no burned caliche was recorded for features at this site. It is, therefore, not surprising that 74% of the thermal features lack heating elements and have only a carbonaceous fill. Nevertheless, there are thermal features with rock or an alternative heating element, adobe.

Two features have fire-fractured rock within them. Feature F.423, a large thermal feature, was exposed in the walls of Trench 5 but was not tested. The profile reveals a deep pit filled with fire-cracked rock and charcoal, and this feature may well have functioned as a roasting pit. The other feature is F.148, a small thermal feature, and was found to have fire-fractured or burned rock of 8 cm or less in size and of the following materials: 34 quartzite, 3 granite, 1 limestone, and 1 sandstone. The stone in this one feature almost matches the total of fire-cracked and burned pieces of rock for the rest of the site. These other pieces of burned rock come from non-feature contexts, some of the larger extramural pits, and the fill of a few rooms. They total 54 pieces of rock of the following materials: 18 granite, 15 limestone, 14 quartzite, 6 sandstone, and 1 rhyolite. In addition to the two features with fire-cracked rock, three features (F.7, F.45, and F.46) have a small number of ground stone fragments or other stone objects. However, these pieces of stone are not burned or fire-fractured and appear to be refuse. The small number of features with rock and the small number of fire-cracked and burned rocks from elsewhere in the site attest to unavailability of rock in the vicinity.

Given the abundance of burned adobe in the large thermal features F.7, F.10, F.45, and F.415 and the small thermal feature F.167, it is thought that adobe may have been used in place of rock in roasting pits (Figure 80). The use of adobe in heating facilities is not only suggested by the presence of burned adobe in features but also by the unusual form of some of the adobe. Much of the burned adobe is comprised of rounded or irregular lumps 7 cm or less in size, and feature F.7 has some large and angular pieces of adobe. But the interesting pieces come from molded, gumdrop-shaped objects of adobe. Fragments indicate basal diameters of 9.5 to 16 cm in diameter and domes with heights of 6.3 to 8 cm or more. Many pieces of these

Figure 80. Roasting pit F.7 with burned adobe visible in cross section and on floor of pit.

burned adobe gumdrops were recovered from F.7 and F.167. They were also found as secondary refuse in non-thermal features, including F.119, F.131, F.165, F.174, and F.429.

Six large thermal features (F.51, F.52, F.115, F.129, F.150, and F.202) and three small thermal features (F.124, F.163, and F.164) have lesser amounts of burned adobe in them than the aforementioned five features. For feature F.150 it is apparent that some of the fill of the feature had been removed and left to the side of the feature (Figure 79). Similarly, the ash and charcoal deposit in the abovementioned feature F.45 had been pushed to one side and burned adobe was scattered in the remainder of the pit. The emptying and reuse of features is also suggested by the presence of unquantified but generally minor amounts of small rounded to irregular lumps of burned adobe, as well as the few pieces of fire-cracked rock, throughout the site in surface refuse and secondary refuse in extramural features and the fill of isolated rooms.

The locations of thermal features are displayed in Figure 78. Many of the features are related to the pueblo occupation, but the palimpsest of features from multiple occupations makes difficult the assignment of features to the less intense, short-term occupations. Where possible stratigraphic information, conjoinable sherds, and spatial patterns are used in placing features with the various occupations. One fairly clear pattern is that thermal features and other features do not generally occur in proximity to structures and near entrances to structures where space has been kept clear for a variety of tasks.

A concentration of 14 small and seven large thermal features associated with the pueblo occupation are some 4 m to 16 m south of the first rooms (Rooms 1-4) constructed of the pueblo. Six small and two large thermal features are in the fill or cut into the walls of the earlier isolated Room 31, and another is below isolated Room 24 and in a layer above isolated Room 31. Feature F.18 is in the fill of F.127 with sherds matching others of the pueblo occupation. There is a tendency for large thermal features in this area to be more distant from the pueblo than the small thermal features.

Four features (F.76, F.146, F.410, and F.423) are south of the western rooms of the pueblo and are likely part of the pueblo occupation. The finding of so few thermal features in this area could suggest that the pueblo occupation did not last long after the addition of the western rooms. The western addition of pueblo rooms also covered thermal features F.51, F.77, and F.84. Two of these features are under pueblo Room 14 and in a deposit with sherds matching others of the pueblo occupation. These seven features and those of the concentration mentioned above form a rough arc south to southwest of the earliest rooms of the pueblo and, again, suggest that few may be associated with the later additions to the pueblo.

Six small thermal features are near the east wall of isolated Room 29. At the time of abandonment a doorway was located in the center of the south wall. And, a sealed hearth in the floor of Room 29 suggests that a doorway may once have been in the east wall. Presumably, this doorway would have been sealed before the intrusion of so many features. The extramural thermal features and postholes indicate considerable outdoor activity linked to this room and during the pueblo occupation. Additionally, there are five small thermal features (F.144, F.148, F.437, F.441, and F.442) southeast, south, and southwest of Room 29 that may possibly be tied to the occupation of this room.

Few other thermal features can be linked to the pueblo occupation. These include F.438 and F.439 in the fill of F.118 that has matching sherds with secondary refuse of the pueblo occupation.

Two small thermal features (F.83 and F.85) and a large thermal feature (F.52) are intruded upon by isolated Rooms 11 and 15 and are linked to the occupation of earlier isolated rooms in the northwestern part of the site. Features F.46, F.58, F.59, F.86, F.124, and F.450 could also have been used by occupants of the isolated rooms in this area, but there is no evidence to tie any of these features to a particular occupation. Large thermal features are noted as favoring greater distances than small thermal features from isolated rooms of this early occupation.

Ten thermal features are close to and encircle the southern group of isolated rooms. No thermal features were discovered in the inner courtyard of this isolated room group. Two of these features (F.38 and F.45) have sherds that match ones from isolated Room 17. The other thermal features could be the result of the occupation of the southern group of isolated rooms. However, some of these features are doubtless from the pueblo occupation

Storage Pits

Structural characteristics identify 44 of the extramural features as storage pits. They are circular to oval in plan and generally have steeply sloping to vertical walls and flat to slightly rounded bottoms (Figures 81, 82). Some have partially undercut walls, but none of the pits could be said to be bell-shaped. However, erosion of openings and slumping of some upper portions of walls may have taken evidence of more restricted openings. Smaller pits are also present in the floors of six of these features. All of these features have floors which have been excavated into the underlying caliche, and none of the features have plastered walls or floors. Two features (F.130 and F.159) show marks of a digging stick on the side walls. Attributes of storage pits are listed in Appendix A.4.

These features are 58 cm to 325 cm wide, with most ranging between one and two meters. Depths are as little as 28 cm and as much as 136 cm, with most being 40 cm to 60 cm deep. Measurable volumes are 0.17 to 2.76 cubic meters, and the average volume is 1.02 cubic meters. Features F.22, F.40, and F.159 are relatively small and have volumes of 0.17 to 0.32 cubic meters. Given the small size of these three features, they may possibly have been used for short-term storage. The other features have volumes of half a cubic meter or more and presumably were intended for long-term storage of food.

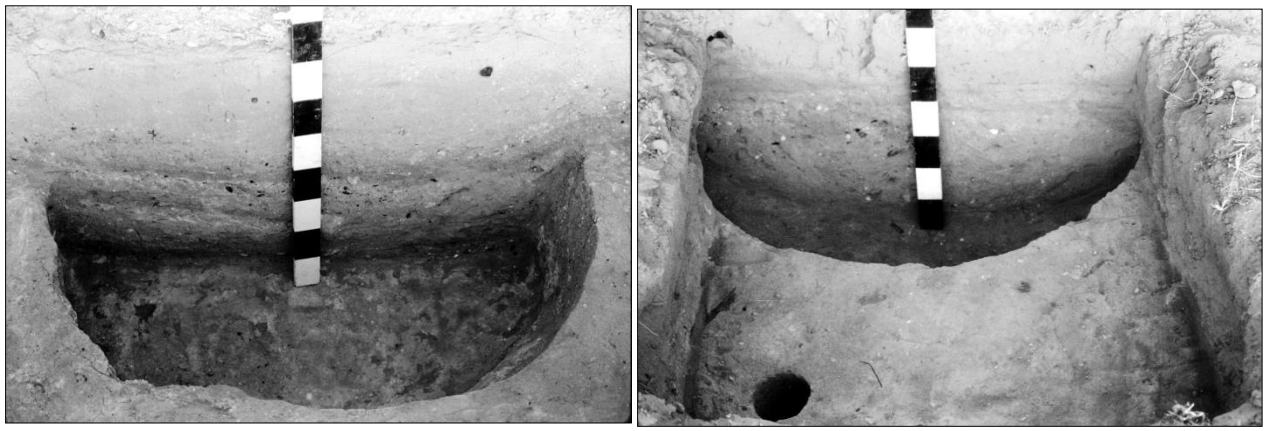


Figure 81. Storage pits: *left*, F.7, note dipping refuse strata at weathered upper edges; *right*, F.14, sands capping secondary refuse.

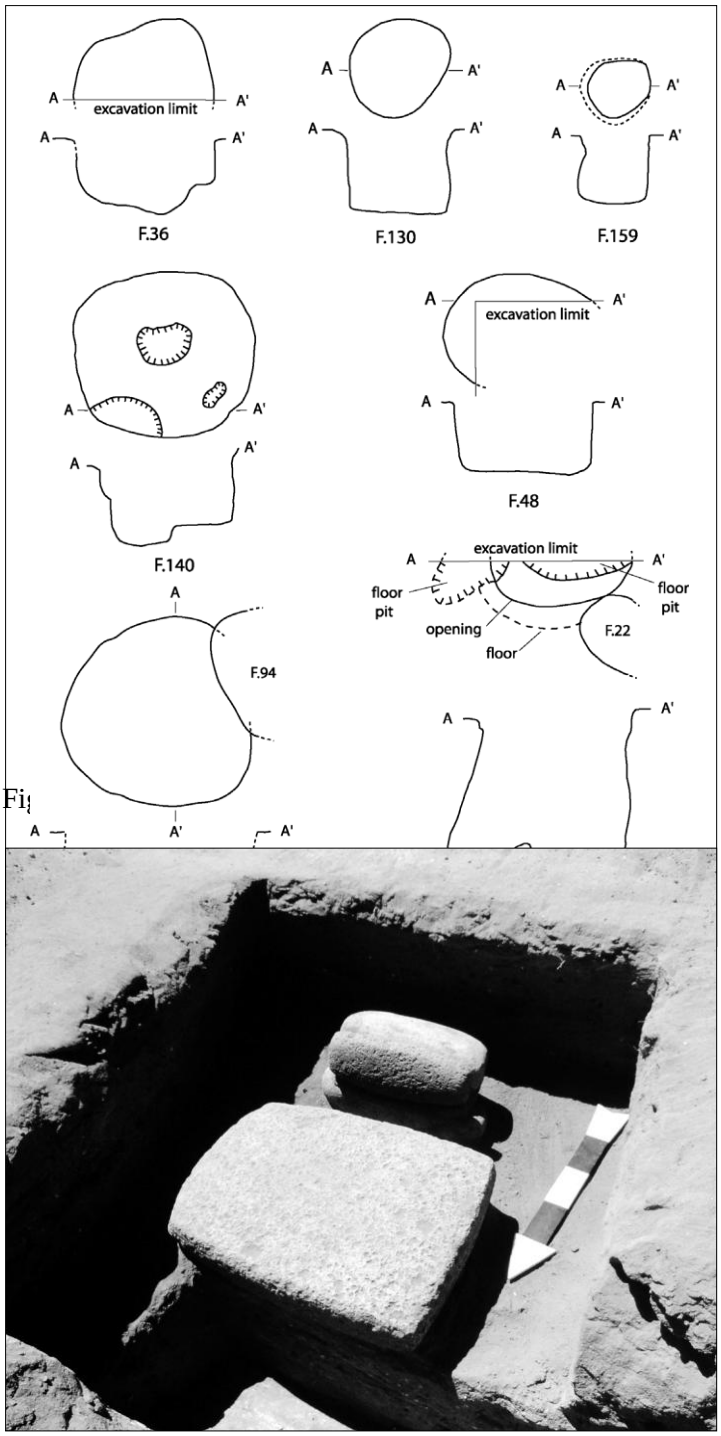


Figure 83. Metate and manos in upper fill of F.82.

The fill of 27 of the storage pits is layered with lenses of ash, charcoal, and other refuse, and another eight features have one to three layers of ash and carbonaceous soils in a matrix of loose, brown sand. The remaining nine features contain brown to reddish brown sands and a little secondary refuse from surrounding deposits. The refuse in storage pits con-sists of sherds, lithics, bone, macrofloral remains, and a variety of other objects. The majority of storage pits are thought to date to the occupation of the pueblo, and it is during this occupation that most of the pits were filled with refuse.

Storage pits may also have been used to cache ground stone. Two pestles were recovered from F.65; a metate and three manos were placed within F.82 (Figure 83); and a metate was found in F.94.

The distribution of storage pits is shown in Figure 84 where an arc of these features is apparent from south of the central part of the pueblo to around and beneath Rooms 10, 12, and 14, the latest additions to the pueblo. This arc of storage pits follows the distribution of thermal features but is generally more distant from pueblo rooms than the thermal features. The rather distinct distribution of storage pits versus those of thermal features is due in part to their larger size and likelihood of dis-covery with interval testing of extramural areas.

The affiliation of many of the storage pits with the pueblo occupation is suggested by the spatial arrangement of these features and by the distribution of con-joinable sherds and the super-positioning of features. Eight features in the arc of storage pits (F.1, F.22, F.36, F.82, F.94, F.123, F.135, and F.140) have matches of sherds to others of the pueblo occupation and indicate that these features were open and filling with secondary refuse during the pueblo occupation.

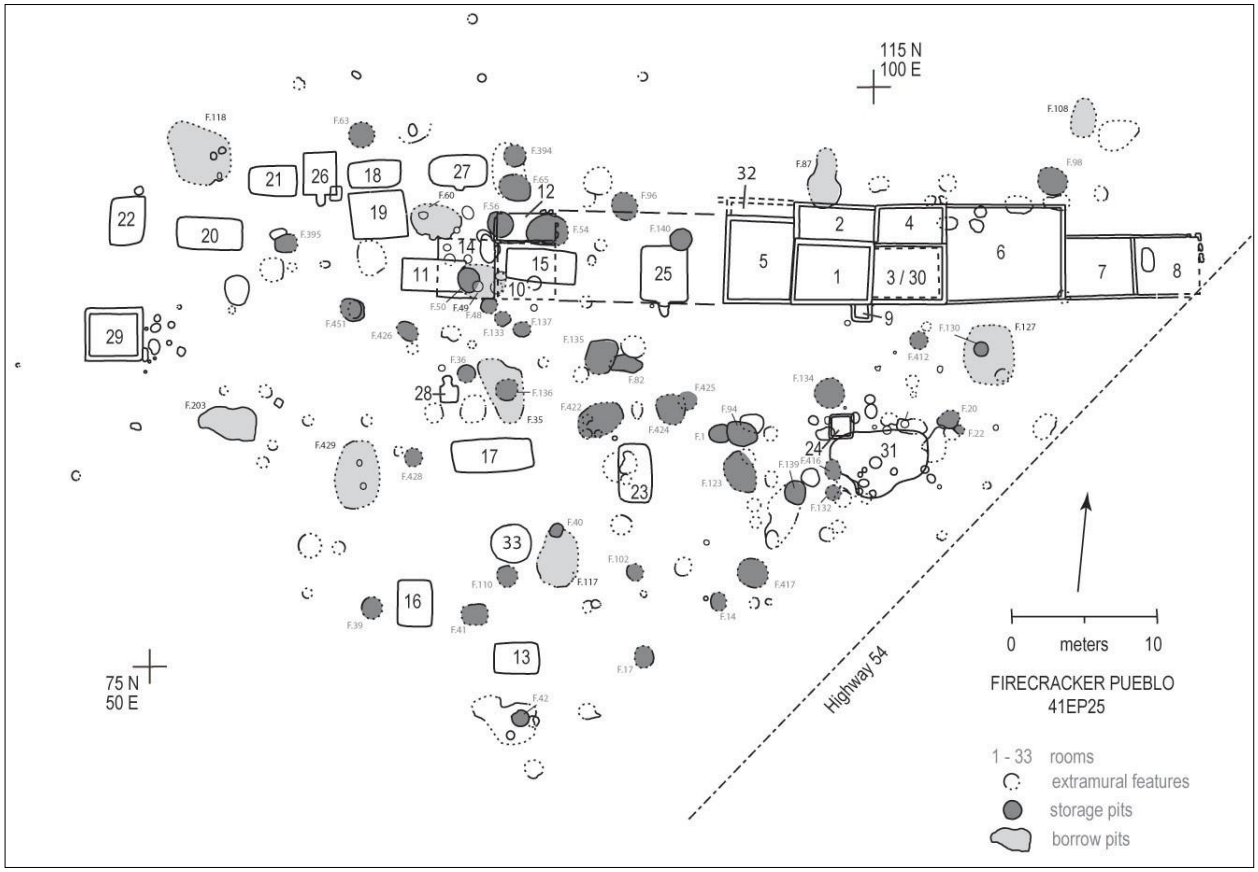


Figure 84. Distribution of storage pits and barrow pits.

Another three features (F.40, F.130, and F.139) are within larger features with sherds matching ones of the pueblo occupation. Feature F.394 has a match to other sherds of the pueblo occupation and is beneath feature F.433. Similarly, Feature F.56 has sherds that join others of the pueblo occupation and is beneath pueblo Room 12. Features F.54, F.96, and F.140 also lie beneath rooms added to the western side of the pueblo. It is doubtful that all of these storage pits were in use at the same time, especially with construction of pueblo rooms over a number of these features.

Few storage pits can be associated with any certainty with other occupations at this location. One is F.50 which is beneath isolated Room 11 and related to the occupation of the earlier isolated rooms in the northwestern part of the site. Another is F.42 which has a sherd matching to ones in isolated Room 17. Proximity suggests that features F.63, F.395, F.426, and F.451 may be connected to the earlier isolated rooms in the northwest part of the site and that features F.17, F.39, F.41, F.102, F.110, and F.428 could be associated with the southern group of isolated rooms. Regrettably and aside from the nearness of features to isolated rooms, there is no other evidence to support their placement with these occupations.

Borrow Pits

There are 10 extramural features that are identified as borrow pits, and their attributes are listed in Appendix A.5. They are the largest extramural features and have estimated volumes that range between two and six and a half cubic meters, with an average of 4.13 cubic meters. These features are mostly oval in shape, though they can also be irregular in form. Minimum width is about two meters and maximum dimension is about six meters.

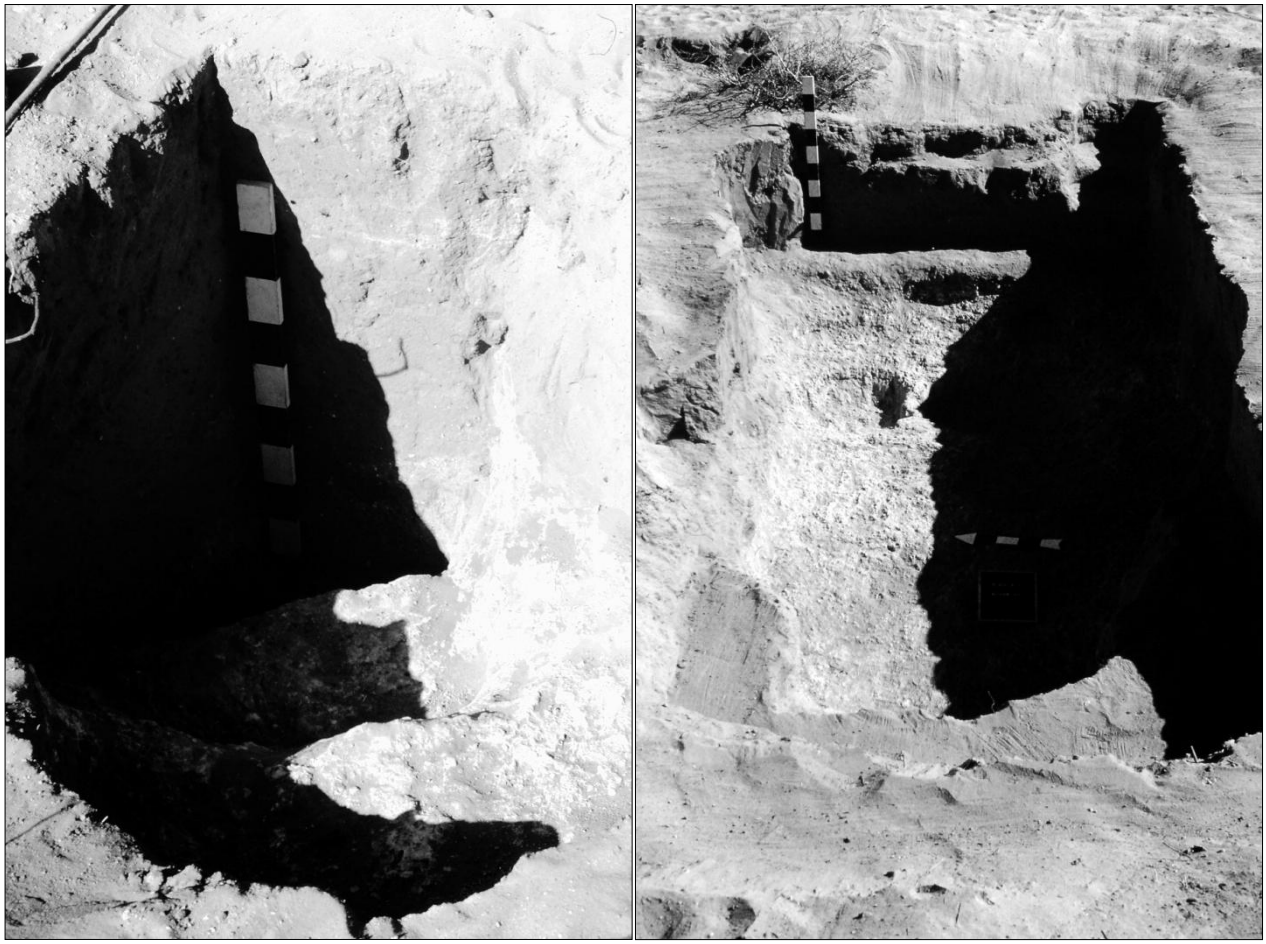


Figure 85. Borrow pits: *left*, F.60 with stepped levels; *right*, F.203 showing excavation into caliche layer.

With the exception of F.60 which has a depth of 1.27 m, the depth of these features is between 41 and 62 cm. Feature F.60 also has a side with stepped levels and shows marks from excavation with a digging stick (Figure 85). Feature 87 is also noted as having digging stick marks.

Borrow pits are so named in that they are large excavations into the La Mesa surface of indurated caliche (Figure 85). Caliche was used to plaster room floors and walls. Feature F.203 has a number of pits in its floor to further exploit the caliche layer.

Layers of gray soil with charcoal and occasionally ash are interspersed with layers of brown to light gray sands with little charcoal in most of the borrow pits. The exceptions are F.49 and F.117 which have sand and little charcoal. A wide range of materials were recovered from the secondary refuse of F.203, the only completely excavated borrow pit. Materials from the other borrow pits vary in amount principally with the extent of testing.

The spatial distribution of borrow pits is shown in Figure 84. Six of the borrow pits can be assigned to particular occupations based on the vertical relationships of features and matched sherds. Four of these of borrow pits have sherds matching ones from the pueblo, and it is likely that they are associated with the pueblo occupation. These four features (F.117, F.118, F.127, and F.203) tend to be farther from the pueblo than other features and three of them form an arc west and south of the pueblo. Feature F.429 appears to be affiliated with the southern group of isolated rooms. Feature F.38 is in the fill of F.429 and has a sherd

matching another on the floor of isolated Room 17. Borrow pit F.49 is situated beneath isolated Rooms 11 and 15 and is, therefore, part of the early occupation of isolated rooms in the northwestern area of the site. The remaining four features (F.35, F.60, F.87, and F.108) cannot definitely be aligned with any given occupation, but the location of F.87 and F.108 behind and at the east end of the pueblo would indicate a connection to the pueblo occupation.

Non-specific Features

Non-specific features are non-descript pits which lack the characteristics of postholes, thermal features, storage pits, and barrow pits. Many of these features were discovered in the systematically excavated one meter squares, and information on them is limited to the portions within the excavated squares. There are also a number that were exposed in the walls of backhoe trenches but not tested. Thus, little information is available for some features, and it is possible that a thermal feature or storage pit has gone unnoticed among this group of features.

Non-specific features are the most numerous extramural features, number 90, and are variable in form, size, and depth (Figure 86; Appendix A.6). These features are mostly round to oval, but 16 are irregular in form, and two are sub-rectangular. The minimum width is 26 cm, the maximum dimension is estimated at 4.5 m, and 55% of the features are less than a meter in diameter. Feature F.21 has a depth of 93 cm. Otherwise, these features are 47 cm or less in depth, and 85% are less than 35 cm in depth. It could be argued from their form that the two sub-rectangular pits (F.81 and F.142) are storage pits. However, the variation in these features suggests the excavation of pits for a myriad of unknown reasons.

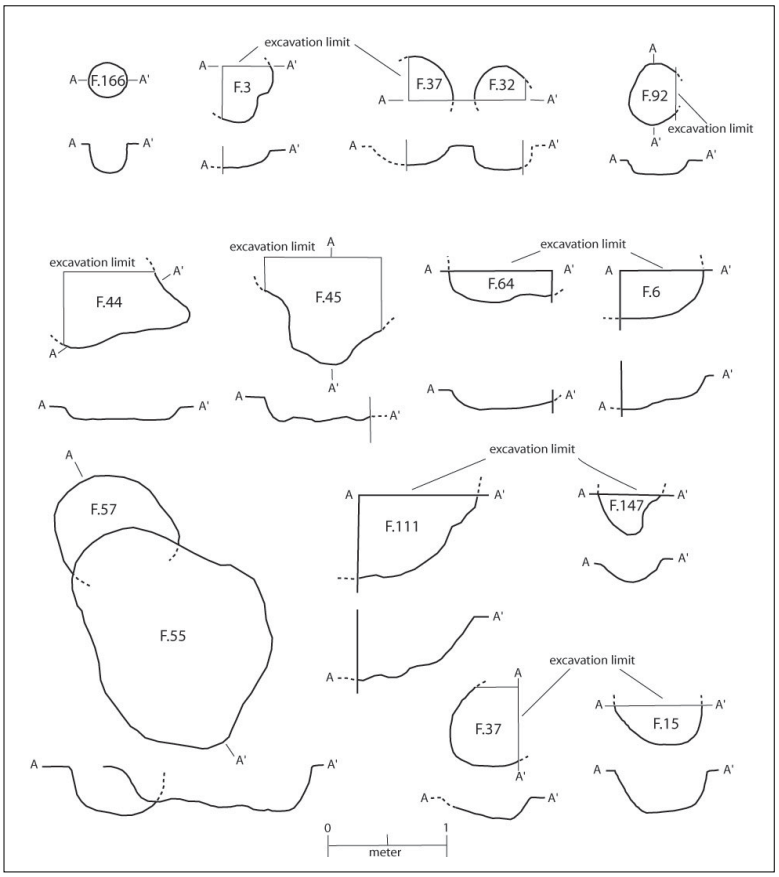


Figure 86. Non-specific features, exemplary plans and profiles.

The contents of the majority of these features are unremarkable. The fill ranges from reddish brown sand to light gray sand with little charcoal to dark soils with secondary refuse, sometimes with sands between layers of refuse. Exceptions are features F.142 and F.452. Feature F.142 is a sub-rectangular pit with a number of carefully placed items. One half of a metate and an unmodified large stone rest on the floor of the pit, and a mano, an abrader, and two ham-merstones are situated above them. This is followed with some 65 rounded, 3-15 cm diameter, pieces of burned adobe on top. The soil in the pit is a brown sandy loam, and there is no suggestion that this is a thermal feature. This is the only instance of cached materials in a non-specific pit. Feature 452 is a small pit in the fill of Room 3 and contains a large number of sherds of an El Paso Polychrome jar. As discussed in Chapter 5, this is a post-abandonment deposit of pre-historic or possibly recent age.

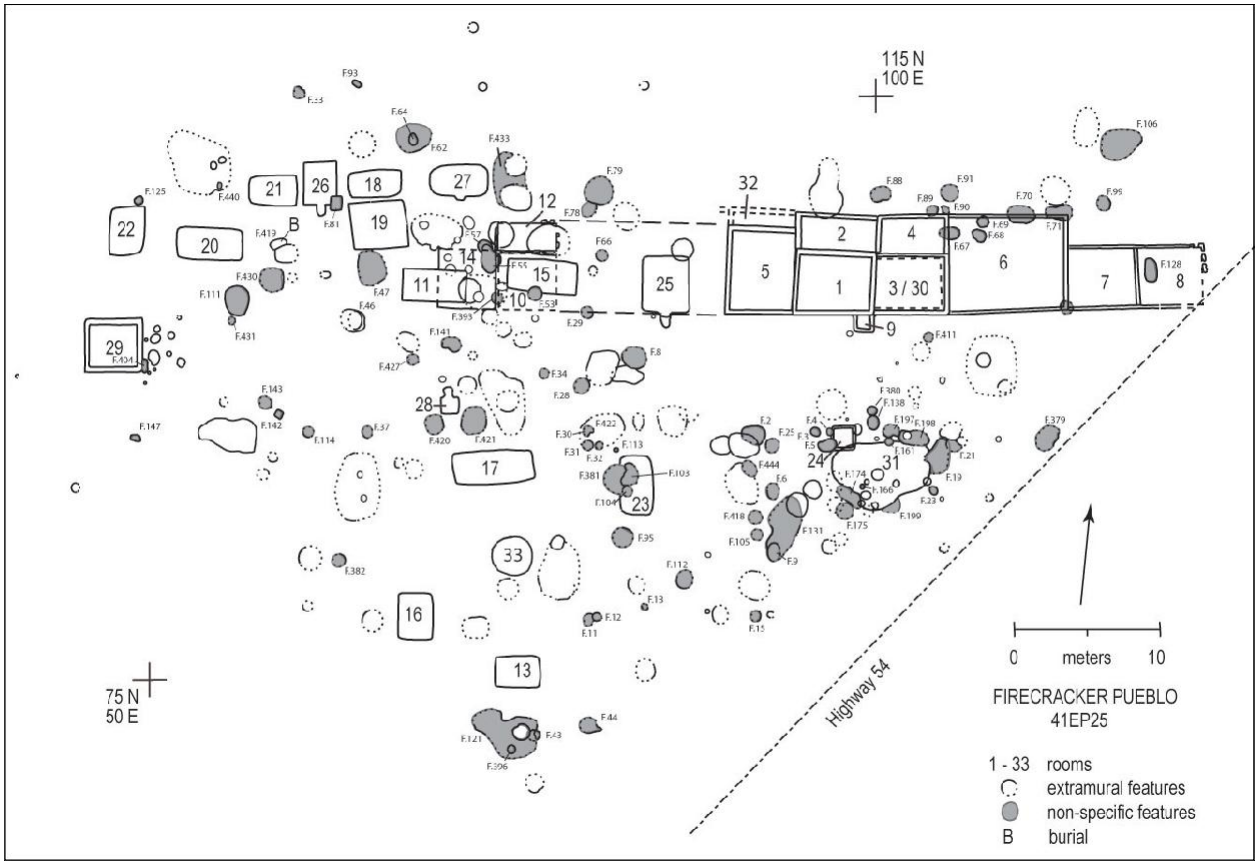


Figure 87. Distribution of non-specific features and location of human burial.

Non-specific features are numerous and occur throughout the site. However, the majority appear to be affiliated with the pueblo occupation. Many of these features are in a curved order from south of the east half of the pueblo to around and beneath the western half of the pueblo and are interspersed among thermal features, and storage pits. Five features (F.6, F.21, F.55, F.131, and F.197) in this arc of non-specific features have sherds matching others of the pueblo occupation. Features F.9, F.19, and F.433 are either cut into or lie above features with matching sherds of the pueblo occupation. Other features most probably associated with the pueblo occupation include F.4, F.5, F.161, F.166, F.174, and F.199 that are either situated beneath isolated Room 24 and above isolated Room 31 or cut into the floor or wall of Room 31.

Non-specific features in the northeastern part of the site are distant to isolated rooms in the northwestern and southern parts of the site and are most likely part of the pueblo occupation. As rooms were added to the pueblo, nine of these features were covered by Rooms 4, 6 and 8. One of these features (F.128) has a sherd matching others of the pueblo occupation. Additionally, Feature F.106 has a match to pueblo occupation sherds.

Feature F.404 is next to the east wall of Room 29. Room 29 is seen as part of the pueblo occupation, and, therefore, F.404 is considered part of that occupation.

A single non-specific feature can be connected to the occupation of isolated rooms in the northwestern part of the site. This is feature F.53 which is below isolated Room 15 that, in turn, is below pueblo Room 10. Other features north or south of these isolated rooms could be related to this first occupation of the site. However, there is no stratigraphic evidence, conjoinable sherds, or other information to tie particular features to this occupation.

Feature F.81 has been cut into a corner of isolated Room 26 and post-dates the occupation of isolated rooms in the northwestern part of the site. It probably dates to the pueblo occupation, but it could also be related to the occupation of isolated Rooms 11 and 15 or possibly that of isolated Rooms 25 and 30.

Three non-specific features are affiliated with the southern group of isolated rooms. Feature F.121 has sherds that match ones in isolated Room 17 and overlies F.43 and F.396. Feature F.121 covers roasting pit F.42 that also has a sherd matching with ones from Room 17. A number of non-specific features encircle this group of isolated rooms, and some of them are most likely part of this occupation.

Burial

Excavations within and beneath rooms and in extramural areas produced the remains of a single human burial south of isolated Rooms 21 and 26 and east of isolated Room 20 (Figure 87). The nearness of the burial to these isolated rooms would suggest that this burial is connected to these isolated rooms and the first occupation of the site.

Given the extensive extramural excavations at this site, the finding of only a single burial, and the absence of evidence for exterior cemeteries, secondary burials, cremations, or crematory areas, none of the occupations at this site would appear to have been long-lived. Additionally, few burials have been recorded for other El Paso phase sites (Miller 2004; Miller and Graves 2009; O'Laughlin 1983), and this intimates mobile populations and limited habitation of pueblo settlements.

The burial pit (F.419) was subrectangular with vertical to slightly sloping sides and a floor that sloped slightly from the head to the feet. It was 111 cm long, 26 cm wide at the head, 38 cm wide at the feet, and 78 cm deep. The pit was dug into the caliche layer and through a portion of storage pit F.395. The fill was reddish brown sand with scattered caliche pebbles and a few pieces of charcoal. The contents of the pit included 2 sherds, 4 pieces of chipped stone, a fragment of a turquoise pendant, and a burned kernel of maize. No artifacts were directly associated with the burial.

The burial was a female of about 18-22 years. She was laid on her back, head to the northeast and tucked forward, knees raised, feet near pelvis, arms extended along sides, right hand on pelvis, and left hand by left side.

Discussion of Extramural Features

A large number of extramural features were identified. Others are undoubtedly present in unexcavated areas, and some were probably removed with construction of Highway 54. Nevertheless, a variety of features were uncovered and include small thermal features (probably hearths), large thermal features (likely including roasting pits), postholes, storage pits, borrow pits, and pits of non-specific or unknown use. Many of the extramural features can be associated with the pueblo structure and intimate the intensity of that occupation. A smaller number of features can be assigned to occupations of isolated rooms and reflect the more ephemeral and short-term occupation of those structures.

Extramural features have a patterned spatial distribution with respect to the pueblo. Entrances to the pueblo are predominantly on the south side of the pueblo. Relatively few features and little trash occur near the south wall of the pueblo where space was maintained to allow for a variety of activities and free movement. Few features are also noted on the north side of the building as there are few possible entrances to the building and limited extramural activity. Instead, most features are located at a distance to the south of the earlier rooms and form an arcing distribution to the southwest and west of the earlier rooms. Eventually, rooms were added to either side of the earliest rooms, some extramural features were covered by the

additions, and other features were put into use and broadened the arc. Thermal features tend to concentrate in areas, with a slight tendency for larger thermal features to be more distant from the pueblo. Storage pits are generally on the outside of the arc, and borrow pits are generally on the site fringe. Non-specific features of unknown use and postholes are scattered among the other features. Overlapping occupations and unassigned features complicate a better appreciation of spatial distribution of extramural features. Still, the patterned distribution of features and the maintenance of space indicate an organized and disciplined use of space concomitant with an intense and long occupation.

Investigations of extramural areas at other El Paso phase sites with contiguous room pueblos have been limited, and little comparison can be made. Mostly, a few hearths, trash-filled pits, and deposits of secondary refuse have noted at La Cabraña (Foster and Bradley 2021), Pickup Pueblo (Gerald 1988), Sabina Mountain (Brook 1980a; Green 1980), Hot Well (Lowry 2005), Sgt. Doyle (Lowry 2005), Hijo de Sgt. Doyle (Kenmotsu et al. 2008), Twelve Rom House Ruin (Moore 1947), Condron Field (Morrow 1970), the Well Site (O'Laughlin 1999), and Casa Blanca (O'Laughlin 2001a). An exception is Madera Quemada where excavations near walls of the pueblo and a few selected and more distant areas revealed hearths, postholes, pits, trash-filled features, and areas of concentrated refuse (Miller and Graves 2009). The work at Madera Quemada highlighted domestic activities near the pueblo but did not yield an overall view of the use of exterior spaces.

Isolated rooms have a distribution of extramural features that is not as well define as that of the pueblo. Extramural features could not be identified for isolated rooms 11, 15, 25, and 30. The pueblo was built over these isolated rooms and any features associated with these isolated rooms could not be differentiated from those of the pueblo. But, extramural features could be related to the other two groups of isolated rooms. For the northwest group of isolated rooms and the earliest occupation of the site, there are six features beneath isolated Rooms 11 and 15 that can be linked to this occupation and include three thermal features, a storage pit, a borrow pit, and a non-specific feature. Other features that may be tied to this occupation are two to five meters south of the northwest group of isolated rooms and a few are north of them. Features are not as dense nor as numerous as for the pueblo occupation, though their locations loosely follow those of the pueblo occupation. The southern group of isolated rooms has seven features that could be definitely associated with it. These include two thermal features, a storage pit, and three non-specific features that are on the periphery of this courtyard group and a non-specific feature cut into the possible storage room in the center of the courtyard. Other thermal features, storage pits, and non-specific features are located around the edges of this room group and may be part of this occupation. The lack of features within the courtyard is most probably a reflection of the limited excavations in this area and erosion of surface soils, particularly in the area of isolated Room 16. Then again, it may be that the inner courtyard was largely an open space free of features.

Thermal features, postholes, storage pits, a borrow pit, trash-filled pits, non-specific pits, and middens have been documented for a number of other El Paso phase sites with isolated rooms (Batcho et al. 1985; Browning et al. 1992; Carlson 2008; Condon et al. 2010; O'Laughlin 1975, 2001a). However, only the excavation at 41EP2724 provides detail of the spatial distribution of extramural features (O'Laughlin and Martin 1990). Three or possibly four isolated rooms were discovered in a large block excavation. Little trash and few features were noted near the isolated rooms. Thermal features, possible storage pits, and secondary refuse were found a short distance away, primarily to the south and west of the isolated rooms. A borrow pit was located north and away from the isolated rooms. The distribution of extramural features at 41EP2724 parallels the distributions of extramural features described for the pueblo and the northwest group of isolated rooms at Firecracker Pueblo. Similar distributions of extramural features around isolated surface rooms and pithouses have also been recorded for earlier Dona Ana Phase sites (Turnbow and Kurota 2008; Miller 1989, 1990; Peterson 2001; Railey 2002). As yet, there is no site with an arrange-ment of isolated rooms comparable to the southern group of isolated rooms at Firecracker Pueblo.

As noted above, extramural features encountered at Firecracker Pueblo are represented at other El Paso phase sites. However, storage pits are few in number at other sites and represent a substantial portion of the extramural features at Firecracker Pueblo. Indeed, the number of apparent storage pits at Firecracker Pueblo exceeds the number of storage pits recorded for all other lowland, Formative period sites of the Jornada region.

Only a handful of storage pits in extramural areas have been recorded for El Paso Phase sites other than Firecracker Pueblo. One and perhaps two extramural storage pits have been reported for the pueblo of Madera Quemada (Miller and Graves 2009), and another storage pit is noted for Casa Blanca which has contiguous room structures and pithouses (O'Laughlin 2001a). Storage pits associated with isolated structures include one or more storage pits in the area of one pithouse at the Dona Ana Airport site (Batcho et al. 1985), a possible storage pit adjacent to an isolated room at 41EP2724 (O'Laughlin and Martin 1990), and a single storage pit near two pithouses at LA457 (Carlson 2008). Additionally, seven extramural storage pits are scattered among 12 isolated structures at the Jaca site of Dona Ana to early El Paso phase age (Railey 2002).

There are few earlier residential sites of the Mesilla and Dona Ana phases with extramural storage pits. The Mesilla phase sites are Los Tules with two storage pits and 11 pithouses (Lehmer 1948), Turquoise Ridge with two or three storage pits and 12 pithouses (Whalen 1994), and LA457 with two storage pits and three pithouses (Oakes 1998). The Dona Ana phase sites are Gobernadora with two storage pits and five pithouses (Miller 1989), 41EP1661 with one possible storage pit and three pithouses (Kenmotsu et al. 2008), the Scorpion Site with two storage pits and two pithouses (Turnbow and Kurota 2008), and Meyer Pithouse Village with six storage pits and five pithouses (Peterson 2001).

Extramural storage pits are best represented at Dona Ana and El Paso phase sites and are few in number for the earlier Mesilla phase. It is also during the Dona Ana and El Paso phases that cultigens exhibit a marked increase in quantity and ubiquity for flotation samples from lowland Jornada sites (McBride 2008; Miller and Kenmotsu 2004; O'Laughlin 2001b, 2001c, 2002, 2005a) (see also Chapter 9). The increase in agricultural production in the late Formative and concomitant dependence upon maize and other crops would have necessitated long-term storage of bulk foods to even out seasonal and annual variation in the food supply. Extramural storage pits provide one means to meet this end.

It is, however, noteworthy that storage facilities at Firecracker Pueblo include rooms as well as extra-mural pits. The relative mix of storage rooms and extramural storage pits is illustrated in Table 9 for the three best documented occupations. The occupations of the northwest and southern groups of isolated rooms have been characterized as less intense and of shorter duration than the pueblo occupation.

The northwest group of isolated rooms is seen as having been comprised of as many as six households in a compact grouping of rooms with a deep storage room (Room 22) on the west side. Room 22 is well-plastered and probably had surface walls. It differs from isolated habitation rooms in having no hearth.

The southern group of rooms is made of four households around an open courtyard with a deep storage room/pit in the center (Room 33). Room 33 is circular and unplastered. It has the appearance of an extramural storage pit but also has a floor hearth. This feature may have had several functions in its life.

The contiguous room pueblo has suffered from erosion but is thought to possibly have had 8-10 households and six to eight storage rooms. Storage rooms may or may not have formal hearths but differ from habitation rooms by their smaller size and addition to one side of a habitation room. It should be noted that small pits occur in some rooms and may have been used for short-term storage.

Table 9. Attributes of Storage Facilities for Three Occupations.

	Northwest Isolated Rooms	Southern Isolated Rooms	Pueblo
No. Rooms (No. Storage Rooms)	7 (1)	5 (1)	15-17 (6-8)
No. Households	6	4	8-10
Floor Area of All Rooms (m^2)	54.6	41.3	294
Floor Area of Potential Storage Rooms (m^2)	7.5	6.1	45 - 61
No. Extramural Storage Pits	1-5	1-7	16-32
No. Extramural Storage Pits per Household	0.2 – 0.8	0.2 – 1.7	1.6 – 4.0
Total Volume of All Extramural Storage Pits (m^3)	3.28	5.88	35.89

A habitation room and the larger communal room additionally have rows of postholes that held, at times, supports for possible storage cribs, racks, or platforms. Moreover, considerable amounts of maize have been found in burned habitation rooms at other sites and indicate episodic storage of food within habitation rooms (O'Laughlin 1985; Vermillion 1939). Thus, pueblo rooms offer a range of opportunities for storage.

The northwest and southern groups of isolated rooms are similar to one another in terms of number of households, number and floor area of all rooms, and number and floor area of storage rooms (Table 9). The pueblo is noted as having approximately twice the number of households, more than two times the number of rooms, and many more storage rooms than either of the groups of isolated rooms. In turn and taking into consideration the number of households, the area occupied by the pueblo and the total floor area of the storage rooms is considerably greater than for the groups of isolated rooms. The larger size of habitation rooms and the sizeable space given to storage mark the pueblo occupations as more intense and of longer duration than those of the isolated room groups.

Minimum and maximum numbers of recorded extramural storage pits are provided for the three occupations in Table 9. The minimum number of extramural storage pits associated with each occupation is based on the distribution of conjoinable pottery sherds and the superpositioning of features. The maximum number is inferred from the spatial arrangement of features and their proximity to rooms. As with numbers of storage rooms and floor area of storage rooms, the total number of extramural storage pits, the average number per household, and the total volume of extramural storage pits are substantially larger for the pueblo than for the groups of isolated rooms. Again, the sheer number and size of extramural storage pits would suggest a longer and more intense occupation and a greater need for storage for the pueblo occupation than for the occupations of the isolated rooms. However, it should be kept in mind that not all extramural storage pits were in use at the same time. This is especially true for the pueblo occupation where rooms were added above earlier storage pits and some were intruded upon by other features.

The presence of extramural storage pits and their association with isolated rooms and the pueblo presents an interesting situation. Extramural storage pits are principally known ethnographically from groups that practice some form of residential mobility and that bury food stores (Binford 1980; DeBoer 1988; Gilman 1983, 1987; Kelley 1995; Raymer 1990; Wills and Windes 1989; Young 1996). The use of extramural storage pits to conceal food stores at times of settlement abandonment and for other reasons is also known (DeBoer 1988; Gilman 1983, 1987; Raymer 1990; Young 1996). Given the situation of the site of Firecracker Pueblo in an area with arable soils, the coincidence of the smaller isolated rooms and extramural storage pits would suggest seasonal occupation, perhaps something akin to field houses in use at spring planting and later during the fall harvest. However, the co-occurrence of extramural storage pits and a pueblo is unique for the Jornada region and unusual for the Southwest. More sedentary groups residing in

contiguous room structures are noted for having above ground storage rooms incorporated in pueblo structures (see Gilman 1983, 1987). Thus, periodic or even seasonal abandonment of the pueblo at this site is a possibility. Then again and with the longer and more intense occupation of the pueblo, the number of extramural storage pits in use at any given time may have been limited and perhaps intended more for cucurbits than maize.

Firecracker Pueblo has a complex history and provides evidence of a number of occupations. The occupations range from small isolated surface rooms and pithouses of possible seasonal habitation to a substantial adobe pueblo with a more intense occupation of some duration. Residential mobility is obviously a component of the El Paso phase settlement system, and the various occupations of this site point to another component of this system, locational stability. Where seasonal and annual variations in resources (rainfall for example) promote residential mobility, spatial distributions in resources (such as arable land) engender the reuse of locations. Indeed, agriculture is seen as the linchpin for past occupations of this site.

CHAPTER 8
MATERIAL CULTURE

More than fifty thousand artifacts were recovered through excavations at Firecracker Pueblo. The assemblage is diverse and befitting a Pueblo period, El Paso phase residential site of the Jornada region. Ceramics and chipped stone comprise the bulk of this material, but there is also a considerable inventory of ground stone, minerals, pigments, ornaments, bone tools and other items.

A sizeable number of El Paso phase pueblos and sites with isolated rooms have been excavated or tested. Yet, it is surprising how few have more than general descriptions or limited inventories of material remains. Thus, the intent here is provide details of the various classes of artifacts, and, when possible, pursue such topics as residential stability and mobility, material selection, production, use and maintenance tools and other items, scavenging and recycling, and exchange.

Ceramics

The ceramics from Firecracker Pueblo are exemplary of the El Paso phase. Of the 41,967 sherds recovered from this site, local brownwares make up 98% of the assemblage (Table 10). These are predominantly sherds of undifferentiated El Paso Brownware and El Paso Polychrome, but a small number of El Paso Bichrome and El Paso Brown sherds are present. In addition to the El Paso ceramics, there is a variety of non-local wares, mostly from southwest and west-central New Mexico and the Casas Grandes and Salado areas. The classification of ceramics from Firecracker Pueblo follows commonly named types, excepting one general category of fine-tempered brownware.

Vessel form, rim attributes, and vessel design are detailed for El Paso Polychrome, and modified sherds and miscellaneous items of clay are described. The site context of El Paso Polychrome and trade ware forms is also considered. Provenience information for ceramic types and their forms is provided in Appendix B.

El Paso Brownware

Pottery of the El Paso Brownware series dominates the assemblage of Firecracker Pueblo. El Paso Brownware has plain and decorated types that are characterized by a friable, coarse-tempered paste with a carbon streak. Miller (1995, 2005) provides a summary of this ceramic tradition that is made up of El Paso Brown, El Paso Bichrome, and El Paso Polychrome. El Paso Brown and El Paso Bichrome are found on Mesilla and Dona Ana phase sites, date to about A.D. 1250 or earlier, and, thus, would not be expected for an El Paso phase settlement. Together, the sherds of El Paso Brown and Bichrome make up less than 0.03% of the Firecracker assemblage and probably were scavenged from nearby Mesilla or Dona Ana phase settlements.

Undifferentiated El Paso Brownware

Undecorated and eroded body sherds of vessels of El Paso Brownwares can be difficult to separate by type. It has become common to designate these sherds simply as El Paso Brownware or undifferentiated El Paso Brownware. The latter term is used here, and undifferentiated El Paso Brownware sherds comprise the largest group of ceramics at Firecracker Pueblo at nearly 57%. However, it should be noted that the rarity of El Paso Brown and Bichrome and the abundance of El Paso Polychrome would suggest that the majority of undifferentiated sherds are from undecorated portions of El Paso Polychrome jars.

Table 10. Sherd Totals by Type and Form.

Type	Form					Total	
	Jar	Bowl	Ladle	Pitcher	Unknown	Number	Percent
El Paso Polychrome	16,230	975	30	11		17,246	41.09
El Paso Bichrome	6					6	0.01
El Paso Brown	4					4	0.01
El Paso Brown, brushed	1					1	<0.01
El Paso Brown, tooled	1					1	<0.01
El Paso Brownware,					23,894	23,894	56.94
Mimbres B/W		4				4	0.01
Chupadero B/W	229	4				233	0.56
Three Rivers R/T		28				28	0.07
Magdalena B/W		39				39	0.09
Heshotuathla Polychrome		6				6	0.01
Seco Corrugated	4	164				168	0.40
Agua Fria B/R	1	1				2	<0.01
Tucson Polychrome	110					110	0.26
Gila Polychrome		5				5	0.01
Ramos Polychrome	30					30	0.07
Escondida Polychrome		3				3	0.01
Casas Grandes Polychrome,	71					71	0.17
Ramos Black	5	3				8	0.02
Playas Red	2					2	<0.01
Playas Red Textured	43					43	0.10
Casas Grandes Plain	1					1	<0.01
Casas Grandes Textured	3					3	0.01
Fine-tempered Brownware	54	5				59	0.14
Total	40,700	1,237				41,967	100.00

El Paso Brown

El Paso Brown is represented by six jar sherds. These include four rim sherds with sidewalls that taper to the rim. “Pinched” rims are common for this early type (West 1982; Whalen 1980). One body sherd exhibits scoring or brushing on the external surface, much like Alma Scored. And, the sixth sherd shows irregular tool marks or incisions.

El Paso Bichrome

El Paso Bichrome is also noted by six jar sherds. The decoration consists of broad red lines with much undecorated space between lines. These sherds are from the necks and upper bodies of jars, and the designs appear to be diagonal lines and possibly chevrons pendant to the rims.

El Paso Polychrome

El Paso Polychrome sherds number 17,246 and make up about 41% of the ceramics from Firecracker Pueblo. This type was first described by Stallings (1931) from examples of the Hueco Bolson and has a black carbon paint and red mineral paint on a low-fired, brown, coarse-tempered paste with a gray core or carbon streak. Its production is centered on the El Paso area, and it has been found in southeastern Arizona to Transpecos Texas and from the Rio Abajo of New Mexico to Villa Ahumada, Chihuahua. When analyzed by neutron activation (NAA), distant sherds are almost always found to have originated within the heartland of the Jornada (Burgett 2007; Creel et al. 2002; Kenmotsu 2005).

Early and late/classic varieties of El Paso Polychrome have been identified, and the classic variety dates from about A.D. 1275 to possibly as late as A.D. 1450 (Miller 1995; O'Laughlin 1985c; Whalen 1985). The classic variety is noted by thickened rims, jars with everted rims, and complex designs incorporating a variety of secondary elements (Miller 1995; O'Laughlin 1985c). As might be expected, the classic variety of El Paso Polychrome typifies this type at Firecracker Pueblo.

El Paso Polychrome at Firecracker Pueblo has a coarse-grained, crushed granitic rock temper with free grains of feldspar and quartz. This alkali granite porphyry temper has its origins in the alluvial fans and Franklin Mountains to the west of the site. Petrographic analyses have also shown that granite porphyries typify the temper materials of El Paso Brownwares from other sites of the western Hueco Bolson (Hill 1988, 1993; Robinson 2001). Additionally, NAA analyses indicate a local origin for most El Paso Brownwares of the western Hueco Bolson (Jackson and Kenmotsu 2008; Shafer 2001).

The production of pottery at Firecracker Pueblo is evidenced by de facto refuse on the floors of Rooms 7, 11, and 26 that includes polishing stones, sherd scrapers, pigments, and sherd palettes with pigments. It is also noteworthy that a basin of unfired pottery clay was on the floor of Room 11 and that an unfired bowl was on the floor of Room 26. A sample from the clay on the floor of Room 11 was subjected to X-ray fluorescence spectrometry and paired with a clay bed not far west of Firecracker Pueblo (Bentley 1993).

El Paso Polychrome Vessel Form, Size and Context

Aspects of El Paso Polychrome vessels considered here are form and orifice diameter. The form and size of vessels can provide information on the function of vessels and may give insight to occupational stability and season of occupation (Hard 1983a; Hard and Mauldin 1986; Mauldin 1986). Vessel forms have chronological significance for the Jornada region and also reflect changes in subsistence (Miller 1995; Scarborough 1992; Seaman and Mills 1988; Whalen 1981b).

Decorated sherds of El Paso Polychrome can relatively easily be assigned to general categories of jars and bowls. Other forms such as pitchers and ladles may be distinguished by rims or handles but body sherds of these forms, and even rims, cannot reliably be separated from simpler jars and bowls. Thus, the categories of jars and bowls are not exclusive and include minor numbers of sherds of other vessel forms. Identifiable portions of ladles and pitchers are listed in Table 10, and other rare forms are hidden in the numbers for jars and bowls. A partially restorable gourd-shaped ladle was covered from the fill of Room 25, and eight other fragments of ladles were retrieved from pueblo floors or refuse of the pueblo occupation. Nine fragments of a pitcher were found in the fill of Room 31, and two handles of other pitchers are noted for pueblo

occupation refuse. A body sherd of a double jar, two rims of indented-rim bowls and a rim fragment of a crenellated bowl were also obtained from refuse of the pueblo occupation. Interestingly, vessel forms other than jars and bowls are recorded only for the pueblo occupation. Though these other vessel forms are few in number, their distribution suggests a more limited range of activities associated with the occupations of the isolated rooms as compared to a more diversified assemblage for the presumed longer-lived pueblo occupation.

The distribution of vessel forms within the site is provided in Table 11 and has a few notable patterns. For this table, pitchers and ladles have been included in jar and bowl forms for El Paso Polychrome, and undifferentiated El Paso Brownware body sherds that are mostly from jar bottoms have been added for comparison. As an additional note, 1725 undecorated and decorated sherds of an El Paso Polychrome jar in the fill of Room 3 have not been included because of the uncertain origin and possible recent introduction of this vessel. A Chi-square test of the data in Table 11 is significant at a probability of 0.01 and indicates a non-random relationship between variables.

Table 11. Percentages and Counts (in parentheses) of El Paso Brownware Sherds by Form and Site Context.

Form	Pueblo Room Floor	Pueblo Room Fill	Isolated Room Floor	Isolated Room Fill	Extra-mural Feature	Surface Refuse	Total
El Paso Brownware undifferentiated	56.4% (1291)	57.5% (911)	55.9% (995)	58.4% (5448)	57.1% (9678)	62.8% (4692)	58.4% (23015)
El Paso Polychrome jar	41.4% (947)	40.4% (640)	39.1% (696)	37.7% (3518)	40.9% (6939)	35.5% (2655)	39.1% (15395)
El Paso Polychrome bowl	2.2% (50)	2.1% (34)	5.0% (89)	3.9% (364)	2.0% (341)	1.7% (127)	2.5% (1005)

Percentages for jars, bowls, and undifferentiated sherds are similar for the various site contexts. Jar sherds far outnumber bowl sherds. Considering only the decorated jar and bowl sherds, bowls comprise only 6.5% of the collection. Earlier Mesilla and Dona Ana phase residential sites often have higher percentages of bowls (see Miller and Burt 2007; Scarborough 1992; Reed et al. 2002). The higher percentage of jars at Firecracker Pueblo may be a reflection of a greater reliance on maize and residential stability during the El Paso phase and a need for jars to process and store maize. In this vane, the somewhat higher percentage for bowls and lower percentages for jars and undifferentiated sherds for isolated room floors would correspond to their presumed more ephemeral occupation as compared to the pueblo.

Surface refuse differs from other contexts in having the highest percentage of undifferentiated sherds and the lowest percentages of jar and bowl sherds. Presumably, exposure to the elements and traffic has reduced the population of identifiable jar and bowl sherds. Sherds from this context also average a smaller size than other contexts.

Rim sherds of El Paso Polychrome number nearly 1,300 from Firecracker Pueblo. Excluding conjoinable sherds or obvious multiple sherds from the same vessel, there are 1,051 rim sherds and 1, 047 rim sherds from which various attributes could be monitored. Some of these are considered later. At present, attention is centered on rim diameter, and 894 rim sherds are sufficiently large enough to provide a confident estimation of rim diameters and an approximation of the orifice diameter. These measurements from Firecracker Pueblo have also been utilized by Hard and others (Hard et al. 1994) and Speth and LeDuc (2007) in their studies of ceramics of the Jornada and Pecos River areas.

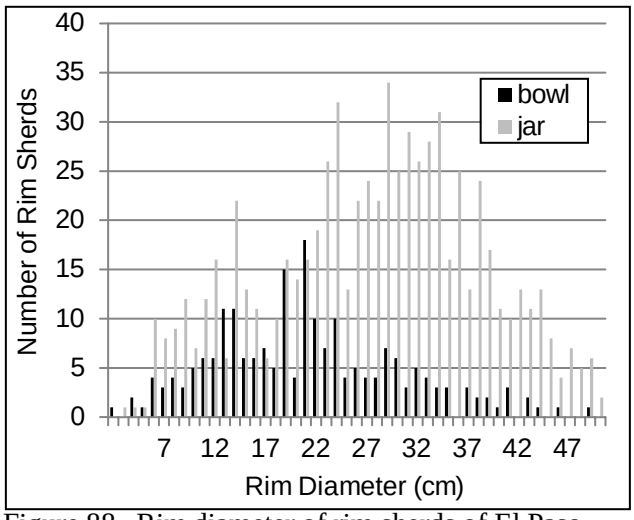


Figure 88. Rim diameter of rim sherds of El Paso Polychrome.

The range of rim diameters for vessels from Firecracker Pueblo is shown in Figure 88. Many of the rims are from jars with everted or out curving rims, and orifice diameters for these vessels would be smaller than the measured rim diameters. Still, rim diameters provide a close approximation of orifice size and reflect the overall size of vessels, as demonstrated by Speth and LeDuc (2007) with measurements of complete or mostly intact jars.

For 697 jar rims, the average rim diameter is 27.6 cm with a standard deviation of 10.5 cm. The mean rim diameter for 209 bowl rims is 21.3 cm with a standard deviation of 9.3 cm. An examination of Figure 88 shows a bimodal distribution of jar and bowl rim diameters with the division at about a diameter of 20 cm. This bimodal distribution of jar rim diameter measurements has also been noted by Speth and LeDuc (2007). Additionally, it is seen that jars and some bowls are very large and approaching 50 cm in diameter for rims. Small and large vessels are represented and reflect a range of functions and activities.

The diameter of rims has been monitored for relatively few Jornada sites. Nonetheless, an increase in the combined rim diameters of all vessel forms from Mesilla to El Paso phase times has been recorded by Whalen (1980, 1994). Similarly, Hard et al. (1994) note an increase in rim diameter for bowls and jars from the early to late Formative. Supportive measurements of rim diameter have also been provided by others (Kurota 2008; McNatt et al. 2010; Miller 1990; Miller and Burt 2007; Shafer et al. 2001b). Rim/orifice diameter and the relative frequency of jars are at their highest during the El Paso phase and a peak in population density, aggregation, and agricultural production in the southern Jornada (Hard et al. 1994; Whalen 1994).

The contextual distribution of jars and bowls with rim diameters less than and greater than 20 cm in diameter for El Paso Polychrome, the dominant and local type of ceramic for Firecracker Pueblo, is provided in Table 12. A Chi-squared test of this data reveals an insignificant distribution of vessel form

Table 12. Percentages and Counts (in parentheses) of El Paso Polychrome Rims by Rim Diameter and Site Context.

Form Rim Diameter	Pueblo Room Floor	Pueblo Room Fill	Isolated Room Floor	Isolated Room Fill	Extra-mural Feature	Surface Refuse	Total
Jar: less than 20 cm	6.2% (2)	20.5% (9)	16.2% (6)	18.4% (38)	20.3% (83)	21.0% (35)	19.4% (173)
Jar: greater than 20 cm	75.0% (24)	59.1% (26)	45.9% (17)	56.8% (117)	58.6% (239)	55.7% (93)	57.7% (516)
Bowl: less than 20 cm	6.2% (2)	6.8% (3)	18.9% (7)	11.2% (23)	10.3% (42)	12.6% (21)	11.0% (98)
Bowl: greater than 20 cm	12.5% (4)	13.6% (6)	18.9% (7)	13.6% (28)	10.8% (44)	10.8% (18)	12.0% (107)

follows one exhibited by all sherds in Table 11. That is, bowls are better represented on the floors of isolated rooms than on the floors of rooms of the pueblo occupation. Additionally, jars with rim diameters greater than 20 cm are much better represented on pueblo floors than on isolated room floors. Differences in settlement longevity and season of occupation and storage and possibly processing of maize may be intimated by these findings and similar expectations have been expressed by Hard et al. (1994), Scarborough (1992), and Whalen (1994).

El Paso Polychrome Rim Attributes

An analysis of the morphology of rim profiles, vessel wall proportions of rims, and the designs on decorated rims of El Paso Polychrome is presented in this section. These features are known to vary from the early to late Formative, and it is hoped that the information provided here from an excavated context will aid future chronometric analyses. They also covary with vessel form and furnish other information on vessel function.

Rim profiles are classified as either inverted, direct, or everted and in the manner described by Seaman and Mills (1988). Inverted rims curve inward, direct rims have a vertical orientation, and everted rims curve outward. Inverted rims comprise only a small portion of the sample of rims with discernible profiles (Table 13). A substantial number of bowls have direct rims, and everted rims are nearly as well represented among bowls. Jar rims are dominated by everted rims that give them an "olla" shape. Additionally, vessels with rim diameters greater than 20 cm are dominated by everted rims while smaller vessels exhibit a mix of direct and everted rims (Table 14). Larger vessels are predominantly jars, and smaller vessels are a mix of jars and bowls.

Table 13. Percentages and Counts (in parentheses) of El Paso Polychrome Rims by Vessel Form and Rim Form.

Form	Inverted Rim	Direct Rim	Everted Rim	Total
Jar	0.0% (0)	11.7% (85)	88.3% (641)	78.2% (726)
Bowl	6.4% (13)	53.5% (108)	40.1% (81)	21.8% (202)
Total	1.4% (13)	20.8% (193)	77.8% (722)	100.0% (928)

Table 14. Percentages and Counts (in parentheses) of El Paso Polychrome Rims by Rim Form and Rim Diameter.

Rim Diameter	Inverted Rim	Direct Rim	Everted Rim	Total
less than 20 cm	1.9% (5)	31.7% (82)	66.4% (172)	30.1 % (259)
greater than 20 cm	1.3% (8)	16.1% (97)	82.5% (496)	69.9% (601)

Ceramic vessels with inverted rims characterize the Mesilla phase, vessels with direct rims and necked jars typify the Dona Ana phase, and jars with everted rims are synonymous with the El Paso phase (Miller 1995; Miller and Kenmotsu 2004; O'Laughlin 1985c; Seaman and Mills 1988; Whalen 1980, 1981b). The rims from Firecracker Pueblo certainly fit well other El Paso phase assemblages.

The Measurement of vessel wall proportion of a rim provides another aspect of rim form. This measure is better known as RSI or rim sherd index and reflects changes in vessel wall thickness. As developed by West (1982), RSI involved measuring the thickness of the vessel wall at 2mm and 15mm below the rim and dividing the first measurement by the second. A value of less than 1 indicates a tapering rim, those of about 1 would be straight or parallel-walled rims, and rims with values greater that 1 would be wedged or thickened rims. As with other attributes of ceramic vessels, RSI values tend to increase from early to late

Formative and have their largest values in assemblages composed primarily of El Paso Polychrome, i.e., the El Paso phase (Carmichael 1986; Hard et a. 1994; Seaman and Mills 1988; Speth and LeDuc 2007; West 1982).

The mean RSI is 1.46 with a standard deviation of 0.36 for 594 jar rims. Bowl rims have a mean RSI of 1.29 and a standard deviation of 0.27 for 191 rims. Both jars and bowls have thickened rims, and jar rims are significantly thicker than bowl rims (t-test, $p<.01$). The RSI values for El Paso Polychrome from Firecracker Pueblo fit comfortably with others of the El Paso phase as noted in the above sources. No significant difference was noted in the mean RSI values for the principal site contexts.

RSI was reviewed with respect to rim profile and vessel size (Tables 15 and 16). As commented by Seaman and Mills (1988), RSI is conditioned by a number of factors that are independent of chronological concerns. Jar forms have similar RSI means for direct and everted rims, and bowls show an increase in RSI from inverted to direct to everted rims (Table 15). There is considerable variability in RSI for jars of different sizes, with the smallest and largest jars having the largest RSI (Table 16). Bowls, however, show an increase in RSI from the smallest to largest vessels. Variation in RSI with respect to vessel form and size and rim profile has been observed by others, for example Jackson and Kenmotsu (2008), Kurota (2008), Myers and Reed (2008), Reed et al. (2002), and Seaman and Mills (1988).

Table 15. RSI and Counts (in parentheses) of El Paso Polychrome Rims by Vessel Form and Rim Form.

Form	Inverted Rim	Direct Rim	Everted Rim
Jar		1.45 (62)	1.47 (509)
Bowl	1.24 (12)	1.28 (95)	1.34 (71)

Table 16. RSI and Counts (in parentheses) of El Paso Polychrome Rims by Vessel Form and Rim Diameter.

Form	0-10 cm	10-20 cm	20-30 cm	30-40 cm	40-50 cm
Jar	1.59 (34)	1.51 (91)	1.43 (182)	1.42 (192)	1.49 (64)
Bowl	1.16 (13)	1.23 (71)	1.34 (67)	1.37 (23)	1.37 (8)

There is little published data on vessel wall thickness, but it has been suggested that thinner-walled vessels typify the later Formative and that thin-walled, everted rim jars of the El Paso phase may have facilitated transport and that they may have been more common on sites with isolated rooms (Miller and Kenmotsu 2004). Body sherds of El Paso Polychrome jars were not specifically measured for thickness, but the RSI measurement at 15 mm below the rim provides an approximate value for vessel wall thickness. Jars were found to have a mean thickness at this point of 5.29 mm, with a standard deviation of 1.10 mm for 595 rims. Bowls have a mean thickness of 5.11 mm and a standard deviation of 1.31 mm for 191 rims. There is considerable variation in the thickness of sherds, nevertheless the mean values for vessel wall thickness is similar to sherd thicknesses for the Pueblo period and smaller than those of the Mesilla phase as reported by Whalen (1994).

Temporal patterns in the decoration of rims have long been known but rarely quantified (Alves 1931; Lehmer 1948; Stallings 1931). Undecorated brownwares distinguish the Mesilla phase, bichromes and simple polychromes follow, and the classic form of El Paso polychrome marks the El Paso phase.

As noted by Stallings (1931), El Paso Polychrome rims are generally topped with red and the insides of jars and outsides of bowls typically have a black line or band bordering the red rim. For Firecracker Pueblo, 97.7% (n=765) of jars and 97.1% (n=201) of bowls have red topped rims, versus 2.3% (n=18) of jars and 2.9% (n=6) of bowls with black rims. The complete widths of black lines or bands, sometime adjoining other design elements, were measured. The band width, including 3 red bands, for the inside of 434 jar rims averaged 11.4 mm with a standard deviation of 4.3 mm. The 171 bands on the outside of bowls, including 3 red bands, averaged 9.2 mm with a standard deviation of 3.9 mm. These band widths are not significantly different. In like manner, there is a predominantly black line of similar size below the red rim in the decorated areas on the outside of jars and within bowls.

A simple painted line or band is present on the rims of many jar interiors and bowl exteriors. But, there are also line variations and more complex designs (Table 17). Jars with simple bands at or below the rim and with either an undulating lower edge or a serpentine form make up 80.1% of the rim sherds with intact lower edges of designs. For bowls, this figure is 89.5%. Jars are distinguished from bowls by diagonal or vertical lines appended to the horizontal band or drip lines that account for 8.8% of the rim sherds. The remaining rim sherds of jars and bowls exhibit a variety of more elaborate designs in black or black and red that parallel those covering jar shoulders and bowl interiors. Hopefully, the details of rim decoration, as well as other rim attributes, will assist efforts in identifying occupation during the El Paso phase in the Jornada region.

El Paso Polychrome Vessel Designs

An examination of designs on vessels is provided and considers design styles relative to vessel form and style. This also allows an opportunity to further explore vessel form and function. Most of the vessels depicted in the following figures were previously presented in a summary of the findings for Firecracker Pueblo (O'Laughlin 2001b). A few have also been included by Kurota et al. (2022) in their review of vessel designs of El Paso Polychrome. In addition to designs on a few other vessels, details of rim decoration are shown here.

El Paso Polychrome is noted for the use of wide lines, large elements, and areas of massed paint. As a result, it is difficult to identify individual elements of design on sherds. For example, Jackson and Kenmotsu (2008) have itemized design elements for decorated El Paso Brownwares at two sites with Dona Ana and El Paso phase occupations and reveal that over 80% of the examined sherds have nothing more than lines of varying orientation or occasional converging or angled lines. Fortunately, the ceramic assemblage from Firecracker Pueblo has restorable vessels or large enough portions of vessels to recognize elements of design and layout.

El Paso Polychrome is a brownware with black and red paint that gives the appearance of black decoration on a red field. Treatment of vessel rims has been described above. The interest here is the decoration of the interiors of bowls and the exteriors of jars. In both forms and with few exceptions, the designs are bound by a horizontal black rim band and a red painted rim.

Bowls are generally viewed as serving ware (Linton 1944; Longacre 1991). Wide openings and shallow depths leave them poorly suited to containing liquids or small solid items such as seeds. Bowls tend to be smaller than jars at Firecracker Pueblo, average 21.3 cm in rim diameter, and range from very small to over 40 cm in orifice diameter. No matter the size, the most common design element is the stepped fret, sometimes in combination with stepped lines (Figure 89). Two, or sometimes three, areas or segments of stepped elements may be separated by parallel lines and present a rotational symmetry. A bowl from the fill of Room 31 differs in having a quadrilateral layout that includes triangles, angled lines, curved lines,and "corn stalk" or "bird" elements in addition to stepped frets and illustrates an uncommon layout with the use of less common elements.

Table 17. Decoration of exterior of bowl rims and interior of jar rims of El Paso Polychrome. Red paint indicated by stippling.

rim band variation	description	bowl		jar		rim band variation	description	bowl		jar	
		no.	%	no.	%			no.	%	no.	%
	no rim band or design	5	2.3	2	0.2		rim band and ladder design	1	0.5	12	1.5
	no rim band, diagonal lines pendant to rim			3	0.4		rim band with concentric half circles	1	0.5		
	simple rim band (with 3 bowl and 3 jar red rim band)	153	69.2	354	42.9		rim band with red band bound by lower black band	5	2.3	3	0.4
	rim band below rim	1	0.5	3	0.4		rim band over angled solids			1	0.1
	rim band with undulating lower edge	7		26	3.1		rim band, red band and partial solid black	1	0.5	1	0.1
	serpentine rim band below rim	1	0.5	1	0.1		no rim band, black and red rectilinear design			2	0.2
	rim band with scalloped lower edge			1	0.1		no rim band, rectilinear design			1	0.1
	rim band with saw-toothed lower edge			3	0.4		rim band with in-line rectilinear design			2	0.2
	rim band with in-line, solid angular element	2	0.9	17	2.1		no rim band, rectilinear design			2	0.2
	rim band with in-line, solid curvilinear element	2	0.9	6	0.7		no rim band, rectilinear design			1	0.1
	rim band with in-line, solid opposing triangles			3	0.4		no rim band, angled design			1	0.1
	rim band with in-line, vertical lines within curving line			3	0.4		no rim band, curvilinear design			1	0.1
	rim band with in-line, curvilinear design	1	0.5				rectilinear and angled design	1	0.5		
	rim band with in-line, rectilinear design			2	0.2		drip lines below rim band or other design			29	3.5
	rim band with diagonal lines below			5	0.6		small rim sherd, partial rim band or design	40	18.1	351	42.5
	rim band with vertical lines below			5	0.6		Total	221	100	826	100

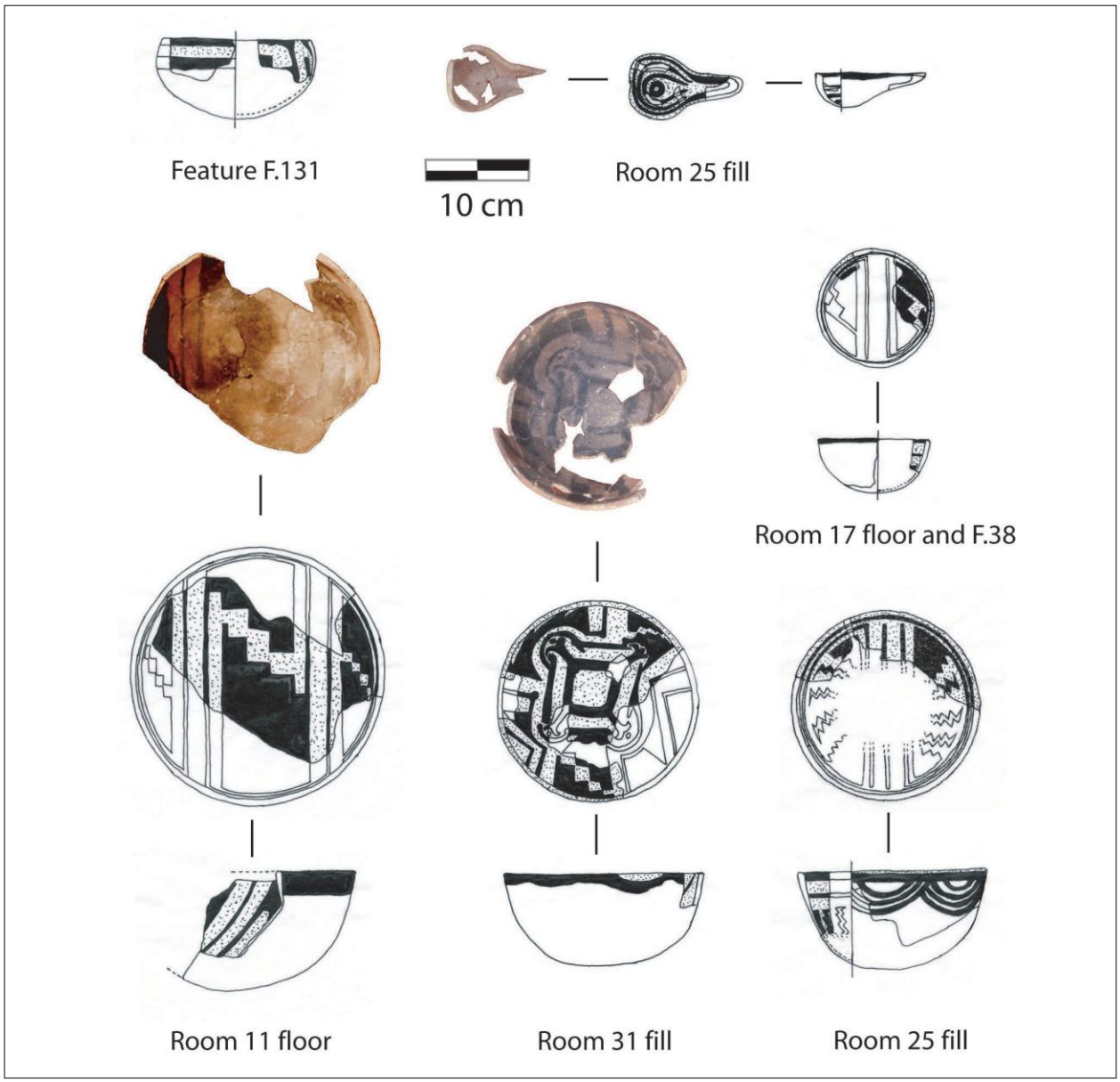


Figure 89. Designs on bowls and a ladle. Red paint indicated by stippling.

A half gourd-shaped ladle from the fill of Room 25 has a small circle in the bottom of the bowl and two partial circles above the complete circle and below the rim band (Figure 89). Similarly, a few sherds from the smallest bowls at Firecracker Pueblo exhibit parallel black lines but are too small to be certain of the complete design.

Jars outnumber bowls, are generally larger than bowls with an average rim diameter of 27.6 cm, and vary considerably in size with the largest having rim diameters of 50 cm. Jars are globular and predominantly necked vessels with everted rims and restricted orifices. Necked jars are suitable for cooking, storage, and transport of liquids. They provide for secure containment of contents by reducing spillage and accommodating easily applied lids and other closures (Braun 1983; Henrickson and MacDonald 1983; Smith 1985).

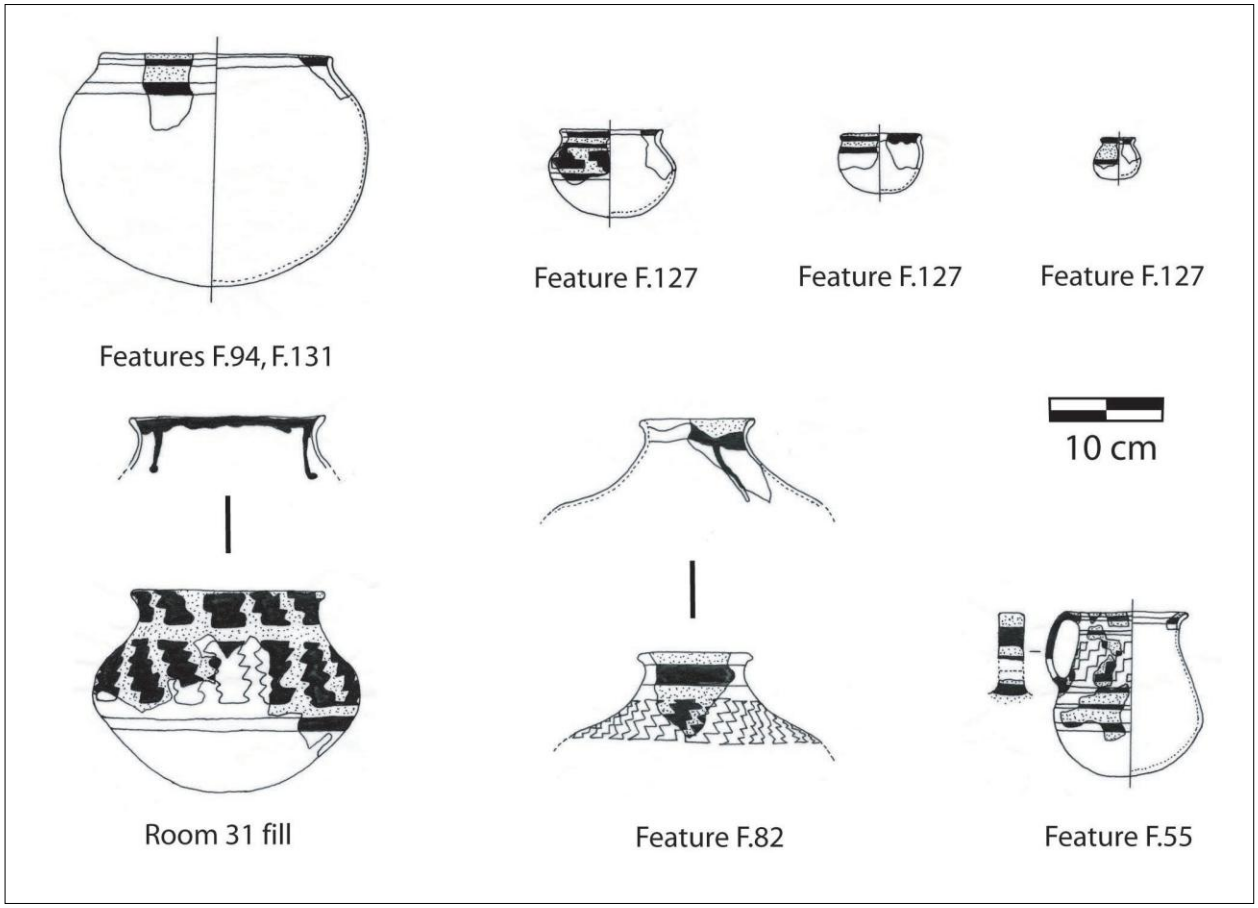


Figure 90. Designs on smaller jars. Red paint indicated by stippling.

Necked jars with everted rims are also appropriate for lengthy soaking or boiling of starchy seeds such as corn and beans (Braun 1983; Hard 1983a; Seaman and Mills 1988).

The exterior decoration of jars is restricted to the neck and shoulder with a black band or line almost always bordering the painted area at the top and bottom. Within these parallel lines, there may be repeating elements, opposed elements, elements free or appended to bordering lines, one or more bands or panels of decoration, and lines dividing panels into multiple repeating segments. The complexity of designs has a tendency to increase with vessel size.

Jars with rim diameters of 20 cm or less are pictured in Figure 90 and illustrate the prevalent design elements and layout. A number of vessels, especially the smaller ones, have a simple design comprised of the black rim band, a lower bordering band or line, and a line or area of red paint between the two black bands. Wide stepped lines that repeat around the vessel are common. Opposing half and full terraces also occur. Most jars of this size have a single panel of decoration. Notable vessels that likely held liquids are the pitcher from F.55 and the narrow-mouthed, wide-bodied jar from F.82.

Jars with rim diameters greater than 20 cm are shown in Figure 91. A design layout with a panel on the neck and another on the shoulder is most common. Medium-sized jars frequently have repeating elements, generally in opposition to one another and appended to bordering lines. Stepped elements are in the majority and include half terraces, terraces, and stepped triangles.

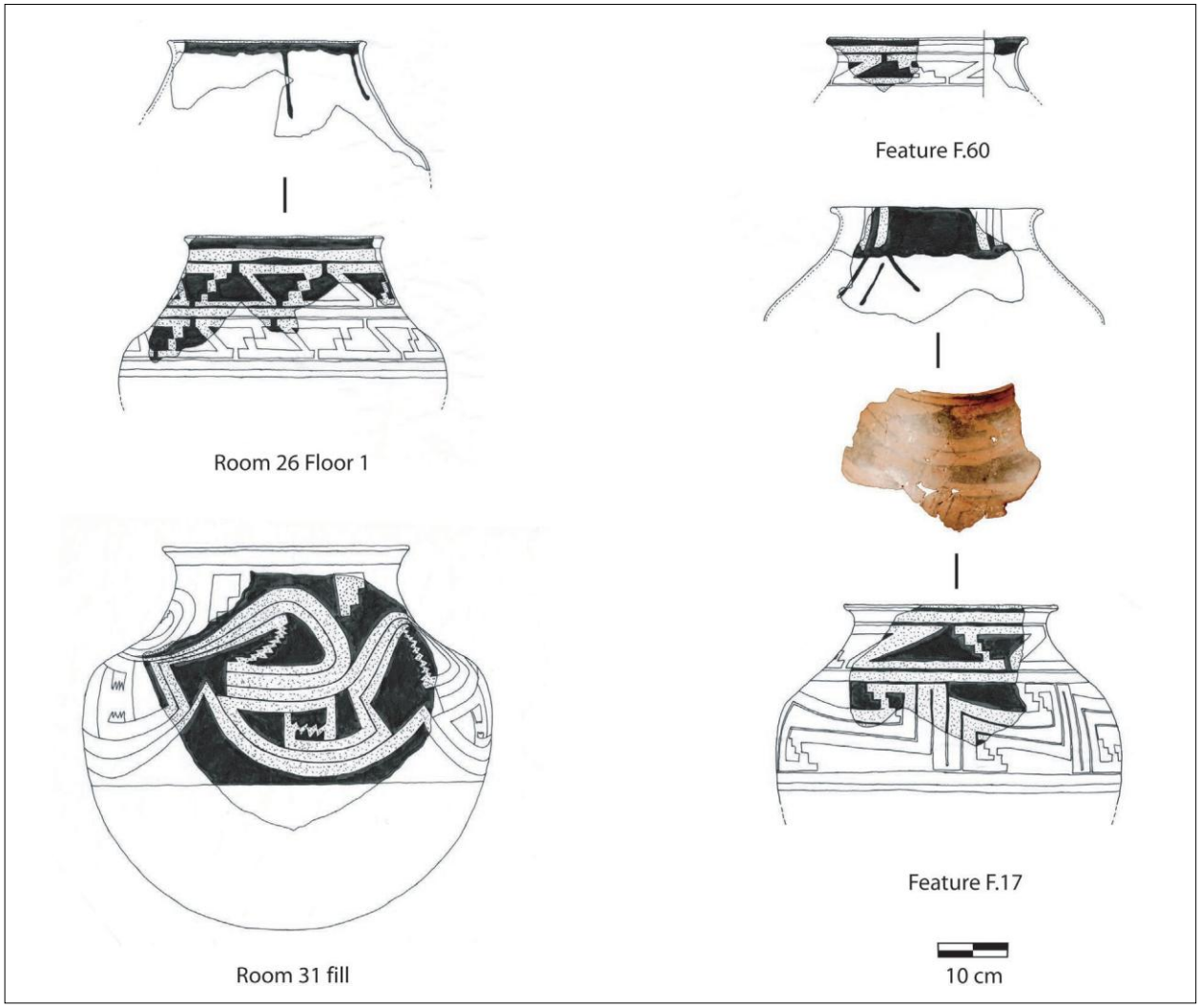


Figure 91. Designs on larger jars. Red paint indicated by stippling.

The largest jars have the most complex designs. Two good examples are presented in the bottom row of Figure 91. Projected rim diameters are 30-35 cm, and body diameters are 50-60 cm. They illustrate the expanded use of parallel lines, curved lines and curved solid elements, and interacting or combined lines and solid elements. The example from F.17 is representative of large jars with two panels of decoration. The upper panel follows smaller jars with repeating, opposed and appended elements. The lower panel differs in having segments emphasized by interlocking lines, interlocking keys or stepped solid elements, and curved lines. The jar from the fill of Room 31 is an exceptional item with large areas of black, elements in red on black, and curved parallel lines and solid elements giving a fluid motion to the design. Kurota et al. (2022) suggest that the design reflects a bird/parrot motif.

Some have suggested that necked jars with everted rims are more easily handled than other forms and that they are better suited for the transport of water and other materials (Kenmotsu et al. 2008; Smith 1985). However, the larger jars at Firecracker Pueblo have a capacity of 50 liters or more and are likely to have been moved infrequently and not far. They may have served as semipermanent storage facilities or they may have been used for cooking on special occasions (Nelson 1985; Seaman and Mills 1988). It has also been suggested that they may have been used to ferment corn or leaf succulents (Jackson and Thompson

2005). Curiously, possible pot rests are recorded for the floor of Room 6 of the pueblo where large storage or perhaps fermentation jars could have been placed. This is the largest of the pueblo rooms, and a room commonly cast as a communal room.

Trade Wares

Ceramics identified as nonlocal number 815 sherds and make up 1.9% of the ceramic assemblage (Table 10). Trade wares are indicative of interaction with other regions and are a visible aspect of material remains on El Paso phase residential sites. However, the nature of exchanges with other regions is not clear. Given the relatively small number of sherds from any given region, trade has the appearance of down-the-line exchange. Nevertheless, painted and textured wares from nonlocal sources may have functioned within specific social contexts. Bowls, for example, are much better represented among trade wares than they are for local brownwares, suggesting a role in public gatherings such as feasting or ceremonies.

There are 18 types or categories of trade wares. Most are recognized and named ceramic types. They include Mimbres Black-on-white from the Mimbres region to the west or northwest, Chupadero Black-on-white and Three Rivers Red-on-terracotta most likely from the Sierra Blanca-Capitan region to the northeast, Magdalena Black-on-white, Seco Corrugated and Heshotuathla Polychrome from drainages of the Black Range and southern Cibola area to the northwest, Agua Fria Black-on-red from the middle Rio Grande or Rio Abajo, Tucson and Gila Polychromes of Salado origin to the west, and Ramos Polychrome, Escondida Polychrome, Ramos Black and Casas Grandes Plain and Textured from the Casas Grandes region to the southwest. In addition to the other wares from Casas Grandes, undifferentiated polychromes have been assigned to the category of Casas Grandes Polychrome.

Other wares included with the trade wares are Playas Red, Playas Red Textured, and fine-tempered brownware. Playas Red and Playas Red textured are known to have been produced in multiple localities. These could include Casas Grandes, Sierra Blanca-Capitan, and the Mimbres drainage, as well as locally within the Hueco Bolson (Bradley and Hoffer 1985; Creel et al. 1997; Wiseman 1981, 2016). Similarly, the artificial category of fine-tempered brownware is a holder for ceramics of fine temper that lack characteristics that would facilitate assignment to a named type. They range from examples comparable to El Paso Polychrome but of a finer temper, to sherds with a smooth finish and similar to Casas Grandes Plain, and to weathered pieces lacking surface treatments that might aid classification. Thus, Playas Red, Playas Red Textured, and fine-tempered brownware are as likely as not to include intrusive sherds.

The various trade wares are described in short order, but first an overview of context for these ceramics is offered. Table 18 itemizes the distribution of the various types within the six general site contexts. A Chi-square test revealed a non-uniform distribution of wares with respect to context ($p<0.01$), and adjusted standardized residuals are provided in Table 18 for those contexts with significantly higher or lower values for trade wares.

Chupadero Black-on-white is the most numerous of the trade wares and is a common intrusive on El Paso phase sites. Floors of both isolated rooms and rooms of the pueblo have fewer than expected sherds, a probable result of maintenance of living spaces. Dovetailing with this is the greater than expected numbers of this ware in refuse areas, notably the fill of isolated rooms and extramural features. Wares with fewer numbers of sherds generally show a more even distribution across contexts. The principal exceptions are Tucson Polychrome, Casas Grandes Polychrome, Playas Red Textured, and fine-tempered brownware. Tucson Polychrome is most numerous on floors of the pueblo where it occurs in greater than expected numbers. However, the majority of the sherds from pueblo floors (as well as elsewhere) are from the same vessel, leading to a bias in the figures. The greater than expected numbers of Casas Grandes Polychrome and Playas Red Textured on floors of isolated rooms are attributed to de facto refuse

Table 18. Numbers of Trade Ware Sherds for Site Contexts.

Ceramic Type	Pueblo Room Floor	Pueblo Room Fill	Isolated Room Floor	Isolated Room Fill	Extramural Feature	Surface Refuse	Total
Mimbres B/W	1			2		1	4
Chupadero B/W	11 - -	8	6 -	56 +	114 ++	38	233
Three Rivers R/T	4	1		7	9	7	28
Magdalena B/W	2	1	1	5	20	10	39
Heshotuathla Polychrome				5	1		6
Seco Corrugated	17	14	9	27	72	29	168
Agua Fria B/R	1				1		2
Tucson Polychrome	48 + +	2	1 -	19	23 - -	17	110
Gila Polychrome	1				4		5
Ramos Polychrome	-	1	1	4	16	8	30
Escondida Polychrome	3						3
Casas Grandes Polychrome	5	2	9 + +	9	27	19 +	71
Ramos Black	1			1	5	1	8
Playas Red					1	1	2
Playas Red Textured	-		14 + +	9	17	3	43
Casas Grandes Plain						1	1
Casas Grandes Textured				1	1	1	3
Fine-tempered Brownware	9	17 + +	1	12	11	9 - -	59
Total	103	46	42	157	322	145	815

++ or - - significantly higher or lower than expected count at p = 0.01, adjusted standardized residual
+ or - significantly higher or lower than expected count at p = 0.05, adjusted standardized residual

that included modified sherds of these wares left on the floors of Rooms 25 and 26. Fine-tempered brownwares have a non-random distribution, but the nature of this category of sherds leaves any interpretation dubious.

The temporal distribution of trade wares assists the dating of occupations and is introduced in the descriptions of the trade wares. It is, however, interesting that a number of infrequently occurring types point to a later date for the pueblo than for the isolated rooms. Notably, Agua Fria Black-on-red, Gila Polychrome, and Escondida Polychrome only occur on pueblo floors, and Heshotuathla Polychrome is present in the fill of isolated rooms. These wares tend to have production dates later than the other wares. Of interest is the absence of Playas Red Textured for floors and fill of pueblo rooms, while it is present on isolated room floors. Perhaps, Playas Red Textured is not as long-lived as some of the other wares.

Mimbres Black-on-white

Four bowl sherds of Mimbres Classic Black-on-white were recovered from Firecracker Pueblo. Cosgrove and Cosgrove (1932) described this distinctive white-slipped and mineral-painted brownware, and production appears to have ceased by about A.D. 1140 (Shafer and Brewington 1995). Mimbres wares predate the occupations of Firecracker Pueblo, and sherds were probably collected from nearby and earlier Mesilla phase settlements.

Chupadero Black-on-white

Chupadero Black-on-white is a gray ware decorated with a black mineral paint and is a common intrusive on sites of the El Paso phase. Production of this ware centers on Chupadero Mesa in the Salinas region and Sierra Blanca in the northern part of the Jornada region, and is dated from about A.D. 1150 to A.D. 1500 or later (Clark 2006; Hayes 1981; Mera 1930; Wiseman 1986). Bowl forms are known, but flat-bottomed, globular, narrow-mouthed, and handled jars useful for water transport are more common as a trade ware. Chupadero Black-on-white is the most frequent intrusive at Firecracker Pueblo and includes 229 jar sherds and four sherds of bowls.

Magdalena Black-on-white

Thirty-nine bowl sherds of Magdalena Black-on-white were recovered. This is a carbon-painted ware that is known to have been made at Gallinas Springs Pueblo near Magdalena and Pinnacle Ruin on the Canada Alamosa northwest of Truth or Consequences (Ferguson et al. 2016). Magdalena Black-on-white dates as early as the late 13th century and may have been made as late as A.D. 1400 (Gomolak and Knight 1990; Lekson et al. 2002).

Three Rivers Red-on-terracotta

An orange to terracotta ware with designs in red mineral paint, Three Rivers Red-on-terracotta was produced in the northern part of the Jornada region in the area of Sierra Blanca. This type is not well-dated but may have been produced as early as A.D. 1150 and as late as A.D. 1400 (Breternitz 1966; Wiseman 2014, 2016). As an intrusive in the southern part of the Jornada region, Three Rivers Red-on-terracotta occurs principally in bowl form on El Paso phase sites, and 28 pieces from bowls were retrieved from this site.

Heshotuathla Polychrome

There are six redware bowl sherds with matte black glaze designs on the interior and thin white lines below the rim on the exterior. These sherds conform to the description of Heshotuathla Polychrome, an early Zuni-Acoma glaze ware of west central New Mexico (Huntley 2008; Kidder and Amsden 1931; Kintigh 1985). This ware has characteristics similar to the earlier St. John's Polychrome, dates to A.D. 1275-1450, and occurs infrequently on El Paso phase sites in the southern Jornada region.

Agua Fria Glaze-on-red

Aqua Fria Glaze-on-red is an early glaze ware of the middle Rio Grande and Rio Abajo regions. Mera (1933) was the first to describe this Glaze A type and dated it to A.D. 1325 to about A.D.1425. The terminal date has been debated but may be closer to A.D. 1450, as there is little good evidence of production after this date (Franklin 1997). Agua Fria Glaze-on-red is rarely recorded for sites of the southern Jornada region, and only two rim sherds of this type are present in the collection from this site.

Seco Corrugated

Seco Corrugated is an obliterated or smeared indented corrugated ware that occurs principally as bowls with smudged interiors and originates from villages in drainages on the eastern side of the Black Range (Wilson and Warren 1973). This type dates to the late 13th and 14th centuries, and coeval and similar obliterated corrugated wares are also found in the eastern Salado, Rio Abajo, and Casa Grandes regions (Laumbach and Laumbach 2013). Intrusive obliterated corrugated sherds are often present on sites of the

El Paso phase. Seco Corrugated is the second most common intrusive at Firecracker Pueblo and is noted by 164 sherds from bowls and 4 sherds from jars.

Tucson Polychrome

Tucson Polychrome is a Salado ware of southwestern New Mexico and southeastern Arizona and is red-slipped with black mineral paint designs often outlined in white (Hayden 1957). Decoration is usually restricted to exterior surfaces of both jars and bowls, and the type was produced from about A.D. 1275 to A.D. 1450 (Franklin 1980; Neuzil and Lyons 2005). Tucson Polychrome is the third most popular intrusive at Firecracker Pueblo and is represented by 110 jar sherds.

Gila Polychrome

Named by Gladwin and Gladwin (1930), Gila Polychrome has organic black paint designs on a white-slipped background and with bowl exteriors and jar bottoms slipped red. This Salado ware dates to A.D. 1300-1450 (Crown 1994). Five bowl sherds were collected at Firecracker Pueblo.

Undifferentiated Casas Grandes Polychrome

A variety of decorated and utilitarian pottery types of the Medio period of Casas Grandes are recognized in the ceramics from Firecracker Pueblo. The Medio period is considered to date to A.D. 1200-1450 (Ravesloot et al. 1995). The temporal span of individual types, however, is not well-documented. Ramos and Escondido Polychromes are present, as well as plain and textured utility wares. There are also 71 jar sherds of undifferentiated Casas Grandes Polychrome. These are unslipped to floated, buff to yellowish orange sherds that are too small or have little visible of the design to reliably assign a type. Most of these are probably Ramos Polychrome, but Carretas and Babicora Polychrome may also be represented.

Ramos Polychrome

Ramos Polychrome is a frequent intrusive on El Paso phase sites and dates to A.D. 1250/1275 to A.D. 1400 or later in the Jornada region (O'Laughlin 1985c). An ivory to yellow/buff ware with fine designs in black and red and with red often outlined in black (Di Peso et al. 1974b; Sayles 1936). Thirty jar sherds are noted from this site; one is from a hooded effigy jar.

Escondida Polychrome

Three bowl sherds were recovered of this ware. Escondida Polychrome has a paste like Ramos Polychrome and has black mineral paint designs over a white slip and a red slip on jar lips and bottoms and bowl exteriors (Di Peso et al. 1974b; Sayles 1936). Designs also emulate Gila and Tonto Polychrome. This ware may date late in the Casas Grandes sequence and to about A.D. 1300-1450 (Minnis and Whalen 2009).

Ramos Black

Ramos Black is a well-polished, smudged blackware that occurs in bowl and jar forms (Sayles 1936). Five jar sherds and three bowl sherds of this Casas Grandes ceramic type were found at this site.

Playas Red and Textured

Playas Redwares can be found in a wide geographical area that includes the Casas Grandes, Animas, Mimbres, and Jornada regions. Once considered a Casas Grandes product, this ware has been found to have been made in multiple places, including within the Jornada (Bradley and Hoffer 1985; Creel et al. 1997;

Wiseman 1981, 2016). Indeed, one sherd from Firecracker Pueblo is among those identified by geochemical composition as likely produced locally in either the Hueco Bolson or Tularosa Basin in the study by Bradley and Hoffer (1985) (J. Bradley, personal communication 1985). The 45 sherds of this brownware at Firecracker Pueblo are medium to coarse-tempered, have a dark core, and have a reddish brown to red slip that is either perfunctory or well-applied. In general, the paste and tempering materials are similar to El Paso Polychrome. The sherds are also from jars, and the few rims are everted. Two sherds are plain or from undecorated portions of vessels. Three sherds are from incised vessels, six exhibit rubbed indented corrugations, and 34 are textured with gouges and punctuation marks. Playas Red Incised is the more common variant in the Jornada region but is outnumbered by sherds of the gouged variety at Firecracker Pueblo.

Casas Grandes Plain and Textured

There are four light brown jar sherds with a paste and temper that conform to Casas Grandes brownwares (Di Peso et al. 1974). One is plain, two are rubbed indented corrugated, and the fourth is a corrugated and incised sherd.

Fine-tempered Brownware

This is a catch-all category of sherds that do not fit nicely into named types. They include 54 jar sherds and five bowl sherds that have a fine sand temper or occasionally exhibit a more medium texture of granite similar to El Paso Polychrome. They are brown to light brown in color with light to dark gray cores and surfaces that are smoothed to polished. Some may be fine-tempered examples of El Paso Brownware; others may be from Casas Grandes vessels.

Modified Sherds

Sherds showing modification of varying sorts make up a substantial portion of the ceramic assemblage. They number 457 sherds or 1.1% of the ceramic assemblage and evidence repair and reshaping of vessels, show shaping of sherds or modification of edges for a variety of uses, or exhibit pigments on their surfaces. Eight categories of modified sherds are described and include sherds with drilled holes, ground rims of vessels, disks, counters, utilized sherds, plates, palettes, and sherds of uncertain use. Attributes of modified sherds can be found in Appendix C.

There are six examples of sherds with drilled holes (Appendix C.7). Five sherds have a single drilled hole that might be a result of vessel repair or the addition of holes to suspend a vessel. None of these sherds show any other modification or indication of once having been part of a shaped object. The sixth case is a repair of a Tucson Polychrome jar, is comprised of four sherds, and has four drilled holes on either side of an old break.

Vessel repair is also noted in the reshaping of six damaged or broken rims (Appendix C.7). In five instances, the vessel form was unchanged with minimal grinding to give a smooth, rounded edge to the opening. The exception is a Ramos Polychrome jar with the lower two-thirds ground down to form a deep bowl.

Shaped forms include 46 disks and 14 oval and rectangular counters (Appendix C.1, C.2). The edges of broken sherds have been modified by chipping and/or grinding to varying degrees. Disks range from 2-13 cm in diameter, with most 7 cm in diameter or less (Figures 92, 93). None of the disks have drilled holes, but one is partially drilled in the center of the disk. Counters, as they are called here, include nine oval shapes with maximum dimensions of 1.4-4.5 cm and five rectangular shapes with long dimensions of

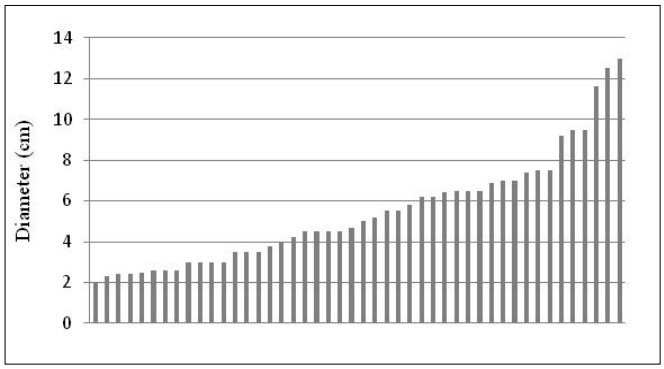


Figure 92. Diameters of sherd disks.

Figure 93. Sherd disks and counters: *Upper three left*, oval counters; *remainder*, disks; *upper right*, Mimbres Classic B/W; *remainder*, El Paso Polychrome and Brownware.

2-4.2 cm. As with disks, counters do not have drilled holes. One rectangular counter has red pigment on one surface. Trade wares make up 13.6% of the sherds used for shaped forms; whereas, they account for only 1.9% of the entire ceramic assemblage. This may reflect a slight bias towards colorful sherds or sherds of harder paste and finer temper. Sherd disks and other relatively small shaped pieces are not uncommon for El Paso phase residential sites (Lehmer 1948), and Southwestern examples have been referred to as gaming or gambling pieces, ritual or magical objects, spindle whorls (perforated disks), and vessel covers for those of larger diameter (Oppelt 1984).

Utilized sherds are one of the more interesting categories of modified sherds (Appendix C.5). Most are fragmentary examples, but complete or near complete specimens have the following forms: 10 rectangular, six oval, two triangular, one notched triangular, and one plano-convex (a fragmented and reused oval form) (Figure 94). Of these, seven or 35% have a single utilized edge, and 13 or 65% have two or more edges of use. With few exceptions, the utilized edge is convex. Of the 58 utilized edges, 20 or 34% of the edges are rounded, and 38 or 66% of the edges are beveled. As with shaped forms, trade wares are well-represented among utilized sherds at 14.3%. Local brownwares are friable and coarse-tempered, while trade wares are generally more durable and finer textured.

Modified sherds with convex edges and rounded edges evidencing use-wear on both the inner and outer edges have been considered ceramic scrapers used in pottery making to smooth the interiors of vessels (Waterworth and Blinman 1986). Thirteen utilized sherds are recorded as having 20 convex and rounded edges, and 13 or 65% have striations from use that are perpendicular to the surfaces. One also exhibits drumlins characteristic of pottery smoothing. These may have been ceramic scrapers, and they compare with similarly modified sherds in the region (Reed et al. 2002; Schafer et al. 2001b).

Utilized sherds with beveled edges total 30, with 38 predominantly convex edges. Use-wear striations occur on 24 or 80% of the utilized edges and run perpendicular or occasionally at an angle to the edge. Drumlins were present on two of the worked edges. These sherds were used in one direction, a pulling motion. This has resulted in a beveled edge with some rounding of the edge to the upper surface of the sherd. Use of the actual edge was not observed; however, two sherds show use on both sides of the same edge and converging beveled use-wear surfaces. There are also two examples of triangular sherds with adjacent beveled edges that taper to a point. The use of bevel-edged tools is not known. They may have been used on many materials, but the predominance of convex edges would suggest use on relatively soft and flexible materials. Reed et al. (2002) posit that similar tools may have been used for scraping of yucca leaves for fiber extraction, the making of wooden bowls, or food processing.

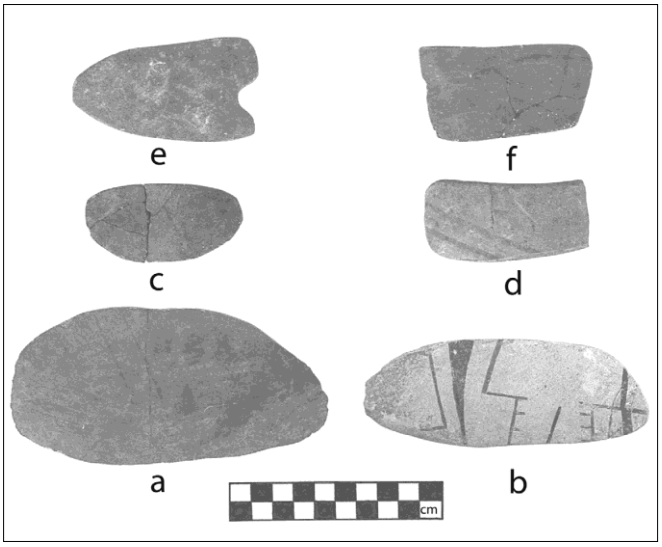


Figure 94. Utilized sherds: *a*, *c*, ceramic scrapers with 2 utilized edges; *b*, *d*, sherds with 2 beveled edges; *e*, notched sherd with 2 beveled edges, *f*, sherd with concave beveled edge and 3 convex and rounded edges; *a*,*c*,*d*, *f*, El Paso Brownware; *b*, Ramos Polychrome; *d*, Casas Grandes Polychrome.

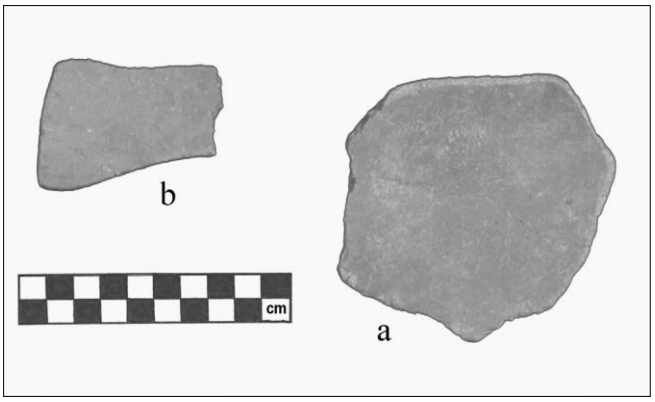


Figure 95. Modified sherds of El Paso Polychrome with pigment: *a*, plate with red pigment on one surface; *b*, small palette with red pigment on both surfaces.

One of the bevel-edged tools is unusual in having a smoothly abraded notch (Figure 94, e). The notch is at the base of a triangular tool with two beveled edges. Similar modified sherds with notches and worked edges and problematic use are reported for 41EP2724, an El Paso phase site with isolated rooms to the southeast of Firecracker Pueblo (Shafer et al. 2001b).

Large sherds with chipped and/or lightly abraded edges have been classed as plates (Appendix C.3). They are principally from large vessels with interior, concave surfaces that are quite shallow and unlike bowls. Complete examples are 9.1-24 cm in width, and forms are primarily subrectangular but with oval and circular specimens. Edges can be irregular to rounded, and in one case the edge has been ground square. Two plates could also have been classed as palettes in that they have yellow to red and red pigments on their concave surfaces (Figure 95, a). Large sherds with no visible modified edges were found on the floors of Rooms 1, 6, 7, 11, and 26, and these sherds may also have served as plates or stockpiles for future use. Miller and Graves (2009) note that a number of ceramic plates were found at the pueblo of Madera Quemada and suggest that they may also have been used as serving vessels or for parching seeds.

Sherds displaying yellow or red pigments on their surfaces and of a small size have been placed in the category of palettes and amount to 213 sherds (Appendix C.4). Most of the sherds in this category are fragments with pigment on one surface, often covering the sherd to a broken edge. Aside from the presence of pigment, the 195 sherds of this sort show no other modification. Thus, these particular sherds are thought to be fragments of larger objects, such as the previously mentioned plates with pigment. Just the same, there are also two sherds where pigments have been carried on to unmodified edges of the sherds. These two sherds indicate the use of broken ceramics without edge modification for use such as palettes. While most sherds show no edge modification, there are 16 with abraded edges. Fourteen of these are small pieces of palettes of unknown size or shape. Two are small, roughly trapezoidal, palettes measuring 4.5 by 6.3+ cm and 3.1 by 5.6+ cm and with pigment on both surfaces (Figure 95, b). Sherds used for mixing pigments, as well as the abovementioned ceramic scrapers, attest to the on-site manufacture of pottery.

The pigment on palette fragments and the two plates are yellow and red. Yellow pigment occurs on 93 palette sherds, and 107 palette sherds and one plate have red pigment. The second plate and 14 of the palette pieces have yellow and red pigment. Interestingly, a number of the sherds with both colors have yellow grading into red and evidence having been burned. Limonite is an iron oxide that turns from yellow to red with heat. While the yellow and yellow to red pigmented sherds would indicate the use of limonite, sherds with only red pigment may reflect the use of limonite or hematite. Both limonite and hematite are present as raw material at Firecracker Pueblo.

The last category of 117 modified sherds is made up of those sherds of uncertain use and not showing beveled or rounded edges and striations from use of the aforementioned utilized sherds (Appendix C.6). Fourteen of these sherds have moderate to well-abraded and squared edges and would appear to be fragments of plates or perhaps counters. The other 98 sherds have light to moderately abraded and rounded edges from intentional shaping of edges or from use. Convex edges predominate, but irregular and little modified edges are common. There are five more or less rectangular and complete pieces with maximum dimensions of 6-8.2 cm. There are also 10 sherds with convex edges and a rounded end and dimensions of 2.6-6 cm by 2.2-4.7 cm. These 15 items may be scoops used to remove ash from hearths, light digging, mixing, or similar activities. The other 83 sherds with rounded edges are fragments of objects and generally of small size. Some may be portions of scoops; others may be parts of plates. A small number of sherd scoops have been reported from El Paso phase habitation sites (Foster and Bradley 2021; Shafer et al. 2001b), but they are more commonly associated with plant roasting facilities on fans bordering mountains (Hard 1983b; Miller 1989; O'Laughlin1980).

Modified sherds are numerous, varied, and are found in rooms, features, and deposits throughout the site. The occurrence of modified sherds among the six general site contexts is shown in Table 19. The distribution of modified sherds is non-random as indicated by a Chi-square test ($p<0.01$). Adjusted standardized residuals for contexts with significantly higher or lower values of modified sherds are indicated in Table 19. For the most part, the different kinds of modified sherds are found in numbers commensurate with the total number of sherds for each context. There are exceptions, however, for modified sherds of uncertain use, plates, palettes, and disks

Table 19. Numbers of Modified Sherds for Site Contexts.

Modification	Pueblo Room Floor	Pueblo Room Fill	Isolated Room Floor	Isolated Room Fill	Extramural Feature	Surface Refuse	Total
Drilled Sherd	1			2	2	1	6
Reshaped Rim	1			1	2	2	6
Disk	2	1	1	21 ++	16	5	46
Counter			1	5	7	1	14
Utilized Sherd	1	1	4	14	16	6	42
Plate	3 ++		1	4	4	1	13
Palette	2 -	33 ++	8	44 - -	109 ++	17 - -	213
Uncertain Use	4	4 -	7	32	43	27++	117
Total	14	39	22	123	199	60	457

++ or - - significantly higher or lower than expected count at p = 0.01, adjusted standardized residual
+ or - significantly higher or lower than expected count at p = 0.05, adjusted standardized residual

Modified sherds of uncertain use are found in greater than expected numbers in surface refuse. Sherds of this group are generally small fragments of larger objects, and they appear to have accumulated in extramural areas as the result of traffic and activities in open spaces and around facilities.

The number of sherds modified for plates on pueblo floors is small but higher than expected. This is attributed to items being left on floors with abandonment of the pueblo and possibly the accumulation of materials on some floors with an anticipated and unhurried abandonment.

The majority of disks were recovered from the fill of isolated rooms, especially those where trash had been deposited. As noted in the previous chapter, chipped stone tools, especially projectile points, also occur in higher than expected numbers in the fill of isolated rooms. The relationship between disks, projectile points, and refuse within isolated rooms is not readily apparent. Perhaps, certain social or ceremonial activities had required the burial of objects following their completion. Or, perhaps, there is no relationship at all.

Modified sherds with the most variable distribution among the site contexts are sherds with pigment or palettes. Higher or lower than expected numbers are observed for five contexts. Even so, it is believed that bias has been introduced by the distinctness of pigmented sherds as opposed to those with edge modification. That is, many of the sherds of this category are fragments of larger objects, do not have modified edges, and are recognizable solely by the presence of pigment. The other categories include complete objects and fragments of modified edges, and they do not cover otherwise unrecognizable non-edge portions of objects. Thus, the variability recorded for pigmented sherds or palettes is due to presence of a fair number of sherds with pigment from a limited number of fragmented palettes. A fragmented palette that may have been on the roof of Room 2 accounts for the higher number for pueblo room fill. Similarly, extramural features have a high number of palette specimens that comes largely from fragmented palettes in features F.1, F.36, and F.56.

Burned Clay, Pottery Clay and Pinch Pot

Burned clay or adobe was found throughout the site, often in the fill of rooms or extramural features. Room 4 of the pueblo has two casts of roofing material, and gumdrop-shaped lumps of adobe are associated with thermal features, particularly F.7 and F.167. Additionally, there are a number of impressions of organic materials in clay.

Six pieces of clay, each less than 3 cm in size, had impressions of matting. The matting appears to have been made of de-clawed sotol leaves, and two pieces suggest an over-one-under-one weave. One was recovered from the fill of Room 25, three from within the unfired bowl on Floor 1 of Room 26, and one each from extramural features F.47 and F.197. None of these pieces is directly associated with roof remains, and all may be from contact with mats on floors or other surfaces.

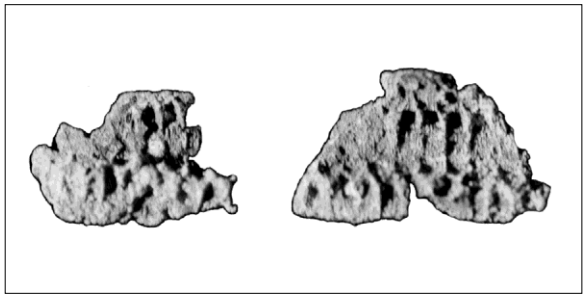


Figure 96. Coiled basketry impressions in clay. Right clay piece 2 cm wide.

There are impressions in two bits of clay of coiled basketry. These specimens are no more than 2 cm in size and reveal coils of 8-9 mm in width and with right slanting stitches of about 2 mm. The clay had been inside the basket, is tempered with granite, and is like the pottery clay on the floor of this room.

The clay pieces with basketry impressions come from the floor of isolated Room 11 and in the area of a "basin" of presumed potter's cay. As described in the overview for this room, this feature is comprised of yellowish brown clay with crushed granitic temper and

is 24 cm in diameter, 1.5-2 cm in thickness, and 1.5 cm in depth. Given the shape of this clay feature and the nearby presence of what appears to be the same clay with basketry impressions, it is reasonable to assume that the potter's clay had been in a basket at some point.

Potter's clay was also found on Floor 1 of isolated Room 26. An unfinished bowl was additionally recovered from Floor 1. Lumps up to 3 cm in size of yellowish brown clay with granitic temper were scattered in and near the hearth (F.369) and were among sherds of the unfired bowl resting on a large El Paso Polychrome jar sherd in the northeast corner of the room. Sherds of this bowl were also in the hearth. The clay of the unfired bowl was yellowish brown with a moderate amount of crushed granitic temper, similar to the lumps of clay. The vessel had been smoothed but not polished. A rim sherd and a three other pieces showed painting with limonite but designs could not discerned. The orifice diameter was 19 cm, and the rim was thickened and flattened. Wall thickness ranged from 6-6.9 mm at the rim, to 4.5-5.4 mm mid-wall, to 6.6-6.9 mm at the bottom. RSI for this vessel was 1.04-1.25.

Half of a low-fired pinch pot bowl was found in the fill of Rom 31. The clay is a light brown in color and untempered. The bowl was hand-formed and roughly smoothed. Finger marks from manufacture are visible on the interior. The bowl is unslipped and unpainted and measures 6.5 cm in diameter and 3 cm in height. The rim is rounded to flattened, and wall thickness varies from 4 mm at the rim to 10 mm at the bottom.

Chipped Stone

The chipped stone assemblage is second to ceramics in size and numbers over fourteen thousand pieces. Waste flakes and debris are abundant, while cores, flake tools, and bifacially worked objects are relatively uncommon and make up less than 3% of the of the collection. Assemblages of this sort are characteristic of Formative period residential sites of some duration and illustrate one end of a spectrum of lithic assemblages where an expedient core technology dominates bifacial reduction.

Core technologies and the expedient use of flake tools were first described for the southern Jornada region by Carmichael (1986), Hard (1983a), Mauldin (1986), and O'Laughlin (1979, 1980) and generally linked to residential stability and an increasing reliance on cultigens during the Formative period. Miller (2007) provides a good overview of changes in lithic technology from the Archaic to the Formative period in the region and identifies several factors contributing to the shift to a core technology: 1) a decline in hunting forays accompanied by a decrease in bifacial reduction and the use of fine-grained materials; 2) an increase in reliance on plant foods and a need for more durable tools of coarser materials; and 3) longer and more stable occupations of residential sites and more thorough on-site reduction of stone materials. The following analysis of raw material selection and chipped stone assemblage attributes for Firecracker Pueblo documents the varied aspects of an expedient core technology. Few chipped stone assemblages have been detailed for late Formative, El Paso phase settlements with structures, and the present analysis hopefully adds substantive information.

Raw Material

Raw materials for chipped stone tools are abundantly available, though differentially distributed, within and near the Hueco Bolson and Firecracker Pueblo (Church et al. 1996; Lukowski 1997; Mauldin et al. 1998). The Franklin Mountains are the principal source of quartzite, rhyolite, granite, basalt, sandstone, and limestone. These materials occur as cobbles and gravels on alluvial fans and drainages to the west of the site. Small cobbles and nodules of chert can be found in lesser amounts in fan deposits of the Franklin Mountains, and finer-grained cherts can be found below the North Franklin Mountains a short distance to the north and west. Cherts, obsidian, and other materials may also be found in gravels along fans of the Franklin and North Franklin Mountains and within the interior of the Hueco Bolson to the east of the site. These materials had been deposited by the Pleistocene Lake Cabeza de Baca and the ancestral Rio Grande.

In addition to the above sources, more distant materials may have been exploited. This would certainly include vesicular basalt, most probably from west of the Rio Grande and possibly near Mt. Riley (Alves 1933).

Thirteen materials are represented in a random sample of 4,724 pieces or roughly one-third of the debitage and for all of the other categories of chipped stone (Table 20). Chert (including chalcedony and jasper) dominates the various categories of chipped stone, and obsidian contributes to all categories and comprises a substantial portion of the materials for projectile points. Neither of these materials is common near the site, and a preference is shown in the selection of these fine-grained materials for bifaces, flake tools, and projectile points.

Quartzite, limestone, and rhyolite are moderately well-represented for debitage, cores, and flake tools. Although these materials are abundant in the alluvial gravels west of the site, they are secondary in importance to cherts.

Minor raw material contributors to debitage are basalt, sandstone, granite, and vesicular basalt. Some sandstone, granite, and vesicular basalt debitage may have come from production or reworking of ground stone. Other materials represented by one or two pieces of debitage are dolomite, quartz, micaceous schist, and silicified shale. Among the projectile points are one of quartz and another of Soledad rhyolite that can be found to the north in the southern Organ Mountains.

The chipped stone assemblage for Firecracker Pueblo reflects the utilization of local materials and a tendency toward the selection of fine-grained materials. This pattern is also exhibited at other nearby El Paso phase residential sites which lie south and east of Firecracker Pueblo in proximity to arable lands and runoff from the Franklin Mountains. These include 41EP1618 which has a contiguous room pueblo (Jackson and Kenmotsu 2008), 41EP2724 with a number of isolated rooms (Shafer et al. 2001a), and 41EP1623 with several isolated rooms (Condon et al. 2010). The makeup of materials represented by debitage at these sites compares well with that of Firecracker. Cherts dominate the raw materials of debitage at these sites, with a mix of lesser amounts of other materials.

Table 20. Raw Material Percentages for the Chipped Stone Assemblage.

Material	Debitage	Cores	Flake Tools	Bifaces and Bifacial Tools	Projectile Points
Chert	54.3%	60.6%	54.1%	86.7%	51.2%
Limestone	20.2%	6.9%	10.2%	--	--
Quartzite	11.4%	7.4%	19.4%	--	--
Rhyolite	6.1%	4.6%	3.1%	--	2.4%
Obsidian	5.6%	20.4%	13.3%	13.3%	43.9%
Basalt	1.1%	--	--	--	--
Sandstone	0.6%	--	--	--	--
Granite	0.4%	--	--	--	--
Vesicular Basalt	0.2%	--	--	--	--
Other	0.1%	--	--	--	2.4%
Number	4724	216	98	15	41

Interestingly, Archaic and Formative limited activity sites in the same area of the western Hueco Bolson show use of the same materials but with lesser amounts of cherts (Lukowski et al. 2006; O'Laughlin and Martin 1993). Assemblages of these ephemeral sites suggest a principal use of materials in the immediate site environ, while longer occupied residential sites provide opportunity for selection and use of more distant sources.

Debitage

Unmodified debitage from Firecracker totals 14,021 pieces which includes flakes, portions of flakes, and debris that lack striking platforms, bulbs of percussion, or identifiable ventral surfaces with conchoidal fracture marks. Of these, a random sample of 4,724 pieces of debitage was analyzed for material and size. In turn, 1,735 items in this sample were examined for completeness, cortex on the dorsal surface, and presence and type of striking platform. Results of this analysis are presented in Table 21. Additionally, attributes of debitage were inspected for variation with respect to site context. There was little differentiation between contexts; however, floors of the pueblo and isolated rooms had slightly larger percentages of cherts, a somewhat greater proportion of flakes over 2 cm in size, and a moderately greater proportion of flakes with 50% or less of cortex on dorsal surfaces. All of which suggests the accumulation of prepared flakes within rooms.

Chert, limestone, quartzite, and rhyolite are the more common materials and manifest characteristics of the extensive reduction of materials for use. The majority of flakes and debris are small and less than 2 cm in size and lack cortex or have less than 50% cortex on surfaces. Complete flakes comprise only 50% to 65% of the assemblage, and single facet striking platforms predominate at between 59% and 67%. Multiple striking platforms are relatively few in number, and bifacial reduction appears limited.

Obsidian occurs as small nodules in the alluvium near the site. It is, therefore, not surprising that obsidian debitage is predominantly small and that a cortex of 50% or more on the dorsal surface is present slightly more often than for the aforementioned materials. Cortex striking platforms are also common, and bipolar splitting of nodules is evident. Notably, multiple or multi-faceted platforms are well-represented and reflect bifacial reduction for formal tools such as projectile points.

The attributes of basalt debitage are similar to obsidian. Most pieces are of small size, dorsal surface cortex compares with obsidian, and the few recorded platforms are cortex and single facet platforms. Debris and incomplete flakes make up most of the basalt. Although the fragmentation of basalt might suggest considerable working of the material, no bifaces or tools of basalt were recovered.

Sandstone, granite, and vesicular basalt are not well-represented in the assemblage. Debitage of these materials tends to be larger than other materials. Most sandstone flakes are complete, and other attributes of sandstone debitage compare with the better represented materials. Sample size limits interpretation of most attributes of granite and vesicular basalt. As noted above, these materials are likely from the production or reworking of ground stone.

Cores and Core Tools

Cores number 216 and are of the five most common materials: chert, limestone, quartzite, rhyolite, and obsidian (Table 22). The representation of the various core materials generally follows that for debitage with the exception of the disproportionately larger number of obsidian cores. While most cores appear to reflect the exploitation of local resources for the expedient production of flake tools, the elevated number of obsidian cores suggests something different, possibly the acquisition of nodules and perhaps tested pebbles of obsidian for anticipated uses.

Table 21. Percentages for Attributes of Chipped Stone Debitage.

Debitage Attribute		Chert	Limestone	Quartzite	Rhyolite	Obsidian	Basalt	Sandstone	Granite	Vesicular Basalt	Other	Number	Total %
Length	<1cm	32.0%	21.3%	24.8%	23.1%	33.3%	36.5%	20.7%	5.3%	12.5%	14.3%	1340	28.4%
	1-2 cm	43.8%	46.3%	44.3%	43.0%	53.0%	40.4%	31.0%	57.9%	25.0%	28.6%	2113	44.7%
	2-4 cm	22.4%	27.7%	24.6%	26.6%	13.6%	17.3%	37.9%	31.6%	62.5%	42.9%	1117	23.6%
	>4 cm	1.8%	4.6%	6.3%	7.3%	0.0%	5.8%	10.3%	5.3%	0.0%	14.3%	154	3.3%
	Number	2566	956	537	286	264	52	29	19	8	7	4724	100.0%
Portion	complete	57.6%	63.3%	60.2%	50.5%	64.4%	35.7%	73.3%	100.0%	33.3%	33.3%	1025	59.1%
	proximal	5.3%	6.9%	4.5%	4.5%	9.6%	0.0%	6.7%	0.0%	0.0%	0.0%	101	5.8%
	medial/ distal	19.2%	16.6%	15.3%	17.1%	18.5%	21.4%	6.7%	0.0%	33.3%	0.0%	311	17.9%
	debris	17.9%	13.2%	19.9%	27.9%	7.4%	42.9%	13.3%	0.0%	33.3%	66.7%	298	17.2%
	Number	898	379	176	111	135	14	15	1	3	3	1735	100.0%
Dorsal Surface Cortex	100%	10.8%	14.0%	18.2%	24.3%	23.7%	28.6%	26.7%	0.0%	33.3%	0.0%	250	14.4%
	>50 %	4.3%	5.5%	7.4%	6.3%	15.6%	7.1%	0.0%	100.0%	0.0%	0.0%	103	5.9%
	<50 %	9.6%	14.2%	10.8%	7.2%	28.1%	7.1%	13.3%	0.0%	0.0%	0.0%	208	12.0%
	0 %	75.3%	66.2%	63.6%	62.2%	32.6%	57.1%	60.0%	0.0%	66.7%	100.0%	1174	67.7%
	Number	898	379	176	111	135	14	15	1	3	3	1735	100.0%
Platform	cortex	18.9%	25.7%	26.5%	21.3%	53.0%	60.0%	41.7%	0.0%	0.0%	0.0%	279	24.8%
	single	67.1%	67.2%	59.3%	67.2%	16.0%	40.0%	58.3%	0.0%	0.0%	100.0%	691	61.5%
	multiple	9.4%	3.0%	5.3%	3.3%	8.0%	0.0%	0.0%	0.0%	100.0%	0.0%	78	6.9%
	crushed	4.6%	4.2%	8.8%	8.2%	15.0%	0.0%	0.0%	100.0%	0.0%	0.0%	68	6.0%
	bipolar	0.0%	0.0%	0.0%	0.0%	8.0%	0.0%	0.0%	0.0%	0.0%	0.0%	8	0.7%
	Number	565	265	113	61	100	5	12	1	1	1	1124	100.0%

Table 22. Percentages for Attributes of Cores.

Core Attribute		Chert	Limestone	Obsidian	Rhyolite	Quartzite	Total %
Maximum Dimension	<2 cm	0.0%	0.0%	47.7%	0.0%	0.0%	9.8%
	2-4 cm	37.7%	13.3%	52.3%	20.0%	0.0%	35.3%
	4-6 cm	54.6%	53.3%	0.0%	20.0%	25.0%	39.5%
	6-8 cm	6.2%	20.0%	0.0%	40.0%	68.8%	12.1%
	>8 cm	1.5%	13.3%	0.0%	20.0%	6.3%	3.3%
Core Type	bipolar single	0.0%	0.0%	13.6%	0.0%	0.0%	2.8%
	bipolar double	0.0%	0.0%	13.6%	0.0%	0.0%	2.8%
	single	28.2%	33.3%	25.0%	40.0%	43.8%	29.6%
	double	32.1%	26.7%	25.0%	40.0%	31.3%	30.6%
	ridged	8.4%	6.7%	15.9%	10.0%	6.3%	9.7%
	multiple	31.3%	33.3%	6.8%	10.0%	18.8%	24.5%
Platform Type	cortex	43.2%	36.7%	64.2%	82.4%	53.8%	48.6%
	single	20.6%	33.3%	9.0%	11.8%	38.5%	20.4%
	ridged	18.3%	20.0%	17.9%	5.9%	7.7%	17.1%
	multiple	17.9%	10.0%	9.0%	0.0%	0.0%	13.9%
Cortex	0 %	14.0%	0.0%	7.0%	0.0%	6.7%	10.4%
	<50 %	58.1%	93.3%	72.1%	30.0%	40.0%	60.8%
	>50 %	27.9%	6.7%	20.9%	70.0%	53.3%	28.8%
Number of Flake Scars	1-2 flakes	3.9%	0.0%	23.1%	30.0%	13.3%	9.2%
	3-8 flakes	28.3%	20.0%	59.0%	30.0%	33.3%	34.0%
	8-16 flakes	50.4%	40.0%	15.4%	20.0%	46.7%	41.3%
	16-24 flakes	15.7%	40.0%	2.6%	20.0%	6.7%	14.6%
	>24 flakes	1.6%	0.0%	0.0%	0.0%	0.0%	1.0%
Number of Cores		131	15	44	10	16	216

Reduction techniques differ for the five raw materials. Chert and limestone cores tend to be small and less than 6 cm in size. They are also more extensively worked with higher percentages of multiple platform cores, cores with ridged and multiple platforms, cores with less than 50% cortex, and cores with eight or more flake scars. Together, chert and limestone cores account for 68% of the cores and 64% of the flake tools. Quartzite and rhyolite form a second group of cores and exhibit a more limited reduction of the raw materials. Cores of these materials are generally larger than those of chert and limestone and have a larger proportion of cores with eight or fewer flakes scars. Simple single and double platform cores, cortex and single striking platforms, and surfaces with greater than 50 % cortex predominate. Quartzite and rhyolite constitute 12% of the cores and 22% of the flake tools. Obsidian cores stand out from the cores of the other materials. They are the smallest of the cores, show the use of bipolar splitting of pebbles, have predominantly cortex striking platforms, and display mostly eight or fewer flake scars. Obsidian cores make up 20% of the cores and only 13% of the flake tools. While obsidian cores evidence relatively light reduction, obsidian projectile points from Firecracker intimate more extensive working of this material.

Six of the cores evidence use. Two appear to be choppers and are larger than most cores, 6.6 and 10 cm in size. One is of quartzite and the other rhyolite, and both have convex, bifacially worked edges that have crushed from use. Edge angles are 60 and 75 degrees, and use lengths are 141 and 96 mm. Three chert cores show unifacial utilization of cortex or single platforms in the form of small feather and step scars. Two have convex edges with 33 and 41 mm of use and edge angles of 50 and 70 degrees. The third chert core has a 41 mm sinuous edge and edge angle of 55 degrees. A limestone core with a single platform has a 24 mm convex edge with a 45 degree angle and that is rounded from use and with small feather scars on either side of the edge. The chert and limestone cores are small and 4.3 to 4.8 cm in size.

Scavenging and reuse of materials is limited and noted by weathered fragments of two thick bifaces of chert. Both items had a small number of flakes removed from one edge.

Edge Modified Flakes

Edge modified flakes are flakes with use-wear along edges and/or retouch along edges but not across the face of a flake. They are relatively few in number at 98 items, but outnumber bifaces and formal tools. The materials of edge modified flakes follow those of debitage. Chert is noted for slightly more than half of these tools, while limestone, obsidian, quartzite, and rhyolite are present in lesser amounts (Table 23). Unike debitage most of these tools are over 2 cm in length. Utilized and retouched flake lengths are primarily less than 4 cm, except limestone flakes which range larger. Flakes used for these tools are predominantly complete, have no or less than 50% cortex on the dorsal surface.

There are a few differences in flake attributes with respect to material. Single and multiple faceted platforms are well-represented for chert flakes and suggest more extensive reduction of chert for suitable flakes. The modification of multiple edges of chert flakes is also more common than for other materials. As with cores, obsidian flakes evidence bipolar reduction. Few flake tools of rhyolite were identified. Use-wear on edges of this coarse-grained material can be difficult to discern (Foix and Bradley 1981), and rhyolite flakes with utilized edges were likely missed. Edges with retouch are more common for the fine to coarse-grained quartzite and the coarse-grained rhyolite flakes and may also intimate the difficulty of recognizing flake tools of coarse-grained materials that were only utilized and not retouched.

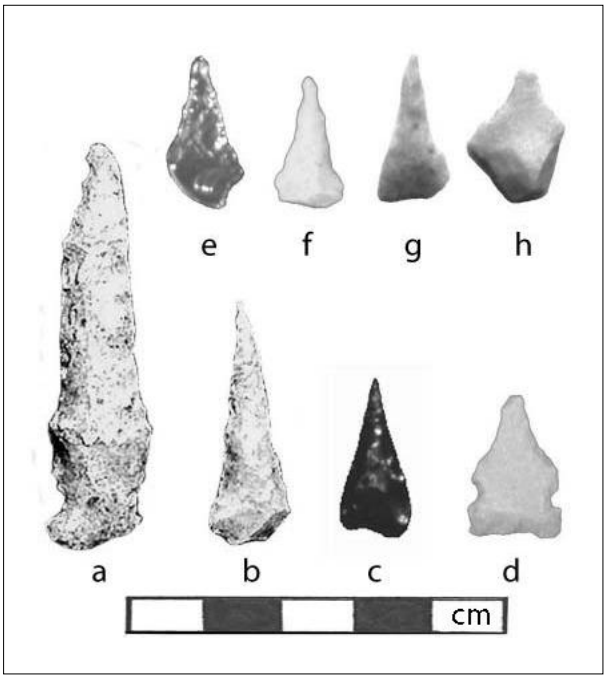
Flake edges with utilization and/or retouch number 144 for the 98 flakes (Table 24). The relatively high proportion of flakes with multiple modified edges hints at the intensity of use and possible re-use of flake tools. Similar proportions have been reported for late Formative residential sites near Firecracker (Jackson and Kenmotsu 2008).

Some 78% of the modified edges show use-wear but no retouch (Table 24). They are evenly split between unifacial and bifacial use-wear, largely along either lateral or distal edges. Convex edges are in the majority, followed by straight and concave edges. Less common are sinuous edges, as are natural projections possibly used as gravers. Evidence of use is principally noted by small feather and step scars and rounding of edges. Striations and polish from use are uncommon. Light to moderate activities are indicated by the preponderance of edge angles of 40-55 degrees. The range of edge angles, the variety of edge shapes, and the occurrence of unifacial and bifacial use-wear would indicate a variety of activities, including scraping, cutting, sawing, shredding, and chopping.

Flake tools having retouched edges with or without use-wear number 32 (Table 24). These include nine edges showing only retouch and comprised chiefly of coarse-grained materials for which use-wear may not be seen if little used. Then, there are also nine edges with edge retouch and wear. These 18 edges generally follow the utilized and unretouched edges in modification of lateral and distal edges, edge shape, and edge angle. Sinuous edges, however, are proportionally more common among the unifacially retouched edges that do not exhibit use-wear.

Table 23. Percentages for Material and Flake Attributes of Edge Modified Flakes.

Edge Modified Flake Attributes		Chert	Limestone	Obsidian	Quartzite	Rhyolite	Total	
							No.	%
Length	<2 cm	11.3%	0.0%	46.2%	5.3%	0.0%	13	13.3%
	2-4 cm	54.7%	10.0%	53.8%	57.9%	33.3%	49	50.0%
	4-6 cm	30.2%	50.0%	0.0%	31.6%	0.0%	27	27.6%
	6-8.7 cm	3.8%	40.0%	0.0%	5.3%	66.7%	9	9.2%
Portion	complete	79.2%	90.0%	92.3%	84.2%	66.7%	81	82.7%
	proximal	1.9%	0.0%	0.0%	10.5%	0.0%	3	3.1%
	medial/distal	18.9%	10.0%	7.7%	5.3%	33.3%	14	14.3%
Cortex	0%	62.3%	60.0%	15.4%	52.6%	66.7%	53	54.1%
	<50 %	30.2%	20.0%	76.9%	26.3%	33.3%	34	34.7%
	>50 %	7.5%	20.0%	7.7%	21.1%	0.0%	11	11.2%
Number of Flakes		53	10	13	19	3	98	
Platform	cortex	28.6%	66.7%	54.5%	70.6%	0.0%	36	44.4%
	single	45.2%	11.1%	9.1%	29.4%	0.0%	26	32.1%
	multiple	26.2%	22.2%	9.1%	0.0%	100.0%	16	19.8%
	crushed	0.0%	0.0%	9.1%	0.0%	0.0%	1	1.2%
	bipolar	0.0%	0.0%	18.2%	0.0%	0.0%	2	2.5%
Number of Flakes		42	9	11	17	2	81	
Edge Modification	utilized	81.2%	86.7%	73.3%	64.0%	75.0%	112	77.8%
	retouch/utilized	16.5%	6.7%	26.7%	12.0%	0.0%	22	15.3%
	retouched	2.4%	6.7%		24.0%	25.0%	10	6.9%
Number of Edges		85	15	15	25	4	144	



Finally, there are 14 modified flakes in the category of drills/perforators. They are unifacially or bi-facially retouched to a slender point (Figure 97). One drill/perforator shows no use-wear, but the others have rounded and polished edges and surfaces from rotary use. Two also exhibit stria-tions. Most of the drills/perforators are small, an17 to 33 mm in length. The largest is 41 mm in length and triangular with shallow notches near the larger end. Presumably, the notches were used to facilitate hafting. Another specimen has a form much like a projectile point with deeper side notches that do indicate hafting of the object (Figure 97, d).

Figure 97. Flake and bifacial drills: *a, b, c, g,* bi-facial drill; *d, e, f, h,* modified flake drill/perforator.

Table 24. Percentages for Utilization and Retouch Attributes of Edge Modified Flakes.

Direction of Retouch		No Retouch		No Retouch		Unifacial		Unifacial		Bifacial		Unifacial		Bifacial		Total	
Direction of Use		Unifacial		Bifacial		Unifacial		Bifacial		Bifacial		No Use		No Use			
Attributes		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Edge Modified	lateral	33	60.0%	40	70.2%	1	33.3%	--	--	2	18.2%	7	100.0%	1	33.3%	84	58.3%
	distal	16	29.1%	13	22.8%	2	66.7%	3	37.5%	--	--	--	--	--	--	34	23.6%
	lateral/distal	6	10.9%	3	5.3%	--	--	4	50.0%	8	72.7%	--	--	1	33.3%	22	15.3%
	proximal	--	--	1	1.8%	--	--	--	--	--	--	--	--	--	--	1	0.7%
	all edges	--	--	--	--	--	--	1	12.5%	1	9.1%	--	--	1	33.3%	3	2.1%
Edge Shape	straight	10	18.2%	15	26.3%	--	--	--	--	2	18.2%	--	--	--	--	27	18.8%
	convex	21	38.2%	23	40.4%	2	66.7%	1	12.5%	1	9.1%	2	28.6%	2	66.7%	52	36.1%
	concave	16	29.1%	10	17.5%	--	--	--	--	--	--	--	--	--	--	26	18.1%
	sinuous	7	12.7%	7	12.3%	--	--	2	25.0%	--	--	4	57.1%	--	--	20	13.9%
	serrated	--	--	--	--	--	--	--	--	--	--	1	14.3%	--	--	1	0.7%
	projection	1	1.8%	2	3.5%	1	33.3%	--	--	--	--	--	--	--	--	4	2.8%
	drill/perforator	--	--	--	--	--	--	5	62.5%	8	72.7%	--	--	1	33.3%	14	9.7%
Use-Wear	feather	50	90.9%	44	77.2%	3	100.0%	3	37.5%	4	36.4%	--	--	--	--	104	72.2%
	step	25	45.5%	29	50.9%	2	66.7%	1	12.5%	2	18.2%	--	--	--	--	59	41.0%
	rounded	17	30.9%	45	78.9%	--	--	8	100.0%	8	72.7%	--	--	--	--	78	54.2%
	polish	--	--	6	10.5%	--	--	4	50.0%	7	63.6%	--	--	--	--	17	11.8%
	striations	2	3.6%	2	3.5%	--	--	--	--	2	18.2%	--	--	--	--	6	4.2%
Retouch	feather	--	--	--	--	3	100.0%	8	100.0%	11	100.0%	6	85.7%	3	100.0%	31	21.5%
	step	--	--	--	--	2	66.7%	5	62.5%	6	54.5%	5	71.4%	3	100.0%	21	14.6%
Edge Angle (less projection/ perforator/drill)	25-35 degrees	11	20.4%	9	16.4%	--	--	--	--	--	--	1	14.3%	1	50.0%	22	15.3%
	40-55 degrees	38	70.4%	37	67.3%	1	50.0%	3	100.0%	3	100.0%	4	57.1%	1	50.0%	87	60.4%
	60-70 degrees	5	9.3%	9	16.4%	1	50.0%	--	--	--	--	2	28.6%	--	--	17	11.8%
Modified Edges		55	38.2%	57	39.6%	3	2.1%	8	5.6%	11	7.6%	7	4.9%	3	2.1%	144	

Bifaces and Formal Tools

Bifaces and bifacially flaked formal tools are not as numerous as edge modified flakes. Nevertheless, they comprise a substantial number of items made almost exclusively of chert and obsidian. Thick and thin bifaces are included here, as well as drills and projectile points.

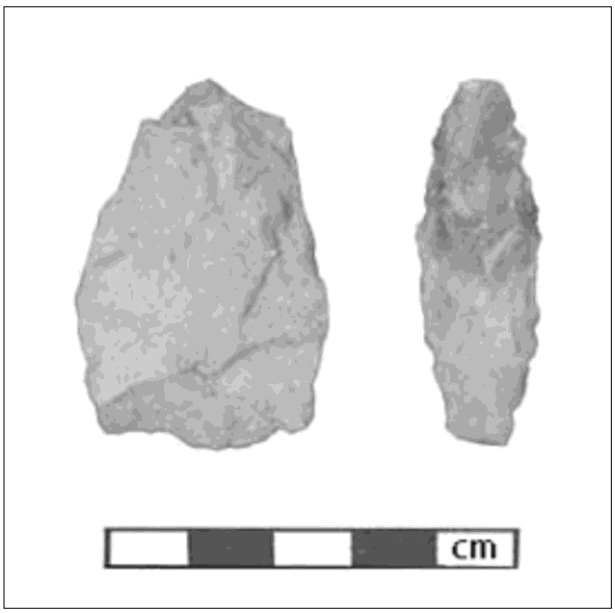


Figure 98. Thick chert bifaces.

There are seven examples of bifaces, four fragmentary and three complete. Two fragments of thick chert bifaces are 8.3 and 10.1 mm in thickness and consist of a midsection and a base 36.1 cm wide. And, two fragments are from thin, finely worked chert bifaces, 3.8 and 5.0 mm in thickness and from distal pointed ends. These two fragments have widths of 13.4 and 17.7 mm and may from scavenged projectile points from other occupations in the area. Complete bifaces are thick and measure 8.3, 10.1, and 10.3 mm in thickness. One is of obsidian and is triangular with a rounded base and with a length of 21.3 mm and a width of 17.3 mm. Another is of chert, triangular, and 45.6 by 31.9 mm, and the last is also of chert, lenticular with rounded ends, and 45.5 by 15.5 mm (Figure 98).

Bifacially worked drills number eight and add to the 14 drills/perforators fashioned by modifying the edges of flakes. The drilling or perforating of materials appears to be a recurrent activity. While flake drills/perforators may have been used for light uses, some of the bifacial drills could have seen heavier duty. Also, all of the bifacial drills could have been hafted, but only 2 flake drills/perforators have notches for hafting.

Four of the bifacial drills are triangular in shape. Two of these, one of obsidian and one of chert, are believed to be projectile points with retouched, narrow distal ends and edge rounding (Figure 97, c, g). They measure 19-20 mm in length, 10 mm in width, and 2.2-2.5 mm in thickness. The other two are both of chert, much longer, and exhibit small feather scars, rounding of edges, and polished surfaces at the distal end (Figure 97, b). One has a pointed distal end, the other is rounded. They are 36-37 mm in length, 11-15 mm in width, and 4.8-4.9 mm in thickness.

The fifth bifacial drill is of chert and unusual and large (Figure 97, a). It is 55 mm long, has an irregular base, and has stem that is concave on either side. The shaft or blade is 10 by 5 mm and expands to 14 mm to form a weak shoulder above the stem. It is possible that it may be a re-worked Archaic or early Formative projectile point. However, there is no indication of multiple episodes of working this object, aside from the removal of two small flakes just below the distal end. That it was used as a drill is seen by rounded edges and distal end and polished surfaces.

The last of the bifacial drills are three large chert, T-shaped drills (Figure 99). One is complete, 46 mm long and 18 mm at the base, and has a shaft that is 4-8 mm wide and 3-6 mm thick. The distal end is rounded and polished and has striations perpendicular to the shaft. The second is missing the tip of the distal end, but was about 42 mm in length. The base has a width of 18 mm, and the shaft is 4-6 mm wide and 2-4 mm thick. Edges are rounded and polished for the remaining distal end. The third T-shaped drill is a fragment of the proximal end, showing a base 15 mm wide and a shaft of 4- 6 mm in width and thickness.

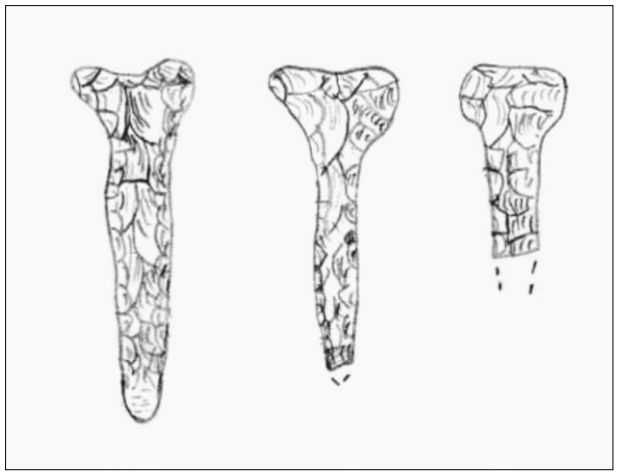


Figure 99. T-shaped drills.

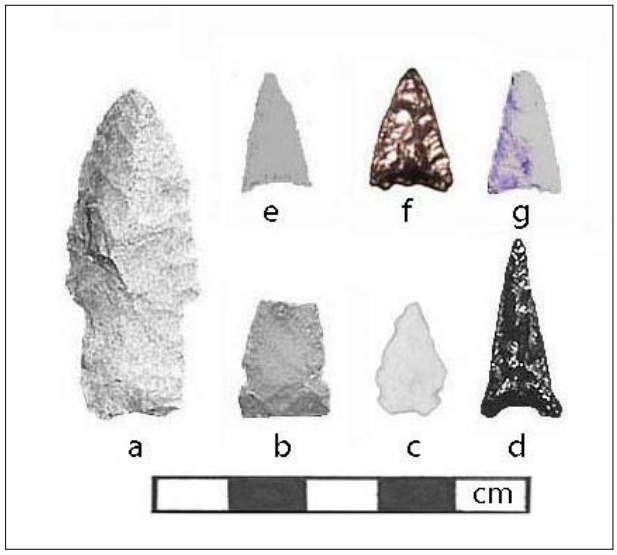


Figure 100. Projectile Points: *a*, Bajada; *b, c* triangular side-notched; *d-g*, triangular.

Projectile points are the most common bifacial artifact and formal tool. In addition to the 41 projectile points to be described, it has been noted that three drills may have been re-tooled points and that two thin biface fragments may be from points. Projectile points from Firecracker Pueblo have also been utilized by Miller and Graves (2019) in their study of the temporal distribution of point types in the Jornada region.

Most of the projectile points are small and triangular and typical of late Formative, El Paso phase sites. They number 36 and include triangular points with straight, convex, concave, and notched bases (Figures 97, c, g; 100, d-g) and triangular points with side notches and straight, concave, and notched bases (Figure100, b, c) (Table 25). Eight-een of the triangular points are of chert, 17 are of obsidian, and one is of quartz. Side-notched, triangular points tend to be made of chert, while obsidian dominates the simple triangular forms. These various forms of small, triangular points have often been called Fresno, Toyah, Harrell, and Washita points in reference to similar forms in Texas east of the Pecos River (Miller and Graves 2019). Although a single good chronological sequence does not exist for the Jornada region, it is widely recognized that small triangular points are best dated to the late Formative and are common on El Paso phase sites.

The remaining five projectile points have probably been scavenged from earlier occupations in the area and consist of four side-notched and expanding stem points and a large point with a square stem (Table 25). The four side-notched, expanding stem points are comprised of three chert and one obsidian point and are similar to Scallorn and small variety San Pedro projectile points of late Archaic to early Formative age (Miller and Graves 2019). The larger, square stemmed point is of rhyolite and is an early Archaic Bajada projectile point (Figure 100, a).

Lithic Reduction and Intensity of settlement

The reduction of stone and chipped stone assemblages should reflect the length and intensity of occupation. Cores would be expected to have been more frequently and extensively reduced with a concomitant greater production of flakes on longer-occupied settlements. In contrast, lighter reduction of cores at short-term or limited activity settlements for expedient tools could be expected to result in fewer flakes relative to flake tools than for residential settlements. Thus, flake/core ratios and flake/flake tool ratios would be expected to be greater for residential sites versus limited activity sites (Miller 1990).

Table 25. Attributes of Projectile Points.

Form	Provenience	Material	Length mm	Width mm	Thickness mm	Note
triangular, straight base	Room 18, fill; Extramural Feature F.118	1 chert 1 obsidian	14 - 15+	8 - 11	2.8 - 3.5	
triangular, concave base	Room 17, 31, floor; Room 20, 22, 25, 28, 30, fill; Extramural Feature F.104; surface refuse	6 chert 11 obsidian	12 -32	8 -15	1.7 - 4.2	
triangular, concave sides and basal notch	Room 31, fill	1 obsidian	14	9	3.2	
triangular, V-notched base	Room 28, fill; surface refuse	2 chert	26 - 27	10	1.9 - 2.5	
triangular, convex base	Extramural Feature F.3, 20, 118	2 obsidian 1 quartz	11 - 25	8 - 15	2 - 3.9	
triangular, straight base, side-notched	Room 25, 28, fill; Extramural Feature F.203	2 chert 1 obsidian	25 - 27	12 - 14	1.9 - 2.7	
triangular, shallow side notches, concave base	Extramural Feature F.118	1 chert	18	10	2.6	
triangular, side and basal notches	Room 20, floor; Room 27, 28, fill; Extramural Feature F.38, 117, 203	6 chert 1 obsidian	14 - 27	10 - 15	1.8 - 3.7	
triangular blade, side notched, weak shoulder, possible expanding stem	Room 13, fill; Extramural Feature F.109	2 chert	17+ - 21+	11 - 12	2.7 - 2.9	neck width 7-8 mm
triangular blade, side notched, strong shoulder, expanding rounded stem, convex base	Room 22, fill; Extramural Feature F.93	1 chert 1 obsidian	26 - 33	18 - 24	5 - 6	neck 8-11 mm; stem length 10-12 mm; base 11-15 mm wide
triangular blade, square stem, weak shoulders, slightly concave base	Extramural Feature F.1	1 rhyolite	45	19	6.8	stem: length 14 mm, width 15 mm

Lithic assemblages from a number of residential and limited activity sites are compared with Firecracker Pueblo in Table 26. With exception of the El Paso phase pueblo of La Cabraña on the Rio Grande (Foster and Bradley 2021), all of the sites are near Firecracker. Other El Paso phase sites include a contiguous room pueblo at 41EP1618 (Jackson and Kenmotsu 2008) and 41EP2724 (Shafer et al. 2001a) and 41EP1623 (Condon et al. 2010) with isolated rooms.

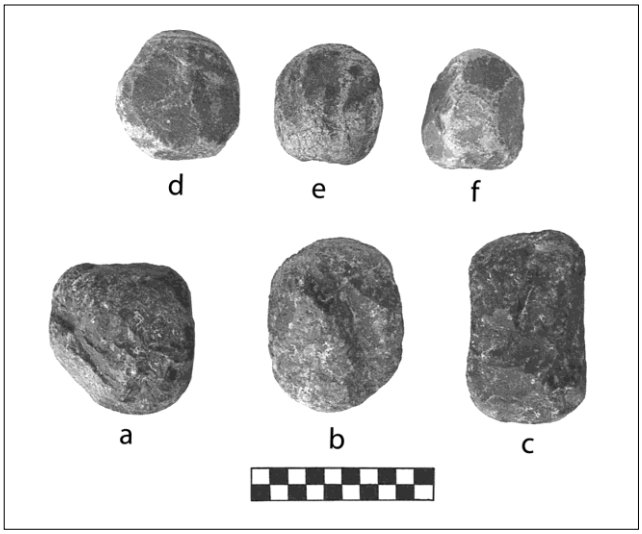
Table 26. Site Attributes for Flakes, Cores, and Flake Tools.

Site	Component	Occupation Type	Flakes	Cores	Flake Tools	Flake/core Ratio	Flake/flake Tool Ratio
Firecracker	El Paso	residential	14021	216	98	64.9	143.1
La Cabraña	El Paso	residential	1409	11	8	128.5	176.6
41EP2724	El Paso	residential	2290	45	76	50.9	30.1
41EP1623	El Paso	residential	1183	32	10	37.0	118.3
41EP4719	Dona Ana	residential	2790	24	96	116.3	29.1
Gobernador	Dona Ana	residential	2616	54	87	34.9	30.1
41EP2805	Mesilla	residential	250	7	6	35.7	41.7
41EP1621	Mesilla	residential	753	20	11	37.7	68.5
Transmountain 5 Sites	multiple	limited	973	70	141	10.2	6.9
Loop 375 25 Sites	multiple	limited	499	26	86	19.2	5.8
Tobin Well 6 Sites	multiple	limited	371	17	23	21.8	16.1

Dona Ana phase residential sites with pithouses are 41EP4719 (Lukowski et al. 2006) and the Gobernador site (Miller 1989), and those of the Mesilla phase are 41EP2805 and 41EP1621 (Shafer et al. 2001a). Limited activity sites of Archaic and Formative age are grouped by project and include those of Transmountain (O'Laughlin 1979), Loop 375 (O'Laughlin and Martin 1993), and Tobin Well (Lukowski et al. 2006).

The flake to core ratio and the flake to flake tool ratio for Firecracker Pueblo are fairly high and within the range of ratios for other residential sites. The ratios for residential sites are also higher than those of the selected limited activity sites. These measures add to the other descriptions of the lithic assemblage and further the implication of extensive reduction of materials at Firecracker Pueblo.

Hammerstones



Hammerstones are somewhat numerous for Firecracker pueblo, as they also appear to be for other El Paso phase pueblos (Foster and Bradley 2021; Lowry 2005). They are made principally of rhyolite and quartzite, hard grainy materials, but limestone is also well-represented (Table 27). The proportions of these materials are similar to those for hammerstones at the nearby pueblo of Sgt. Doyle (Lowry 2005), both reflecting the use of locally available materials. Additionally, these materials are of lesser importance than cherts and obsidian in the chipped stone assemblage and range larger in size than cores for Firecracker.

Figure 101. Rounded hammerstones: *a-c*, rhyolite; *d-f*, quartzite.

Table 27. Percentages for Attributes of Hammerstones.

Hammerstone Attributes		Chert	Limestone	Quartzite	Rhyolite	Total	
						No.	%
Size	4.5-6 cm	0.0%	31.3%	18.2%	7.1%	11	16.2%
	6-8 cm	100.0%	56.3%	36.4%	53.6%	34	50.0%
	8-10 cm	0.0%	6.3%	18.2%	28.6%	13	19.1%
	> 10 cm	0.0%	6.3%	9.1%	3.6%	4	5.9%
	fragment	0.0%	0.0%	18.2%	7.1%	6	8.8%
Form	angular	0.0%	18.8%	83.3%	42.3%	29	42.6%
	angular fragment	0.0%	0.0%	5.6%	7.7%	3	4.4%
	angular/rounded	100.0%	37.5%	4.5%	28.6%	17	25.0%
	rounded	0.0%	43.8%	9.1%	25.0%	16	23.5%
	rounded fragment	0.0%	0.0%	13.6%	0.0%	3	4.4%
Wear Location	single	100.0%	25.0%	36.4%	10.7%	17	25.0%
	polar	0.0%	50.0%	36.4%	50.0%	30	44.1%
	longitudinal	0.0%	12.5%	22.7%	25.0%	14	20.6%
	generalized	0.0%	12.5%	4.5%	14.3%	7	10.3%
Total		2	16	22	28	68	100.0 %

Hammerstone forms vary with material. Quartzite hammerstones are predominantly angular, limestone hammerstones tend to be round, and rhyolite hammerstones are mixed in form but with angular hammerstones the most common. It has been suggested that angular hammerstones are best suited to knapping, while rounded forms may have been better suited to the production and reshaping of ground stone, the rejuvenation of grinding surfaces, and general pounding or crushing (Adams 2002). Angular/round hammerstones, as well as round hammerstones, show considerable crushing of edges and surfaces (Figure 101). With use, hammerstones could have become more rounded and their function could also have shifted from knapping and pecking to battering and crushing.

Ground Stone

Ground stone artifacts are fairly numerous at Firecracker Pueblo and are made of a variety of materials (Table 28). Some objects are familiar and well-defined, such as metates, manos, shaft abraders/smoothers, mortars, pestles, and polishing stones. Others are categorized by shape and evident wear and include cobble abraders, pigment crushers, rubbing stones and smooth pebbles. The largest group of objects is comprised of abraders, predominantly fragmented, that are grouped as either active abraders (hand-held) or passive abraders (lapstones, anvils, etc.).

The materials used for ground stone are like those used for chipped stone. They include pebbles and cobbles of quartzite, sandstone, limestone, granite, basalt, chert, and obsidian that are present in nearby alluvial fans and gravels of the western Hueco Bolson. Scoria and vesicular basalt potentially could also be present in the bolson gravels. The Franklin Mountains are the probable source of granite and sandstone for metates and manos, as well as granite, quartzite, and limestone for mortars and pestles. Vesicular basalt for metates and manos may have originated in lava fields along and west of the Rio Grande, and scoria for small abraders may also have come from lag gravels along the Rio Grande or areas of volcanic activity along and west of the Rio Grande.

Table 28. Categories and Materials for Ground Stone.

Category	No.	Basalt	Vesicular basalt	Scoria	Granite	Sandstone	Quartzite	Limestone	Chert	Obsidian
metate	31		18		9	4				
mano	25		5		12	8				
metate/mano fragment	9		5		4					
mortar	2				1		1			
pestle	7				2		2	3		
pigment crusher	2						2			
mano-like abrader	6				1	5				
active abrader	33	1		12		14	6	1		
passive abrader	26					5	21			
indeterminate abrader	28					23	5			
shaft straightener/abrader	3		2			1				
rubbing stone	8				8					
polishing stone	4						2		1	1
smooth pebble	28						27		1	
Total	212	1	30	12	37	60	66	4	2	1

Metates

Six complete metates and 25 fragments of vesicular basalt, granite, and sandstone were recovered from Firecracker Pueblo (Tables 28 and 29). Three of the complete metates were found in extramural pits, and two were present on the floor of an isolated room. In difference, metate fragments were retrieved from a variety of contexts including surface refuse, the fill of rooms, and trash-filled extra-mural features.

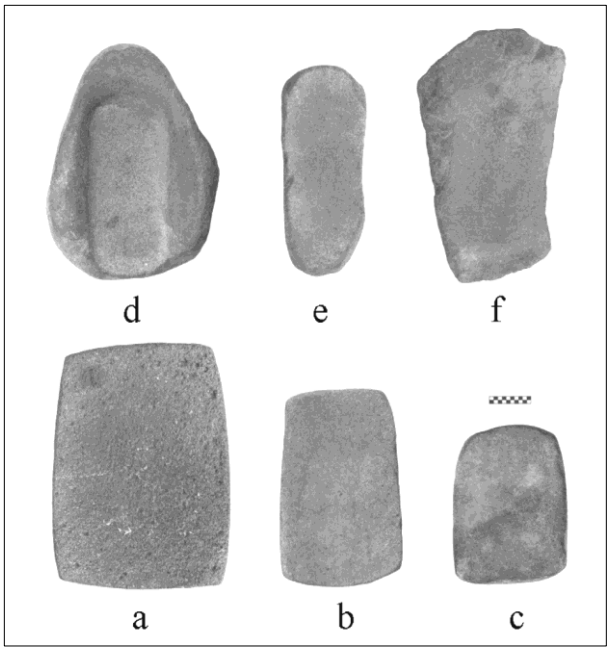


Figure 102. Complete metates.

The principal form is a trough metate, open at one end. Three complete specimens have been pecked and ground to a rectangular shape but exhibit little use and shallow troughs (Figure 102, a, b, c). A fourth complete metate is an ovoid rock with ground upper and lower surfaces (Figure 102, d). This metate has a deep, 5 cm trough. The fifth complete metate is a trapezoidal-shaped natural stone (Figure 102, f). Though little used, grinding has produced a shallow trough-like depression with one closed and one open end. Grinding surfaces are smooth on all of these metates, and three exhibit striations from use that are parallel to the long axes.

Table 29 . Attributes of Trough Metates and Unifacial Manos.

Trough Metates	Material	Weight (gr)	Length (cm)	Width (cm)	Thickness (cm)	Trough Length (cm)	Trough Width (cm)	Trough Depth (cm)	Figure
Extramural Feature F.82	vesicular basalt	48,560	54.5	40	13	48	29-35	1	102, a
Isolated Room 11, floor	granite	30,820	52.5	38.5	13.5	40.5	18	5	102, d
Extramural Feature F.1	sandstone	20,840	44.5	25	11.5	36	22	1	102, b
extramural 76E96N	sandstone	19,640	35.5	26	13	29	22	1.8	102, c
Extramural Feature F.142	granite	18,040+	36+	36	13.5	25+	20	5.1	
Isolated Room 11, floor	granite	17,210	45.5	18.5	13	33	17		102, e
extramural Feature F.94	granite	33,550	54.5	33.5	13	37	21-24	0.7	102, f
Unifacial Manos	**Material**	**Weight (gr)**	**Length (cm)**	**Width (cm)**	**Thickness (cm)**	**Note**			**Figure**
Extramural Feature F.82	granite	7273	37.6	11.2	9.7				103, b
Extramural Feature F.82	granite	8091	33.4	11.7	11.2				103, a
Extramural Feature F.82	vesicular basalt	2267	31.2	11.6	4.9				103, c
Room 5, fill	sandstone	2046	23	8.6	6.8				103, d
Trench 5, surface refuse	sandstone	1125	20.3	11.7	2.6	well used			103, e
Isolated Room 11, floor, south hearth F.304	sandstone	1475	19.7	11.8	4	well used, wedge cross-section			103, f
Room 1, fill	vesicular basalt	1300	16.5	10.7	4.3	one end reworked, chipped and roughly ground			103, h
Trench 8, surface refuse	sandstone	369	15.4	8.2	2.4	very worn			103, g
Isolated Room 11, floor, south hearth F.304	sandstone	1275	14.6	10.8	4.3	broken, end roughly ground smooth			103, i
Isolated Room 11, floor	granite	1280	12.3	11.1	5.4	broken, end roughly ground smooth			103, j
Extramural Feature F.142	granite	760	10.8	9.6	4.7	broken, end roughly ground smooth			

With respect to fragments, there are seven with trough depths of 2-5 cm and three that also part of the open end of metates. The length of the grinding area ranges principally from 29 to 40.5 cm for the complete metates, and the widths are mostly between 18 and 24 cm. The largest metate, however, has a grinding length of 48 cm and a trough width of 29-35 cm. The three largest manos from this site were apparently cached with this metate in the extra-mural feature F.82.

The sixth complete metate could be classed as a slab metate. It has a narrow oval shape with a smooth grinding surface that is slightly concave in both directions (Figure 102, e). There is an area or shelf at one end that is not part of the grinding surface. The bottom has been ground flat, and the ends are rounded from grinding. Yet, the sides have been chipped and roughly ground. The impression is that this was once a trough metate, likely open at one end and possibly reworked with failing of the trough walls.

Pieces of ground stone which could have been from either metates or manos number nine and are of vesicular basalt and granite. In addition, large spalls and flakes from the modification or reconditioning of metates were recovered. These are not included with the counts of chipped stone debitage and include 52 pieces of vesicular basalt and possibly the same metate from extramural feature F.55, 24 pieces of sandstone possibly from the same metate from the fill of isolated Room 25, and five pieces of metates of vesicular basalt from elsewhere in the site.

Manos

There are eight complete manos, and three broken manos with one end reconditioned by grinding (Table 29). There are also 14 fragments of manos. As with metates, the materials used for manos are vesicular basalt, granite, and sandstone (Table 28). Manos are subrectangular to rectangular in form and are identifiable as two-hand manos (Figure 103). Excepting one fragment of a bifacial mano, manos have one smoothly ground surface. The grinding surface tends to be slightly convex with both axes of manos, and the ends of most manos curve upward, suggesting use on trough metates. Striations perpendicular to the long axis were noted on six of the complete manos, two of the broken and reworked manos, and two of the mano fragments. Widths range from 8.2 to 12.3 cm, and thickness vary from 2.4 to 11.2 cm, with the thinner manos showing wear around edges.

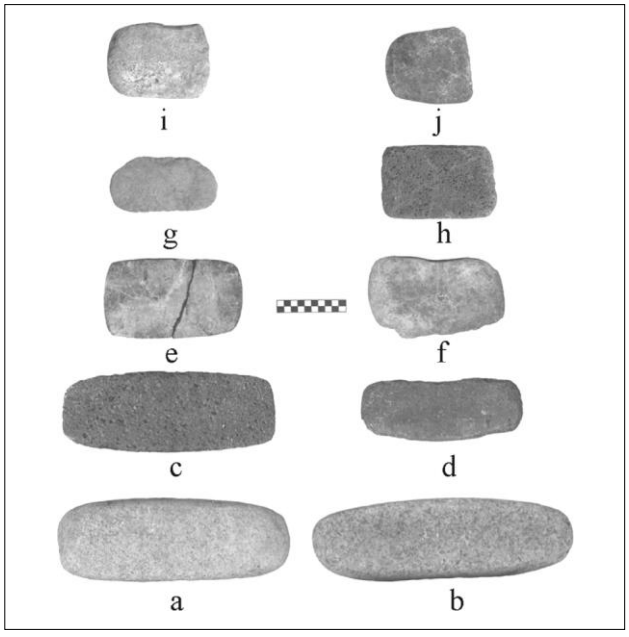


Figure 103. Complete and reconditioned manos.

The lengths of manos follow the widths of the grinding area for metates. The eight complete manos have lengths ranging from 15.4 to 37.6 cm, with an average of 24.6 cm. The manos from Firecracker Pueblo are relatively large for the Jornada region and fit comfortably with assemblages from other pueblo sites. The range and mean of mano lengths could also be taken as an indication of moderate to high dependence on agriculture (Hard 1990; Hard et al. 1996). This accords well with the abundance of maize in macrofloral samples from this site (Chapter 9).

Complete manos and fragments of manos were retrieved from varied contexts, including the floors and fill of rooms, extramural pits, and refuse on the surface of the site. Notable occurrences include three manos

left with two metates on the floor of isolated Room 11 and three manos cached with a metate in extramural feature F.82.

Mortars

Two mortars were recovered from Firecracker (Table 30). One is fairly large and was found with a pestle in a floor pit in isolated Room 15 (Figure 104). The top and bottom of this granite mortar are of natural stone, and the sides have been chipped and roughly ground to a rectangular shape. The deep cavity of this mortar is smooth from use. The second mortar is a fragment of a tabular cobble of quartzite with an oval and shallow concavity with multiple striations in various directions. This object was on the base of a posthole for Room 6.

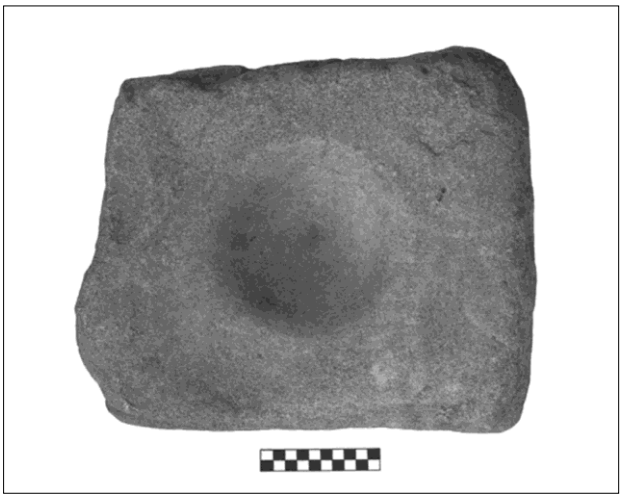


Figure 104. Large mortar from isolated Room 15.

The larger mortar and the elongated and narrow pestle found with it may well have been used for processing mesquite beans as described by Bell and Castetter (1937). It is also possible that tornillo, pinyon, and acorns could have been processed in a mortar of this sort; however, they are not found in the immediate vicinity of Firecracker. The smaller, cobble mortar has a shallow and elongated concavity that suggests it may have been used for a range of activities other than or in addition to grinding foods.

Pestles

Pestles are of two forms (Table 30). One is narrow and long, with one or both ends rounded and smooth from use and with use wear extending 2-6 cm up shafts (Figure 105). Limestone, quartzite, and granite were used for these seven pestles. The second form is comprised of two shorter pestles of irregular cobbles of granite. One has an end that is rounded and smooth and with use wear extending 3 cm up the cobble (Figure 106, a). The other has a rounded, battered, and somewhat smooth end with use wear of some 3 cm (Figure 106, b). This pestle also has one side that has been used for grinding, as an abrader or one-hand mano. The grinding surface is slightly convex, 10.3 cm by 5-8.2 cm, and has striations from use that are perpendicular to the long axis.

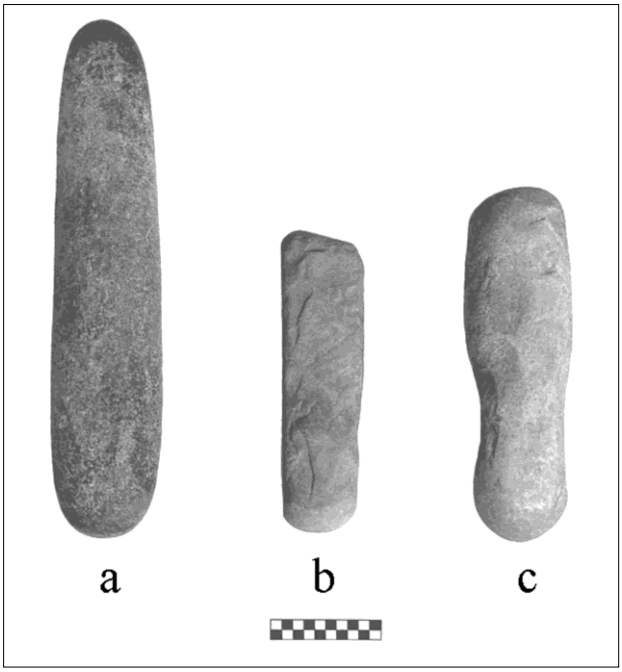


Figure 105. Long, narrow pestles.

Long and relatively narrow pestles have been associated with food processing, as noted above. Nevertheless, they may also have been used to crush other materials, such as pigments and clay.

Table 30 . Attributes of Mortars, Pestles and Pigment Crushers.

Provenience	Category	Material	Weight (gr)	Length (cm)	Width (cm)	Thickness (cm)	Note	Figure
Isolated Room 15, corner pit F.328	mortar	granite	31,977	35	31	15.5	concavity round, diameter 15 cm, depth 6.3 cm	104
Room 6, posthole F.260	mortar	quartzite	3,447	22.5+	19.5+	6.5	concavity oval, 10+ by 10.5 cm, 0.8 cm depth	
Extramural Feature F.65	pestle	quartzite	5,900	47.5	9.8	7.9	both ends rounded from use	105, a
Extramural Feature F.65	pestle	limestone	3,826	31.4	9.4	7.9	both ends rounded from use	105, c
Room 7, floor	pestle	limestone	2,500	27.4	7.4	6.2	one end rounded from use, other end ground smooth	105, b
Isolated Room 15, corner pit F.328	pestle	quartzite	2,300	24.5	7.6	7.4	both ends rounded from use	
Extramural Feature F.56	pestle	limestone	680	9.8+	7.2	4.9	fragment of rounded end	
Room 7, floor	pestle	granite	1,627	16.8	9.7	5.4	one end rounded from use	106, a
Isolated Room 11, floor	pestle/mano	granite	1,375	11.4	9.3	7.4	one end rounded from use, one side used for grinding with striations perpendicular to long axis	106, b
Room 2, posthole F.235	pigment crusher	quartzite	148	7.1	4.8	3.3	convex surface of one end with impact fractures, scattered striations, and greenish blue pigment	107, a
Room 5, fill	pigment crusher	quartzite	419	8.5	7	5	convex surfaces of polar ends with impact fractures and greenish blue pigment	107, b

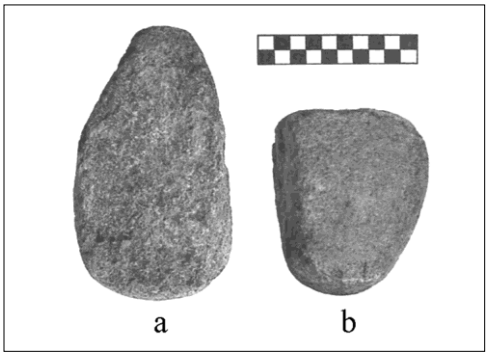


Figure 106. Short, cobble pestles.

The smaller pestle with the smooth rounded end may have seen use much like that of the longer pestles. The other pestle may have been used in higher impact activities and certainly saw use as an abrader.

Pestles were recovered from the floors of isolated Rooms 11 and 15 and Pueblo Room 7. As previously mentioned, one of the longer pestles was found alongside a large mortar in a pit in the floor of isolated Room 15. Two pestles may have been cached in an extramural pit (F.65), and this is possibly the case for a third pestle found in F.56.

Pigment Crushers

Pigment crushers are technically pestles in that they have a surface used for pounding or pulverizing a substance. They differ from the previously described pestles in being smaller and unmodified cobbles of quartzite (Table 30). The convex end of one exhibits impact fractures and miscellaneous striations and a coating of a greenish blue pigment, perhaps malachite or chrysocolla (Figure 107, a). The second has impact fractures at polar ends of the cobble, as well as pigment the same color as on the first crusher (Figure 107, b). One is from a posthole of Room 2, and the other is from the fill of Room 5.

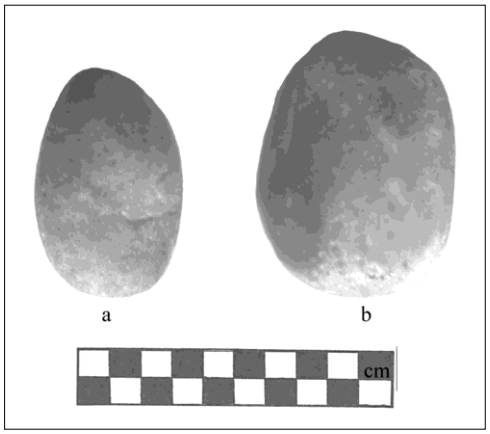


Figure 107. Pigment crushers.

Abraders

Abraders, as used here, are tools used principally for grinding, abrading and smoothing. The distinction between metates, manos, mortars, pestles, and even pigment crushers and abraders is technically fuzzy (see Adams 2002); however, they have been separated for descriptive purposes and because they are largely informal tools. They are a mixed lot, fairly numerous, and include mano-like artifacts, other active abraders (hand-held), passive abraders (lapstones or netherstones), and non-specific fragments that may have been used for many non-specialized activities. Few abraders have been reported from other sites in the region, though they seem to more common for Pueblo period sites (O'Laughlin 1999, 2001a). The materials, dimensions, and use wear of abraders is provided in Appendix D.

Descriptive categories of abraders and the materials used for abraders are summarized in Table 31. Mano-like abraders and other active abraders are mostly made of sandstone, passive abraders are domi-nated by quartzite, and nodular abraders are principally of scoria.

Table 31. Abrader Categories and Materials.

Category	Sandstone	Quartzite	Limestone	Granite	Scoria	Total
mano-like abrader	5			1		6
nodular active abrader		3	1		12	16
tabular active abrader	14	3				17
tabular passive abrader	5	21				26
non-specific abrader	23	5				28
Total	47	32	1	1	12	93

Mano-like abraders

There are five sandstone and one granite mano-like abraders, and examples are shown in Figure 108. The maximum dimension for these abraders ranges from 6.8 and 12.8 cm, within the range of what are often referred to as one-hand manos (Appendix D). Indeed, two oval to circular specimens with wedge-shaped cross-sections would compare well with one-hand manos from other sites and could possibly have been salvaged from earlier sites. However, it is also worth noting that these abraders vary in form, extent of shaping, and number of used surfaces and were likely used in a number of non-specialized activities. Mano-like abraders exhibit a mix of unifacial and bifacial use surfaces that may be flat or convex. None were

found in association with other formal ground stone tools. They were retrieved from the fill of rooms, an extramural feature, and the surface refuse.

Nodular Active Abraders

There are two sets of nodular active abraders Appendix D). The first is comprised of three nodules of quartzite and one of limestone that have a polish, light abrasion, and in one case striations and greenish blue pigment on a convex or flat surface of the otherwise unaltered nodule. These range from 4.2 to 8.6 cm in length. The second set is made up of 3.2 to 11.2 cm nodular pieces of scoria (Figure 109). These light, vesicular, basaltic rocks are easily worn with use, and these 12 specimens have well-defined use wear surfaces. Most have one or two flat or convex surfaces from use, and one has six convex, faceted surfaces giving a diamond shape to the abrader. Nodular active abraders are evenly distributed between room floors and fill, extramural pits, and surface refuse.

Tabular Active Abraders

The 14 sandstone and three quartzite tabular active abraders are mostly fragmented and relatively small (Appendix D). The four complete sandstone active abraders have lengths of 2.4 to 6.2 cm (Figure 110, c-d). Tabular active abraders are also somewhat thin. One quartzite tabular active abrader is 4 cm thick but all others are 0.5-2.2 cm thick. Nearly two-thirds of these abraders are bifacial. Flat use wear surfaces slightly outnumber convex surfaces, and there are two concave surfaces. Abraded surfaces are perfunctorily to well-smoothed but lack polish or striations. Two bifacial, tabular sandstone active abraders have convex surfaces that taper to a narrow rounded edge, and a third has a beveled edge. The sandstone used for these abraders is fairly soft and somewhat friable. It is suspected that many of the nonspecific fragments of sandstone abraders are from active abraders. Most of the tabular active abraders were recovered from the floors or fill of rooms, with others scattered in extramural features and the surface refuse.

Figure 108. Mano-like, sandstone abraders.

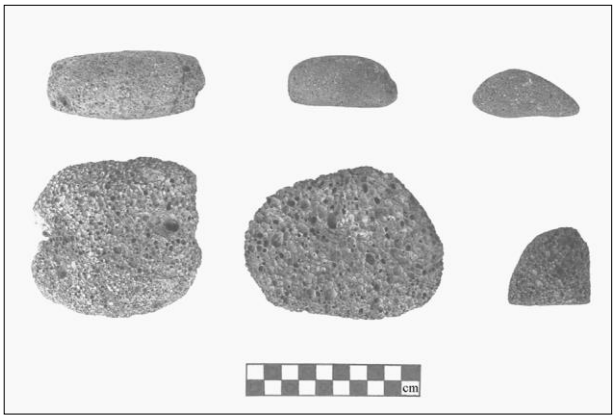


Figure 109. Scoria active abraders.

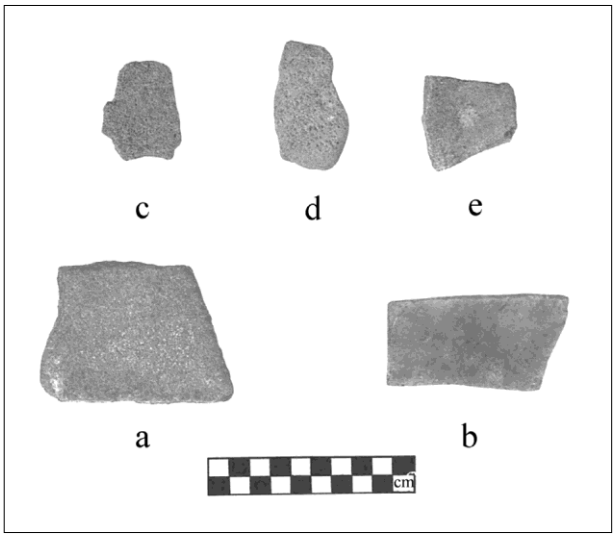


Figure 110. Complete tabular active and passive abraders: *a*, sandstone passive abrader; *b*, quartzite passive abrader with red pigment on surface; *c*-*e*, sandstone active abrader.

Tabular Passive Abraders

Tabular passive abraders number 26 and were found throughout the site (Appendix D). However, these and other abraders occur disproportionately on the floors and in the fill of isolated rooms. In difference to tabular active abraders, quartzite passive abraders outnumber sandstone passive abraders by 21 to five. The majority of these abraders are fragmented, with fragments as large as 19.1 cm. Measurable thicknesses of these tabular abraders range from 0.9 to 4.8 cm. Natural, unshaped but tabular cobbles of stone were used for passive abraders, and the majority was used on only one surface. Sandstone passive abraders have flat to concave surfaces abraded smooth, and one has impact fractures from use as an anvil. The only complete specimen is 6.9 by 9.2 cm and has an oval and concave surface from abrasion in the center of one surface (Figure 110, a). The natural and unmodified surfaces of stone were utilized for quartzite passive abraders. Most of the surfaces are flat, but a few concave and convex surfaces are present. Use of surfaces is noted by the light abrasion of high spots on the stones. Additionally, 13 of the tabular quartzite passive abraders have striations or scratch marks on the utilized surface, and impact fractures are evident on six. The single complete quartzite passive abrader is a roughly rectangular stone of 9 by 4.7 cm with light abrasion on both surfaces and red pigment covering one surface (Figure 110, b).

Grooved Abrader/Straighteners

Three fragments of stones with single grooves were retrieved from Firecracker Pueblo. Two are made of vesicular basalt and the grooves are polished with striations parallel to the grooves. Potentially, these could have been used to straighten reed mainshafts of compound arrows (see Adams 2002; Rinaldo 1974; Woodbury 1954). The third object is made of sandstone, and the groove is roughly smooth and would have suited abrading and smoothing of wood shafts. The grooves on all three stones are of similar width and depth and with a convex profile that suggest the rocking of shafts across the stones.

The most complete grooved abrader/straightener is from extramural feature F.203 and is a nearly square piece of vesicular basalt with rounded corners, a convex top, and a slightly convex base (Figure 111, a). It had been ground to shape and measures 7.9 by 7.1 by 3.1 cm. The groove is 4.2 cm long, 1.0 cm wide, and 0.4 cm deep.

The other fragment of a vesicular basalt grooved abrader/straightener was found in the fill of isolated Room 22. It had been ground to shape and appears to be part of a circular or oval abrader/straightener with a convex upper surface and a slightly concave base (Figure 111, b). Surviving dimensions are 7.6 by 4.2 cm, with a thickness 2.5 cm. Goove width and depth are 1.4 and 0.4 cm.

The sandstone grooved abrader/straightener may originally have been oval in shape with a plano-convex cross-section (Figure 111, c). The frag-ment measures 5.5 by 5.1 cm and is 3.0 cm thick. It also has been ground to shape and has a groove that is 1.2 cm wide and 0.3 cm deep. This piece was found in the fill of isolated Room 28.

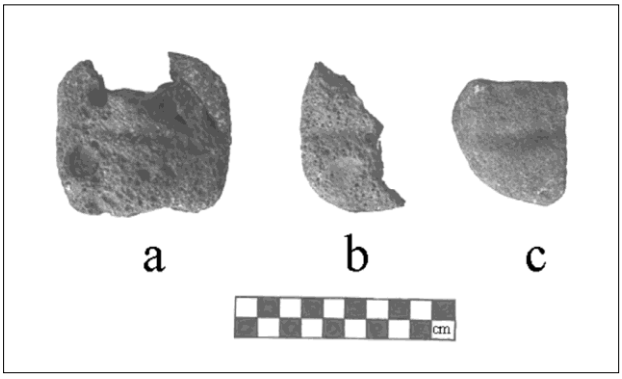


Figure 111. Grooved abrader/straighteners.

Rubbing Stones

Cobbles of granite with a smoothed, broad, convex surface are referred to here as rubbing stones to differentiate them from other stone tools. The wear on these cobbles is similar to that described for hide processing stones (Adams 2002); however, the use of these eight cobbles is unknown but presumably they

were used to work soft materials. Four are complete, and four are fragmentary. The complete specimens have lengths of 12.8-17.9 cm, widths of 11.1-15.3 cm, and thicknesses of 6.2-8.3 cm. They come from the floor of Room 7, posthole F.260 of Room 6, the roof fall of Room 4, the fill of Rooms 1 and 33, and extramural features F.44, F.50, and F.142.

Polishing Stones

Four polishing stones were identified in the assemblage of stone tools. Two are from the floor of Room 7. One is a chert pebble with a crescent shape, measures 7.0 by 3.3 by 2.6 cm, and shows an abraded surface of the long convex edge of the stone, a smooth, polished surface with striations parallel to the edge (Figure 112, a). The other is a quartzite pebble that has been abraded or ground into a subrectangular shape, measures 4.8 by 3.5 by 2.4 cm, has smooth polished upper and lower surfaces and ends, and exhibits faint parallel striations that are perpendicular to the long edges of the upper and lower surfaces (Figure 112, b). While a number of other artifacts were present on the floor of Room 7, evidence of the manufacture of pottery beyond the two polishing stones is limited to an unusual sherd scraper, a sherd with red pigment on one surface, and several pieces of limonite. The third polishing stone was retrieved from the lower first floor of Room 26 where pottery making was more evident and included a sherd scraper, a piece of limonite, a sherd palette with pigment, pottery clay, and an unfired, partially painted clay bowl. This polishing stone is a pebble of quartzite with well-polished surfaces and edges, measuring 4.3 by 3.2 by 1.8 cm (Figure 112, c). The fourth is a pebble of obsidian from the fill of Room 25. It measures 4.5 by 2.4 by 1.8 cm and has one rounded, convex ridge where abrasion has removed the cortex and where the surface is polished with faint striations following the ridge (Figure 112, d).

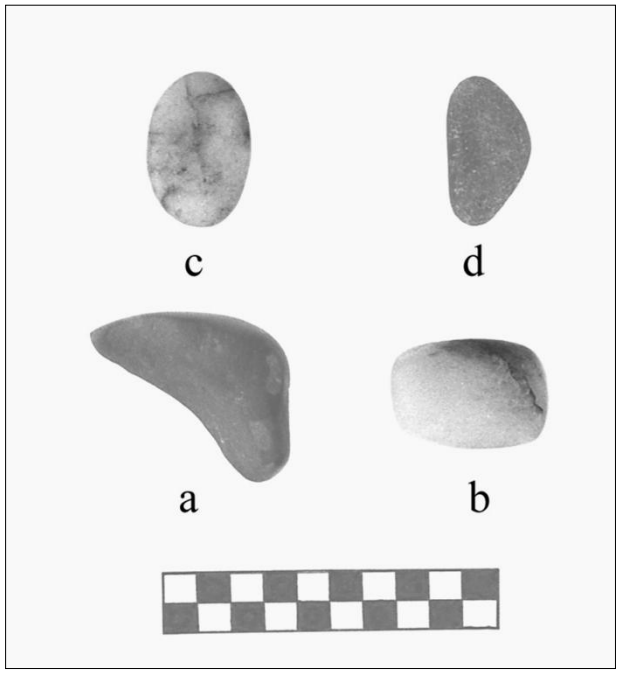


Figure 112. Polishing Stones.

Smooth Pebbles

Smooth pebbles number 28 and include 27 quartzite pebbles and one chert pebble. They range in size from as little as 2.0 cm to as much as 6.2 cm. They are distinguished by smooth and somewhat polished surfaces, but it is not certain if this is the result of the use of these stones as tools. Such stones do not occur naturally in the soils of the site and are likely from lag gravels of nearby alluvial fans. Eleven smooth pebbles are from the floors of Rooms 1, 2, 6, 7, 11, 25, 26, and 29. Five are from the fill of Rooms 1, 25, 27, 28, and 31. Eleven are from the fill of extramural features F.1, F.20, F.68, F.96, F.117, F.118, F.130, and F.203, and one was found in surface materials of the site.

Minerals, Pigments and Fossils

A total of 173 items of minerals, pigments, and fossils were found in varied contexts throughout the site (Table 32). These include crystals of quartz, fluorite, calcite, gypsum, biotite mica, specular hematite, malachite, and chrysocolla and limonite, hematite, and kaolinite pigments. In most cases only one or two of the minerals or pigments were present in the same context. The exceptions are 11 pieces of chrysocolla

on the floor of Room 20 and 116 pieces of specular hematite in extramural feature F.87. Notably, limonite was retrieved from the floors of Room 7 and 26 where polishing stones, sherd scrapers, and sherds with limonite on them were also recorded and intimate the role of limonite in ceramic manufacture.

Two fossils are also included here with minerals and pigments. As noted in Table 32, both are somewhat thin and have natural or punched holes in their centers and are otherwise unmodified. They may or may not have been ornaments.

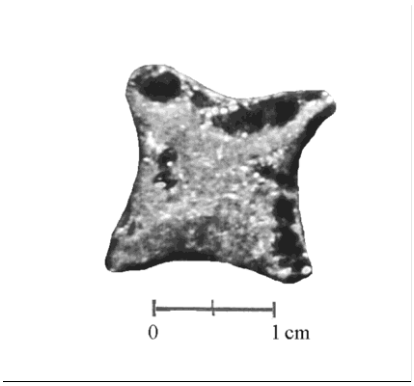
All of the minerals, pigments, and fossils are extra-local. Some may have come from the nearby Franklin or Organ Mountains, others from as far away as Lake Lucero and White Sands National Monument and the Jarilla Mountains near Oro Grande, New Mexico. While some are associated with mundane activities such as pottery making at Firecracker Pueblo, others have been reported as dedication objects or part of floor or subfloor deposits perhaps related to rituals of abandonment. Floor and subfloor deposits of minerals, pigments, fossils and other artifacts have been noted for an Alamogordo pueblo (Stubbs 1930), Robledo Mountain Pueblo (O'Laughlin 1985b), Madera Quemada (Miller and Graves 2009), and La Cabraña (Foster and Bradley 2021). While no deposit of a collection of these materials was observed at Firecracker, these materials may generally have had a special value or meaning for the inhabitants for individual or social rituals.

Table 32. Minerals, Pigments, and Fossils.

Category	Provenience	No.	Remarks
Quartz	Room 22, 25, fill; extramural feature F.203	3	two crystals 1.8 and 4.6 cm in length, both with flake scars at point; quartz ground to oval shape, 2.1 x 1.4 x 0.5 cm
Fluorite	surface refuse	1	roughly rectangular, unmodified
Calcite	Room 25, fill	1	roughly round, possibly battered
Gypsum (Selenite)	Room 3, floor; Room 25, 31, fill; extramural feature F.20, 55, 56	13	thin, 0.4-1.3 mm thick gypsum plaques, rectangular, trapezoidal, to irregular pieces with maximum size of 1.1 to 6.9 cm, unmodified
Biotite mica	Room 22, fill; extramural feature F.203	2	irregular, unmodified
Specular Hematite	Room 11, floor; Room 13, 25, 31, fill; extramural feature F.50, 87, 117	123	116 pieces from F.87; specular hematite and quartz, maximum size 1.4-6.2 cm
Malachite	Room 11, floor; extramural feature F.203	2	irregular, unmodified
Chrysocolla	Room 20, floor; extramural feature F.36	12	irregular, unmodified
Limonite	Room 7 floor; Room 26, floor 2; Room 22, 25, fill; extramural feature F.36, 50, 55, 96, surface reuse	10	maximum size 0.7 to 2.8 cm; one with three and one with two flat facets from abrasion; on with rounded surface from abrasion
Hematite	Room 2, floor; surface refuse	2	maximum dimensions of 0.8 and 2.4 cm; one with two flat facets from abrasion
Kaolinite	Room 22, fill; extramural feature F.139	2	round to rectangular, unmodified
Fossil	Room 21 floor; Room 25 fill	2	crinoid stem, possible bead, 0.6 cm diameter, 0.1 cm thickness; gastropod, possible pendant, 1.3 by 1.2 cm and 0.4 cm thick; both have natural or punched hole of about 0.1 cm in center

As noted by Miller and Graves (2009), such materials have ethnohistoric or ethnographic accounts of their use for ceremonies, inclusion with burials, shrines, and altars, and medicine bundles or pouches. Young (1981) simply calls such items fetishes.

Obsidian Cruciform



An obsidian cruciform was recovered from the fill of isolated Room 20. It had been chipped to shape and then most of its surface had been abraded but not polished (Figure 113). From point to point, it measures 21.6 and 21.0 mm, and it has a thickness of 4.8 mm. Cruciforms are not well-dated but appear to date to the late Archaic, early agricultural period (Hard and Roney 2005; Vint 2015). This cruciform was likely salvaged from another place and, along with other items, may have been left in the room as part of a ritual closure that ended with burning of the room.

Ornaments

Objects of social or ritual importance include 133 ornaments of marine shell, fossils, and stone (Appendix E), as well as two possible fossil ornaments described previously and bone rings reported in the following section on bone artifacts. With respect to the shell ornaments, identifications were made by Ronna Jane Bradley who includes this information and inductively-coupled plasma emission spectroscopy (ICP) of a sample of the shell in her dissertation and other reports (Bradley 1993, 1996, 1999, 2000). Unfortunately, the ICP data did not identify specific geographical sources for the shell.

The marine shell consists of 43 whole shell beads of *Olivella dama* with the spires ground down, eight fragments of *Olivella* sp. beads, two *Nassarius iodes* whole shell beads with holes punched near the orifice for suspension, a whole shell pendant of *Glycymeris* sp. with the umbo ground down to yield a suspension hole, two disc beads of *Glycymeris* sp., one disc bead of *Laevicardium elatum*, 18 disc beads of unidentifiable marine shell, a fragment of a possible *Conus* sp. tinkler, and a fragment of worked *Glycymeris* sp. shell. Additionally, a tubular bead of a Vermitid marine worm was also recovered.

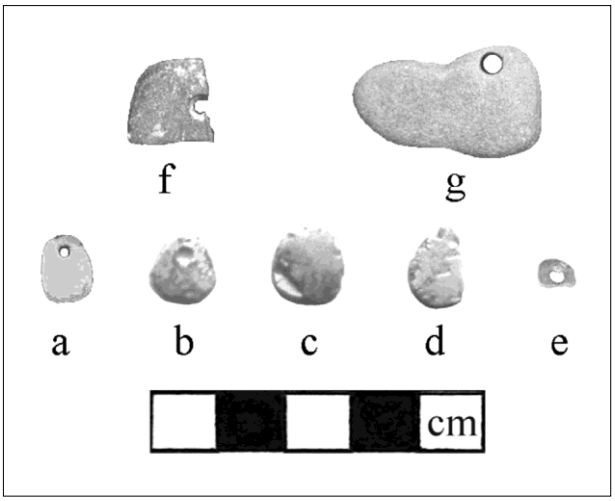


Figure 114. Stone and turquoise ornaments: *a-e*, turquoise; *f*, schist; and *g*, sandstone.

There are 55 long and thin tubular beads of a fossil branch corral. This fossil can be found in the limestone deposits of the Franklin and Hueco Mountains, and pieces have abraded square ends and lightly abraded surfaces to give a round or subrectangular cross-sections. Similar beads have also been found at the Sgt. Doyle site, not far from Firecracker (Lowry 2005).

A variety of stone materials were utilized for five pendants. Four are fragmented and manufactured from schist (Figure 114, f), limestone, quartzite, and lignite. The complete specimen is of sandstone but may be a stone with a natural perforation (Figure 114, g). It exhibits no obvious signs of having been worked.

Turquoise has a small but noticeable representation with 16 pieces (Figure 114). These include one complete pendant (Figure 114, a), one pendant with a partially drilled hole (Figure 114, b), two pendant blanks (Figure 114, c), 2 reworked pendants (Figure 114, d), four pendant fragments, one bead (Figure 114, e), and five pieces of partially worked scrap.

Ornaments appear to have played a role in rituals of abandonment of structures. As noted in Chapter 7, turquoise occurs more often than expected on floors or in features of pueblo rooms and shell ornaments are found in significant numbers on floors or in features of isolated rooms. Notably, turquoise was recovered from the floor of Room 1 and within a posthole of Rooms 1 and 5. Both of these pueblo rooms had burned. Similarly, shell beads were found on the floor and in a floor feature of isolated Room 20 that had also burned. And, a shell pendant had been placed in a posthole of Room 30 that had been intentionally demolished and followed by Room 3. Of additional interest is the presence of 17 shell beads, 53 fossil beads, two stone pendants, and five bone rings in a deposit of disturbed soils that is thought to have come from the roof level of isolated Room 13, another of the burned rooms (Figure 115). The apparent intentional burning of structures with ritually placed ornaments and other materials is not unknown for the Jornada region and has been noted for Madera Quemada (Miller and Graves 2009) and La Cabraña (Foster and Bradley 2021).

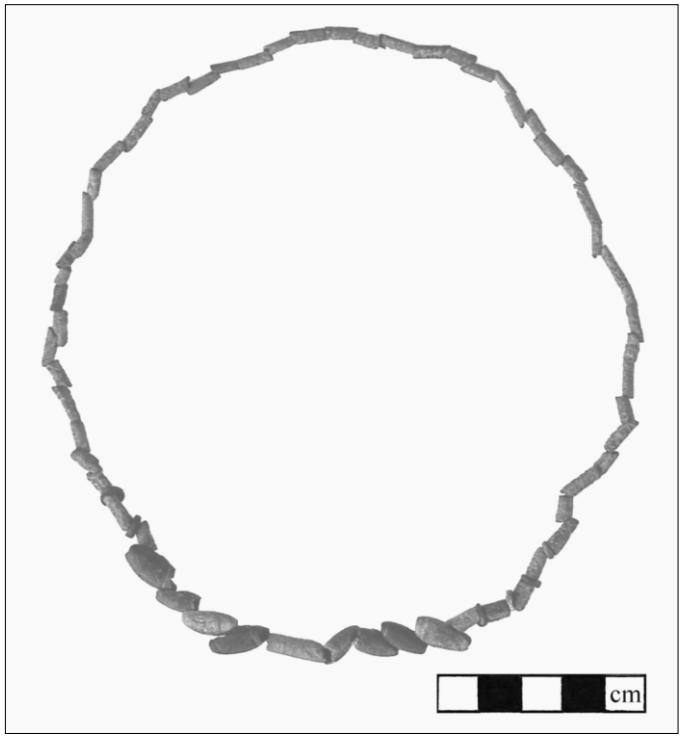


Figure 115. Shell and fossil ornaments from disturbed soils above extramural feature F.117.

Shell ornaments were collected from varied contexts throughout the site and in addition to those termination items listed above. Access to shell does not appear to have been restricted, even though shell is a precious non-local resource most probably from the Gulf of California. Additionally and as reported by Bradley (1996, 1999), the Firecracker assemblage exhibits a low diversity of ornament classes with uneven-ness across the classes as compared to other sites in the Southwest and northern Mexico. There is also little evidence for the working of shell and no decorated shell. Shell may have been acquired through complex prestige or peer-polity exchange networks or ritual economies. However, the assemblage from Firecracker would seem to promote down-the-line or direct exchange as the mechanism for acquiring shell. Certainly, as a low level, end of the network entity, the inhabitants of Firecracker may also have gained access to shell through intermarriage, lineage, sodality, and residential mobility.

Turquoise from Firecracker is bluish green, blue, and green, and much of it, if not all, may be from the Jarilla Mountains to the northeast. A few pieces are finished ornaments. However, most of the turquoise is in the form of scrap, unfinished pieces, and reworked broken ornaments. Turquoise scrap suggests access to turquoise that may have been obtained directly or through exchange with neighboring pueblos. However, the reworking of turquoise and the presence of relatively few turquoise objects would intimate that it was an important but limited resource and that Firecracker was not involved in a larger network moving turquoise from the region elsewhere.

Bone Artifacts

Bone artifacts include whole or fragmented awls, a broad-tipped awl or pin, whole or fragmented rings, and a piece of worked bone. Awls appear to have been made from large mammal bones, and the rings and piece of worked bone are of medium to large mammal bone.

A complete splinter awl was recovered from extramural feature F.136, and two fragments of another splinter awl were found in extramural feature F.174. The complete awl is 13.9 cm long and 1.7 cm wide, with a long tapering point and a weathered surface showing neither polish or use wear (Figure 116, a). The fragmented awl would have been over 8 cm in length and has a width of 1.1 cm, a tapering point, and polished sides and point with a few striations parallel to the long axis. In addition to these two awls, small fragments of midshafts of two other awls with polished edges were retrieved from the floor of isolated Room 15 and extramural feature F.150

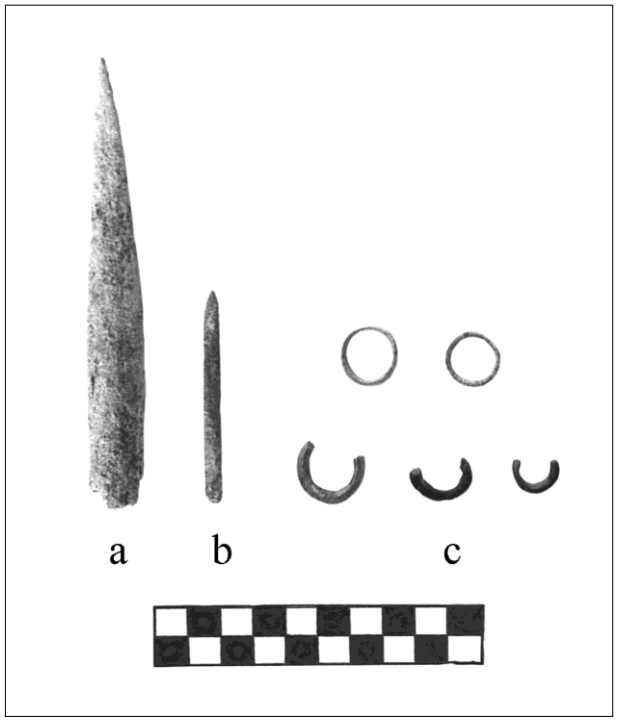


Figure 116. Bone awls and rings.

The distal end of a broad-tipped awl or possibly a pin was discovered in extramural feature F.395 (Figure 116, b). The shaft is long and thin with a roughly circular cross-section, and has a maximum diameter of 0.4-0.5 cm and a surviving length of 6.6 cm. The distal end of this tool tapers sharply to an angled point, and the point and some of the shaft above the point shows a light polish.

Twelve complete bone rings and fragments of another 10 bone rings were recovered from Firecracker (Figure 116, c). One of the complete rings is from the fill of isolated Room 25, and the other is from extramural feature F.1. Five fragments of rings are from extramural features F.1, F.20, F.110, and F.174. The remaining five fragments of rings are burned and from the disturbed soils above extramural feature F.117 where they were associated with burned shell, fossil, stone ornaments mentioned previously. Outside diameters range from 1.5 to 2.2 cm, widths are 0.3to 0.9 cm, and thicknesses are 0.1 to 0.4 cm. Edges are abraded smooth, and a few show a light polish.

The single piece of worked bone is from extramural feature F.54, is a small fragment of a long bone shaft of about 2 cm in diameter, and has a two, V-shaped and abraded grooves perpendicular to the shaft. One of the grooves is at the end of the bone and has been broken along the groove. The other groove is 0.5 cm from edge groove, a good width for a bone ring. Perhaps, the bone broke before completion of a cut for a ring.

Summary

A large and diverse artifact assemblage was recovered and reflects long-lived occupations of a residential settlement. The prominent diagnostic ceramic of this site is the classic style of El Paso Polychrome, principally in the form of large jars. This ceramic and associated small, triangular projectile points, two-hand manos, and trough metates point to a late Pueblo period occupation. Similarly, trade wares are predominantly of the Pueblo period, and the late wares Agua Fria Black-on-red, Gila Polychrome,

Escondida Polychrome, and Heshotuathla Polychrome were present only on the floors of pueblo rooms or in the fill of earlier isolated rooms.

Vessel forms, painted designs, and attributes of rims have been described to assist regional studies of local brownwares. Of note is the predominance of jars over other vessel forms, and jars with an orifice diameter of 20 cm or greater are more common on pueblo floors than isolated room floors. Bowls, however, are better represented on the floors of isolated rooms. The differential distribution of large jars and bowls is seen as a reflection of the intended length of occupation. That is, large jars are not easily moved and may have been used for storage or perhaps the processing of maize for feasts or rituals. Thus, the better representation of large jars and the lesser representation of bowls would appropriately correspond to longer occupations such as the pueblo as opposed to the presumed shorter-lived occupations of isolated rooms.

Sherd scrapers, polishing stones, and pigments associated with pottery making were found on floors of both the pueblo and isolated rooms and are often encountered at other Pueblo period sites. Surprisingly, pottery clay and an unfired clay bowl were found in an isolated room, and pottery clay from a local source was also recovered from a second isolated room. Pottery making is an activity that can be associated with the pueblo and at least some of the isolated rooms and suggests some overlap in activities for the various occupations.

Modified sherds, including the abovementioned utilized sherds linked to pottery production, are varied and found in all site contexts. The most meaningful distribution is the presence of large sherds with worked or unworked edges on pueblo and isolated room floors, presumably used as plates or as palettes in some instances.

The chipped stone assemblage is second to ceramics in terms of number and illustrates an intensive, expedient core technology with a preponderance of flakes and relatively few cores, flake tools, and bifacially worked objects. This is a pattern common to residential sites of the region and stands in principle for all contexts, though some differential distributions of materials are noted in Chapter 7. Additionally, the somewhat high number of flakes with multiple modified edges further intimates the intensity of use and possible re-use of flake tools.

Materials used for chipped stone are almost exclusively sourced from the near vicinity of the site. Although a number of materials were utilized, cherts were preferred and dominate all categories of chipped stone. There is also a preferential use of obsidian, and many of the projectile points are of obsidian. The raw material selection evidenced at this site is comparable to other El Paso phase sites of the western Hueco Bolson.

Ground stone, as with chipped stone, is manufactured largely of local materials available on upper alluvial fans or in the nearby Franklin Mountains. Ground stone includes metates, manos, mortars, pestles, shaft smoothers, pigment crushers, rubbing stones, polishing stones, and numerous other, mostly fragmented, active and passive abraders. The varied assemblage of ground stone reflects the residential nature of the occupations and a wide range of activities. Of particular interest are manos and metates where length of manos and width of grinding areas of metates suggest a moderate to high dependence upon maize agriculture.

Ground stone exhibits a site-wide distribution. However, metates, manos, mortars, and pestles occur on the floors of pueblo and isolated rooms and abraders on the floors of isolated rooms in higher than expected numbers. These items may be de facto refuse associated with abandonment of the settlement as in the case of Room 7. Or, some may have been cached for later use as in the case of Room 15. An extramural feature with a metate and manos and another with pestles may also illustrate the caching of objects for potential recovery and use.

Clay for brownware ceramics and stone for chipped or ground stone was obtained primarily from nearby natural sources. Additionally, materials left at other places of occupation may have been scavenged for use. The evidence is limited primarily to objects identifiable as temporally earlier and includes sherds of Mimbres Black-on-white and El Paso Brown and Bichrome, early Formative and Archaic projectile points, and a cruciform. Several biface fragments with worn surfaces from exposure may also be salvaged pieces.

Some materials do not occur nearby and were acquired at a distance through logistical forays or exchange with neighboring settlements. Vesicular basalt for metates, manos, and shaft smoothers was likely obtained from along or west of the Rio Grande. Minerals, pigments, and fossils may largely have been sourced from nearby mountains, but the origin of gypsum plaques, chrysocolla, and malachite could have been as far away as Lake Lucero or the Jarilla Mountains. The few ornaments and pieces of scrap turquoise are also most probably from the Jarilla Mountains.

Extra-regional exchange is demonstrable in trade wares that constitute a small percentage of the ceramics. Chupadero Black-on-white from the Sierra Blanca or Salinas areas is the most common intrusive, Seco Corrugated and Magdalena Black-on-white from the Black Range and southern Cibola areas are prominent, ceramics from the Casas Grandes region are fairly numerous, and Tucson and Gila Polychromes illustrate trade to the west.

Shell is yet another indicator of inter-regional exchange. The assemblage is relatively small and made up almost entirely as finished ornaments. While coming most probably from the Gulf of California, the mechanism for shell trade is poorly understood. The small number of shell ornaments, as well as the small number of turquoise ornaments and sherds of extra-regional ceramics, would suggests little more than a down-the-line mechanism for trade with a network of direct local exchange.

CHAPTER 9
BOTANICAL REMAINS

The investigation of Firecracker Pueblo yielded a large number of soil and macrobotanical samples with plentiful carbonized remains of plants. Soil samples numbering 128 from rooms and extramural features were selected for flotation and analysis, and all 768 macrobotanical samples retrieved during excavation were examined. Maize cob fragments and/or kernels were found in 89% of the flotation samples and intimated the importance of agriculture for this settlement. Some thirty-six thousand items were recovered from the flotation samples, and the density of seeds and other reproductive plant parts was 136 per liter of soil. Additionally, more than twenty thousand items were enumerated for the macrobotanical samples. Thirty-nine taxa were recognized among the samples and furnished considerable data on resources exploited by this community.

The abundance of burned plant remains is unusual for a lowland site of the Jornada region. This is largely attributed to the burning of a number of rooms. Many stems and seeds of grass are among the burned roofing materials of pueblo rooms and an isolated room. Similarly, large numbers of maize cobs and kernels and beans are noted for a single burned isolated room. These extraordinary occurrences are interesting by themselves but do not alter the general findings and the fact that burned botanical remains are otherwise quite prolific.

Methods

The burned plant remains come from two different, yet complementary samples. Macrobotanical samples were obtained through hand excavation or screening of soils and are biased toward larger pieces of charcoal and easily recognized seeds and other reproductive plant parts. Flotation samples, on the other hand, can have a bias toward smaller remains. Additionally, macrobotanical samples were taken from many contexts throughout the site, while flotation samples were limited to the number of samples that could be processed and analyzed for this project.

Macrobotanical samples required little more than cleaning before attempting identification. Flotation samples, however, involved a more laborious process. The 128 samples and 200.4 liters of soil were processed by a simple water flotation process. Soils were placed in a pail, water was added and stirred, and the suspended material was collected in a mesh of about 0.3 mm. This was repeated until charcoal was no longer visible in the water or in the remaining sediments in the pail. The fine fraction in the mesh was then dried and packaged. The heavy fraction in the pail was water screened through about a 1mm screen, and the residue sorted for any remaining charcoal, bones, or artifacts.

The fine fraction from flotation samples was further sifted through a series of 0.5-4 mm geological screens. The contents of each screen were examined under a binocular microscope for seeds and other non-wood materials which were separated for identification. Charcoal in the 4 mm screen was separated from other materials for wood identification.

Identification of burned plant remains was by comparison with materials of the writer or in the collections of the Department of Biology of the University of Texas at El Paso. In a few cases, reference was made to standard published sources. For charcoal samples, pieces were snapped to reveal a clean surface for identification of the wood, and an attempt was made to identify 20 pieces of charcoal in each of the flotation and macrofloral samples. In those cases where identification was uncertain but reasonable on morphological grounds, a “cf” indicates the taxon in question.

Results

The various taxa and the parts represented are listed in Table 33. Cultigens include maize, common bean, possibly tepary bean, squash, and bottle gourd. Resources available on the bolson floor near the site

Table 33. Plant Taxa Recovered from Flotation and Macrobotanical Samples.

Taxon	Common Name	Part
Zea mays	maize	cob cupule, kernel, stalk, leaf
Phaseolus vulgaris	common bean	bean
Phaseolus cf *acutifolius*	tepary	bean
Cucurbita sp.	cultivated cucurbit	rind, seed
Lagenaria siceraria	bottle gourd	rind
Cucurbita foetidissima	buffalo gourd	rind
Apodanthera undulata	melon loco	seed
Prosopis glandulosa	mesquite	seed, seed coat, pod, wood
Prosopis pubescens	tornillo	seed, pod
Platy-opuntia (*Opuntia* sp.)	prickly pear	seed
Echinocereus sp.	pitaya or hedgehog cactus	seed
Echinocactus sp.	Turk's cap or barrel cactus	seed
Yucca elata	narrow-leaf or soaptree yucca	leaf, leaf fibers, flowering stalk
Yucca baccata	datil	seed, fruit
Dasylirion wheeleri	sotol	leaf, flowering stalk
Agave cf lechuguilla	lechuguilla	leaf, leaf fibers, flowering stalk
Sporobolus sp.	dropseed	seed, stem, leaf
cf Bouteloua curtipendula	sideoats grama	seed
Poaceae	grass family	seed, stem
Phragmites communis	common reed	stem
Amaranthus sp.	amaranth/pigweed	seed
Cheno-Am	amaranth/goosefoot	seed
Chenopodium sp.	goosefoot	seed
Portulaca sp.	purslane	seed
Kallstroemia parviflora	warty caltrop	seed
Malvaceae	mallow family	seed
cf *Koeberlinia spinosa*	allthorn	seed
Lepidium sp.	peppergrass	seed
Brassicaceae	mustard family	seed
Euphorbia sp.	spurge	seed
cf *Viola* sp.	violet	seed
cf *Ambrosia* sp.	ragweed	seed
Asteraceae	sunflower family	seed
Atriplex canescens	four-wing saltbush	wood, fruit
Larrea tridentata	creosotebush	wood
Ephedra trifurca	ephedra or joint fir	wood
Populus sp.	cottonwood	wood
Quercus sp.	oak	wood
Juniperus sp.	juniper	wood

include mesquite, narrow-leaf yucca, four-wing saltbush, dropseed and other grasses, prickly pear, melon loco, and ruderals and other herbaceous plants. Prickly pear, pitaya, Turk's cap, datil, lechuguilla, allthorn, ephedra, and creosotebush occur on the alluvial fan or bajada a short distance west of the site, and some of these plants can be found on south slopes further into the Franklin Mountains. Tornillo, cottonwood, and oak may have come from sheltered lower canyons of the Franklin Mountains, and sotol is present on upper portions of the alluvial fan and lower elevations of the mountains. The only plants which may have been sourced at some distance are juniper and the common reed. A few juniper can be found in protected areas high in the Franklin Mountains, but juniper are better represented in the Organ Mountains to the north. The common reed can be found today in marshy areas along the Rio Grande.

Flotation Samples

Provenience, sample volume, and counts for identified burned seeds and other non-wood items and unidentifiable remains for the 128 flotation samples is given in Appendix F.1. These data are summarized by site context in Table 34 where the number of items per liter of soil is provided for each site context and for each taxon. Total counts and ubiquity are also provided for each taxon and for all samples

Cultigens are well-represented in the flotation samples, with maize found in a high percentage of the samples. Maize cupules (cup-shaped sockets in a maize cob that hold two kernels in place) occur in 82% of the samples, and maize kernels were present in 77%. Common bean, common or tepary bean, a cucurbit, and bottle gourd are also in the samples but occur less frequently and with ubiquity values between 3% and 19%.

The counts of cultigens vary by context. With respect to maize and beans, the floors, hearths, and pits of pueblo rooms and isolated rooms have the lowest density of these cultigens, and this would seem to be a reflection of the regular maintenance of rooms. Middle range values are noted for trash-filled isolated rooms and extramural features. The highest values are for isolated Room 13. Samples taken from just above the floor of this burned room exhibit very high densities of maize cupules and kernels and beans. These samples were taken from deposits with obvious high numbers of either maize or beans. A total of 10,006 maize kernels and beans are recorded for the two flotation samples, while 9,498 maize kernels and beans are noted for macrobotanical samples from the remainder of the room. Obviously, the density of maize kernels and beans for the entire room is less than that suggested by the flotation samples. It is also higher than the macrobotanical count would indicate, given that not all items were collected and many smaller pieces passed through soil screens. Nevertheless, a substantial number of carbonized maize kernels and beans have resulted from the burning of Room 13.

Two other occurrences of cultigens are of interest. A relatively high density of maize cupules is observed for small thermal features where maize cobs were used with woods as fuel. Ninety-two bottle gourd fragments were recovered from the bottom of the floor pit (F.328) in isolated Room 15 and below a mortar and pestle and other artifacts in the pit. This room may have burned, a possibility considered further below.

Twenty-seven taxa of native plants are represented in flotation samples (Table 34). Many of these are also known to have been utilized by the Mescalero Apache whose historic territory included the Hueco Bolson. Castetter and Opler (1936) provide a good summary of Mescalero plant use that is largely repeated by Basehart (1974). These sources outline collection practices where important resources include roasted agave hearts, datil fruits, piñon nuts, and mesquite pods; where sotol or narrow-leaf yucca hearts could substitute for agave; where less important plants included the fruits of prickly pear and various hedgehog cacti, flowering stalks of sotol and yucca, acorns, and juniper berries; and where among the minor resources were dropseed and other grass seeds, wild potatoes, onion, walnut, chokecherry, sumac berries, grapes, sunflower seeds, and greens and seeds of such plants as amaranth, goosefoot, and purslane.

Table 34. Density of Carbonized Seeds and Other Non-wood Items by Context and Total Count, Density and Ubiquity for All Flotation Samples.

Taxon Density (No./Liter)	Pueblo Room Floor 9 samples 12.4L	Pueblo Room Hearth 4 samples 4.9L	Isolated Room Fill 8 samples 9.85L	Isolated Room Floor 10 samples 16.6L	Isolated Room 13 Floor 2 samples 2.55L	Isolated Room Hearth 14 samples 18.95L	Isolated Room Floor Pit 3 samples 4.2L	Extramural Posthole 2 samples 2.5L	Small Thermal Feature 15 samples 26.1L	Large Thermal Feature 9 samples 15.65L	Storage Pit 20 samples 37.05L	Borrow 9 samples 13.4L	Non-specific Feature 23 samples 36.25L	All Samples 128 samples 200.4L		
														Number	No./Liter	Ubiquity
maize cupule	3.31	0.61	14.21	6.51	252.15	4.33	0.48	14.00	52.03	15.91	22.16	10.00	14.62	4146	20.69	82.0%
maize kernel	1.13	0.20	8.53	1.99	2286.67	3.75	0.24	9.60	6.09	1.41	6.88	12.54	2.59	6757	33.72	77.3%
maize leaf/stalk	0.73		0.61	0.36		2.32			0.15	0.32	0.38	0.75	0.08	101	0.50	16.4%
common bean			0.10		160.00				0.08		0.27	0.67	0.03	431	2.15	7.8%
common/tepary bean			2.23	0.24	1477.26			4.80	0.04	0.13	0.32	17.31	0.22	4060	20.26	18.8%
cucurbit rind	0.08			0.06						0.06		0.07		4	0.02	3.1%
bottle gourd rind				0.06			21.90	3.20	0.04		0.03		0.17	109	0.54	6.3%
melon loco seed			1.02			0.11		3.20			3.75		0.94	193	0.96	7.8%
buffalo gourd rind											0.05			2	0.01	0.8%
mesquite seed/exocarp			2.74	10.90		1.06	5.00	1.60	0.61	0.89	2.59	17.69	0.72	642	3.20	30.5%
mesquite pod										0.06	0.08	0.37		9	0.04	2.3%
tornillo pod									0.04					1	0.00	0.8%
platy-opuntia seed			0.10	0.06				8.40	0.08		2.56	1.12	0.80	164	0.82	12.5%
hedgehog seed											0.03	0.07		2	0.01	1.6%
barrel cactus seed													0.11	4	0.02	0.8%
datil seed			0.71	0.30		0.21		1.20		0.26	0.13	0.15	0.03	31	0.15	8.6%
yucca leaf			0.20	0.06			0.48		0.04	0.06	0.16		0.08	16	0.08	6.3%
yucca leaf fiber											0.38		0.28	24	0.12	3.9%
cf lechuguilla leaf											0.03			1	0.00	0.8%
cf sotol leaf											0.27			10	0.05	1.6%

Table 34. Continued.

Taxon Density (No./Liter)	Pueblo Room Floor 9 samples 12.4L	Pueblo Room Hearth 4 samples 4.9L	Isolated Room Fill 8 samples 9.85L	Isolated Room Floor 10 samples 16.6L	Isolated Room 13 Floor 2 samples 2.55L	Isolated Room Hearth 14 samples 18.95L	Isolated Room Floor Pit 3 samples 4.2L	Extramural Posthole 2 samples 2.5L	Small Thermal Feature 15 samples 26.1L	Large Thermal Feature 9 samples 15.65L	Storage Pit 20 samples 37.05L	Borrow 9 samples 13.4L	Non-specific Feature 23 samples 36.25L	All Samples 128 samples 200.4L		
														Number	No./Liter	Ubiquity
grass stems	77.5	496.12	26.60	27.59	1414.90	13.09	26.43	1.20	1.23	1.85	8.64	12.54	1.90	8700	43.41	82.8%
dropseed seed	244.03	879.18	21.12	9.64	1.18	4.75	182.38	1.20	1.15	1.02	3.70	1.64	0.74	8796	43.89	67.2%
cf sideoats grama													0.08	3	0.01	1.6%
grass seed			0.10						0.04		0.11	0.07	0.14	12	0.06	5.5%
reed stems	0.24	0.20					0.24				0.03			6	0.03	3.1%
pigweed seed	59.27	118.78	2.34	0.24	0.40	0.47	0.48		2.72	0.89	3.97	0.37	0.72	1619	8.08	43.0%
goosefoot seed									0.04		0.08		0.03	5	0.02	2.3%
cheno-am seed								2.40		1.60	3.45	0.15	0.06	163	0.81	10.9%
saltbush fruit										0.06	0.05	0.07		4	0.02	2.3%
portulaca seed	0.08	7.35	4.37	5.24		0.05	0.24	0.80	1.11	0.96	1.43	0.60	0.41	291	1.45	34.4%
peppergrass seed											0.03		0.03	2	0.01	1.6%
mustard family seed									0.04				0.03	2	0.01	1.6%
caltrop seed						0.21	0.24				0.70	0.97	0.03	45	0.22	6.3%
spurge seed									0.04				0.06	3	0.01	1.6%
mallow family seed				0.06		0.05	0.24		0.08		3.21			124	0.62	6.3%
cf allthorn seed											0.03			1	0.00	0.8%
cf violet seed											0.30			11	0.05	0.8%
cf ragweed seed									0.15					4	0.02	0.8%
sunflower family seed									0.04					1	0.00	0.8%
total	386.37	1502.44	84.98	63.31	5592.56	30.40	238.35	51.60	65.84	25.48	65.80	77.15	24.90	36449	181.88	

As might be expected, many of the plants utilized by the Mescalero are also recorded by burned remains at Firecracker, and this would imply that the inhabitants of Firecracker and the Mescalero made use of plant resources in much the same way. However, it must be remembered that the Firecracker local is only a portion of the range of the Mescalero and that the inhabitants of Firecracker were more dependent on horticulture. Thus, differences may be expected with respect to the resources annotated for the Mescalero and those noted by carbonized remains at Firecracker Pueblo.

A small number of leaf fragments and fibers of narrow-leaf yucca, leaf fragments of sotol, and a leaf fragment of an agave were recovered. They were found principally as refuse in extramural storage pits and non-specific features and were noticeably absent from pueblo rooms. Given the absence of large thermal features with rock and rock near the site, it is probable that the hearts of leaf succulents were not processed at the site. Rather, logistical forays to the nearby upper alluvial fan or bajada and the Franklin Mountains were likely undertaken to gather and process leaf succulents (see Hard 1983b; Miller 1989; O'Laughlin 1979). The burned leaf fragments and fibers of these plants at Firecracker may not be associated with the use of these plants as food, but more likely as evidence of on-site manufacture of cordage, sandals, and matting.

Datil, another leaf succulent, is noted by a small number of burned seeds in a relatively small number of samples. They occur in surface refuse, a number of extramural features, and isolated rooms. The fruits were utilized for food, and the seeds discarded. The seeds make their way into the archaeological record as intentionally or unintentionally burned refuse. The presence of datil seeds would suggest that the fruits were of some importance, as they were for the Mescalero.

Mesquite is somewhat like datil. The seeds and exocarp or seed coat are a by-product of separating the edible bean pulp from the seeds, and the seeds then burned by chance or intentionally as refuse. The importance of mesquite beans for food would appear to be more important than the fruits of datil. That is, there are many more seeds and seed exocarps, as well as some pod fragments, and they are found in nearly a third of the flotation samples and throughout the site with the exception again of pueblo rooms. An interesting occurrence of burned mesquite seeds and exocarps is in isolated Room 15 where many were found on the floor and within the floor pit F.328. Within the floor pit was found a mortar and pestle likely used in processing mesquite beans, and the presence of mortar, pestle, and burned mesquite seeds together would imply that the processing of mesquite beans was carried out within the room.

The burned seeds of prickly pear (platy-opuntia) are moderately abundant and were recovered from a fair percentage of the samples and most contexts but not the pueblo rooms. As with mesquite and datil, the seeds were burned incidentally to the use of the edible fruit.

Tornillo pods are comparable to mesquite beans in properties and preparation, as are hedgehog and barrel cactus to prickly pear. However, these are apparent minor resources in that only one tornillo pod and six seeds of hedgehog and barrel cactus were identified in the flotation samples.

Pigweed, goosefoot, and purslane are herbaceous plants with small seeds. They are common plants to disturbed areas, and their presence as burned seeds in the flotation samples could be attributed to cultural as well as natural factors. Few seeds of goosefoot were identified, though some may be among the category cheno-am (either pigweed or goosefoot). The seeds of pigweed and purslane are recorded from almost all contexts and in more samples than the aforementioned native species. Thus, it is most likely that their presence is the result of the use of the greens or seeds of these plants as food. Parching of seeds may also have contributed to their numbers in the carbonized remains. The majority of the pigweed seeds were recovered from the floor and hearth (F.204) of pueblo Room 1. Purslane seeds were also well-represented in the sample from the hearth of Room 1, and nearly half of the purslane seeds were recovered from the sample from the floor of isolated Room 19. The differential distribution of the burned seeds of pigweed

and purslane, as well as mesquite, could be a reflection differing household activities, season of occupation, and even season of abandonment. Unfortunately, the flotation data does not warrant a specific interpretation.

Wild cucurbits of limited use include buffalo gourd and melon loco. Buffalo gourd is represented only by two rind fragments. The seeds are said to have been roasted and eaten by the Pima and Isleta (Jones 1931; Russell 1908), and the Western Keres used the gourds as rattles (Swank 1932). Within the Jornada region, a painted disk of buffalo gourd is recorded for Chavez Cave (O'Laughlin 2003).

Pennington (1980) describes the use of the bitter fruit of melon loco by the Pima Abajo, and Hodgson (2000) notes that the Onavas Pima used the fruit when food was in short supply. Lira and Caballero (2002) also report the present day use of roasted seeds of melon loco in the northern states of Mexico. Burned seeds have been recovered from a Dona Ana phase site and a Dona Ana to early El Paso phase site near Orogrande (O'Laughlin 2002), a Mesilla phase site and El Paso phase site on the northeastern edge of the Hueco Bolson (McBride 2007), and a cave in the Hueco Mountains (O'Laughlin 1977b). A fair number of burned melon loco seeds were found at Firecracker where they occurred with other trash in extramural pits of various sorts.

A number of the taxa could not be identified beyond the genus or family level, and most are noted by no more than four burned seeds. Some may have been used for food, and these would include peppergrass, members of the mustard and sunflower families, and possibly allthorn. Others may have been utilized for their medicinal value. Among this later group are spurge, ragweed, violet, warty caltrop, saltbush, and members of the mallow family. Most of these taxa are herbaceous and their seeds may have been introduced by natural means unconnected to or incidentally to activities of inhabitants of this settlement. Nevertheless, the higher numbers of seeds for warty caltrop, violet, and members of the mallow family would suggest a medicinal use of these plants.

The largest number of carbonized seeds from the flotation samples is for grass seeds of dropseed. Dropseed seeds and probable dropseed grass stems constitute 48% of the material recovered from flotation samples and were retrieved from a similar number of samples when compared to maize cupules and kernels. While they are found in all contexts, the overwhelming majority of grass seeds and stems are associated with burned rooms. This includes floor and hearth samples from pueblo Rooms 1, 2, 4, and 6 and isolated Rooms 13 and 20. The abundance of grass seeds and stems in these rooms is indicative of their use as roof materials. Common reeds and maize stalks were also used as roofing material, but their distributions are not as pointed.

The burned seeds of dropseed and grass stems are not only found in burned rooms but also in unburned rooms, extramural features and surface refuse. The seeds of dropseed have also been recorded for a number of archaeological sites in the region (Deering 2001; O'Laughlin 2001c, 2002, 2005a, 2008a; Toll 2004). As suggested by O'Laughlin (2001c), dropseed was probably used as a food resource following the use of the Mescalero as a minor resource or one used at times of food scarcity.

Room 15 presents an interesting issue. The excavation of this isolated room did not reveal definite evidence of it having been burned. However, the pit (F.328) in the northwest corner of the room raises questions. Walls of this feature were fire-reddened, and the carbonized materials in the bottom of the pit raise the question of whether the room might have been burned and reoccupied or abandoned and burned. The materials include the burned remains of a diverse range of plants dominated by the seeds of dropseed and grass stems, a combination not unlike samples from burned rooms. Samples from the hearth and floor also have seeds of dropseed and grass stems, as well as other materials. Given the presence of seeds of dropseed and grass stems in all three samples from this room, it must be considered that Room 15 was burned at or following abandonment or, less likely, that the room was burned and then reoccupied.

Table 35. Wood Identifications from Flotation Samples.

Provenience		No. of Flotation Samples	mesquite	saltbush	creosotebush	cottonwood	oak	lechuguilla stalk
Pueblo Room	Floor	4	16			59		7
	Room 6 Hearths	2	3			21		13
	Total	6	19			80		20
	Percent		15.97			67.23		16.81
Isolated Room	Fill	3	53	2				2
	Room 20 Floor	1	4					6
	Room 20 Hearth	1				1		9
	Other Floor	3	41					0
	Hearth	3	59	0	2			0
	Floor Feature	2	14	0	0			8
	Total	13	171	2	2	1		25
	Percent		85.07	1.00	1.00	0.50		12.44
Extramural Feature	Small Thermal	5	82	1				0
	Large Thermal	5	68					2
	Storage Pit	13	164	11	12			3
	Borrow	5	74	5	2			2
	Non-specific Pit	13	164	19		2	1	3
	Total	41	552	36	14	2	1	10
	Percent		89.76	5.85	2.28	0.33	0.16	1.63
All Samples	Total	60	742	38	16	83	1	55
	Percent		79.36	4.06	1.71	8.88	0.11	5.88

Charcoal was identified from a sample of 60 flotation samples, and the results are listed in Table 35. Appendix F.2 provides provenience information. Six species are represented. Mesquite and saltbush can be found in the site vicinity and throughout lowland areas and into lower elevations of nearby mountains. Creosotebush and lechuguilla are generally restricted to alluvial fans and exposed portions of the Franklin Mountains and occur a short distance to the west of the site. Cottonwood and oak are in some of the protected lower canyons of the Franklin Mountains, and oak is also found at higher elevations.

Mesquite makes up nearly 80% of the identified pieces of charcoal. Mesquite is present in all contexts; however, it is not the predominant wood for pueblo rooms where burned roof materials dominate. Mesquite is the most common, if not the only, species represented by charcoal used for fuel in lowland ephemeral and residential sites of the region.

Saltbush and creosotebush are recorded in small numbers and principally as refuse in extramural features. A single piece of oak was also noted for a nonspecific extramural feature. All three of these species would appear to be secondary resources for fuel.

Cottonwood and the flowering stalks of lechuguilla are present primarily in the flotation samples from burned rooms where they were used as elements in roof construction. These flotation samples are from pueblo Rooms 3, 4, 5, and 6 and isolated Room 20. Lechuguilla stalks are in the sample from the floor pit (F.328) of Room 15, and, as noted before, there is some question as to whether Room 15 might also have burned. A few pieces of cottonwood and lechuguilla were recovered from extramural features, suggesting that they were additional secondary fuels.

Macrobotanical Samples

Carbonized seeds and other non-wood items from the 768 macrobotanical samples are enumerated by context in Table 36. Fewer taxa were identified than for the flotation samples, and small seeds are poorly represented. However, a number of patterns recognized for the flotation samples are also evident for macrobotanical remains. Cultigens dominate the assemblage, little was recovered from pueblo rooms, and grass stems and common reed presumably used for roofing material were largely found in burned rooms.

Maize cob cupules are numerous and are distributed throughout the site. Many occur in the burned isolated Rooms 13 and 20 and in association with burned maize kernels and beans. Many also occur as refuse in the fill of isolated rooms and extramural features and as surface refuse. A number are also noted for thermal features where maize cobs were certainly used as fuel.

Maize kernels are primarily restricted to the burned isolated Room 13; whereas, few were collected from other contexts. Cobs with kernels and shelled maize, along with beans, are abundant in both the macrobotanical and flotation samples of Room 13. These materials appear to have been on the roof and/or suspended from the roof at the time of the fire. A cob with kernels was also found on the floor of the burned isolated Room 20. As commented upon in Chapter 6, it is possible that both rooms were intentionally burned as part of an abandonment ritual.

Nearly all of the beans are from Room 13. These include numerous common beans, a small number of possible tepary beans, and a large number of beans that could be either common or tepary beans. Similarly, the majority of fragments of bottle gourd rind are from Room 13.

Cultivated cucurbits consist of four rind fragments from Room 20 and four seed fragments from surface refuse and a borrow pit. The seed fragments have the appearance of *C. mixta* but are too fragmented for a definite identification.

Mesquite seeds and pod fragments, tornillo pod fragments, and seeds of prickly pear and melon loco are noticeably represented and were recovered from the fill of isolated rooms and extramural features and the surface refuse. Datil seeds and fragments of the fruit are more numerous in the macrobotanical samples than for the flotation samples; however, most of the datil specimens are from a single feature, a borrow pit F.203.

Leaf succulents are marked by leaves of narrow-leaf yucca and possibly lechuguilla. Ninety-three fragments of yucca leaves were found in the fill if isolated Room 25 and include a square knot and bent and twisted leaves that may be portions of a sandal or possibly a netted carrier. The five leaf fragments of lechuguilla are from storage pit F.65 where they occur as refuse, perhaps from processing lechuguilla for food or possibly from making cordage or some other activity.

Table 36. Counts of Carbonized Seeds and Other Non-wood Items by Context and Total Count and Percentage for All Macrobotanical Samples.

Taxon	Pueblo Room Floor	Pueblo Room Floor Feature	Subtotal	Isolated Room Fill	Isolated Room 13 Roof	Isolated Room 13 Floor	Isolated Room 20 Floor	Isolated Room Floor	Isolated Room Floor Feature	Subtotal	Extramural Posthole	Small Thermal Feature	Large Thermal Feature	Storage Pit	Borrow	Non-specific Feature	Subtotal	Surface Refuse	Total All Contexts	Percent of All Taxa
maize cupule	5		5	1060	759	553	119	178	1	2670	1	206	46	755	414	2065	3487	244	6406	36.62
maize kernel	2		2	19	4699	3244	41	1		8004		3	5	21	70	3	102	393	8501	48.60
maize stalk															1	4	5	1	6	0.03
common bean	1		1	5	303	478				787			5	5	7		17	24	829	4.74
common/tepary bean					406	359		1		766				1	6		7	2	775	4.43
cf tepary bean						9				9					2		2		11	0.06
cucurbit rind							4			4									4	0.02
cucurbit seed															2		2	2	4	0.02
bottle gourd rind		1	1	1	3	11				15					4		4	1	21	0.12
melon loco seed	1		1															4	5	0.03
mesquite seed				1					1	2	7		2	1	26	1	37	16	55	0.31
mesquite pod		1	1	3						3				1	13	0	14	6	24	0.14
tornillo pod				2						2									2	0.01
platy-opuntia seed											2				1		3	1	4	0.02
datil seed				15						15					270	1	271	4	290	1.66
datil fruit carpel				1						1			1		10		11		12	0.07
yucca leaf				93						93									93	0.53
cf lechuguilla leaf														5			5		5	0.03
grass stem	310		310	5	7	74	34	3		123		1		2	1		4		437	2.50
reed stem	3		3													1	1	5	9	0.05

Table 37. Wood Identifications from Macrobotanical Samples.

Provenience		mesquite	saltbush	creosotebush	ephedra	cottonwood	oak	yucca stalk	lechuguilla stalk	sotol stalk
Pueblo Room	Fill	55	1			18		1	18	
	Room 4 Roof					22		20	66	
	Floor	25		3		209		16	45	27
	Floor Feature	23				28			24	
	Total	103	1	3		277		37	153	27
	Percent	17.14	0.17	0.50	0.00	46.09	0.00	6.16	25.46	4.49
Isolated Room	Fill	724	27	8	2	69	2		32	
	Room 13 Roof	4				12		27	210	
	Room 13 Floor	10		3		7		71	164	
	Room 20 Floor	4				6		88	42	
	Other Floor	423	8	3	1	4			5	
	Floor Feature	123	1			6			13	
	Total	1288	36	14	3	104	2	186	466	
	Percent	61.36	1.72	0.67	0.14	4.95	0.10	8.86	22.20	0.00
Extramural Feature	Small Thermal	271	10			1			1	
	Large Thermal	138	1			2			2	
	Storage Pit	841	12	14		19			14	
	Borrow	316	4	3		0		1	4	
	Non-specific Pit	745	17	10		10		0	4	
	Total	2311	44	27		32		1	25	
	Percent	94.71	1.80	1.11	0.00	1.31	0.00	0.04	1.02	0.00
Surface Refuse	Surface Refuse	133	5			5		3	4	
	Percent	88.67	0.03			0.03		0.02	0.03	
All Samples	Total	3835	86	44	3	418	2	227	648	27
	Percent	72.50	1.63	0.83	0.06	7.90	0.04	4.29	12.25	0.51

As mentioned above, grass stems and common reeds are predominantly from burned rooms where they were used as material in roofs. The represented rooms are pueblo Rooms 1, 2, 3, and 6 and isolated Rooms 13 and 20.

Charcoal identifications for the macrobotanical samples are listed in Table 37. Again, the charcoal specimens can be broken into two groups: those used principally for fuel, and those used as roofing elements.

Fuel woods are dominated by mesquite and also incorporate the secondary fuels of saltbush, creosotebush, ephedra, and oak. Mesquite is found in most contexts. Saltbush and creosote are principally noted for the

fill of isolated rooms and extramural features. Ephedra and oak are few in number and mostly from the fill of isolated rooms.

Macrobotanical materials collected from burned roofs include cottonwood and the flowering stalks of lechuguilla, yucca, and sotol. These materials were obtained from burned pueblo Rooms 1, 2, 3, 4, and 5 and isolated Rooms 13 and 20. In addition to the pieces of cottonwood charcoal recorded in Table 37, 32 sections of cottonwood beams were collected from pueblo Rooms 1 to 6, as were the cottonwood posts in the two primary postholes of Room 1 and the west primary posthole of Room 3. Portions of a juniper post were saved from the northwest primary posthole of Room 6. General dimensions of these beams and posts are provided in the room descriptions in Chapter 5.

Charcoal from isolated Room 15 includes two pieces of cottonwood and a piece of lechuguilla stalk from the floor and two pieces of cottonwood and two pieces of lechuguilla stalk from the bottom of the northwest floor pit F.328. These pieces of charcoal add to the other materials from the floor pit and further beg the question of whether the room had burned.

Maize and Cultivated Beans

The remains of maize cob fragments and kernels and cultivated beans are recorded as limited or degraded for most sites investigated in the Jornada region. They are, however, well-represented at Firecracker, and this permits some additional description of their characteristics.

Maize cob fragment details are summarized in Table 38. These fragments number 102 and are sufficiently intact to count row number, measure cupule width, kernel thickness, and rachis and cob diameter, and note cob appearance. Measurements were taken as described by Nickerson (1953) and have not been adjusted for shrinkage of cobs with carbonization. The number of kernel rows tends to be low with 8-row and 10-row cobs outnumbering 12-row cobs and with 14-row cobs poorly represented. Cupule width ranges from 3.6 to 10.5 mm, and kernel thickness ranges from 2.4 to 4.8 mm. Cobs appear small and slender with tapering ends and an occasional rounded butt end. Cobs also show an increase in rachis and cob diameters with an increase in row number.

Thickness, width, and height of a random sample of 175 of the many maize kernels were measured in the manner described by Cutler (1956) and are provided in Table 38. Slightly more than half of the kernels are from 12-row maize; otherwise kernels are similar to cobs in showing a mix of 8-row, 10-row, and 12-row maize and few 14-row specimens. Kernel thickness, as measured using kernels, ranges from 3.3 to 7.8 mm and is some 20% larger than the thickness measured with cobs, reflecting the shrinkage of cobs with carbonization. Kernels also vary from thin and narrow to isodiametric and, with row number, suggest different types of maize, including 8-row, Pima-Papago, Pueblo, and possibly a hybrid floury Pima-Pago maize (Adams 1994).

The attributes of maize generally follow those reported for other El Paso phase sites (Ford 1977; Foster and Bradley 2021; Foster et al. 1981; O'Laughlin 1977b, 1986b, 2001c, 2002, 2005a, 2008a; Wetterstrom 1983). Kernel rows are predominantly 10-row and 12-row, and 8-row maize is well-represented. Metrics of cobs and kernels are also not significantly different. However, mean values for Firecracker are less than those for Hot Wells on the eastern side of the Hueco Bolson, and both are less than for two pueblos on the Rio Grande (O'Laughlin 2001c, 2005a). Potentially, these data could suggest that conditions for the cultivation of maize varied from place to place or perhaps temporally.

Cultivated beans occur in low numbers in Pueblo period sites of the Jornada region (Brook 1966; Derring 2001; Ford 1977; Foster and Bradley 2021; Foster et al. 1981; Green 1980; Jackson and Kenmotsu 2008; McBride 2007, 2008; O'Laughlin 2001c, 2002, 2005a, 2008a).

Table 38. Metrics for maize cob fragments and kernels.

No. Cobs	No. Rows	Measure	Cupule Width (mm)	Kernel Thickness (mm)			Rachis Diameter (mm)	Cob Diameter (mm)	Shape
36	8 (35%)	mean	6.63	3.40			7.69	10.67	square cross-section, mostly straight rows
		std. dev.	1.41	0.57			2.33	2.55	
37	10 (36%)	mean	6.18	3.59			8.99	12.05	mixed round to oval cross-section, straight to twisted rows
		std. dev.	1.29	0.45			1.87	2.54	
24	12 (23%)	mean	6.02	3.77			9.68	12.93	mostly oval cross-section, straight rows
		std. dev.	1.02	0.35			2.44	2.71	
5	14 (5%)	mean	6.58	3.80			12.18	15.44	mostly oval cross-section, straight rows
		std. dev.	1.04	0.75			3.63	4.13	
No. Kernels	No. Rows	Measure		Kernel Thickness (mm)	Kernel Width (mm)	Kernel Height (mm)			Shape
32	8 (21%)	mean		4.78	8.88	7.53			mostly thin and narrow
		std. dev.		0.55	0.96	0.89			
37	10 (24%)	mean		4.58	8.44	7.85			mixed thin and isodiametric
		std. dev.		0.49	0.67	0.73			
84	12 (54%)	mean		4.52	8.01	7.56			mixed thin and isodiametric
		std. dev.		0.57	0.83	1.02			
2	14 (1%)	mean		5.20	8.15	7.05			near isodiametric
		st. dev.		1.56	1.20	0.35			

Common bean (*Phaseolus vulgaris*) and tepary (*P. acutifolius*) are the principal species, but a few larger and possible lima or sieva beans (*P. lunatus*) have been reported for two pueblos on the Rio Grande (Foster and Bradley 2021; Foster et al. 1981). Carbonized common beans and tepary beans are difficult to distinguish by the characteristics outlined by Kaplan (1956). Common beans are reniform or kidney-shaped, while tepary beans may be cuboid or truncated. Common beans also tend to be larger than the tepary, but their lengths overlap considerably. Weathered and fragmented beans confound identification, and undeveloped or smaller beans at the ends of pods of common bean can be confused with tepary beans. Nevertheless, it appears that both of these beans, as well as lima beans are represented in the archaeological record.

Table 39. Metrics for Cultivated Beans.

	Common Bean (P. vulgaris)			Tepary (P. cf acutifolius)		
	Length (mm)	Width (mm)	Thickness (mm)	Length (mm)	Width (mm)	Thickness (mm)
range	7.6-14.1	4.8-8.3	2.0-6.2	6.0-10.4	3.7-5.1	2.0-3.1
mean	10.0	6.42	3.95	7.69	4.42	2.47
st. dev	1.33	0.81	1.06	1.53	0.35	0.49
number	150	150	150	11	11	11

A large number of beans were retrieved from Firecracker. Many are fragments or weathered and damaged cotyledons or whole beans. Still, more than a thousand whole beans or cotyledons of beans have been identified as common beans on the basis of form first and then size. The recognition of

possible tepary beans can be questioned and is based first on size and then on form. That is, beans with lengths smaller than the range of lengths for common beans (less than 7.4 mm) have been portioned into the tepary category, and metrics for beans are provided in Table 39. Additionally, a few beans have a somewhat cuboid shape and have been placed in the tepary group. However, the total number of possible tepary beans is only 11 or less than 1% of the total number of common and tepary beans. Some tepary beans may have gone unnoticed among the common beans, and some of the beans identified as possible tepary beans may actually be common beans. Either way, it seems that the tepary was a very minor complement to the inventory of cultivated beans.

Discussion

The inventory of burned plant remains from Firecracker is large and varied. This is attributed, in part, to the extensive and systematic exploration of the site and the acquisition of numerous flotation and macrofloral samples from the pueblo and surface rooms, as well as the depths of a myriad of extramural features, pitrooms, and pithouses. Additionally, burned plant remains were recovered from all of the examined flotation samples. Seeds and other reproductive plant parts were also found in all but three of the 128 flotation samples.

The abundance and diversity of burned plant materials from Firecracker and other late Dona Ana and El Paso phase residential sites stand in contrast to those from earlier sites and point to the intensity and duration of the later occupations. For example, a mere 26 native seeds, one cultivated bean, three maize kernels, and 14 cob cupules and three small cob fragments were retrieved from 133, two liter flotation samples from structures and extramural features at the late Mesilla phase site of Conejo Village (Goldborer 1985). While the number of flotation samples and volume of processed soil for Conejo Village and Firecracker Pueblo are comparable, the assemblages of burned plant remains are not. Certainly they differ in size, but they also differ in that maize and other cultigens are a substantial portion of the material from Firecracker and of limited occurrence at Conejo. This situation also plays out at other residential sites in the region, and, along with other evidence, suggests that the Pueblo period saw more intensive occupation of residential sites and a concomitant reduction in residential mobility, a greater accumulation of trash with a better preservation of burned plant remains, and a greater dependence upon cultigens (Derring 2001; Hard et al. 1996; Miller and Kenmotsu 2004; O'Laughlin 2002, 2008a; O'Laughlin and Martin 1990; Whalen 1994).

Carbonized remains of native fruits and seeds embrace 23 taxa. As previously noted, many of these were utilized as food by the Mescalero Apache, and they are well-represented in number of items and ubiquity in the Firecracker assemblage. These may have been the common or preferred foods during the Archaic and early Formative; however, their role during the horticulturally-oriented Pueblo period may have changed to famine foods or foods used more intensively during periods of food scarcity (see Minnis 1991). That is, crop failures, depletion of stores, and lean times before harvests would have been compensated with an increased use of native foods. Dried fruits and seeds of these native plants are also known to have good storage properties and may have been gathered to offset anticipated poor crop yield or crop failure and extend the period of reliance on stored foods during winter to early spring, a time of food scarcity. Even so, Miller and Kenmotsu (2004) suggest a lesser dependence during the El Paso phase on mesquite, cacti, and leaf succulents with an increase in agricultural specialization, as evidenced by a decrease in ubiquity values for flotation samples spanning the Formative period. In deference to their analysis, higher percentages for these plants are recorded for Firecracker, as well as for El Paso phase samples from LA457 in Alamogordo (O'Laughlin 2008a). Variability in the composition and abundance of native food plants in flotation samples should not be surprising and mirrors a mix of settlement and subsistence strategies where agriculture is tenuous in an arid environment.

The distribution of burned plant remains by context has been described for Firecracker, along with some general observations. Noticeably, a number of rooms had burned, and details of roof construction and

materials follow those for Madera Quemada (Miller and Graves 2009) and Room 17 at Hot Wells (O'Laughlin 2005a). Roof materials identified for Firecracker include cottonwood, juniper, possibly mesquite, stalks of lechuguila, sotol, and yucca, reeds, and dropseed grass. Whether the result of catastrophic or intentional burning, large quantities of maize, cultivated beans, pigweed, and purslane were recovered from Rooms 1, 13, and 20. The plant remains suggest that burning may have occurred in summer to fall, and there is some evidence to suggest that these rooms may have been burned as part of an abandonment ritual (see Miller and Graves 2009). That is, Room 1 and a number of rooms of the pueblo were apparently burned at the same time, and Room 20 and perhaps Room 13 have associated ornaments, projectile points, minerals, and other esoteric objects that may have been deposited at the time of abandonment and burning of the structures. A number of burned mesquite seeds and seed exocarps were on the floor and in a floor pit of Room 15 and in association with a mortar and pestle, and together intimate the processing of mesquite beans in the room. It is also possible that Room 15 had burned. Maize cobs are often cited as fuel, and they are common in thermal features of Firecracker. Finally, most floors of the pueblo were found to have little other than remnants of burned roofs, probably the result of the maintenance of habitation spaces, while extramural features and earlier isolated rooms served as receptacles for trash.

The contextual analysis of the many taxa has provided some interesting observations for the plant remains. Similarities or differences in the relative importance of cultigens and wild foods for occupations of the isolated rooms and that of the pueblo, however, are not readily apparent. An attempt to remedy this situation is provided by Table 40 where the various wild taxa in flotation samples are grouped into grass seeds, seeds and fruits of perennial plants (mesquite, cacti, datil, melon loco), and seeds of weedy, herbaceous plants (pigweed, cheno-am, purslane). The density and ubiquity values of these wild plant groups, maize cupules and kernels, and cultivated beans are provided for the floors of pueblo and isolated rooms, extramural features identified in Chapter 7 as associated with either the pueblo or occupations of isolated rooms, and the fill of isolated rooms with trash deposited during the pueblo occupation as also identified in Chapter 7. While isolated rooms may be from different occupations, the small number of samples necessitated a single group. A few flotation samples from pueblo and isolated rooms have been excluded from this analysis as they have large numbers of seeds that would unduly influence the results. These include samples from the floor of pueblo Rooms 1, the upper floor of pueblo Room 6, floors of isolated Rooms 13 and 19, and one sample from the fill of isolated Room 25.

Table 40. Density and Ubiquity for Plant Seeds of Pueblo and Isolated Room Occupations.

Provenience		No. Samples	No. Taxa	All Seeds		Maize Cupule		Maize Kernel		Cultivated Bean		Grasses		Perennial Plants		Herbaceous Plants	
				Number	No./Liter	No./Liter	Ubiquity %	No./Liter	Ubiquity %	No./Liter	Ubiquity %	No./Liter	Ubiquity %	No./Liter	Ubiquity %	No./Liter	Ubiquity %
Pueblo	room floor	8	5	162	14.0	1.5	37.5	0.3	25	0	0	8.4	62.5	0	0	2.4	37.5
	extramural feature	31	21	2525	43.0	23.6	100	5.2	100	0.4	32.3	1.5	74.2	7.1	61.3	3.6	80.6
Isolated Room	room fill	5	8	252	37.9	8.6	80.0	9.0	100	0.1	20.0	6.3	80.0	3.3	60.0	5.1	80.0
	room floor	7	8	155	12.9	2.0	57.1	1.7	71.4	0.3	28.6	5.4	57.1	0.6	28.6	0.7	85.7
	extramural feature	11	13	712	41.5	20.2	100	8.3	100	0.3	18.2	1.6	90.9	2.2	54.5	7.7	54.5

An examination of density and ubiquity values in Table 40 suggests that most of the variation for flotation samples can be attributed to the treatment of refuse. Samples from floors of pueblo rooms and isolated

rooms are similar with a relatively small number of seeds per liter of soil. In contrast to floor samples, the samples from extramural features have about three times the number of seeds per liter of soil. The lower recovery of plant remains from room floors is likely due to room maintenance and the cleaning of floors, while the accumulation and preservation of refuse in the depths of extramural features provides a greater abundance of these materials. The density of seeds and other reproductive parts for the fill of isolated rooms is not as high as extramural features, suggesting that trash deposited in shallower rooms may have been more exposed to the elements and that the accumulation of refuse and soil may have been slower than for extramural features. The disparity in the representation of burned plant remains between floors and extramural secondary refuse has also been noted for Madera Quemada pueblo (Miller and Graves (2009).

Ubiquity values for cultivated and gathered wild foods are comparable for similar contexts (Table 40). They range from low to moderate percentages for pueblo and isolated room floors which is understandable given the low density of seeds and reproductive parts for floors. Extramural features and isolated rooms with secondary refuse exhibit high percentages for grass seeds, moderate values for perennial species, and moderate to high percentages for seeds of herbaceous plants. Maize is well-represented in the secondary refuse of the pueblo and isolated room occupations and ranges from 80% to 100% for cupules and kernels. Even cultivated beans, generally of limited in occurrence at Pueblo period sites, are present in a fifth to a third of the samples from secondary refuse. All in all, no significant difference is noted between the pueblo and isolated room flotation samples. Maize cupules and kernels outnumber other plant remains and reflect the importance of crops, and the gathering of wild plant foods is illustrated by their variety and frequent presence.

The assemblage of carbonized seeds and other reproductive parts from Firecracker is compared with those of a number of other El Paso phase settlements in Table 41. The volume of soil for samples ranges from less than a liter to ten liters, and sample volume is unknown for two sites and prevented calculation of seed density. The productive measure is the percentage of samples with seeds or other reproductive parts (principally maize cupules). Again, a number of samples from Firecracker with large numbers of seeds that would bias the results have been excluded. These include Room 1 floor and hearth (F.204), Room 6 floor and hearth (F.257), Room 13 floor, and Room 15 floor pit (F.328).

Site 41EP2724 has several isolated rooms and a number of extramural features. The MOTR site has a single surface room and few extramural features, one of which produced maize cupules that account for nearly all of the plant material from this site. Both of these sites exhibit low productivity and low ubiquity values for maize (Table 41). Limited occupation and exposure appear responsible for the limited plant remains. Nevertheless, maize dominates both assemblages.

Site 41EP1623 also has several isolated rooms and a number of extramural features. Site 41EP823 has a number of thermal features and pits, but no structures could be located. Both sites have high sample productivity, high maize ubiquity, and density values for maize cupules and kernels that exceed other categories (Table 41). These two sites have limited occupation but differ from the aforementioned two sites in having more productive samples from presumably better preserved features. Again, maize dominates the assemblages.

Madera Quemada stands out from the other sites. It is a multi-room pueblo with some history of additions and modifications to the building. The return of plant remains for this pueblo is not impressive and mirrors that of sites with less intense occupation and exposed features (Table 41). However, the samples are predominantly from floors and features of rooms, as little excavation was undertaken in areas around

Table 41. Sample Productivity, Maize Ubiquity and Seed Densities for El Paso Phase Sites.

	41EP2724	MOTR	41EP1623	41EP823	Madera Quemada	Hot Well	Three Lakes	LA457	Firecracker
Number of Samples	46	16	8	26	15	19	15	9	121
Number of Liters Soil	252.7	N/A	80	166.25	60	11.51	N/A	45	190.75
Number of Seeds	34	6187	779	731	40	333	504	3855	7594
Seeds/Liter Soil	0.1	N/A	9.7	4.4	0.7	28.9	N/A	85.7	37.9
Sample Productivity %	26.1	50	87.5	92.3	33.3	68.4	93.3	100	97.5
Maize Cupule and Kernel Ubiquity %	19.6	25	75	73.1	13.3	52.6	66.7	100	89.3
Maize Cupules/L	0.01	N/A	9.01	3.70	0.25	4.95	N/A	37.33	18.23
Maize Kernel/L	0.11	N/A	0.46	0.44	--	11.21	N/A	1.87	4.79
Cultivated Beans/L	--	N/A	--	0.01	--	0.35	N/A	0.27	1.66
Grass Seeds/L	--	N/A	0.05	0.01	--	6.95	N/A	1.91	4.27
Perenial Plant Seeds/L	0.02	N/A	0.10	0.02	0.20	0.96	N/A	28.58	5.38
Herbaceous Plant Seeds/L	--	N/A	0.05	0.21	--	2.35	N/A	5.60	4.88
Reference	Dering 2001	Cummings 1992	Hickey et al. 2010	McBride 2007	Dering 2009	O'Laughlin 1986b, 2005a	Ford 1977	O'Laughlin 2008a	this report

the pueblo. Thus, the low productivity of samples, low ubiquity of maize, and low densities of seeds is a reflection of the maintenance of rooms and cleaning of floors. The samples from this site are also like those from the floors and floor features of Firecracker where seeds and other reproductive parts are similarly few in number.

Hot Well has a number of small pueblos and a few isolated rooms that have been investigated by the El Paso Archaeological Society. Over half of the soil samples from Hot Well are less than half a liter in size, and seven of the 15 flotation samples are from rooms. These factors contribute to the moderate productivity of the samples and the moderate ubiquity for maize (Table 41). Together, maize cupules and kernels outdistance other plant categories in terms of density. Grass seeds occur with an elevated density attributed primarily to burned roof material in the sample from Room 17 of Area 1.

Three Lakes is near Hot Well and has been impacted by grading with ranch activities. A pueblo may once have been present, but only a single pit room and a small number of extramural features were located. The ubiquity of maize is moderate, even though sample productivity is high (Table 41). Maize, beans, and squash dominate the assemblage.

Site LA457 differs from the aforementioned basin sites in that it rests on an alluvial fan within Alamogordo. Occupation of the alluvial fan runs from the Archaic through the El Paso phase. Nearby sites have multiroom adobe pueblos; however, erosion and development may have removed any evidence of a pueblo at this site. Rather, three pit rooms dating to the late Dona Ana and El Paso phases were excavated, as well as a number of extramural features. Flotation samples are marked by high productivity and high ubiquity of maize (Table 41). Maize cupules occur with a density higher than any other category, although a considerable number of mesquite seeds are present in the samples.

Firecracker Pueblo has a large number of flotation samples, one of the higher volumes of processed soil, a large number of seeds and other reproductive parts, a high percentage of productive samples, a high ubiquity value for maize, and densities of maize cupules and kernels that exceed other categories of plant seeds (Table 41). As has been pointed out previously, there is little difference in the composition of burned plant remains between the pueblo flotation samples and those associated with isolated rooms of the Firecracker site. Taking into consideration factors affecting the preservation of plant remains, number and volume of samples, sampling strategy, and intensity of occupation, there also appears to be little difference between Firecracker and the other sites in Table 41. That is, maize dominates the assemblages of burned seeds and other reproductive parts, even for those sites where sample productivity is low and maize occurs in a small percentage of the samples. Cultivated beans are recorded for all sites except MOTR and Madera Quemada, and cucurbits and bottle gourd are noted for a number of sites. Native grasses and perennial and herbaceous species are also important but are generally represented by small few burned remains. At face value these assemblages reflect agricultural pursuits augmented by the gathering of wild foods. Minimally, occupation at any of these settlements could have been from spring to fall, the growing season. However, cultigens and many of the wild plant taxa have storage properties that would have allowed extended occupation. Some have suggested that settlements with single room, small structures had maintenance/logistic roles or were field houses (Batcho et al. 1985; Browning et al. 1992; Kenmotsu et al. 2008; Miller and Graves 2009). But, the burned plant remains from these sites, as well as the presence of structures and in most cases middens, a variety of extramural features, and large and diverse artifact assemblages, would indicate multiple season residential sites that differ principally in length and intensity of occupation.

CHAPTER 10
FAUNAL REMAINS

Few sizeable faunal assemblages of have been reported from residential sites of the El Paso phase. The faunal remains from Firecracker Pueblo provide an opportunity to examine a number of topics for one such intensely occupied settlement. Analysis centers on a description of the remains and represented species, with the expectation that they would reflect a lowland environment and show low assemblage diversity with a predominance of rabbits and hares. Considerations are also given to processing and discard behavior, season of occupation, and hunting techniques. The distribution of faunal remains within the site is presented, and the assemblage is compared with those of other sites in the region. Worked bone and shell artifacts are noted with other cultural material in Chapter 8.

Methods

Faunal materials were retrieved through hand excavation and the screening of soils through ¼-inch mesh and from flotation samples. The bone was largely fragmented and small, and bones with fresh breaks were refitted prior to identification. Identification of the bone was to lowest taxonomic level possible. In some cases, identification was not definite but reasonable on morphological grounds. These taxa were noted by "cf" for closely follows. Leporidae (rabbits and hares) and Artiodactyla (two-toed ungulates) make up the bulk of the collection and were identified through reference to the writer's personal material. Other mammals and birds were identified with reference to the synoptic collections of the Biology Department of The University of Texas at El Paso. Some faunal material could be identified only to class or order, and unidentifiable mammal bones were recorded as small, medium, large, or a combination of these size classes. Mammal bones the size of a cottontail or smaller were defined as small mammal. Bones of jackrabbit to coyote size were called medium mammal, and larger bones were classified as large mammal.

Attributes recorded for the faunal material included anatomical part, portion, side, and size (longest dimension). The fusion of epiphyses was monitored for information possibly pertinent to an understanding of seasonality of site occupation and to assist the identification of individual animals. Observations on the modification of bone were also made. Thermal modification was described as burned, or calcined. Rodent or carnivore gnawed bone was monitored; however, only two large mammal long bone splinters showed rodent gnawing, one from the fill of Room 19 and the other from extramural feature F.60. Butchering marks were not observed, but a fragment of a large mammal rib from extramural feature F.1 showed abrasion on one surface.

Quantification of faunal remains involves the use of two measures. The first measure is simply the count of the number of identified bones or NISP for each recognized taxon. Given the relatively small number of bones from features of this study, NISP furnishes an adequate means of comparing these assemblages. NISP is also commonly reported for faunal assemblages of the region and is one of the easier measures with which to compare sites. The second measure is the minimum number of individuals or MNI. MNI references the most common element or portion of an element for a taxon, taking into consideration bone size and animal age. MNI is calculated here only for cottontail and jackrabbit, as they make up the majority of bone identified below the level of class and other taxa have few elements.

Represented Taxa

The faunal assemblage of Firecracker is comprised of 6,833 bones and 279 pieces of eggshell (Table 42, Appendix G). Ninety percent of the bones and the majority of eggshell are from the fill of isolated rooms, storage pits, and borrow pits of some depth. Even so, only 29.3% of the bone is identifiable below class. The bone is highly fragmented with a mean length of 14.8 mm, and 62.6% of the bone is either burned or

Table 42. Counts (NISP) and Percentages for Faunal Remains by Context with Bone Length and Thermal Alteration.

Taxon	Pueblo Room Fill	Pueblo Room Floor	Isolated Room Fill	Isolated Room Floor	Isolated Room Floor Feature	Extramural Posthole	Small Thermal Feature	Large Thermal Feature	Storage Pit	Borrow	Non-specific Feature	Surface Refuse	Total Bone		Mean Length (mm)	Percent Burned	Percent Calcined
													NISP	Percent			
Aves eggshell			23	11				2	240	2	1		279		10.2	0	0
cf *Crotaphytes collaris*				1									1	0.01	10	0	0
Colubridae			1										1	0.01	4	0	0
Terrapene ornata												1	1	0.01	24	0	100
Aves			2						2				4	0.06	11	0	75.0
Callipepla sp.			2						1				3	0.04	11.3	0	33.3
Callipepla cf *squamata*			3										3	0.04	22	33.3	0
Passeriformes					1								1	0.01	13	0	0
Leporidae			71	3	1				30	21	7	2	135	1.98	10.4	8.1	63.7
Sylvilagus sp.	1		159					1	69	41	6	9	286	4.19	19	11.9	34.6
Lepus californicus	1	2	840	1	5	2	3	6	419	168	33	29	1509	22.08	18.8	7.8	51.2
Rodentia			7						1	1	2		11	0.16	10.1	0	36.4
Spermophilus sp.										1			1	0.01	22	0	0
Spermophilus cf *spilosoma*			1							1			2	0.03	9	0	100
Dipodomys sp.			3						2				5	0.07	13	0	0
Dipodomys ordii or *merriami*			1						4	2	1		8	0.12	13.4	0	12.5
Dipodomys cf *spectabilis*									1				1	0.01	28	0	0
cf *Peromyscus* sp.			1										1	0.01	12	0	0
Neotoma sp.			11						2	1	1	1	16	0.23	11.4	0	31.2
Carnivore									1				1	0.01	7	0	100

Table 42. Continued.

Taxon		Pueblo Room Fill	Pueblo Room Floor	Isolated Room Fill	Isolated Room Floor	Isolated Room Floor Feature	Extramural Posthole	Small Thermal Feature	Large Thermal Feature	Storage Pit	Borrow	Non-specific Feature	Surface Refuse	Total Bone		Mean Length (mm)	Percent Burned	Percent Calcined
														NISP	Percent			
cf *Canis* sp.				1										1	0.01	27	0	0
Canis latrans										7				7	0.1	68	0	0
Artiodactyla				2							1			3	0.04	40	0	33.3
Odocoileus sp.				3										3	0.04	42.3	0	0
small mammal				21						20	22	5	2	70	1.02	11.1	4.3	54.3
small-medium mammal		4	1	2162	12	20	6	12	75	829	494	215	95	3925	57.44	12.1	6.9	59.5
medium mammal		1	1	357	18			1	2	216	56	30	30	712	10.42	17.8	11.2	48.3
medium-large mammal			4	32						18	3	17	11	85	1.24	21.4	11.8	41.2
large mammal				23						12	2			37	0.54	36.9	8.1	45.9
Total Bone	NISP	7	8	3703	35	27	8	16	84	1634	814	317	180	6833	100	14.8	7.8	54.8
	Percent	0.1	0.1	54.2	0.5	0.4	0.1	0.2	1.2	23.9	11.9	4.6	2.6	100				
Mean Length (mm)		18.0	19.0	14.4	13.0	10.6	10.1	12.5	11.2	17.4	12.8	13.4	15.9	14.8				
Percent Burned		0	12.5	7.4	11.4	0	25.0	0	10.7	7.2	11.7	5.4	5.6	7.8				
Percent Calcined		14.3	25.0	56.8	25.7	85.2	75.0	62.5	71.4	48.5	57.7	63.4	38.3	54.8				

calcined. The fragmentation and thermal alteration of bone have certainly contributed to the relatively low proportion of identifiable bone. Fourteen mutually exclusive taxa are, however, represented among the faunal remains.

Small to medium-sized mammals make up most of the unidentifiable mammal bone, and large mammal bones are but a small part of the assemblage. The small to medium-sized mammal bones are probably of leporids (rabbits and hares), as they make up the bulk of the identifiable mammal remains. The preponderance of small-medium mammal and medium mammal remains reflects the relative abundance of jackrabbit (*Lepus californicus*) over cottontail (*Sylvilagus* sp.) in the assemblage. Large mammal bones have a size suggesting they are from medium-sized artiodactyl (two-toed ungulates), such as deer (*Odocoileus* sp.).

Leporid remains, including those identified as jackrabbit or cottontail, constitute 28.2% of the assemblage and 96.5% of the identifiable remains. The high percentage for identifiable bone and thermal alteration indicates they were the most frequently hunted animals from this site. Elements identified as leporid are only a small portion (2%) of the assemblage, while jackrabbits and cottontails respectively represent 22.1% and 4.2%. The jackrabbit remains are most probably those of *Lepus californicus*, the only jackrabbit presently occupying the region. The majority of cottontail bones could only be identified as a species of *Sylvilagus*. Measurements of dentaries, however, indicate that only *S. auduboni* is represented (Findley et al. 1975). *S. auduboni* is the species represented in the area today, although similar-sized species occur at higher elevations or latitudes.

Forty-five elements belong to the order Rodentia. The most common remains are those of woodrat (*Neotoma* sp.) and kangaroo rat (*Dipodomys ordii* or *mearriami* or *D.* cf *spectabilis*), and the other rodents represented are spotted ground squirrel (*Spermophilus* cf *spilosoma*) and deer mouse (cf *Peromyscus* sp.). Eleven elements could only be identified as rodent. Most of the remains are of fragmented long bones and portions of dentaries and crania, and 28.9% of the rodent bone is burned or calcined. Rodent remains are poorly represented in lowland faunal assemblages of this region, frequently unburned, and often questioned as to whether they were food items or post occupational intrusions (O'Laughlin 1977a, 2005; Whalen 1994). The rodents identified in the Firecracker assemblage, particularly woodrat and kangaroo rat, all occur today in the general site area, are among those most often encountered in archaeological assemblages of the El Paso area, and were eaten by historic groups in the Southwest (Szuter 1991).

Remains of carnivores are limited. They include an isolated and calcined premolar or molar fragment of an unknown carnivore, another isolated and unburned canine of either a coyote or dog (*Canis* sp.), and seven unburned elements of the same coyote (*Canis latrans*) from extramural feature F.54. The coyote elements include two cervical vertebrae, the proximal end of a scapula, a complete tibia, two complete metatarsals, and a calcaneum. Given the completeness of the bones and the lack of thermal alteration, it may be that this coyote was not taken for food, and it is noteworthy that a long bone fragment of a medium-large mammal from F.54 was worked for the possible production of bone rings. The few elements of carnivores make interpretation difficult but it is presumed that carnivores were trapped or hunted for pelts, certain bones, and food. Carnivore bones occur in assemblages of the El Paso area in numbers smaller than those of rodents and have generally received little attention (O'Laughlin 1977a, 2005; Whalen 1994). While a number of different carnivores are recorded for fauna from sites of this region, no remains of definite dog or dog burials have been noted for low elevation sites.

Medium-sized artiodactyls are the last group of mammals identified for Firecracker and could encompass deer, pronghorn, or mountain sheep. The remains are few in number, a situation mirrored by many lowland sites (O'Laughlin 1977a, 2005; Whalen 1994). They include an astragalus, a calcaneum, and an antler fragment of deer (*Odocoileus* sp.) and fragments of a mandible, a calcined rib, and a thoracic vertebra of

artiodactyl. Remains identifiable only as large mammal but likely of artiodactyl consist of one tibia midshaft, five rib fragments, and 31 long bone fragments, and there are a small number of large mammal worked bones described in Chapter 8. Twenty of the 37 unmodified large mammal bones are thermally altered, and the fragmented tibia and other long bone fragments may be the result of processing for marrow or rendering for fats and oils. Taken together, the few bones of artiodactyls and large mammals suggest the opportunistic taking of a few animals in the vicinity of the settlement and not acquisition through a logistical effort. The elements are also varied enough to imply the introduction of whole carcasses rather than just hides or portions of animals.

Deer can be found today in the nearby Franklin Mountains, and they occasionally venture out on the desert floor. The presence of deer within a day's hunt of Firecracker lends credence to the supposition that deer were brought to the site as whole carcasses. Pronghorn no longer occur in the immediate vicinity of Firecracker but can be found to the north in the Tularosa Basin. They may have been extirpated in the Hueco Bolson with intense hunting pressure but, more likely, their present distribution reflects the dramatic reduction in grass cover and suitable habitat for pronghorn in historic times (O'Laughlin and Crawford 1977). Some bones identified only as artiodactyl may include mountain sheep. Mountain sheep has not been recorded for any site within the Hueco Bolson, and the nearest site with remains of mountain sheep is on the western slope of the Organ Mountains and at some distance from Firecracker Pueblo (O'Laughlin 1977a).

Bird bones from Firecracker Pueblo consist of three bones of scaled or Gambel's quail (*Callipepla* sp), three elements of scaled quail (*C. squamata*), one bone of a perching bird (Passeriformes), and for elements that could only be identified as bird (Aves). The unidentified bird elements include two the size of quail and two the size of a hawk. Elements represented by the remains are of the wing and foot, and six of the 11 bones have been thermally altered.

Bird bones, particularly those of quail, are not uncommon for sites in the El Paso (O'Laughlin 1977a, 2005; Whalen 1994). The frequent occurrence of quail in archaeological assemblages may be a reflection of their terrestrial habits, which make them prone to capture with snares and nets. Their common occurrence in archaeological sites also leaves little doubt they were a food item

An ulna was identified as belonging to a perching bird. The infrequent occurrence of small birds in faunal assemblages of the El Paso area suggests they sometimes were used for food. The presence of only a wing element may also indicate the introduction of wings and their feathers for other uses.

Reptilian remains number three unburned elements and are comprised of a colubrid snake vertebra, the dentary of a collard lizard (cf *Crotaphytes collaris*), and a marginal costal of a carapace of a box turtle (*Terrapene ornata*). Reptiles are occasionally recorded for faunal assemblages from open sites, and their remains are often relegated to post occupational intrusions. Nevertheless, they may have been marginal subsistence resources. Box turtle shell rattles have also been found in caves of the region (Cosgrove 1947), and it is possible this unmodified costal is from such a rattle.

Eggshell and Aviculture

Faunal remains from Firecracker also include bird eggshells. Although 279 eggshell fragments were recovered, their combined surface area represents no more than three or four mallard or turkey-sized eggs. The majority of the eggshell was found in an extramural feature, F.50, that was later truncated by isolated Room 11. The eggshell count for F.50 is 240, and 10 eggshell fragments assigned to the floor of Room 11 may actually have come from F.50. The remaining 29 fragments were scattered on the floor of isolated Room 13, in the fill of isolated Rooms 21, 22, and 25, and in the fill of extramural features F.52, F.203, and F.382. Eggshells have been found in other sites of the region (O'Laughlin 1977a), including the not distant

pueblos of Hot Well and Sgt Doyle (O'Laughlin 2005) and Madera Quemada (Brown and Brown 2009). On the basis of the size, Brook (1966) claims that the eggshell of Hot Well is turkey eggshell, and Brown and Brown (2009) also believe the Madera Quemada eggshell represents turkey.

The eggshells have long ago lost any color that might aid identification. Additionally, most of the fragments are small, and the average length is 10.2 mm. The suggested diameters of 27 measurable eggshells range from 3.5 to 7.2 cm and average 5.6 cm, within the range of egg size reported for Merriam's turkey (*Meleagris gallopavo merriami*) and for Rio Grande turkey (*M. g. intermedia*) (Schorger 1966). Additionally, the thickness of a random sample of 30 eggshell fragments from Firecracker was found to have a mean of 0.33 mm and a range of 0.25 to 0.40 mm. Eggshell from Madera Quemada has a mean of 0.38 mm and a range of 0.26 to 0.54 mm (Brown and Brown 2009). These values follow those of probable turkey eggshells from Las Humanas (McKusick 1981) and Tijeras Pueblo (Fletcher 2015), both north of the Jornada region.

It would be tempting to simply conclude that the eggshell at Firecracker is turkey eggshell, but this is not certain. The diameters for the Firecracker eggshells are also within the range of egg size for numerous other birds, including mallards, teals, horned owl, hawks, eagle, and turkey vulture (Ehrlich et al. 1988). The thickness of shells is also shared by other fowl. If the eggshell is turkey eggshell, then what other evidence is there of turkey and/or turkey husbandry at Firecracker Pueblo or elsewhere in the Jornada region? The mark of turkey aviculture can include deposits of dung, eggshells, egg clutches, immature birds, mended bone breaks, gizzard stones, and penning areas (Lang and Harris 1984; Conrad 2022). Unfortunately, only a few bones, a handful of eggshells, and a small number of suspected pens are documented for the Jornada and limit the following discussion.

Turkey bones of definite prehistoric origin are known for only three low elevation sites of the Jornada region. The first is Abajo de La Cruz near Tularosa where only a single turkey bone was found (Wiseman 2015). The second site is LA457 in Alamogordo and where again a single bone of turkey was recovered along with three eggshells (O'Laughlin 2008b). These two sites are below forested areas of the Sacramento Mountains and habitat for wild turkey. Thus, these remains of turkey could be from the hunting of wild turkey rather than from kept birds. The third site is Cottonwood Spring Pueblo in the Jornada del Muerto and below the San Andres Mountains where three elements of turkey are noted, as well as some eggshell (Corl 2015). Together, the turkey bones and eggshell furnish a good argument for the keeping of turkeys at Cottonwood Spring and possibly LA457. Regardless, if aviculture was practiced in the Jornada, then the general paucity of turkey bone could suggest that few turkeys were managed in any given settlement and that they may not have been a source of food.

In the Mimbres region and elsewhere, the presence of few or no turkey bones, limited butchering marks on bones, and articulated turkey skeletons or burials have been taken as evidence of the raising of turkeys not for food but for their feathers for prayer sticks and other ceremonial purposes and for feather blankets (Morrison 2002; Presley and Shaffer 1991; Speth et al. 2004; Spielmann and Angstadt-Leto 1994). Perishable remains in caves and shelters of the Jornada region illustrate the use of feathers as additions to pahos or prayer sticks, fletching for arrows, and ornaments; however, little remains of most feathers and turkey has only been identified in fletching of arrows at Feather Cave in the Sacramento Mountains (Ellis and Hammack 1968). Additionally, no feather cordage or remains of feather blankets and only those of fur have been reported for caves or rock shelters of the Jornada (Cosgrove 1947; Ellis and Hammack 1968; Fresquez and Toll 2006; MacNeish 1993; O'Laughlin 1977b, 2003, 2007). Again, the scarcity of turkey bones, the absence of turkey burials, and the limited evidence of the use of turkey feathers imply that turkey husbandry may only have involved a few birds and perhaps for a limited time period in the Jornada.

The distribution of eggshell is uneven in the Jornada region. The majority of sites with eggshell date to the El Paso phase. Earlier sites have no more than three eggshells, and only five El Paso phase settlements have

more than three eggshells. These include Firecracker Pueblo with 279 eggshells, the Hot Well Site with 255 eggshells (O'Laughlin 2005), Madera Quemada Pueblo with 102 eggshells (Brown and Brown 2009), Cottonwood Spring Pueblo with 68 eggshells (Corl 2015), and the Sgt. Doyle Site with 51 eggshells (O'Laughlin 2005). While the amount of eggshell is relatively small, the association of eggshell with pueblos of the El Paso phase puts some weight to the identification of eggshell as that of turkey and would further intimate that turkey husbandry, presumably for feathers, is peculiar to a time of greatest population density, residential stability, dependence upon agriculture, and societal complexity as compared to earlier phases of occupation in the Jornada region.

Architectural evidence for aviculture in the Jornada region is tenuous and consists of rooms used for pens, pens or cubicles within rooms, and small cubicles against pueblo or plaza walls. Although eggshell has been found in the fill and on the floor of rooms at a number of sites, indications of the use of abandoned rooms to pen turkeys has not been observed. However, Rooms 11 and 13, created by walling off space between other rooms, may have housed turkeys at Madera Quemada Pueblo (Miller and Graves 2009). They are somewhat small with floor areas of 5.7 and 11.2 sq m, lack plastered floors, and may or may not have been roofed. Interpretation of these rooms as turkey pens is attributed the occurrence of some eggshell on the floors of these rooms and in subfloor contexts of one room. Similarly, the finding of eggshells throughout the site of Sgt. Doyle, prompted the identification of a roughly 2 m by 2.2 m area in the corner of Room 1 as a turkey pen (Green 1969). The floor had been worn away within this feature and was outlined by small holes that may have held posts. Eggshell was also found in the fill of this room (O'Laughlin 2005). The presence of eggshell in many areas of Hot Well 1 (see O'Laughlin 2005) was also stimulus for Brook (1968) to suggest that alignments of holes within some unspecified rooms may have held posts for small pens. However, a later review of archaeological work at the Hot Well Site makes no mention of possible turkey pens (Lowry 2005).

Curious small, adobe-walled rooms or cubicles of less than two square meters of floor area are known for three sites and have been compared by Gerald (1963) and Miller (2009) to the turkey pens of Paquime (Di Peso et al. 1974a). Two such cubicles were recorded for a large pueblo known as House 2 of Alamogordo Site 1 (Lehmer 1948); Stubbs 1930). These square, contiguous cubicles are within and against a wall of a room, have small openings to the room, and have evidence of two poles passing through their walls for roosts 20 cm above the floors of the cubicles. The Well Site is some 30 miles south of El Paso and Cd. Juarez and has a number of small cubicles or rooms (Gerald 1963; O'Laughlin 1999). Rooms 7, 8, and 9 are eroded contiguous, square cubicles against a plaza wall, have unplastered floors, and bear the greatest resemblance to the pens of Paquime. Room 16 is built into the corner of a room and plaza wall, and Room 18 is a short distance away and against the plaza wall. Both rooms are rectangular with plastered floors that lack floor features, and room 16 has a doorway into the plaza. Rooms 23 and 24 are square, abut one another, have plastered floors without floor features, and are part of a room block of four rooms. Eggshell was not recovered from the Well Site and is not noted for the Alamogordo site. However, soils were not screened at the Well Site and probably not for the Alamogordo site. The last site with cubicles is Firecracker Pueblo which has two square cubicles with unplastered floors and little remaining of the walls. Room 9 was constructed against the south wall of the pueblo, and Room 24 lies in the open a short distance south of Room 9. Eggshell was not found in either of these cubicles but was recovered from contexts associated with the pueblo occupation. Eggshell is also associated with the occupation of isolated rooms in the northwest part off the site, yet features that might be pens are not obvious. Isolated Room 26 is noted as having seen several uses following abandonment and could have been used to pen turkeys, and isolated Room 28 is similar to the small, square cubicles but was excavated some 80 cm below the surface and has a stepped entry. The walls and floor of isolated Room 28 are unplastered, and nothing defined the nature of the superstructure. Eggshell was not obtained from either isolated Room 26 or isolated Room 28.

With respect to the aforementioned possible turkey pens, their interpretation should be taken with caution, especially those without associated eggshell. Indeed, Miller (2009:338) states that, "It is acknowledged

that there is some degree of circular reasoning in this interpretation. The eggshell is thought to have a high probability of being turkey in part because it is concentrated within and around the small rooms thought to be turkey pens; in turn, the small rooms are thought to be turkey pens because of the presence of eggshell." Nevertheless, eggshell has now been reported from a number of settlements of the El Paso phase, and some of these settlements and others without eggshell have architectural elements intimating the penning of small numbers of birds. Also, Cottonwood Spring Pueblo and LA457 are notable in having both eggshell and turkey bone in the same site. Turkey aviculture appears to have been a component of the El Paso phase and apparently focused on turkeys as a source of feathers for ritual or domestic use and perhaps exchange. The eggshell and small cubicles of Firecracker Pueblo additionally suggest active participation of this settlement with aviculture.

Rabbits and Hares

Leporid (rabbits and hares) bones include those of jackrabbit and cottontail and together constitute 28.2% of all bones and 96.5% of the identifiable bone. Jackrabbit and cottontail bones and small to medium-sized mammal bones the size of cottontail and jackrabbit make up 97.1% of the collection from Firecracker. Jackrabbit remains outnumber those of cottontail by six to one. The calculation MNI is 31 for jackrabbit and 11 for cottontail for the site as a whole and 83 jackrabbit and 29 cottontail when considering room and feature contexts. Either way, MNI gives a ratio of three to one in favor of jackrabbit. Given their dominance of the faunal assemblage, a closer look at leporids is warranted.

The distribution of skeletal elements of jackrabbit and cottontail as a percentage of the expected number of elements for the MNI of the site as a whole is provided in Table 43. Also presented in this table are the number of elements that could only be identified as leporid and those of small to medium-sized mammals. Percentages of thermally altered bone are also noted.

Skeletal elements of jackrabbit are better represented than those of cottontail but both species show a similar pattern. The more common elements are those of dense bone such as the proximal portions of the scapula, radius, and ulna, the distal parts of the humerus and tibia, the dentary, the calcaneum, and the metatarsals. Carpals, metacarpals, tarsals, and phalanges have dense bones but are small in size, and their smaller percentages reflect lower recovery rates. Differential preservation of the less dense femur, proximal humerus, vertebrae, and ribs is also noticeable and attributable to such factors as butchering, processing, burning, and discard. Elements recognized for leporids and small to medium-sized mammals add to the counts phalanges, metapodials, vertebrae, and ribs, but vertebrae and ribs remain poorly represented. It is probable that vertebrae and ribs were extensively processed and cooked with the meat and thus rendered edible, smaller, and less identifiable. The paucity of vertebrae and ribs in leporid assemblages of low elevation sites dominated by leporids is commonplace (for example, Brown and Brown 2009; Duncan et al. 2002; O'Laughlin 2005, 2008; Whalen 1994).

The distributions of skeletal elements for jackrabbit and cottontail are comparable and indicate that the processing, discard, and preservation of bone is similar for both species and that entire animals were likely introduced into the site. The bone of leporids and that of leporid-sized mammal bone is extremely fragmented, and only two long bones of cottontail were found to be complete. Butchering marks are absent, spiral fractures of bone are rare, and the breakage of bone is typically angular. Bone may have been broken in the preparation of meals or to extend the utility of the animals through rendering of some oil and fat. However, thermal alteration of the bone may also have contributed to the fragmented and small size of the bone. Some of the bone is blackened and burned, and much of it is calcined from high temperatures which can result in fragmentation or complete consumption of bone.

Table 43. Element Distribution and Thermal Modification for Lepus californicus and Sylvilagus sp.

Element	Lepus californicus				Sylvilagus sp				Leporidae			Small-Medium Mammal		
	No.	% MNI (31)	% Burned	% Calcined	No.	% MNI (11)	% Burned	% Calcined	No.	% Burned	% Calcined	No.	% Burned	% Calcined
cranium, premaxilla	10	16.1	0	50										
cranium, maxilla	13	21	23.1	30.8	2	9.1	0	0						
cranium, fragment	28	--	3.6	50	2	--	100	0				55	14.5	34.5
dentary	49	79	14.3	32.7	7	31.8	14.3	28.6	23	17.4	56.5	2	0	50
atlas	2	6.4	50	50										
axis	1	3.2	0	0										
cervical vertebra												1	0	0
thoracic vertebra	1	0.3	0	0										
lumbar vertebra	2	0.9	0	0								4	0	50
caudal vertebra												9	11.1	77.8
vertebra fragment												16	6.2	43.7
rib, fragmentary	2	0.3	0	50								101	8.9	26.7
scapula, head, neck	50	80.6	14	54	14	63.6	7.1	28.6						
humerus, proximal	7	11.3	0	28.6	4	18.2	0	0						
humerus, distal	53	85.5	5.7	30.2	17	77.3	11.8	29.4						
radius, proximal	33	53.2	21.2	42.4	10	45.4	30	20						
radius, distal	12	19.3	8.3	41.7	3	13.6	0	33.3						
ulna, proximal	42	67.7	7.1	42.9	14	63.6	0	57.1						
ulna, distal	6	9.7	0	33.3	1	4.5	0	0						
metacarpal	59	23.8	3.4	28.8	5	5.7	0	40						
phalange (manus)	52	7	1.9	38.5										
innominate	55	88.7	18.2	38.2	17	77.27	5.9	35.3						
femur, proximal	12	19.3	25	33.3	7	31.8	28.6	0						
femur, distal	10	16.13	0	20	3	13.64	0	33.3						
tibia, proximal	10	16.13	10	70	6	27.27	16.7	33.3						
tibia, distal	26	41.9	3.8	42.3	15	68.2	26.7	20						
fibula, proximal	1	1.6	0	0	1	4.5	0	0						
astragalus	13	21	0	92.3	3	13.6	0	100						
calcaneum	52	83.9	7.7	63.5	19	86.4	10.5	52.6						
navicular	5	8.1	20	80	1	4.5	0	100						
tarsal	14	5.6	7.1	71.4	1	1.1	0	0						
metatarsal	204	82.3	7.8	47.5	63	71.6	4.8	34.9						
phalange (pes)	264	35.5	5.3	51.9	33	12.5	9.1	33.3						
metapodial	20	4	25	75	1	0.2	0	100	53	3.8	77.4	46	15.2	63.0
phalange									31	9.7	48.4	2		

Where differential burning of bones of the feet as opposed to other bones may indicate the roasting of whole animals and has been recorded for some sites (O'Laughlin 1994, 2005, 2008c; Whalen 1994), the bone of Firecracker appears to be indiscriminately burned.

The overall percentage of burned and calcined bone is 62.8% for Firecracker (Table 42), a figure that is quite high and in the range of thermally altered bone for ephemeral, non-residential sites of the desert floor and where bone is often associated with thermal features (O'Laughlin 2008c). It is also two to three times larger than the amount of burned and calcined bone from the Mesilla phase residential sites of Huecito (Russel and Hard 1987), Conejo (Lear 2007), and Turquoise Ridge (Whalen 1994) and one and a half times larger than the amount of burned and calcined bone from the Dona Ana residential site of Jaca (Duncan et al. 2002). With respect to El Paso phase sites the percentage of thermally altered bone ranges less than Firecracker and from 17% to 41% and seems to pattern with the intensity of occupation and the amount of attention paid to the investigation of extramural areas and features. From lower to higher percentages, these sites include the single room or small pueblo of MOTR (Bertram 1992), 41Ep1623 with several isolated rooms (Jacobson 2010), and the pueblos of Madera Quemada (Brown and Brown 2009), Hot Well, and Sgt. Doyle (O'Laughlin 2005). Aside from Firecracker, the El Paso phase site with the highest percentage of thermally modified bone is 41EP0823 at 52% and where only extramural features were excavated (Schneibs 2007).

Three groups of sites with differing expressions of thermal alteration of bone are suggested. The first includes low elevation, ephemeral campsites where exposure has reduced faunal assemblages and where bone is often associated with thermal features and generally modified by heat. The second set is made up of seasonally or intermittently occupied residential sites and where thermally modified bone is present in relatively low percentages. The third group is made up of more heavily occupied El Paso phase pueblos, including Firecracker Pueblo, with the highest percentages of thermally altered bone. The amount of thermally modified bone in pueblos varies somewhat, depending on whether excavations focused on architecture or included extramural areas. Nevertheless, the intensity of occupation of pueblos is reflected in the high percentages of thermally modified bone and suggests that bone was thrown in thermal features following meals or intentionally burned along with other trash and that maintenance of interior spaces and extramural areas prompted disposal of bone and other trash in middens, subsurface extramural features, and abandoned structures. This purposeful treatment of refuse also leads to faunal assemblages with larger mean bone lengths and higher proportions of identifiable bone (O'Laughlin 2005, 2008b, 2008c). Certainly, this all seems to be the case for Firecracker Pueblo.

The long, limb bones of jackrabbit and cottontail were monitored for fusion of epiphyses to ascertain the proportion of juvenile and adult animals. Leporids have long breeding seasons, roughly late spring to late summer and sometimes longer. Adults can make up 85% to 100% of a population in the early spring, and by late summer to late fall juveniles predominate and can reach 75% to 85% of the population (Lechleitner 1959; Russell and Hard 1987). Through the winter the proportion of juveniles decreases to the early spring low. Over a single year, juveniles comprise an average of about 40% of the population. Few studies have looked at the fusion of leporid long bones in the Jornada region (Russell and Hard 1987; O'Laughlin 2005, 2008b; Whalen 1994), and the method is generally considered unreliable for assessing season of occupation. Even so, the percentages of jackrabbit and cottontail juveniles are respectively 4.3% and 17.8% for the humerus, radius, ulna, femur, and tibia. The percentages are 10.5% and 21.4% for just the proximal ends of the humerus, femur, and tibia for which the epiphyses do not fuse as quickly as the distal ends of long bones and the radius and ulna. The majority of the faunal material is associated with the pueblo and not the isolated rooms, and these low percentages could reflect a winter or year-round occupation of the pueblo. However, caution should be exercised in the interpretation of the proportion of immature lagomorphs for juveniles rarely exceed 20% in the region, regardless of time period, environment, and season or length of occupation based on other lines of evidence (O'Laughlin 2005, 2008b).

Contextual Distribution of Faunal Remains

The number of bones (NISP), percentage of total bones, mean length, and percentage of thermally modified bones are provided in Table 42 for the various contexts of the Firecracker site. The various taxa and faunal counts for rooms and features are also detailed in Appendix G. Although faunal remains are found throughout the site, a little over 87% of the bone was recovered from a somewhat small number of contexts associated with the occupation of the pueblo. These include the refuse deposited in the fill of abandoned isolated Rooms 22, 25, and 31 and the deposits of extramural features F.1, F.56, F.94, F.123, F.131, F.140, F.150, and F.203. Other contexts associated with either the pueblo occupation or those of isolated rooms have little bone, and none with a count of more than 25 bones.

Pueblo room floors and the floors and floor features of isolated rooms have very little bone. Together, only 71 bones are recorded and constitute 1% of the faunal assemblage. Maintenance of interior spaces is indicated, but the processing and perhaps consumption of animals was likely an outdoor activity such that much of the bone never made it indoors. Longer bones and fewer calcined bones are noted for pueblo floors whereas isolated room floors and floor features have a few more bones, smaller bones, and similar to higher amounts of calcined bone. These finds would imply a different level of maintenance for isolated rooms as compared to pueblo rooms.

The pueblo occupation followed the occupation of many of the isolated rooms. A southern cluster of isolated rooms is thought to have been occupied after the pueblo. However that occupation may have been of short duration as few faunal remains ended up in the fill of the pueblo rooms. It may also be that refuse from the southern cluster of isolated rooms was deposited around those structures or to the south of the structures and further from the pueblo. In difference to the little accumulation of bone in the fill of pueblo rooms, the fill of abandoned isolated rooms beneath and west of the pueblo and isolated Room 33 just south of the pueblo abound with faunal remains from the pueblo occupation that make up 54% of the faunal collection. As with most of the other contexts, the bone from the fill of isolated rooms has a small mean length and much of it is calcined. The few bones from the fill of pueblo rooms are much like those on the floors of pueblo rooms with a larger mean length and few calcined bones.

Extramural features are similar to abandoned isolated rooms in that they serve as receptacles for faunal remains, and some 42% of the bones from Firecracker were recovered from extramural features. Mean bone lengths and percentages of calcined bone are similar for extramural features, excepting storage pits with a slightly larger mean for bone length and a smaller percentage of calcined bone. Many of the storage pits have layered deposits that were protected by the confines of these relatively deep pits with somewhat confined openings, as opposed to borrow pits and non-specific features and even abandoned isolated rooms where the deposits are generally unstratified and unsorted and presumably exposed to the elements before additional refuse was added. Most of the faunal material was found in storage pits, borrows, and non-specific features. A few bones were recovered from one posthole. Surprisingly, little bone is recorded for the 62 thermal features, and most of this bone is from the large thermal feature F.150. It would seem that extramural thermal features were cleaned out periodically as there is so much thermally altered bone as secondary refuse in extramural pits.

Relatively few bones were retrieved from surface deposits and amount to 2.6% of the faunal assemblage. The mean length of the bone is slightly larger than the site average and only a moderate amount of the bone is calcined. Surface refuse may actually be a mixture of de facto and secondary refuse.

The distribution of faunal remains is fairly distinct with little bone on floors of structures, most of the bone as secondary refuse in any room or extramural feature with depth, and few bones elsewhere. This is a pattern also observed at the pueblos of Hot Well and Sgt. Doyle (O'Laughlin 2005), Madera Quemada (Brown and Brown 2009), and La Cabraña (Foster and Bradley 2001) and at El Paso phase sites with

isolated rooms such as 41EP2724 (Presley and Shaffer 2001), 41EP1623 Condon et al. 2010) and Jaca (LA 6829) (Duncan et al. 2002).

Intraregional Assemblage Comparisons

Jackrabbit and cottontail dominate faunal assemblages of low elevation sites in the Jornada region and are important constituents of assemblages of mountain sites. The interpretations of the relative abundance of jackrabbit and cottontail remains center on the habitat preferences and predator avoidance behaviors of these animals. Cottontail prefer areas with dense vegetation as might be found around playas, along arroyos, and in foothill and mountain settings, while jackrabbit are often associated with more open vegetation such as in grasslands or mesquite desert (see O'Laughlin 1977a, 2005; Russell and Hard 1987; Szuter and Bayham 1989). Thus, changes in the relative abundance of cottontail and jackrabbit could mirror changes in the vegetation following changes in precipitation or temperature and disturbance of the landscape with human occupation. In terms of predator avoidance, cottontail seek cover and hide while jackrabbit tend to run in an effort to outdistance predators on open ground. Because of the differences in predator avoidance behavior, it has been argued by some that jackrabbit can be more successfully taken than cottontail through communal hunts that involved the driving of game into nets and that faunal assemblages dominated by jackrabbit bones could indicate such communal hunts in the El Paso area (see Mick-O'Hara 1998; O'Laughlin 2005; Russell and Hard 1987; Whalen 1994). Similarly, trapping and individual hunting would be indicated by an abundance of cottontail remains.

The relative contribution of cottontail and jackrabbit to an assemblage can be measured by the lagomorph index. This index is calculated as the NISP of cottontail divided by the sum of the NISP of cottontail and jackrabbit and ranges from zero to one (Bayham and Hatch 1985). A high lagomorph index would suggest an environment suitable to cottontail or an emphasis on the individual hunting of cottontail. A low value would indicate an environment more suitable to jackrabbit and possibly the communal hunting of jackrabbit.

Artiodactyls are generally a minor contributor to faunal assemblages of low elevation sites but can make up the better part of faunal remains from mountain sites. The artiodactyl index provides a measure for comparing jackrabbit and cottontail remains with those of artiodactyl (principally deer and pronghorn) and is calculated by dividing the NISP of artiodactyls by the total NISP of artiodactyls and lagomorphs (Szuter and Bayham 1989). High artiodactyl index values would indicate reliance on artiodactyls, while low values reflect a lesser importance compared to cottontail and jackrabbit.

Figure 117 shows the lagomorph and artiodactyl indices calculated by O'Laughlin (2008b) for 41 faunal assemblages in the Jornada region, as well as the values for Firecracker Pueblo. Sites included in this analysis range from the late Archaic to the Pueblo period and encompass small, ephemeral sites to intensively occupied residential sites to caves and rock shelters. Assemblages are grouped into four geographic or environmental zones noted as the Rio Grande, floors of basins, the periphery or margins of mountains, and mountains.

Sites categorized as basin and mountain periphery zone sites differ from sites in mountainous areas in the minimal contributions of artiodactyl to faunal assemblages and the predominance of jackrabbit in the majority of sites. This distinction between the mountain zone, higher elevation sites with abundant artiodactyl remains and the lower elevation, basin, and mountain periphery zones with very little artiodactyl material would follow the proposition by Szuter and Bayham (1989) that subsistence regimes for lowland sites will be different from that of upland sites and that the relative abundance of artiodactyl should be correlated with elevation and not intensity of agriculture. Given that the sites presented in Figure 117 date from the late Archaic to Pueblo period and that involvement in or intensity of agriculture varies from site to site, this proposition would be supported by the assemblages considered in this study.

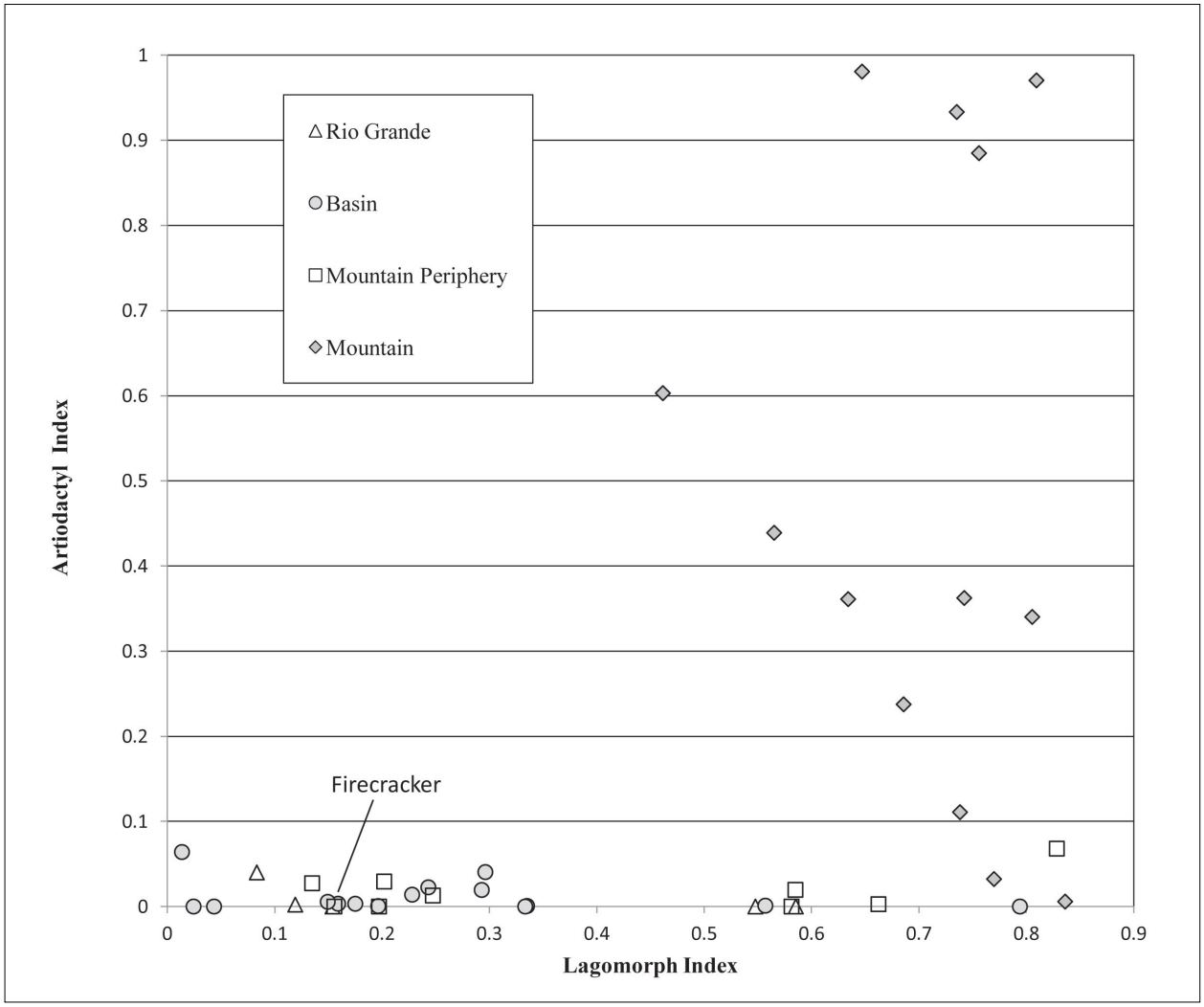


Figure 117. Comparison of lagomorph and artiodactyl indices of Jornada region faunal assemblages of southern New Mexico and west Texas (adapted from O'Laughlin 2008: Figure 9.3).

However, this is not to say that meat from large bodied animals was not important to the former occupants of Firecracker Pueblo or other basin and mountain periphery sites, only that they were not readily available in those environments. It can also be drawn from this data that hunting of deer from basin or mountain periphery zone residential sites probably involved use of the mountains and hunting camps. It is also possible that dried meat may have been obtained by populations living in interior basins at low elevation from those living at higher elevations or from more distant populations east of the Sacramento Mountains that hunted bison on the Plains. Occasional trips may have been made by those living in the Tularosa Basin and Hueco Bolson east of the Sacramento Mountains to specifically hunt bison (see Speth 2004).

Sites along the Rio Grande sometimes have faunal remains that contain riverine resources such as fish and turtle. Otherwise, the faunal assemblages from these sites and basin and mountain periphery zone sites are very similar and dominated by leporids. Most low elevation sites show a predominance of jackrabbit, but cottontail is more important in a number of sites. In a similar study of Jornada faunal assemblages Miller et al. (2009: Figure 12.4) also noted a slight but statistically insignificant increase in jackrabbit over cottontail from the Mesilla to the El Paso phase, attributable to an interplay among prehistoric subsistence economies, periodic ecological conditions of rainfall, biomass pulses, and natural changes in leporid

populations. Others have suggested that variation in the relative proportions of jackrabbit and cottontail may be related to seasonal differences in occupation, especially of residential sites (O'Laughlin 2008b; Russell and Hard 1987; Whalen 1994). Though there may be some cases where the lagomorph index may be useful in assessing season of occupation or temporal changes subsistence for the late prehistory of the Jornada, the observed variation in the lagomorph index for sites along the Rio Grande and in the basin and mountain periphery zones is likely a reflection of a combination of environmental and cultural factors that have yet to be better defined. Much of the variation, however, may well relate to patchiness of the environment where habitat for cottontail and jackrabbit varies within broad vegetation zones.

Summary

The faunal assemblage from Firecracker Pueblo is a substantial collection made up almost exclusively of jackrabbit, cottontail, and unidentifiable bone the size of these leporids. Few elements were recovered of other taxa but include reptiles, birds, rodents, carnivores, and artiodactyls. A comparison of the relative abundance of jackrabbit, cottontail, and artiodactyl remains with those of assemblages from other sites shows a likeness with many other sites of low elevation settings. In particular, the better representation of jackrabbit over cottontail is common to settlements of desert floors. The Firecracker assemblage is largely a measure of the local environment where leporids are the principal game and deer and pronghorn are scarce.

The represented elements for cottontail and jackrabbit, allowing for differential recovery and preservation, indicate that whole carcasses were brought to the site. However, the rather small number of vertebrae and ribs would suggest processing and cooking that reduced the bone and eased consumption. Butchering marks were not noted, and burning of elements also appeared indiscriminate and did not suggest methods of cooking.

The assemblage is comprised of highly fragmented and small pieces of bone, and more than half of the bone is calcined or burned. Much of the thermal alteration of bone and some of the bone breakage is doubtless connected to the intensity and length of occupation and discard behavior. Few bones were retrieved from the floors of pueblo rooms and isolated rooms, little bone was scattered in extramural spaces, and secondary refuse, the majority from the pueblo occupation, was deposited in subsurface features of various sorts and abandoned isolated rooms.

The composition of the faunal assemblage and the treatment and spatial distribution of the bone for Firecracker Pueblo is similar to other El Paso phase assemblages. This comparison also extends to eggshell which is associated with the occupation of isolated rooms and the pueblo of Firecracker and a few other pueblos. The writer knows of no definite identification of eggshell from the Jornada region as that of turkey. However, the rare occurrences of turkey bone, small cubicles like the turkey pens of Paquime, and rooms which may have penned turkeys raise the question of turkey husbandry in the Jornada. Turkey bone was not recovered from Firecracker, but two of the quizzical cubicles are recorded for the pueblo occupation.

CHAPTER 11
CHRONOLOGY

A number of chronometric methods and one relative dating method were pursued to define the chronology of occupations at Firecracker Pueblo. Two of these, dendrochronology and obsidian hydration dating, were unfortunately found unable to support this project. The results of ceramic correlation, archaeomagnetic, and radiocarbon dating are presented in the following sections.

Samples of beams and posts have been deposited with the Laboratory of Tree Ring Research at the University of Arizona. These included the juniper post from Room 6 and numerous samples of cottonwood beams and posts from Rooms 1 through 6. However, these woods were identified as unsuitable for dendrochronological dating in this region.

Flakes and cores of obsidian from Firecracker were provided to the obsidian hydration dating Lab of New Mexico State University and to the Chronometric and Relative Chronology Project of the Cultural Resources Branch of Fort Bliss and the University of Texas at El Paso to assist with an understanding of the rates of hydration and the development of measures to date obsidian artifacts in the region. However, obsidian hydration dating proved too problematic and unreliable and of no use to defining the temporal range of occupations at Firecracker (see Miller 1996). Even so, sourcing of the obsidian from Firecracker confirmed the use of Rio Grande gravels in the project area and that the ultimate sources of obsidian include Obsidian Ridge, Polvadero, and East Grants Ridge of northern New Mexico.

Ceramic Cross Dating

Nonlocal ceramics encompass a variety of types and wares from central and western New Mexico and the Casas Grandes region. Their descriptions, temporal spans of production and distribution, and contextual occurrences within Firecracker Pueblo are provided in Chapter 8. The dates for intrusive ceramics are listed in Table 44 as a cross dating reference.

Table 44. Imported Ceramic Types and Date Ranges.

Ceramic Type	Date	Number
Chupadero Black-on-white	1150 - 1500+	233
Three Rivers Red-on-terracotta	1150 - 1400	28
Magdalena Black-on-white	1275/1300 - 1400	39
Seco Corrugated	1280 - 1400	168
Agua Fria Glaze-on-red	1300/1325 - 1425	2
Heshotuathla Polychrome	1275 - 1450	6
Tucson Polychrome	1275 - 1450	110
Gila Polychrome	1300 - 1450	5
undifferentiated Casas Grandes polychromes	1200 - 1450	71
Ramos Polychrome	1200 - 1450	30
Escondida Polychrome	1300 - 1450	3
Ramos Black	1200 - 1450	8
Playas Redware	1150/1200 - 1450	45
Mimbres Black-on-white	800 - 1140	4

The indigenous ceramic, the classic version of El Paso Polychrome, bounds the period of interest to A.D. 1275/1300-1450 (Miller 2005). The question then becomes whether trade wares can more narrowly define occupations at Fire-cracker. In this regard, the temporal spans of intrusive wares similarly sur-round the broad interval of occupation and loosely suggest a period of as early as the late 13th century to middle 15th century. The principal deviant to this pattern is Mimbres Black-on-white which predates classic El Paso Polychrome and the other intrusives and reflects the scavenging of a few sherds from earlier settlements.

Trades wares make up less than two percent of the ceramic assemblage, and a number of the ceramic types are

represented by just a few sherds. Additionally, only 132 sherds were recovered from the 33 isolated and pueblo rooms and eroded pueblo room floors and limit interpretation of temporal spans of occupation. Some ceramics, such as Chupadero Black-on-white, Magdalena Black-on-white, Seco corrugated, and undifferentiated Casas Grandes polychromes, occur throughout the site in early and late contexts. Others are differentially distributed and may intimate temporal differences in occupation. Playas redwares can be found in most contexts but are absent from the fill and floors of the pueblo, perhaps suggesting a decline in production or popularity in the 15th century or earlier. Agua Fria Glaze-on-red, Heshotuathla Polychrome, Espinosa Polychrome, Gila Polychrome, and Tucson Polychrome are principally associated with the pueblo and assist the interpretation that the pueblo was the most recent occupation of this site. St. John's Polychrome is often found in Dona Ana phase and early El Paso phase sites and dates to A.D. 1150-1300 (Carlson 1970). With the extent of excavations at Firecracker, the absence of this ceramic type could imply that the initial occupation of the site was sometime after A.D. 1300.

The nonlocal wares delimit at best a broad temporal period of approximately A.D. 1275/1300-1450 within which there were a number of occupations of Firecracker Pueblo. Nevertheless, they offer support of the chronometric dates reported in the following sections.

Archaeomagnetic Dating

Adobe-plastered hearths in Room 11, 20, and 29 were sampled for archaeomagnetic dating; however, only the sample from the east hearth (F.305) of Room 11 was submitted for dating to the Archaeometric Laboratory of Colorado State University. The precision value (*k*) for this sample is 267.18, and the angle of confidence (α95) is 3.39. These values suggest that the measurements of inclination and declination cluster about the mean. The final processing results are a paleolatitude of 85.40 degrees, a paleolongitude of 209.43 degrees, an error along the great circle of 4.80 degrees, and an error perpendicular to the great circle of 3.39 degrees. For dating purposes, these directions are converted to a virtual geometric pole (VGP) or the north end of the magnetic pole ascertained from the sample.

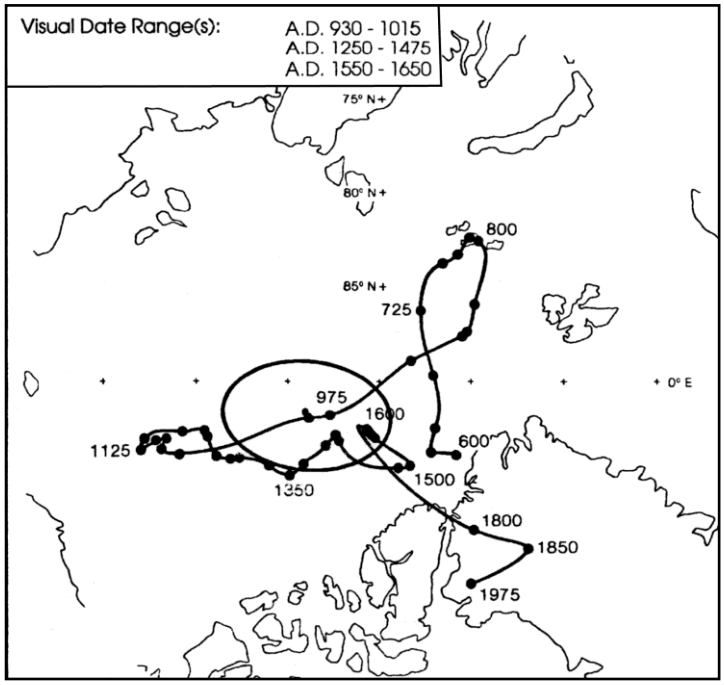


Figure 118. Plot of east hearth of Room 11 archaeomagnetic date (VGP and oval of confidence) against the master Southwest curve, SWCV595.

The location of the VGP of the sample from Room 11 is shown in Figure 118 and in reference to the Southwest virtual geomagnetic pole curve (SWCV595) in use at the time of dating in 1994 (Eighmy 1991). The oval around the VGP is the oval of confidence and reflects the error associated with direction measurements. As noted in the figure, three date ranges are suggested from visual inspection of the plot and are A.D. 930-1015, A.D. 1250-1475, and A.D. 1550-1650. Of these, the A.D. 1250-1475 range would encompass the El Paso phase and the period of occupation of Firecracker but does not specifically aid the dating of Room 11 relative to other rooms and occupations at the site.

Radiocarbon Dating

Eight samples of annual products of plants from rooms and extramural features were analyzed by Beta Analytic. The materials submitted for radiocarbon dating included maize cobs and kernels, common beans, dropseed grass stems and leaves, and flowering stalks of narrow-leaf yucca and lechuguilla. Seven samples were of sufficient size for standard dating, and the eighth, Beta 72425, was subjected to accelerator mass spectrometry (AMS) radiocarbon dating. Samples chosen for dating were primarily those of sufficient size for standard dating, as well as those samples associated with structures of the three principal occupations. These included the contiguous room pueblo, a room in the northwest group of isolated rooms, and a room in the southern group of isolated rooms. Six of the samples were radiocarbon dated as part of the abovementioned Chronometric and Relative Chronology Project.

Details of the radiocarbon dated samples, radiocarbon age estimates, and corrections for isotopic fractionation are furnished in Table 45. Two-sigma calibrated date ranges are also given with calibration to compensate for fluctuations in atmospheric carbon using the Calib Radiocarbon Calibration Program (Revision 8.1.0) and the IntCal20 Northern Hemisphere radiocarbon age calibration curve (Reimer et al. 2020). Corrected dates were also processed through the OxCal 4.4 calibration program (Bronk Ramsey 1994, 2019) for a graphic format for the calibrated dates (Figure 119). The calibrated date ranges differ very little between the Calib and OxCal programs.

The contiguous room pueblo has four related samples. Two samples consist of roofing materials from Rooms 2 and 4, two of the first four rooms of the room block. The other two samples are from extramural features just beneath floors of rooms in the western portion of the pueblo and reasoned to be of similar age to rooms in the eastern part of the pueblo. Feature 55 is in a refuse layer below Room 14 of the pueblo and above isolated Room 11, and Feature 140 is covered by the eroded floors of the western

Table 45. Radiocarbon Dates.

Provenience	Material	Lab Number	Measured ^{14}C Age	$\delta\ ^{13}$C	Corrected ^{14}C Age	Calib 2-Sigma Calibrated Age Range	Oxcal 2-Sigma Calibrated Age Range
Room 13, floor	*Zea mays*, kernels	Beta 30831	230 ± 50	-10.1	470 ± 50	1320 - 1620	1320 - 1620
Room 20, roof	*Yucca elata*, stalk	Beta 32394	1090 ± 70	-22.1	1140 ± 70	690 - 1030	690 - 1030
Room 4, roof	*Yucca elata*, stalk	Beta 72421	380 ± 50	-23.6	400 ± 50	1440 - 1640	1430 - 1630
Room 2, roof	*Agave lechuguilla*, stalk	Beta 72422	280 ± 60	-13.1	470 ± 60	1320 - 1630	1320 - 1630
Room 13, floor	*Phaseolus vulgaris*, common beans	Beta 72423	540 ± 50	-27.1	510 ± 50	1310 - 1470	1310 - 1470
Extramural Feature F.55	*Zea mays*, cobs	Beta 72424	180 ± 50	-12.2	390 ± 50	1440 - 1640	1430 - 1640
Room 20, floor	*Zea mays*, cob with kernels	Beta 72425	450 ± 60	-8.3	730 ± 60	1180 - 1400	1180 - 1400
Extramural Feature F.140	*Sporobolus* sp, grass stems, leaves	Beta 72426	350 ± 90	-15.5	510 ± 90	1290 - 1630	1280 - 1630

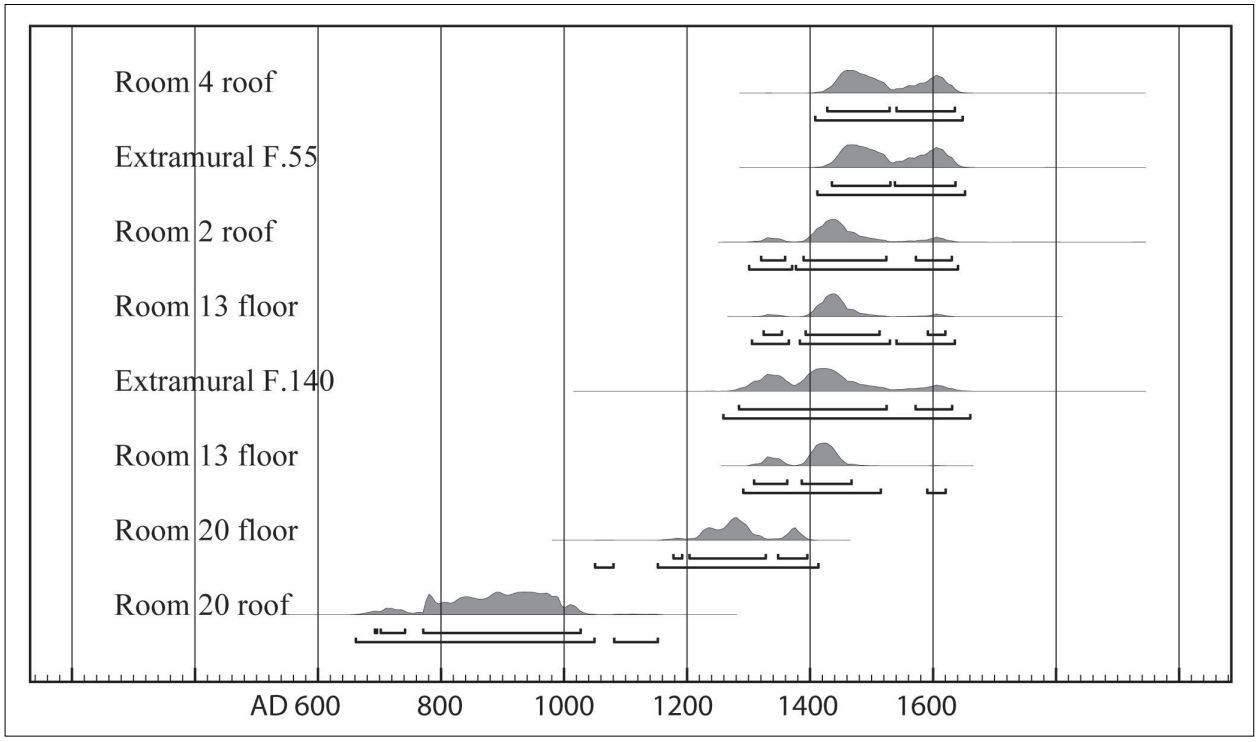


Figure 119. Calibrated radiocarbon age ranges and summed radiocarbon probability distribution.

part of the pueblo and cut into isolated Room 25. There is no significant difference between the radiocarbon dates for these four samples, as indicated by a Ward and Wilson (1978) Case II contemporaneity test (t = 2.7; df = 3; $\chi^2_{0.05}$ = 7.8). The weighted average age for these samples is 424 BP ± 26, and the 2-sigma calibrated age ranges are A.D. 1430-1500 (0.96 probability) and A.D. 1600-1615 (0.04 probability). A mid-15th century occupation is apparent. These radiocarbon dates for the pueblo are among the very few late radiocarbon dates for the Jornada Pueblo period and have been taken by Miller (2005) as evidence for an end date of A.D. 1450 for the El Paso phase.

Two samples are from isolated Room 13, one of four or five rooms in a courtyard group of isolated rooms south of the pueblo. A large quantity of maize kernels and common beans were burned along with the room and provide two radiocarbon dates. These two dates do not differ significantly from one another (Case II contemporaneity test; t = 0.3; df = 1; $\chi^2_{0.05}$ = 3.8), have an average weighted age of 490 BP ± 35, and have a 2-sigma calibrated age range of A.D. 1397-1458 (probability 1.0). Thus, isolated Room 13 would appear to date earlier than the pueblo, and the courtyard group of southern isolated rooms would also seem to have predated the occupation of the pueblo. Whatever gap there may have been between occupations, it may have been small, as the radiocarbon dates for isolated Room 13 do not differ significantly from those of the four dates for the pueblo (Case II contemporaneity test; t = 5.5; df = 5; $\chi^2_{0.05}$ = 11.1). Radiocarbon dates are illustrated in ascending order in Figure 119 where it can be seen that there is some overlap in dates for isolated Room 13 and the pueblo and that both occupations appear to have taken place in the first half of the 15th century.

The last two radiocarbon samples are from isolated Room 20, one of a number of isolated rooms in the northwestern part of the site. As seen in Figure 119, the radiocarbon dates from isolated Room 20 are earlier than the others. A contemporaneity test of all eight samples revealed significant differences among the dates (t = 106.5; df = 7; $\chi^2_{0.05}$ = 14.1). In that the dates from other areas have been shown to not differ significantly, the two dates from isolated Room 20 are considered to reflect an earlier occupation. In turn

a Case II contemporaneity test of these two dates shows that they are significantly different from one another (t = 19.8; df = 1; $\chi^2_{0.05}$ = 3.8). One of the dates suggests a 7th to 11th century date that must be considered aberrant given the weight of other chronometric, ceramic, and architectural evidence. As noted by O'Laughlin (2001b), this is the only structure in which modern trash had been deposited and included the remains of a calf, glass and metal can fragments, fireworks debris, and oil deposits that may have affected the dating of the sample. The other sample from isolated Room 20 is from roofing material and implies an occupation before A.D. 1400 and perhaps as early as the late 13th century. Given the presence of almost exclusively the late or classic variety of El Paso Polychrome, the occupation of the northwestern group of isolated rooms would have been no earlier than A.D. 1275/1300. Isolated Room 20 and other isolated rooms in this northwestern part of the site have been identified as the first identifiable occupation of the site based on stratigraphy and the presence of refuse from the pueblo occupation in the fill of a number of the isolated rooms (Chapters 6 and 7).

Summary

The predominance of the late or classic variety of El Paso Polychrome, the temporal ranges of intrusive ceramics, and the single archaeomagnetic date bracket the upper and lower limits of occupation at Firecracker Pueblo. The radiocarbon dates, however, provide support for the proposed occupational sequence outlined in Chapter 6. The isolated rooms in the northwestern part of the site include Rooms 18-22, 26, and 27. These isolated rooms are thought to be the earliest for the site, and the radiocarbon date from isolated Room 20 reflects a 14th century occupation. Notably, the presence of considerable trash from the later pueblo occupation on or just above the floors of a number of these rooms may indicate occupation closer in time to that of the pueblo and perhaps in the latter half of the 14th century. Isolated Rooms 11 and 15 followed not long after the earliest rooms, and isolated Rooms 28 and 31 may also have been constructed at the same time or perhaps later with occupation of the southern group of isolated rooms. The southern group of isolated rooms includes Rooms 13, 16, 17, 23, and 33, and the radiocarbon dates from isolated Room 13 indicate a late 14th century to early 15th century occupation. Next in the sequence are isolated Rooms 25 and 30 which were quickly replaced by the pueblo. Radiocarbon dates place occupation of the pueblo and associated isolated Rooms 24 and 29 to the first half of the 15th century.

The radiocarbon dates show occupation, albeit intermittent, from possibly as early as the first of the 14th century to the middle of the 15th century. No other excavated El Paso phase site has furnished data that illustrates such a long use of a particular location during the Pueblo period and such a late date of occupation. It is easy to visualize continuity in land use patterns during a period of relatively intense agricultural pursuits and a sense of land tenure and community identity.

CHAPTER 12
SUMMARY

Firecracker Pueblo is a late Pueblo period, El Paso phase settlement in northeast El Paso, Texas, near the border with New Mexico. It was first thought to be a small, contiguous room, adobe-walled pueblo. However, the systematic and extensive investigation of the site area has revealed multiple occupations, a large number of non-contiguous surface rooms and pithouses, a myriad of varied extramural features, and a large and diverse inventory of material and biological remains. A summary of occupation is provided, beginning with the pueblo and then the earlier occupations. This is followed by an overview of subsistence and settlement strategies.

The Pueblo

The pueblo is a linear arrangement of 15-17 rooms that can be divided into eastern and western halves based upon wall bonding and abutment and presence or absence of foundations for walls. The eastern half is noted as having begun as a core of two to four rooms and with accretion grew to 10 rooms. The western half was added to the earlier rooms and may have included five to seven rooms. Unfortunately, much of the western half of the pueblo has suffered from erosion. In addition to the pueblo, two non-contiguous surface rooms are linked to the pueblo occupation and include a habitation room and a storage/special purpose room.

Pueblo rooms have been classed as habitation, storage/special purpose, and civic/ceremonial. Habitation rooms are the most numerous rooms and have plastered floor hearths, either two or four post roof supports depending on the size of the room, and other miscellaneous floor features. Most habitation rooms have floor areas of 16-24 sq m. Some of these larger rooms are backed by smaller habitation rooms of 8-12 sq m, creating two-room suites that presumably accommodated larger households. Five households have been estimated for the eastern set of rooms, and three to five households may have occupied the poorly preserved western rooms. Two supra-household social groups are believed represented by the architectural differences between the two halves of the pueblo and the growth of the pueblo. Indeed, this segmented construction history may well reflect aggregation of affiliated groups during a favorable period.

The eastern half of the pueblo has one very large room of 48 sq m that has an alignment of two hearths and other features along the south-north axis of the room. Rooms like this one have been called kivas and clan and ceremonial rooms and most recently have been referred to as communal rooms (Marshall 1973; Miller and Graves 2009). The one known communal room is surrounded by habitation rooms of the eastern half of the pueblo. The question rises as to whether there had been one in the western half of the pueblo in the area of the eroded remnants of caliche plastered floors.

Communal rooms occur in pueblos of six or more rooms, and larger pueblos may have more than one communal room. They also tend to increase in size with size of the pueblo, smaller pueblos may only have a single hearth in the communal room, and pueblos of 10 or more rooms may see two hearths in the communal room (Miller 2009b). The association of communal rooms with pueblos of about six rooms and the presence of additional communal rooms in larger settlements is suggestive of a sequential hierarchy (Johnson 1982, 1989). A sequential hierarchy can be seen as a communal, segmentary organization where the parts can be assembled and disassembled in a modular fashion to facilitate different scales of decision-making and social integration. According to Johnson, a sequential hierarchy is formed when the number of information sources reaches or exceeds an average number of six entities in order to more effectively manage information. The entities or decision-making units could be family heads, clans, corporate groups, villages, or allied polities.

The one communal room in the eastern half of the pueblo is congruent with the ratio of pueblo rooms to communal rooms for similar sized and smaller pueblos. If there had been a second communal room in the western half of the pueblo, Firecracker would not stand out from other pueblos of similar size and certainly those with segmented histories. It could also be that there was only ever the one communal room. It, however, has two plastered floor hearths which may reflect the dualistic aspect of the two halves, segments or supra-households of the pueblo.

Storage or special purpose rooms include two small rooms without plastered floors, postholes, or other floor features. The larger of these two rooms has a floor area of some 5 sq m and backs one of the larger habitation rooms of the pueblo. The smaller room has a floor area of about 1 sq m and is attached to the front or south side of the pueblo. A surface room associated with the pueblo occupation is a short distance south of the pueblo and also has a floor area of 1.4 sq m. Small rooms or cubicles are known for two other El Paso phase sites, and it has been suggested that they resemble turkey pens of Paquime (Gerald 1963; Miller 2009a). Aside from the presence of turkey-sized eggshell scattered elsewhere in the site, there is no evidence that these small rooms were used in turkey aviculture. Nevertheless, the use of these small rooms for penning turkeys remains a possibility.

Relatively little material was found on the floors of pueblo rooms, indicating regular maintenance and disposal of trash. Some trash was allowed to accumulate in one corner of a room, perhaps with anticipated abandonment of the pueblo. De facto refuse is noted for the roof of one room, and large sherds and some ground stone was left on the floors of several rooms with abandonment.

The core rooms and the communal room were burned with abandonment of the pueblo, presumably as an act of ritual termination. The burning of rooms and deposition of selected materials in floor and subfloor contexts is a known abandonment phenomenon of the Jornada Region (Miller 2009c). While a few and disproportionate number of turquoise objects were recovered from postholes and a floor, the placement of offerings as part of an abandonment ritual is not clearly supported for this pueblo.

The investigation of areas surrounding the pueblo has revealed a structured distribution of secondary refuse and features of an intensive occupation. Hearths within rooms are situated near the center of south wall where entrances would have been located. In turn, little refuse and few features occur near the southern face of the pueblo, implying maintenance of the space for competing outdoor activities. Secondary refuse was allowed to accumulate at a distance from the pueblo, principally in a broad arc in front and to the west of the pueblo. Secondary refuse was also deposited in extramural features and earlier structures. Extramural features generally follow the distribution of secondary refuse with small thermal features nearer to the pueblo, large thermal features more distant, storage pits toward the outside of the arc of refuse, and borrow pits on the site periphery. As rooms were added to the pueblo, some of the secondary refuse, a few earlier rooms, and a number of extramural features were capped by the new construction. Subsequently, new features were put to use, and the arc of secondary refuse was pushed away from the additions.

A variety of extramural features have been documented for Firecracker Pueblo and for other El Paso phase pueblos. But, the large number of features categorized as storage pits is exceptional. While few rooms have been identified as possible storage rooms, the larger habitation rooms may have accommodated some storage (O'Laughlin 1985b). Additionally, the smaller habitation rooms in the two-room suites may have been important for storage. Nevertheless, a minimum of 16 and a maximum of 32 storage pits may have provided up to 36 m^3 of storage capacity. Although they were undoubtedly not all in use at the same time, they still complemented above ground storage in pueblo rooms. Storage pits are known ethnographically for groups that are residentially mobile, bury food stores, conceal food stores with abandonment of a residence, and for other reasons (DeBoer 1988; Gilman 1983, 1987; Raymer 1990; Young 1996). Seasonal or periodic abandonment of the pueblo is conceivable. It is also possible that few storage pits were in use at any given time and that they may simply have been used for limited storage, perhaps of cucurbits.

Whatever use they may have had, two of the pueblo occupation storage pits were used to cache ground stone, likely at the time of abandonment.

The modification or remodeling of pueblo rooms was noted for eight rooms and includes the capping of features, the modification of roof supports, the rebuilding of one hearth, the resurfacing of one floor, and the excavation of small pits in floors. The hearth in the isolated habitation room of this occupation was also twice relocated. The limited room modifications and the finding of a single burial, possibly from an earlier occupation, suggest that the occupation was relatively short-lived.

The length of occupation can be estimated by accumulation models and use-life estimates for vessels. El Paso Polychrome jar rims and body sherds from excavated contexts of the pueblo occupation number 30,728 sherds. Considering the unexcavated areas of surface refuse and unexcavated extramural features and portions of features, the number of jar sherds is roughly calculated to be 77,700. Given the varying weights of sherds for the different site contexts, the weight of the jar sherds is approximately 208 kg or 2.7 gr per sherd. Accumulation research models provide estimates of length of occupation for households based on the weight of discarded broken cooking vessels. The accumulation rate of 3,900 to 7,998 gr per year per household brackets a number of the developed rates (Varien and Mills 1997) and yields an occupation length of 2.6 to 6.7 years for the estimated eight to 10 households of the pueblo. The jars at Firecracker Pueblo range from small to very large and the number of sherds for fragmented vessels correspondingly range from as few as 30 or 40 to 1,725 for the large jar deposited in the fill of Room 3. As an average and liberal estimate of the number of sherds from a fragmented and discarded El Paso Polychrome jar, 500 to 1,000 sherds are used here to project the number of vessels represented by sherds. Some 78 to 155 jars are suggested for the pueblo occupation. Cooking pot discard rates for the Tarahumara range from two to five per year per household (Arnold 1985) and encompass archaeological examples (Varien and Potter 1996). Using these rates and the estimated number of vessels for the eight to 10 households, the length of occupation ranges from 1.6 to 9.7 years. The estimated occupation lengths are similar and imply a relatively short occupation of the pueblo. As noted by Miller (2009a), not all El Paso Polychrome jars are cooking pots and the use of counts and weights for all jars for discard and accumulation equations may overstate the length of occupation.

Isolated Rooms

Isolated or single room structures of occupation prior to that of the pueblo number 18. Radiocarbon dates and the superpositioning of structures, other features, and refuse deposits place occupation earlier than the pueblo and guide the understanding of relationships between structures and the sequence of occupation. Isolated structures of the El Paso phase have also been called surface rooms, pit rooms, and pithouses depending on the depth of the room. As with pueblo rooms, they can be categorized as habitation, storage/special purpose, and civic/ceremonial.

There are 14 habitation rooms with plastered floors and hearths and floor depths ranging from a few centimeters to over a meter. Most are rectangular in shape and with floor areas generally smaller than the pueblo rooms and from 6.1 to 15.8 sq m. Isolated rooms lack foundations for walls, and wall stubs survived for only one habitation room. Four rooms have two primary roof supports, and the deepest room has four. Other floor features are relatively few in number. Few modifications to rooms were noted and included the reconstruction of one hearth, the relocation of another hearth, the excavation of small pits in a number of floors, and the capping of some floor features. Four clusters of two to seven isolated rooms have been identified and are viewed as sequential occupations by supra-households.

Possible storage or special purpose rooms are few in number and different from one another. Floor depths for the three rooms are 53-95 cm, and the floors are the smoothed caliche substrate into which the structures were excavated. One is rectangular with plastered walls, a floor area of 7.5 sq m, and a small pit and several

shallow depressions. This isolated room is in the northwest cluster of rooms and is seen as a probable storage room. Another is circular with unplastered walls, a floor area of 6.1 sq m, and floor features that include an unlined hearth and a depression. It is located in the center of the southern cluster of five isolated rooms and has been classed as an isolated room because of the presence of a hearth. However, it may simply have been a very large storage pit. The third example is a square, unplastered room of 1.3 sq m with a step entry and no floor features. It cannot be associated with any of the clustered rooms. The size of this room compares with the two smallest pueblo rooms, but its depth would suggest a use for storage rather than some special purpose.

South of the pueblo and east of the other isolated rooms is the largest of the isolated rooms. It is subrectangular in shape with an entry or antechamber and a total floor area of 22.1 sq m. The floor is the compact caliche substrate, and the walls are unplastered. There is a series of postholes between the antechamber and the main room, another row of postholes in the western third of the room, a large informal hearth, and a number of small pits and depressions in the floor. The large size of this room suggests that it might have been a communal room. However, it is not spatially associated with other isolated rooms, and the architecture reveals a low labor investment that suggests that it might have been a large isolated habitation utilized by a large household or extended family household.

Little material was recovered from the floors of most rooms, implying regular maintenance of isolated rooms in a manner following the maintenance of pueblo rooms. Pottery making was indicated by de facto refuse in one room. Ground stone and other objects were cached in two rooms that comprised one of the occupations, and one of these rooms had possibly been burned.

Two other burned rooms are of interest for their contents and the possibly that they may have been burned as part of an abandonment ritual. A burned ear of maize, four shell beads, 11 pieces of chrysocolla, and a projectile point were found on the floor and in one pit of Room 20, and an obsidian cruciform was recovered from the fill just above the floor. Little else was recorded for the room, and it is possible that the items were intentionally placed and the room burned in a termination ritual. Similarly, Room 13 is noted for a large quantity of burned beans and maize cobs and kernels mostly within the roof level. A shell bead and a projectile point were also recovered from the roof level. Grading disturbed the roof material, and a nearby cluster of burned beans and maize and 70 shell and fossil beads, fragments of five bone rings, a quartzite pendant, and a projectile point are believed to have come from the roof level. While the burning of so much maize and beans may appear to be a catastrophic event, the association of jewelry and projectile points with the roof deposit and the absence of de facto refuse on the floor suggest that Room 13 was burned in a closing ceremony.

Secondary refuse and extramural features could not be found for a number of the isolated rooms due to the accumulation of trash or numerous extramural features of the later comparatively intense occupation of the pueblo. An ordered, but less intense, use of space is noted for the northwest cluster of seven rooms and the southern cluster of five rooms. Areas around these isolated rooms are largely free of trash, with secondary refuse deposits to the south of a number of rooms. Extramural features are few in number and include thermal features, storage pits, borrow pits and non-specific features. These features are primarily a short distance south and east of the northwest cluster and around the periphery of the southern cluster.

Few storage pits could be assigned to the northwestern and southern clusters of isolated rooms, the somewhat small isolated rooms provide little space for storage, and potential storage rooms are also few in number and relatively small. Thus, the prospective ability for occupations of the isolated room clusters to store foodstuffs of any quantity is limited as compared to the pueblo occupation. The small rooms, few extramural features, meager storage space or facilities, and somewhat modest accumulation of secondary refuse reflect a less intense occupation of the isolated room clusters as compared to the pueblo. Additionally, while the isolated rooms have many of the architectural characteristics of pueblo rooms, their

smaller size and restricted storage capability imply that occupation of isolated room clusters was anticipated to be short-lived, risky or uncertain, or perhaps seasonal.

The clusters of isolated rooms at Firecracker reflect an organization of households akin to the segments of contiguous room pueblos. This is most apparent for the cluster in the northwestern part of the site where seven surface rooms and pithouses are closely spaced in a linear arrangement that parallels the form of small pueblo room blocks of the region. Subsequent occupations, each with two isolated rooms, extend this linear configuration to the east. The cluster of five isolated rooms in the southern part of the site, however, expresses a different spatial form of social cohesion. Four of the isolated rooms define a central courtyard, and the fifth structure is a storage room or large storage pit in the center of the settlement. Pit rooms and surface structures loosely arranged around what appear to be informal courtyards are known for the earlier Dona Ana phase, but only one other El Paso phase site is known where a contemporaneous relationship between structures is suggested. This site is 41EP2724, and it has two pit rooms with hearth locations indicating openings onto a common extramural area (Dering et al. 2001).

Subsistence

Firecracker Pueblo is situated below the alluvial fan emanating from the Franklin Mountains and at the western edge of the Hueco Bolson. It is one of many El Paso phase settlements aggregated in this location to presumably take advantage of arable land and runoff for agriculture. The importance of cultigens to the occupations of Firecracker is illustrated in the high ubiquity values for both maize cob fragments and kernels and their presence in all site contexts. The occurrence of trough metates and large two-hand manos additionally correlate with a reliance on maize agriculture.

The sequential occupation of this settlement would imply that conditions suitable for maize production were not always extant. Indeed, a reconstruction of precipitation from tree ring data for the Rio Grande Basin of southern New Mexico shows considerable variation in precipitation over the last two thousand years (Grissino-Mayer et al. 1997). Of note, there is a severe drought for A.D. 1272-1296, followed by increased precipitation for the 14th century as compared to the 13th century and a particularly wet interval for A.D. 1309-1314. The radiocarbon date for Room 20 indicates a late 13th to early 14th century date for the occupation of the northwest cluster of isolated rooms, and it can be suggested that this occupation may have happened during this wet period. The 15th century is distinguished by a return to below average precipitation, severe droughts at A.D. 1405-1415 and A.D. 1445-1450, and a wet period at A.D. 1425-1435. Based on radiocarbon dates, the occupations of the southern cluster of isolated rooms and the pueblo appear to have been between these 15th century droughts. Abandonment of the pueblo, and perhaps the region, may have been coincident with the mid-15th century drought.

Native fruits and seeds from 23 taxa were recovered from the large number of flotation samples and macrofloral samples for Firecracker. These remains reflect the contribution of gathering activities for the various occupations and the use of resources from the basin floor, alluvial fan, and lower elevations of the Franklin Mountains. Mesquite beans, fruits of datil, melon loco, prickly pear and other cacti, and seeds of pigweed, goosefoot, portulaca and dropseed are the well-represented food plants. Mortars and pestles likely used in processing mesquite beans are also a conspicuous part of the ground stone assemblage. Definite evidence for on-site processing of the caudex or heart of agaves or other leaf succulents was lacking, though a few fibers and leaves were retrieved and stalks were utilized in roof construction.

Mesquite is the principal wood used for fuel, followed by small amounts of saltbush and creosotebush. There is little support for the gathering of fuel woods from beyond the vicinity of the settlement. Materials for roof construction, on the other hand, include cottonwood and one instance of juniper from the nearby mountains.

Hunting and trapping of game is documented by small, triangular projectile points and a substantial collection of faunal remains. The faunal assemblage is comparable to many other basin sites of differing time periods and is dominated by the bones of jackrabbit and cottontail. Elements of rodents and birds are few in number, as are those of artiodactyls. Following the plant remains, the faunal material discloses the utilization of local resources.

Settlement Strategies

The assorted occupations of Firecracker Pueblo are not random occurrences of settlement. Rather, they provide insight to the structured relations between populations and their social and physical environment. They reflect a history with the land and an adaptive context or organizational role played within a regional settlement system.

The aggregation of El Paso phase settlements at the western edge of the Hueco Bolson can be viewed as one community with reliance on a single cultigen, maize. Firecracker is a part of this community and intimates a close relationship to a portion of the landscape through sequential occupation. The environmental encouragements for occupation are the availability of arable land for maize on the nearby lower alluvial slope and playa margin, ponded playa water for drinking and other activities, and the congruence of other resources such as fuel wood. The repeated settlement of the same location implies a form of land tenure that possibly included a buffer zone relative to nearby contemporaneous settlements. Dissolution of the occupations also implies social or environmental instability, or what may be referred to as locational stability and occupational instability (Horne 1993).

Abandonment of the location could have been for any number of reasons, though the lack of congruence in critical resources, especially rainfall, was probably most critical. It could also have been that social or environmental conditions improved at a former or other place of occupation. Some of the occupations at Firecracker may also have been seasonal. Residential mobility plays a part in all of these scenarios.

Mauldin (1986), following Hard's (1983a) lead for the Mesilla phase, formulated a model of the El Paso phase settlement system where group mobility and settlement are viewed as cultural adjustments to seasonal environmental conditions. The main components of this model are primary villages along mountain edges and the Rio Grande and secondary habitations during the warm season for agricultural activities and foraging. With subsequent archaeological investigations in the region and the documentation of a number of settlements with noncontiguous surface rooms and pit rooms, Kenmotsu et al. (2008) added to Mauldin's work three particular settlement strategies that addressed environmental risks and incorporated residential mobility. Inherent in these strategies is the concept of sequential hierarchies and a corporate form of social organization (Feinman et al. 2000; Johnson 1982, 1989; Spielmann 1994). A sequential hierarchy is well-suited to the spatial and temporal variability of the Jornada region and is basically a communal, segmentary organization in which the units can be assembled or disassembled as needed. Settlement aggregation and dispersion may occur during periods of resource stress or abundance, as well as in response to changing social conditions.

The three settlement strategies envisioned by Kenmotsu et al. (2008) are dispersion-aggregation, short-term sedentism, and auxiliary settlements. Each is described below and then considered with respect to the findings of the Firecracker site.

The strategy of dispersion-aggregation is essentially an extension of Mauldin's (1986) settlement model. Segmented pueblos and clusters of isolated rooms are related with the occupation of smaller isolated room settlements having dispersed from larger pueblo settlements as a response to resource stress or population pressures. Dispersion could also have been on a seasonal basis, and with more favorable conditions, those in the isolated room settlement would rejoin those at the pueblo.

Short-term sedentism is a strategy where the isolated room clusters and pueblos are no longer contemporaneous. That is, aggregated pueblos are temporarily or permanently abandoned, and popula-tions are dispersed to isolated room settlements across the landscape and as a response to a long period of resource stress.

Auxiliary settlements are those isolated room occupations that functioned as field houses or agricultural field maintenance. These seasonally occupied settlements are noted as having two or fewer contem-poraneously occupied isolated rooms (Batcho et al. 1985; Browning et al. 1992; Condon et al. 2010; Dering et al. 2001)

The clusters of five to seven isolated rooms in the northwestern and southern parts of Firecracker are seen as supra-household groups and equivalent to segments of larger pueblos. They exhibit a structured use of space and an arrangement of rooms reflecting contemporaneity and close social relations. Extramural features are few but varied and refuse has accumulated around rooms. The material remains are diverse, and the gathering of local plant foods and hunting of local game is well documented. Maize dominates the botanical remains, and storage rooms or pits are present. Taken together, the evidence would suggest more than seasonal occupation, but one of limited duration. The small size of the isolated rooms also suggest a risk involved in establishing a settlement and that occupation may have been anticipated to be short-term. However, radiocarbon dates and reconstructed precipitation patterns would suggest occupation at intervals between droughts and with average or above average precipitation.

The northwestern and southern clusters of isolated rooms could represent the seasonal dispersement of populations from a primary pueblo or the establishment of a new settlement with abandonment of the former residence. An occupation of more than a season is suggested by the archaeological remains, and a short-term occupation is favored. However, distinguishing between a seasonal occupation, repeated seasonal occupations, and a short multi-season occupation is a complicated task, and other interpretations could be proffered. Nevertheless and if it is accepted that these clusters of isolated rooms are short-term residential occupations, then questions remain as to why this settlement was established and why it was abandoned. Obviously, the congruence of resources allowed occupation and the diminishment of a critical resource or favorable conditions elsewhere promoted abandonment. But, was the original settlement abandoned due to resource stress? Or, might have populations budded off from aggregated communities under favorable conditions and population growth? Similarly, did abandonment of the isolated room clusters lead to the establishment of a new settlement where critical resources were congruent? Or, did populations return and reoccupy the original settlement? Other questions could also be asked, but the point is that our current understanding of the organization of the settlement system for the El Paso phase is limited and that residential mobility is a critical aspect of this organization and one that should be addressed in future investigations.

Isolated Rooms 25 and 30, beneath the pueblo, provide the only known case where a relationship between a cluster of isolated rooms and a pueblo can be demonstrated. Room 30 is a deep pit room or pithouse and was demolished to permit construction of one of the core rooms of the pueblo. Room 25 is a deep pithouse that was intentionally backfilled first with caliche and then refuse prior to construction of the western part of the pueblo. An alignment of Rooms 25 and 31 and the southern walls of the pueblo strengthen this relationship. There is also the possibility that other isolated rooms may have been part of the cluster but obliterated with construction of the pueblo. Rooms 25 and 30 differ from other isolated room in that they are somewhat large and square. The modification of the hearth in Room 30 also suggests an occupation for some time or perhaps a repeated seasonal occupation. At any rate, this cluster of isolated rooms was replaced by a contiguous room pueblo indicating that conditions for settlement were sufficient for establishment of a more permanent settlement for a larger group. Again, this case does not fit easily into proposed settlement models but does illustrate the fluid and dynamic nature of residence and mobility.

Finally, isolated Rooms 11 and 15 furnish another picture of isolated room clusters. These two rooms are of similar size, have similar floor features, are close to one another, and are oriented east-west. Both rooms have de facto refuse with one room having metates, manos, and evidence of pottery manufacture and the other with a large mortar and pestle. A repeated seasonal occupation or a short-term occupation is implied by the relocation of the hearth in one room. Both of these rooms are beneath the western part of the pueblo ad above features associated with the northwestern cluster of isolated rooms. Extramural features and trash could not be confidently aligned with the occupation of Rooms 11 and 15. Occupation would appear to have been short-term by two households or an extended family. De facto refuse on the floors of these rooms suggests that a return might have been anticipated or that movement was at such a distance that heavy ground stone was abandoned and not retrieved. The question is whether these two rooms represent an auxiliary settlement or simply a smaller version of a settlement with population dispersion or a settlement illustrative of short-term sedentism. Some have called single room settlements field houses (Batcho et al. 1985; Browning et al. 1992). Others have queried whether settlements with two or three non-contiguous rooms of questionable contemporaneity are field houses, examples of repeated seasonal occupation, or limited and short-term occupations (Condon et al. 2010; Dering et al. 2001). Then, there are larger clusters of isolated rooms of the El Paso phase where Firecracker is the example. The issue is not one of function, but rather of adaptive context or role in the larger settlement system. It is also one of scale where archaeological manifestations exhibit variability along a continuum of mobility and intensity of occupation and social complexity.

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APPENDIX A

ATTRIBUTES OF EXTRAMURAL FEATURES

Table A.1. Posthole Attributes.

Number	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
26	25	23	27	circular	straight to undercut walls, flat bottom	5	1		
27	22	19	25	oval	vertical walls, flat bottom	6	3		1 maize cupule, 7 mesquite seeds, 2 prickly pear seeds, 1 shell disc bead
75	12	11	14	circular	vertical walls, rounded bottom	1			
80	13	11	20	circular	vertical walls, rounded bottom			8	
122	11	11	10	circular	vertical walls, flat bottom				
126	16	16	14	circular	vertical walls, rounded bottom				
405	11	11	23	circular	tapering				
406	9	9	11	circular	tapering				
407	12	10	27	circular	vertical walls				
408	13	10	26	circular	tapering				

Table A.2. Small Thermal Feature Attributes.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
16		58	28+ (est 60)	7	circular	sloping sides, flat bottom	3	1		
38	in fill of F.429	34	28	2	oval	lens	167		1	
59	overlies F.60	48	44	9	oval	basin		1	1	
73		45	44	8	circular	basin				
74		34	34	3	circular	basin				
76		40	40	4	circular	lens				
77	overlain by eroded pueblo floor	22+ (est 40)	30	8	oval	basin				12 maize cupules
83	cut by Room 11, overlain by Room 14	81	47+ (est 80)	5	circular	basin				17 maize cupules

Table A.2. Small Thermal Feature Attributes, continued.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
84	overlain by Room 14	43	43	3	circular	basin	3	5		
85	overlain by Rooms 10, 14, cut by Room 15, overlies F.49	84+ (est 88)	57	4	oval	lens	12	4		
86	in fill of F.60	73	53	10	oval	basin	15	7		
92		52	42+ (est 48)	12	circular	steeply sloping sides, flat bottom				
100		30+ (est 60)	15+ (est 60)	7	circular	lens				
101		54	39+ (est 55)	6	circular	lens				
107		52	38	3	irregular	lens	27			
116		43+ (est 60)	20+ (est 60)	5	circular	lens				
120		21	11+ (est 21)	5	circular	basin				
124		46+ (est 70)	53	13	oval	basin	5			
144		36+ (est 50)	15+ (est 50)	5	circular	lens				
145		51+ (est 70)	37+ (est 70)	7	circular	lens	15	1		
146		25+ (est 40)	34	4	circular	basin		2		27 maize cupules
148		56	37+ (est 55)	9	circular	basin				95 maize cupules
151	fill of Room 31	53	52	8	circular	basin	25	5		21 maize cupules
152	fill of Room 31	32	30	2	circular	basin				
162	overlies Room 31	60	38+ (est 66)	8	circular	basin	2			2 maize cupules
163	upper fill of Room 31	78	63	8	circular	basin	13	12	14	

Table A.2. Small Thermal Feature Attributes, continued.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral
164	fill of Room 31, overlies F.174	51	46	8	circular	basin	3			
167	fill of Room 31	48	39	9	oval	basin	3	2		
375		33+ (est 50)	7+ (est 50)	3	circular	lens				16 maize cupules
376		35	35	4	circular	lens	128	1		
377		24	24	3	circular	lens				
378		58+ (est 70)	33+ (est 70)	3	circular	lens	7	2		
399		116	79	3	oval	lens				
400		70	60	3	circular	lens				
401		30	30	3	circular	lens				
402		57	54	3	circular	lens				
403		41	41	4	circular	basin				
409		70	63	3	ovoid	lens				
413	exposed in Trench 1, not tested	85+ (est 90)	Unk.	9	circular?	basin				
414	exposed in Trench 1, not tested	28+	Unk.	8	circular?	basin				
437		22	11+ (22 est)	1	circular	lens				
438	in fill F.118	45	43+ (est 48)	3	circular	basin				
439	in fill F.118	43	25+ (est 45)	5	circular	basin				
441		30+ (est 70)	20+ (est 70)	3	circular	lens				
442		45+ (est 60)	15+ (est 60)	3	circular	lens				
445	in fill of F.429	38	36	3	circular	lens				
450	exposed in Trench 8, not tested	55+ (est 60)	Unk.	8	circular?	lens				

Table A.3. Large Thermal Feature Attributes.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
7		149	67+ (125 est)	35	oval	basin	147	20		1 abrader, 1 hammerstone, 1 polishing pebble
10		109	54+ (est 105)	24	circular	basin	13			
18	fill of F.127	85+ (est 140)	60+ (140)	18	circular	basin	128	17	2	14 maize cupules
45		90+ (est 160)	100+ (est 140)	13	circular?	strongly sloping sides, irregular bottom	38	3		3 kernels, 21 cupules maize; 5 common beans; 2 mesquite seeds; 1 ground stone frag; 1 hammerstone
46	fill of F.451	115	50+ (est 100)	16	oval	basin	15	5		2 metate frags
51	cut into F.49, F.50; overlain by Room 14	82	80	37	circular	sloping sides, flat bottom	65	32		
52	cut by Room 11, overlain by Room 14	52	50	33	circular	steeply sloping to slightly undercut sides, rounded bottom	7	7		2 eggshell
58		84	73	29	oval	basin				
115		100+ (est 150)	80+ (est 150)	17	circular	straight sides, flat bottom	29	3		1 datil fruit frag
129	overlain by Room 24	95	63+ (est 72)	14	oval	basin	57	12		
150	upper fill of Room 31	85	82	18	circular	basin	47	29	82	11 maize cupules, 1 bone awl frag
202	cut into wall of Room 31	75+ (est 100)	25+ (est 100)	23	circular	sloping sides, irregular bottom				
410	exposed in Trench 4, unexcavated	55+	Unk.	23	circular?	basin				

Table A.3. Large Thermal Feature Attributes, continued.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
415	exposed in Trench 2, unexcavated	75+ (est 100)	70+ (est 100)	23	circular	basin				
423	exposed in Trench 5, unexcavated	80+	70+	37	oval	vertical sides, slightly rounded bottom				

Table A.4. Storage Pit Attributes.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
1	cut by F.94	168	167	58	circular	vertical walls, flat floor	917	377	644	3 kernels, 65 cupules maize; 1 mesquite pod; 1 shell bead; 1 turquoise pendant; 2 bone rings; 1 biface; 1 projectile point; 1 mano frag; 2 stone abraders; 1 stone palette frag; 2 hammerstones; 2 polishing pebbles
14		131+ (est 150)	49+ (est 150)	28	circular	sloping to vertical sides, slightly rounded bottom	11	3		115 maize cupules
17		100+ (est 180)	80+ (est 180)	30	circular	sloping sides, flat bottom	45	17	1	2 shell beads

Table A.4. Storage Pit Attributes, continued.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
20	cut by F.22	125 top, 163 bottom	55+ (est 110) top, 67+ (est 140) bottom	136	oval	vertical walls, undercut one side, flat bottom; 66+ by 39, 27 deep and 83 by 29+, 17 deep floor pits	370	136	81	8 kernels, 179 cupules maize; 1 bean; 1 bone ring; 1 gypsum plaque; 3 bifaces; 1 projectile point; 1 hammerstone; 1 polishing pebble
22	cut into F.20, cut by F.21?	40+ (est 50) top, 51+ (est 70) bottom	46 top, 68 bottom	109	circular	vertical to undercut walls, shallow rounded bottom	21	7		26 maize cupules
36		120	70+ (est 120)	58	circular	vertical to steeply sloping walls, uneven but roughly flat floor	206	179	74	1 kernel, 61 cupules maize; 1 common bean;1 turquoise pendant; 1 chrysocola; 1 limonite
39		72+ (est 150)	46+ (est 150)	44	circular	vertical walls, flat floor	4	2		
40		103	93	32	circular	steeply sloping sides, flat bottom	65	27	6	1 kernel, 101 cupules maize; 1 common bean; 1 shell bead
41		100+ (est 175)	43+ (est 150)	48	oval?	steeply sloping side, slightly rounded bottom; 43 by 30+, 13 deep basin in floor	2	1		1 abrader, 1 hammerstone
42	cut into F.43, overlain by F.121	133	124	45	circular	vertical to sloping walls, flat floor with slight slope	132	71		1 metate frag, 1 ground stone frag
48		124+ (est 135)	94+ (est 135)	63	circular	vertical sides rounding to flat floor	13	8		1 cf tepary bean

Table A.4. Storage Pit Attributes, continued.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
50	cut by F.51, cut into F.49, overlain by Rooms 11, 14	178	165	36	circular	steeply sloping walls, flat floor	231	192	1	1 kernel, 7 cupules maize; 240 eggshell; 2 abrader frags; 1 specular hematite; 2 limonite
54	overlain by Room 12	277+ (est 295)	210	57	oval	straight to sloping walls, flat floor	59	23	9	1 kernel, 68 cupules maize
56	overlain by Room 12	185	183	56	circular	vertical to steeply sloping walls, flat floor; 80 by 50, 32 deep floor pit along north wall	189	268	342	1 kernel, 75 cupules maize; 1 drill; 1 pestle frag; 6 hammerstones; 1 gypsum plaque
63		100+	100+	47	circular?	flat bottom	54	16	8	33 maize cupules, 1 common bean, 1 abrader
65	overlain by F.433	187+ (est 200)	177+ (est 190)	51	circular	vertical walls, flat floor; 150 by 76, 28 deep floor pit along north wall	170	119	112	1 kernel, 1 cupule maize; 5 leaf frags, 30 fibers agave; 2 pestles; 1 abrader; 1 hammerstone
82	overlain by F.8, cut by F.135	208+ (est 230)	103	48	oval	vertical walls, flat floor	208	45	2	1 kernel, 22 cupules maize; 1 common bean; 1 mesquite seed,; 1 metate; 3 manos
94	cut into F.1 and F.2	216+ (est 240)	144	63	oval	straight to steeply sloping walls, flat floor	369	163	101	1 metate, 1 mano frag, 1 abrader, 1 abrader frag, 4 hammerstones
96	overlain by eroded pueblo floor	140+ (est 200)	40+ (est 200)	42	circular	vertical wall, flat floor	45	30	1	1 metate frag, 2 polishing pebbles, 1 limonite

Table A.4. Storage Pit Attributes, continued.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
98	cut into F.71	100+ (est 200)	40+ (est 200)	46	circular?	sloping walls, slightly rounded bottom	13	7		
102		107+ (est 125)	67+ (est 125)	43	circular	vertical walls, flat floor	9	5		1 maize kernel
110		153	100+ (est 150)	72	circular	vertical to steeply sloping walls, flat floor	91	33	1	2 bone rings
123	cut by F.448	261+ (est 290)	90+ (est 220)	41	oval	steeply sloping walls, flat floor	88	74	81	1 drill, 1 turquoise pendant, 1 schist pendant, 1 tubular fossil bead
130	cut into F.127	98	95	73	circular	vertical walls, flat floor	204	229		25 maize cupules, 2 hammerstones, 1 polishing pebble
132	exposed in Trench 2, unexcavated	92+	Unk.	34	circular?	vertical to undercut walls, flat floor				
133		61+ (est 110)	50+ (est 110)	72	circular	steeply sloping walls, slightly rounded bottom	28	2		
134		200 (210 est)	90+ (est 210)	53	circular	steeply sloping walls, slightly rounded bottom	3	1		
135	cut into F.82	192+ (est 230)	208	45	oval	steeply sloping walls, flat floor; 82+ by 77, 13 deep and 55 by 33, 22 deep floor pits	366	197	22	2 maize kernels, 1 hammerstone
136	overlain by F.35	100+ (est 190)	71+ (est 190)	30+	circular	vertical wall, slightly rounded bottom	69	41	3	1 metate frag, 1 hammerstone, 1 shell bead, 1 bone awl

Table A.4. Storage Pit Attributes, continued.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
137		100+ (est 120)	28+ (est 120)	44	circular	steeply sloping to vertical walls, rounded bottom	7	3		
139	cut into F.131	166+ (est 170)	152	46	circular	eroded steeply sloping walls, flat floor	197	102	25	1 maize kernel
140	cut into Room 25, overlain by eroded pueblo floor	162	153	64	circuar	vertical walls, flat floor, 62 by 30, 16 deep pit along south wall	237	264	120	2 metate frags, 1 mano frag, 1 hammerstone, 1 tubular fossil bead
159	cut into F.198	62	58	61	circular	vertical to slightly undercut walls, slightly rounded bottom	138	23	1	29 maize cupules
394	overlain by F.433	143	83+ (est 145)	38	circular	sloping walls, flat floor	84	15		
395	cut by Burial 1	133+ (est 140)	107+ (est 140)	56	circular	vertical walls, flat floor	14	7	1	1 shell bead, 1 bone awl frag
412	exposed in Trench 1, unexcavated	105+	70+	35	circular?	vertical walls, flat floor				
416	cut into Room 31, exposed in Trench 2, unexcavated	187+ (est 200)	est 130	43	oval	sloping sides,flat bottom				
417	exposed in Trench 3, unexcavated	190+ (est 200)	180+ (est 200)	42	circular	vertical to steeply sloping walls, flat floor				
422	exposed in Trench 5, unexcavated; F.30, F.31, and F.32 in fill	325	70+ (est 275)	46	oval	vertical to steeply sloping walls, flat floor				

Table A.4. Storage Pit Attributes, continued.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
424	overlies F.425, exposed in Trench 5, unexcavated	160+	70+	32	circular?	vertical and sloping sides, flat bottom				
425	overlain by F.424, exposed in Trench 5, unexcavated	90+	Unk.	35	circular?	slightly sloping walls, flat bottom				
426	exposed in Trench 6, unexcavated	130+ (est 180)	70+ (est 115)	43	oval	sloping to undercut walls, level, slightly sloping bottom				
428	exposed in Trench 6, unexcavated	120+	Unk.	52	circular?	eroded sloping to vertical walls, slightly rounded bottom				
451	F.46 in fill, exposed in Trench 7, unexcavated	135	70+	34	oval	eroded to slightly sloping walls, flat bottom				

Table A.5. Borrow Pit Attributes.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
35	overlies F.136	390+ (est 450)	325	54	oval	vertical to sloping sides, shallow rounded bottom	67	47	1	1 mano frag
49	cut by F.50, F.51; overlain by F.85, Rooms 11, 15	340+ (est 365)	200+ (est 265)	42	oval	sloping walls?, uneven bottom	27	5	1	

Table A.5. Borrow Pit Attributes, continued.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
60	overlain by F.59, F.86 in fill	352	178+ (est 225)	127	irregular	sloping walls, stepped in three levels on one side, level to rounded bottom	226	229	14	52 maize cupules, 1 common bean, 1 hammerstone
87	overlain by Room 2	330+ (est 350)	235	41	keyhole	vertical to sloping sides, flat bottom	424	106	7	32 kernels, 136 cupules maize; 3 common beans; 1 bean frag; 3 gourd rinds; 4 pods, 1 seed mesquite; 1 shell bead; 116 specular hematite; 2 abraders
108		100+ (est 300)	100+ (est 200)	49	oval	sloping sides, flat bottom				
117		415	255+ (est 330)	62	oval	sloping walls, irregular bottom	119	125	8	1 kernel, 37 cupules maize; 1 projectile point; 1 biface; 1 specular hematite; 1 mano frag; 2 hammer-stones; 1 polishing pebble
118	F.438, F.439, F.440 in fill	565+ (est 600)	350+ (est 400)	48	oval	sloping sides, shallow rounded bottom	296	217	31	24 kernels, 62 cupules maize; 3 common beans; 4 bean frags; 1 tube bead; 3 projectile points; 1 abrader; 1 polishing pebble
127	F.18 in fill, cut by F.130	300+ (est 400)	200+ (est 350)	44	oval	basin	246	55	2	1 shell disc bead

Table A.5. Borrow Pit Attributes, continued.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
203		394	231	60	irregular	steeply sloping to vertical sides, level bottom; 76 by 66, 23 deep, 68 by 64, 16 deep, and 84 by 71, 27 deep floor pits	2665	2040	748	13 kernels, 127 cupules maize; 2 common beans; 1 bean frag; 1 cucurbit seed; 1 gourd rind; 270 seeds, 10 fruit frags datil; 9 pods, 25 seeds mesquite; 1 prickly pear seed; 2 eggshell; 1 turquoise pendant; 2 pieces turquoise; 1 malachite; 11 shell beads; 1 biotite mica; 1 ground quartz crystal; 2 projectile points; 1 drill; 1 mano frag; 2 abraders; 1 hammer-stone; 1 polishing pebble; 1shaft straightener
429	F.38, F.445 in fill	455	170+ (est 330)	51	oval	sloping sides, irregular bottom	50	40	1	16 maize cupules, 1 projectile point

Table A.6. Non-specific Feature Attributes.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
2	cut by F.94	145+ (est 175)	88	46	oval	basin	20	5	1	
3		62+ (est 70)	48+ (est 75)	18	irregular	sloping sides, flat bottom	6	8		1 projectile point

Table A.6. Non-specific Feature Attributes, continued.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
4	overlain by Room 24	28+ (est 40)	32+ (est 35)	14	irregular	basin				
5	overlain by Room 24	77+ (est 135)	53+ (est 85)	22	irregular	vertical to sloping sides, irregular bottom	3	2		
6		71+ (est110)	39+ (est 110)	36	circular	basin	62	11	2	
8	overlies F.82	152+ (est 155)	56+ (est 145)	38	circular	basin	added to F.82			1 disc bead, 1 metate frag
9	cut into F.131	123	101	34	oval	basin	130	53	73	11 maize cupules, 1 abrader, 1 hammerstone
11	cut by F.12	65+ (est 85)	43+ (est 75)	33	circular	vertical to sloping sides, shallow rounded bottom	9	6	3	2 maize cupules, 1 hammerstone
12	cut into F.11	67	60+ (est 70)	27	circular	steeply sloping to incurving sides, rounded bottom	43	4	4	15 maize cupules
13		45+ (est 65)	40+ (est 45)	26	oval	basin	1	5		
15		71+ (est 75)	33+ (est 75)	33	circular	basin	6			12 maize cupules
19	cut into F.21, cut into Room 31	246	106+ (est 170)	34	oval	basin	47	18	6	3 maize cupules
21	cut by F.19, cut into F.22?	105	44+ (est 80)	93	oval	vertical to sloping sides, rounded bottom	124	40	3	
23		28+ (est 40)	25+ (est 40)	14	circular	basin	1	1		
25		55+ (est 95)	53+ (est 95)	25	circular	sloping sides, flat bottom	1			
28		59+ (est 80)	17+ (est 80)	29	circular	basin	5	2		
29	overlain by eroded pueblo floor	37+ (est 70)	34+ (est 70)	34	circular	basin				

Table A.6. Non-specific Feature Attributes, continued.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
30	fill of F.422	60+ (est 95)	48+ (est 70)	17	irregular	sloping sides, irregular bottom	15	3	1	
31	fill of F.422	38+ (est 70)	37+ (est 70)	16	circular	basin	3	1		
32	fill of F.422	42+ (est 50)	30+ (est 50)	20	circular	vertical sides, rounded bottom	2	1		
33		63+ (est 70)	35+ (est 70)	31	irregular	vertical to sloping sides, irregular bottom	46	16	7	
34		31+ (est 65)	25+ (est 65)	15	circular	basin				
37		55+ (est 65)	46+ (est 65)	11	circular	basin	4	1		2 maize cupules
43	cut by F.42, overlain by F.121	63	48+ (est 60)	16	circular	basin	82	4		
44		65+ (est 115)	100+ (est 140)	11	irregular	sloping sides, flat bottom	2429	19	1	2 kernels, 8 cupules maize; 1 ground stone frag
47		173+ (est 260)	154+ (est 190)	39	oval?	sloping to stepped sides, flat bottom	105	26	6	1 maize kernel, 1 mesquite seed, 2 mat impressed clay
53	overlain by Rooms 10, 15	105	96	39	circular	steeply sloping sides, rounded bottom				
55	cut into F.57, overlain by Room 14	205	153	40	irregular	sloping sides, flat bottom	422	208	20	1,799 maize cupules, 1 datil seed, 1 limonite, 3 gypsum plaques, 1 biface, 2 abraders, 2 abrader frags, 3 hammerstones, 18 metate flakes
57	cut by F.55, overlain by Room 14	93+ (est 110)	98	47	oval	vertical sides, rounded bottom	6	4	1	

Table A.6. Non-specific Feature Attributes, continued.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
62	cut by F.64	100+	100+	17	circular?	sloping sides, flat bottom	26	2		
64	cut into F.62	89+ (est 110)	27+ (est 65)	15	oval	basin	1			
66	overlain by eroded pueblo floor	37+ (est 70)	36+ (est 70)	19	circular	basin	1	1	2	
67	overlain by Rooms 4, 6	93+ (est 130)	103	Unk.	oval	unexcavated				
68	overlain by Room 6	137	112	32	irregular	vertical to sloping sides, uneven bottom	33	26		21 maize cupules, 1 polishing pebble
69	overlain by Room 6	71	71	29	circular	basin	1	1		3 maize cupules
70	overlain by Room 6	206	163	32	irregular	sloping sides, uneven bottom	7	5		5 maize cupules
71	overlain by Room 6, cut by F.98, F.97	120+ (est 155)	139	25	circular	steeply sloping sides, flat bottom	17	1		
72	overlain by Rooms 6, 7	62+ (est 120)	61+ (est 120)	24	circular	basin	2			
78	cut by F.79	72+	60+	24	unknown	sloping wall and uneven bottom			6	
79		100+ (est 200)	65+ (est 200)	31+	circular	basin	9	8		
81	cut into Room 26	97	82	44	subrect-angular	vertical to steeply sloping sides, flat bottom; 57 by 29,12 deep basin in floor on west side	13	7	1	
88		100+ (est 150)	43+ (est 120)	16	circular?	sloping walls, rounded bottom?				
89	overlain by Room 4	63+ (est 90)	26+ (est 80)	21+	circular?	basin				

Table A.6. Non-specific Feature Attributes, continued.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
90	overlain by Room 4	33+ (est 80)	33+ (est 40)	12	oval	basin				
91		30+ (est 120)	30+ (est 120)	27	circular?	undercut side?				
93		53+ (est 60)	38+ (est 45)	17	oval	sloping sides, irregular bottom	10	20	19	1 projectile point
95		85+ (est 120)	40+ (est 110)	26	circular?	sloping side	28	9		2 hammerstones
99		80+ (est 110)	15+ (est 90)	28	oval	sloping side, rounded bottom?	4			
103	overlain by Room 23, cut into F.381	134	77+ (est 125)	36	irregular	sloping sides, irregular bottom	99	40		1 maize kernel
104	overlain by Room 23, cut into F.381	50+ (est 70)	43+ (est 70)	20	circular	basin	148		6	
105		54+ (est 120)	43+ (est 120)	37	circular	basin	5	12	3	
106		225+ (est 275)	100+ (est 200)	23	oval	basin	5	4		1 mano frag
111		207	163	34	oval	basin	11		25	19 maize cupules
112		77+ (est 125)	73+ (est 125)	28	circular	sloping side, flat bottom	14	3		
113		35	32	8	circular	basin				
114		40+(est 65)	38+(est 65)	11	circular	basin	2	1		1 abrader
121	overlies F.42, F.43, F.396	436+ (est 450)	247+ (est 310)	8	irregular	sloping sides, uneven bottom	965	266	1	1 metate frag; 2 abrader frags
125		62+ (est 70)	56+ (est 70)	10+	circular	basin?	5		1	
128	overlain by Room 8	197	102	45	oval	sloping sides, uneven bottom	215	98	1	
131	cut by F.9, F.139	305+ (est 360)	206+est 220)	33	irregular	sloping sides, irregular bottom	681	143	108	27 maize cupules, 1 clay disk, 1 mano frag, 1 metate frag, 1 abrader frag
138	cut by F.380	100 (est 104)	43+ (est 88)	15	oval	basin				

Table A.6. Non-specific Feature Attributes, continued.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
141		120+ (est 130)	68+ (est 90)	25	irregular	sloping sides, flat bottom	39	8		
142		51	49	36	subrect-angular	sloping sides, flat bottom	9	1		1 mano, 1 half metate, 2 metate frags, 1 abrader, 2 hammerstones
143		53+ (est 80)	43+ (est 80)	38	circular	basin	3	1		
147		52	35+ (est 65)	23	irregular	basin	2	1		1 metate frag
161	cut into Room 31	53	52	25	circular	vertical to sloping walls, rounded bottom	12	5		
166	cut into Room 31	32	30	25	circular	vertical sides, rounded bottom	4			
174	overlain by F.164, overlies wall of Room 31	185+ (est 190)	92	27	oval	sloping sides, flat bottom	151	43	16	6 maize cupules, 1 drill, 1 bone awl
175	exposed in Trench 2, unexcavated	120	Unk.	20	circular	basin				
197		94	48+ (est 80)	30	irregular	sloping sides, uneven bottom	70	8		30 maize cupules, 1 mat impressed clay
198	cut by F.159	232	103	6	oval	sloping sides, flat bottom	13			
199	cut into wall of Room 31	100+ (est 170)	67+ (est100)	12	oval	sloping sides, irregular bottom; 35 by 21, 10 deep basin in floor near north side				
379		100+	68+	7+	oval?	basin?	14	1		
380	cut into F.138	72+ (est 80)	49+ (est 65)	16	oval	basin	1			

Table A.6. Non-specific Feature Attributes, continued.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
381	overlain by Room 23, cut by F.103, F.104	100+ est 230	100+ est 230	33	circular	sloping sides, uneven bottom	39			
382		33+ (est 70)	31+ (est 70)	33	circular	basin	4		1	1 eggshell
393	beneath Room 10, cut into F.49	54+ (est 80)	43+ (est 80)	37	circular	sloping walls, flat bottom	13	2		
396	overlain by F.121	60+ (est 70)	63	13	oval	basin	32	9		
404		88	32	27	irregular	sloping sides irregular bottom				
411	exposed in Trench 1, unexcavated	38+	Unk.	24	circular?	basin				
418	exposed in Trench 3, unexcavated	80+	Unk.	24	circular?	basin				
420	exposed in Trench 5, unexcavated	100+	45+	28	circular?	sloping side				
421	exposed in Trench 5, unexcavated	170+	70+	30	circular?	sloping sides, flat bottom				
427	exposed in Trench 6, unexcavated	83+	Unk.	17	circular?	basin				
430		185+ (est 225)	10+ (est 225)	15	circular?	basin	14	1	1	
431	exposed in Trench 9	45	Unk.	4	circular?	basin				

Table A.6. Non-specific Feature Attributes, continued.

Number	Context	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Sherds	Lithics	Bone	Macrofloral and Other
433	overlies F.65 and F.394	382	170+ (est 240)	33	oval	basin				
440	in fill F.118	42	26	23	circular	vertical sides, shallow rounded bottom				
444	cut into F.123, exposed in Trench 3, unexcavated	78+	Unk.	25	circular?	vertical to sloping sides,flat bottom				
452	fill of Room 3	31	23	11	oval	basin	1725			

APPENDIX B

CERAMIC TYPES BY PROVENIENCE

Table B. Ceramic Types by Provenience.

Provenience	El Paso Brownware jar	El Paso Polychrome jar	El Paso Polychrome bowl	Chupadero B/W jar	Seco Corrugated bowl	Tucson Polychrome Jar	Magdalena B/W bowl	Other	Total
Room 1 fill	77	93			1			1 fine-tempered brownware jar	172
Room 1 floor	205	205	1					2 fine-tempered brownware jar	413
Room 1 floor features	6	15	1						22
Room 2 fill	66	33	2	1			1		103
Room 2 floor	14	19				1		1 fine-tempered brownware jar	35
Room 2 floor features	2	1							3
Room 3 fill	104	56	11	2	12			1 fine-tempered brownware jar	186
Room 3 fill F.452	879	846							1725
Room 3 floor	50	58	2	1	12	1		1 Mimbres B/W bowl 1 fine-tempered brownware bowl	126
Room 4 fill	39	11	3					13 fine-tempered brownware jar	66
Room 4 floor	13	37	2	1					53
Room 4 floor feature		1							1
Room 5 fill	84	39	1	1					125
Room 5 floor	33	92	1	4				1 Three Rivers R/T bowl	131
Room 6 fill	159	104	7	3		2		1 Casas Grandes Poly. jar 1 Three Rivers R/T bowl	277
Room 6 Floor 2	283	176	26	3				1 Ramos Black bowl 1 Casas Grandes Poly. jar 1 Aqua Fria Glaze/R jar 2 Three Rivers R/T bowl 1 Seco Corrugated jar 1 El Paso Red/Brown jar 3 fine-tempered brownware jar	498
Room 6 Floor 2 features	4		1						5
Room 6 fill on Floor 1	40	40						1 fine-tempered brownware jar	81

Table B. Ceramic Types by Provenience, continued.

Provenience	El Paso Brownware jar	El Paso Polychrome jar	El Paso Polychrome bowl	Chupadero B/W jar	Seco Corrugated bowl	Tucson Polychrome Jar	Magdalena B/W bowl	Other	Total
Room 7 fill	99	62	1		1				163
Room 7 floor	86	94	4					1 Three Rivers R/T bowl 1 El Paso Polychrome ladle	186
Room 7 subfloor	20	13	1						34
Room 8 fill	60	36	6					1 Gila Polychrome bowl	103
Room 8 subfloor	17	20	2	1					40
Room 9 fill	1								1
Room 10 fill/floor	61	6				11			78
Room 11 floor	29	23	23						75
Room 11 floor feature		2							2
Room 12 fill	239	206	9					1 Ramos Polychrome 1 Casas Grandes Poly. jar 2 fine-tempered brownware jar	458
Room 12 floor	63	10						3 Escondido Polychrome jar	76
Room 12 floor features	1								1
Room 13 fill	103	96	7	3					209
Room 13 roof	25	30	5	2				1 Three Rivers R/T bowl	63
Room 13 floor	11	17							28
Room 13 floor features	3	2							5
Room 13 subfloor	2								2
Room 14 fill/floor	74	25	2		1			2 Casas Grandes Poly. jar	104
Room 14 floor feature		5							5
Room 14 subfloor	47	80	1					6 Ramos Polychrome jar 5 Casas Grandes Poly. jar	139
Room 15 fill	21	10							31
Room 15 floor	21	18	2			1			42
Room 15 floor features		2	1						3

Table B. Ceramic Types by Provenience, continued.

Provenience	El Paso Brownware jar	El Paso Polychrome jar	El Paso Polychrome bowl	Chupadero B/W jar	Seco Corrugated bowl	Tucson Polychrome Jar	Magdalena B/W bowl	Other	Total
Room 15 subfloor	3	3							6
Room 16 fill	49	22	4	1		1		2 smudged bowl	79
Room 16 floor	18	15			1			1 smudged bowl	35
Room 17 fill	125	72	9	1	2			1 Casas Grandes Poly. jar 1 smudged bowl 1 fine-tempered brownware bowl	212
Room 17 floor	88	83	4		2		1	1 Casas Grandes Poly. jar	179
Room 18 fill	57	56	3		1			1 Three Rivers R/T bowl	118
Room 18 floor	19	11	8						38
Room 18 subfloor	4	3	6						13
Room 19 fill	31	21	2						54
Room 19 floor	42	29	2		1			2 Casas Grandes Poly. jar	76
Room 20 fill	15	19	1						35
Room 20 floor	2	2							4
Room 21 fill	155	93	2		1		1		252
Room 21 floor	149	105	3		1			1 Casas Grandes Poly. jar 1 El Paso Brown	260
Room 21 floor feature		1							1
Room 22 upper fill	208	107	10					1 Ramos Polychrome jar	326
Room 22 lower fill	504	252	4	1				1 Playas Red Rubbed Indented Corrugated jar 1 Seco Corrugated jar	763
Room 23 fill	70	29			1				100
Room 23 fill/floor	210	89	1	3					303
Room 24 fill	22	15	2						39

Table B. Ceramic Types by Provenience, continued.

Provenience	El Paso Brownware jar	El Paso Polychrome jar	El Paso Polychrome bowl	Chupadero B/W jar	Seco Corrugated bowl	Tucson Polychrome Jar	Magdalena B/W bowl	Other	Total
Room 25 fill	1900	1152	107	14	11	3	1	1 Ramos Polychrome jar 5 Casas Grandes Poly. jar 1 Ramos Black bowl 6 Playas Red Gouged jar 1 Playas Red Incised jar 1 Casas Grandes Tooled Corrugated jar 3 Heshotauthla Poly. bowl 4 Three Rivers R/T bowl 22 El Paso Polychrome ladle 1 El Paso Brown 8 fine-tempered brownware jar	3241
Room 25 floor	6	3						1 Casas Grandes Poly. jar 14 Playas Red Gouged jar	24
Room 25 subfloor			1						1
Room 26 fill	48	28	1				1	1 fine-tempered brownware jar	79
Room 26 Floor 3	42	17	1		2				62
Room 26 fill between Floors 2 and 3	23	20					1		44
Room 26 Floor 2	14	14							28
Room 26 Floor 1	40	57	1					3 Casas Grandes Poly. jar	101
Room 26 Floor 1 features	9	5							14
Room 27 fill	138	58	19	1					216
Room 27 floor	13	11							24
Room 28 fill	272	187	4	1	2			2 Ramos Polychrome jar 1 Casas Grandes Poly. jar 1 El Paso Brown 1 fine-tempered brownware jar	471

Table B. Ceramic Types by Provenience, continued.

Provenience	El Paso Brownware jar	El Paso Polychrome jar	El Paso Polychrome bowl	Chupadero B/W jar	Seco Corrugated bowl	Tucson Polychrome Jar	Magdalena B/W bowl	Other	Total
Room 29 fill	66	46	8	1					121
Room 29 floor	17	19	1		1				38
Room 30 fill	23	16		1					40
Room 30 floor	3	10							13
Room 30 floor features	2								2
Room 31 fill	1381	1097	151	30	3	15	1	2 Casas Grandes Poly. jar 1 Playas Red Rubbed Indented Corrugated jar 2 Heshotauthla Poly. bowl 1 Three Rivers R/T bowl 2 Mimbres B/W bowl 1 El Paso Polychrome ladle 1 fine-tempered brownware jar	2688
Room 31 fill/floor	220	144	34	3				1 Ramos Polychrome jar 1 Casas Grandes Poly. jar 4 El Paso Polychrome ladle	407
Room 31 floor features	36	22	4					1 fine-tempered brownware bowl	63
Room 32 fill	20	18							38
Room 33 fill	235	108	2	1	2				348
Room 33 floor	1								1
Room 33 floor feature	10								10
Eroded Pueblo floors	290	117	3	2	2	35	2	2 Casas Grandes Poly. jar 1 Seco Corrugated jar 1 El Paso Polychrome pitcher 1 fine-tempered brownware jar	456
Burial F.419 fill	1	1							2

Table B. Ceramic Types by Provenience, continued.

Provenience	El Paso Brownware jar	El Paso Polychrome jar	El Paso Polychrome bowl	Chupadero B/W jar	Seco Corrugated bowl	Tucson Polychrome Jar	Magdalena B/W bowl	Other	Total
Extramural Feature F.1	464	403	28	8	1	5	2	1 Casas Grandes Poly. jar 1 Playas Red jar 1 Three Rivers R/T bowl 2 fine-tempered brownware jar 1 fine-tempered brownware bowl	917
Extramural Feature F.2	10	10							20
Extramural Feature F.3	3	3							6
Extramural Feature F.5	1	1	1						3
Extramural Feature F.6	31	29	1					1 Three Rivers R/T bowl	62
Extramural Feature F.7	95	44	6		1	1			147
Extramural Feature F.8/82/135	56	83	7	2				1 Chupadero B/W bowl 3 Casas Grandes Poly. jar	152
Extramural Feature F.9	86	36	5	1	1			1 Casas Grandes Poly. jar	130
Extramural Feature F.9/131	134	93	4	2	1			1 Playas Red Rubbed Indented Corrugated jar 1 Playas Red Gouged jar 1 fine-tempered brownware jar	237
Extramural Feature F.10	6	6			1				13
Extramural Feature F.11	4	4					1		9
Extramural Feature F.12	25	18							43
Extramural Feature F.13			1						1
Extramural Feature F.14	7	4							11
Extramural Feature F.15	4	2							6
Extramural Feature F.16		3							3
Extramural Feature F.17	16	29							45
Extramural Feature F.18	68	55	3	1				1 Three Rivers R/T bowl	128
Extramural Feature F.19	25	18	4						47

Table B. Ceramic Types by Provenience, continued.

Provenience	El Paso Brownware jar	El Paso Polychrome jar	El Paso Polychrome bowl	Chupadero B/W jar	Seco Corrugated bowl	Tucson Polychrome Jar	Magdalena B/W bowl	Other	Total
Extramural Feature F.20	197	147	19	6				1 Casas Grandes Poly. jar	370
Extramural Feature F.21	76	45	2					1 Heshotauthla Poly. bowl	124
Extramural Feature F.22	5	13	2				1		21
Extramural Feature F.23	1								1
Extramural Feature F.24	205	104	15		4	1		1 Ramos Polychrome jar	330
Extramural Feature F.25	1								1
Extramural Feature F.26	1	3	1						5
Extramural Feature F.27		5		1					6
Extramural Feature F.28	3	2							5
Extramural Feature F.30	6	8				1			15
Extramural Feature F.31	3								3
Extramural Feature F.32		2							2
Extramural Feature F.33	36	9						1 Casas Grandes Poly. jar	46
Extramural Feature F.35	43	21	2			1			67
Extramural Feature F.35/136	59	31							90
Extramural Feature F.36	128	71	3	2			1	1 Playas Red Gouged jar	206
Extramural Feature F.37	1	3							4
Extramural Feature F.38	101	59	5	1	1				167
Extramural Feature F.39	3	1							4
Extramural Feature F.40	43	20	2						65
Extramural Feature F.40/117	167	71	22						260
Extramural Feature F.41	1	1							2
Extramural Feature F.42	67	64	1						132
Extramural Feature F.43	49	32					1		82
Extramural Feature F.44	1374	1048		7					2429

Table B. Ceramic Types by Provenience, continued.

Provenience	El Paso Brownware jar	El Paso Polychrome jar	El Paso Polychrome bowl	Chupadero B/W jar	Seco Corrugated bowl	Tucson Polychrome Jar	Magdalena B/W bowl	Other	Total
Extramural Feature F.45	16	18	2	1				1 Three Rivers R/T bowl	38
Extramural Feature F.46	6	9							15
Extramural Feature F.47	73	31	1						105
Extramural Feature F.48	11	2							13
Extramural Feature F.49	8		19						27
Extramural Feature F.50	134	92	2		1			1 Three Rivers R/T bowl 1 Playas Red Gouged	231
Extramural Feature F.51	41	21						1 Casas Grandes Poly. jar 2 Ramos Black jar	65
Extramural Feature F.52	5	2							7
Extramural Feature F.54	31	27	1						59
Extramural Feature F.55	136	254	12	4	5		1	1 Ramos Polychrome jar 1 Casas Grandes Poly. jar 8 El Paso Polychrome pitcher	422
Extramural Feature F.56	111	70	1	1				1 Gila Polychrome jar 2 Ramos Polychrome jar 1 Playas Red Incised jar 2 fine-tempered brownware jar	189
Extramural Feature F.57	2	4							6
Extramural Feature F.60	95	121	7					1 Casas Grandes Poly. jar 2 El Paso Red/Brown jar	226
Extramural Feature F.62	9	17							26
Extramural Feature F.63	32	18	2		1		1		54
Extramural Feature F.64		1							1
Extramural Feature F.65	95	68	2		1	2		1 Ramos Black jar 1 El Paso Red/Brown jar	170

Table B. Ceramic Types by Provenience, continued.

Provenience	El Paso Brownware jar	El Paso Polychrome jar	El Paso Polychrome bowl	Chupadero B/W jar	Seco Corrugated bowl	Tucson Polychrome Jar	Magdalena B/W bowl	Other	Total
Extramural Feature F.66	1								1
Extramural Feature F.68	24	8						1 fine-tempered brownware jar	33
Extramural Feature F.69	1								1
Extramural Feature F.70	3	4							7
Extramural Feature F.71	9	8							17
Extramural Feature F.72		2							2
Extramural Feature F.75		1							1
Extramural Feature F.79	8	1							9
Extramural Feature F.81	8	4			1				13
Extramural Feature F.82	109	90	2	4			1	1 Chupadero B/W bowl 1 Casas Grandes Poly. jar	208
Extramural Feature F.84	1							2 El Paso Red/Brown jar	3
Extramural Feature F.85	2	10							12
Extramural Feature F.86	7	8							15
Extramural Feature F.87	266	148	8			1		1 Casas Grandes Poly. jar	424
Extramural Feature F.93	8	2							10
Extramural Feature F.94	192	152	15	1	1	3		1 Gila Polychrome jar 2 Casas Grandes Poly. jar 1 Playas Red Gouged jar 1 smudged bowl	369
Extramural Feature F.95	17	10		1					28
Extramural Feature F.96	30	13	2						45
Extramural Feature F.98	7	6							13
Extramural Feature F.99		4							4
Extramural Feature F.102	3	6							9
Extramural Feature F.103	56	40	3						99
Extramural Feature F.104	87	49	7	1	2		1	1 Aqua Fria Glaze/R bowl	148

Table B. Ceramic Types by Provenience, continued.

Provenience	El Paso Brownware jar	El Paso Polychrome jar	El Paso Polychrome bowl	Chupadero B/W jar	Seco Corrugated bowl	Tucson Polychrome Jar	Magdalena B/W bowl	Other	Total
Extramural Feature F.105	3	2							5
Extramural Feature F.106	2	3							5
Extramural Feature F.107	17	8				2			27
Extramural Feature F.109	43	63	3		4				113
Extramural Feature F.110	55	36							91
Extramural Feature F.111	5	4	1	1					11
Extramural Feature F.112	9	5							14
Extramural Feature F.114	2								2
Extramural Feature F.115	13	12	1					1 Three Rivers R/T bowl 2 fine-tempered brownware jar	29
Extramural Feature F.117	41	77						1 Ramos Black jar	119
Extramural Feature F.118	177	97	16	3	1		1	1 Playas Red Gouged jar	296
Extramural Feature F.119	13	29						2 Casas Grandes Poly. jar	44
Extramural Feature F.121	500	432	13	9	3		1	2 Playas Red Gouged jar 2 Three Rivers R/T bowl 1 El Paso Polychrome ladle 2 fine-tempered brownware jar	965
Extramural Feature F.123	55	25	6		1	1			88
Extramural Feature F.124	2	2	1						5
Extramural Feature F.125	1	4							5
Extramural Feature F.127	132	96	10	1	6		1		246
Extramural Feature F.128	113	96	4		1			1 Gila Polychrome bowl	215
Extramural Feature F.129	38	19							57
Extramural Feature F.130	108	81	10	1	1			1 Playas Red Incised jar 1 Seco Corrugated jar 1 El Paso Polychrome ladle	204

Table B. Ceramic Types by Provenience, continued.

Provenience	El Paso Brownware jar	El Paso Polychrome jar	El Paso Polychrome bowl	Chupadero B/W jar	Seco Corrugated bowl	Tucson Polychrome Jar	Magdalena B/W bowl	Other	Total
Extramural Feature F.131	397	251	15	3	8	1	2	1 Gila Polychrome jar 3 Casas Grandes Poly. jar	681
Extramural Feature F.133	16	12							28
Extramural Feature F.134		3							3
Extramural Feature F.135	173	178	1	3	3	1		1 Chupadero B/W bowl 5 Ramos Polychrome jar 1 Casas Grandes Poly. jar	366
Extramural Feature F.136	36	32	1						69
Extramural Feature F.137	3	4							7
Extramural Feature F.139	108	83	1	2		1		2 Casas Grandes Poly. jar	197
Extramural Feature F.140	107	119	4	2	2		1	1 Ramos Polychrome jar 1 Casas Grandes Poly. jar	237
Extramural Feature F.141	24	12	2					1 Ramos Black bowl	39
Extramural Feature F.142	5	3						1 Playas Red Gouged jar	9
Extramural Feature F.143	3								3
Extramural Feature F.145	9	5			1				15
Extramural Feature F.147		2							2
Extramural Feature F.150	22	23	1	1					47
Extramural Feature F.151	17	7				1			25
Extramural Feature F.159	59	47	1	31					138
Extramural Feature F.161	5	6		1					12
Extramural Feature F.162	2								2
Extramural Feature F.163	9	4							13
Extramural Feature F.164	3								3
Extramural Feature F.166	1	2	1						4
Extramural Feature F.167	3								3

Table B. Ceramic Types by Provenience, continued.

Provenience	El Paso Brownware jar	El Paso Polychrome jar	El Paso Polychrome bowl	Chupadero B/W jar	Seco Corrugated bowl	Tucson Polychrome Jar	Magdalena B/W bowl	Other	Total
Extramural Feature F.174	58	76	6		11				151
Extramural Feature F.197	33	32	1	3				1 Playas Red Gouged jar	70
Extramural Feature F.198	5	6		2					13
Extramural Feature F.203	1746	863	34	2	3	1	3	4 Ramos Polchrome jar 3 Casas Grandes Poly. jar 2 Playas Red Rubbed Indented Corrugated jar 3 Playas Red Gouged jar 1 Casas Grandes Rubbed Indented Corrugated jar	2665
Extramural Feature F.376	97	31							128
Extramural Feature F.378	7								7
Extramural Feature F.379	5	9							14
Extramural Feature F.380	1								1
Extramural Feature F.381	29	9			1				39
Extramural Feature F.382		4							4
Extramural Feature F.393	11	1			1				13
Extramural Feature F.394	28	49	3	1	1		1	1 Casas Grandes Poly. jar	84
Extramural Feature F.395	7	5						2 Ramos Polychrome jar	14
Extramural Feature F.396	19	12						1 Three Rivers R/T bowl	32
Extramural Feature F.429	34	13	2	1					50
Extramural Feature F.430	7	7							14

Table B. Ceramic Types by Provenience, continued.

Provenience	El Paso Brownware jar	El Paso Polychrome jar	El Paso Polychrome bowl	Chupadero B/W jar	Seco Corrugated bowl	Tucson Polychrome Jar	Magdalena B/W bowl	Other	Total
Extramural non-feature	4598	2536	116	36	26	17	10	1 Chupadero B/W bowl 2 Ramos Polychrome jar 14 Casas Grandes Poly. jar 1 Ramos Black jar 1Playas Red jar 1 Playas Red Rubbed Indented Corrugated jar 2 Playas Red Gouged jar 1 Casas Grandes Plain 1 Casas Grandes Rubbed Indented Corrugated jar 7 Three Rivers R/T bowl 1 Mimbres B/W bowl 3 smudged bowl 1 El Paso Polychrome pitcher 1 El Paso Brown jar 1 El Paso brownware tooled jar 1 El Paso brownware brushed jar 8 fine-tempered brownware jar 1 fine-tempered brownware bowl	7387

APPENDIX C

MODIFIED CERAMICS BY PROVENIENCE

Table C.1. Attributes of Ceramic Disks.

Provenience	Ceramic type	Edge Treatment	Diameter cm	Length cm	Width cm	Thickness cm
Room 3 floor	Mimbres B/W	abraded and rounded	4.5	2.7+	2.5+	0.5
Room 6 floor 2	El Paso Polychrome	chipped	7.4	7.4	6.3+	0.5
Room13 fill	El Paso Polychrome	abraded and rounded	2.3	2.3	1.8+	0.5
Room 14 fill/floor	El Paso Polychrome	abraded and rounded	7.5	5.1+	2.8+	0.5
Room 18 fill	El Paso Brownware	abraded and rounded	9.5	4.5+	3+	0.5
Room 22 fill	El Paso Brownware	chipped, lightly abraded and rounded	6.4	6.4	5.8	0.4
Room 22 fill	El Paso Brownware	chipped, lightly abraded and rounded	7	4.9+	3.9+	0.6
Room 22 fill	El Paso Brownware	chipped, lightly abraded and rounded	5.5	5+	3.5+	0.5
Room 23 fill	El Paso Brownware	abraded square	2.6	0.9+	0.8+	0.3
Room 25 fill	El Paso Polychrome	abraded and rounded	4.5	3.2+	3.1+	0.3
Room 25 fill	El Paso Brownware	chipped, lightly abraded and rounded	3	3	2.9	0.6
Room 25 fill	El Paso Brownware	chipped, lightly abraded, rounded, partially drilled	2.6	2.6	2.5	0.6
Room 25 fill	El Paso Brownware	chipped, lightly abraded and rounded	13	10.7+	5.5+	0.5
Room 25 fill	El Paso Polychrome	abraded and rounded	12.5	12.5	11.8+	0.5
Room 25 fill	El Paso Brownware	abraded square	5.8	5.8	4.1+	0.4
Room 25 fill	El Paso Brownware	abraded square	2.5	1.3+	0.8+	0.4
Room 25 fill	El Paso Brownware	abraded and rounded	3	2+	1.6+	0.4
Room 25 floor	El Paso Polychrome	abraded and rounded	9.2	9.2	6.5+	0.5
Room 27 fill	El Paso Brownware	chipped	5.5	5.5	4.8	0.8
Room 28 fill	El Paso Brownware	abraded square	4.5	2.6+	2.5+	0.3
Room 28 fill	El Paso Brownware	chipped, lightly abraded and rounded	6.9	6.9	6.4	0.3
Room 28 fill	El Paso Brownware	abraded and rounded	9.5	5.6+	2.7+	0.5
Room 31 fill	El Paso Brownware	chipped, lightly abraded and rounded	2.4	2.4	2.2	0.5
Room 31 fill	Chupadero B/W	chipped, lightly abraded and rounded	6.2	6.2	4.1+	0.5
Room 31 fill	El Paso Brownware	chipped, lightly abraded and rounded	3.5	3+	2+	0.4
Extramural Feature F.1	Chupadero B/W	chipped, lightly abraded and rounded	4	2.2+	1.9+	0.6
Extramural Feature F.1	El Paso Brownware	chipped, lightly abraded and rounded	6.5	4.6+	2.6+	0.7

Table C.1. Attributes of Ceramic Disks, continued.

Provenience	Ceramic type	Edge Treatment	Diameter cm	Length cm	Width cm	Thickness cm
Extramural Feature F.2	El Paso Polychrome	abraded and rounded	3.5	2+	1.7+	0.5
Extramural Feature F.20	El Paso Brownware	chipped, lightly abraded and rounded	6.5	6.5	6.2	0.5
Extramural Feature F.21	El Paso Polychrome	chipped	3	3	2.9	0.3
Extramural Feature F.24	El Paso Brownware	chipped, lightly abraded and rounded	6.2	6.2	5.9	0.5
Extramural Feature F.38	El Paso Brownware	abraded and rounded	4.2	3+	1.8+	0.6
Extramural Feature F.55	El Paso Polychrome	abraded and rounded	5	4.8+	2.2+	0.4
Extramural Feature F.55	El Paso Polychrome	chipped, lightly abraded and rounded	5.2	5.2	3.7+	0.4
Extramural Feature F.103	El Paso Brownware	abraded and rounded	2.4	2+	0.8+	0.6
Extramural Feature F.121	El Paso Polychrome	abraded square	11.6	11.6	8.9+	0.5
Extramural Feature F.135	Chupadero B/W	abraded and rounded	6.5	2.7+	1.7+	0.6
Extramural Feature F.140	El Paso Brownware	chipped, lightly abraded and rounded	4.5	3.2+	1.2+	0.6
Extramural Feature F.174	El Paso Brownware	abraded and rounded	3	1.9+	1.4+	0.6
Extramural Feature F.203	El Paso Brownware	chipped, lightly abraded and rounded	7.5	5.8+	2+	0.4
Extramural Feature F.203	El Paso Brownware	chipped, lightly abraded and rounded	3.5	2.5+	1.5+	0.5
Extramural Non-feature	Chupadero B/W	abraded and rounded	2.6	1.3+	.3+	0.4
Extramural Non-feature	El Paso Polychrome	chipped, lightly abraded and rounded	7	3.4+	2.7+	0.5
Extramural Non-feature	El Paso Polychrome	abraded square	3.8	3.8	2+	0.6
Extramural Non-feature	El Paso Polychrome	abraded and rounded	2	1.5+	0.9	0.4
Extramural Non-feature	Mimbres B/W	abraded and rounded	4.7	4.7	4.5	0.7

Table C.2. Attributes of Ceramic Counters.

Provenience	Ceramic type	Oval	Rectangular	Note	Length cm	Width cm	Thickness cm
Room 21 floor	El Paso Brownware		1	rectangular sherd, three edges lightly abraded and rounded	1.8+	2.6	0.3
Room 22 fill	El Paso Brownware		1	edges abraded square, slightly rounded corners	2.4	1.9	0.4

Table C.2. Attributes of Ceramic Counters, continued.

Provenience	Ceramic Type	Oval	Rectangular	Note	Length cm	Width cm	Thickness cm
Room 22 fill	El Paso Brownware	1		chipped and lightly abraded square	1.4	1.3	0.5
Room 25 fill	Chupadero B/W		1	edges abraded square, incomplete	2.5+	2	0.6
Room 25 fill	El Paso Brownware	1		edges abraded square	3	2.3	0.5
Room 25 fill	El Paso Brownware	1		edges chipped	4.5	3.5	0.5
Extramural Feature F.38	El Paso Polychrome		1	edges abraded square, , one square and one rounded corner, incomplete	4.2	1.9+	0.4
Extramural Feature F.118	El Paso Polychrome		1	edges lightly abraded and rounded, rounded corners, incomplete	2	1.8+	0.4
Extramural FeatureF.130	El Paso Brownware	1		edges lightly abraded and rounded	1.5	1.4	0.5
Extramural Feature F.203	El Paso Brownware	1		edges abraded square	1.6	1.4	0.3
Extramural Feature F.203	El Paso Brownware	1		edges abraded square	1.7	1.4	0.5
Extramural Feature F.203	El Paso Brownware	1		edges abraded square, incomplete	1.8+	1.4+	0.3
Extramural Feature F.203	El Paso Brownware	1		edges lightly abraded and rounded	1.0+	1.3	0.3
Extramural Non-feature	Three Rivers R/T	1		edges lightly abraded and rounded, incomplete	3.8+	3+	0.8

Table C.3. Attributes of Ceramic Plates.

Provenience	Ceramic Type	Edge Treatment And Profile	Shape	Length cm	Width cm	Thickness cm
Room 1 floor F.222	El Paso Polychrome	chipped, lightly abraded, rounded	convex edges, rounded corner	6.8+	4.8+	0.4
Room 6 floor 2	El Paso Polychrome	lightly abraded, rounded	subrectangular shape	14.9+	9.3+	0.6
Room 12 floor	El Paso Polychrome	chipped, lightly abraded, rounded	convex edge	13.3+	9.7+	0.7
Room 18 fill	El Paso Polychrome	lightly abraded, rounded	convex edges, subrectangular corner	7.3+	5+	0.5

Table C.3. Attributes of Ceramic Plates, continued.

Provenience	Ceramic Type	Edge Treatment And Profile	Shape	Length cm	Width cm	Thickness cm
Room 22 fill	El Paso Brownware	lightly abraded, rounded	rounded corner	10.8+	9.6+	0.5
Room 22 fill	El Paso Brownware	lightly abraded, rounded	rounded corner	13.3+	4.4+	0.4
Room 25 fill	El Paso Polychrome	lightly abraded, rounded	irregular rounded edge	17.1+	8.7+	0.4
Room 26 floor 1	El Paso Polychrome	lightly abraded, rounded	subrectangular, red/yellow pigment on concave surface	24	22.5	
Extramural Feature F.55	El Paso Polychrome	lightly abraded, rounded	convex edges, subrectangular corner	7.8+	7.2+	0.6
Extramural Feature F.56	El Paso Polychrome	lightly abraded, rounded	circular shape, red pigment on concave surface	10.2	9.1	0.5
Extramural Feature F.94	El Paso Brownware	abraded square	convex edges, rounded corner	5.5+	4.5+	0.5
Extramural Feature F.124	El Paso Brownware	lightly abraded, rounded	convex edges, subrectangular corner	7+	4.5+	0.5
Extramural Non-feature	El Paso Brownware	chipped, lightly abraded, rounded	oval shape	16.5	12.2	0.6

Table C.4. Attributes of Sherd Palettes with Pigment.

Provenience	Ceramic type	Sherds with Ochre	Edge Modification	Note	Length cm	Width cm	Thickness cm
Eroded Pueblo fill/floor	El Paso Brownware	1			2.5+	2.3+	0.5
Room 2 fill	El Paso Brownware	24			3.5-4+	1.8-3.3+	0.4-0.5
Room 3 fill	El Paso Brownware	4			1.2-3.5+	0.9-2.3+	0.3-0.5
Room 4 fill	El Paso Brownware	2			1.4-2.2+	1.2-1.3+	0.5
Room 6 fill	Three Rivers R/T	1			2.4+	1.3+	0.6
Room 7 floor	El Paso Brownware		1	one convex edge lightly abraded and rounded	9+	3.4+	0.5
Room 7 floor	El Paso Brownware	1			1.9+	1.3+	0.4
Room 8 fill	El Paso Brownware	1			4.2+	2+	0.4

Table C.4. Attributes of Sherd Palettes with Pigment, continued.

Provenience	Ceramic type	Sherds with Ochre	Edge Modification	Note	Length cm	Width cm	Thickness cm
Room 13 fill	El Paso Polychrome	1			4.6+	4.2+	0.5
Room 18 fill	El Paso Brownware	13			2-4+	0.7-3+	0.3-0.4
Room 18 floor	El Paso Brownware		1	one convex edge lightly abraded and rounded	3.5+	1.8+	0.4
Room 19 floor	El Paso Brownware	1			2+	1.2+	0.3
Room 21 fill	El Paso Brownware	1			3.8+	.5+	0.5
Room 21 floor	El Paso Polychrome	3			2.5-3.9+	1.5-3.6+	0.3-0.6
Room 21 floor	Three Rivers R/T	1			2+	1.8+	0.6
Room 21 floor, F.353	El Paso Brownware	1			5+	3.3+	0.4
Room 22 fill	El Paso Polychrome	5			2.2-8.6+	1.5-3.9+	0.3-0.7
Room 22 fill	El Paso Brownware		1	pigment extends over one convex edge	6.2+	5.9+	0.5
Room 22 fill	El Paso Polychrome	1			5.3+	4.1+	0.4
Room 25 fill	El Paso Polychrome	11			1.2-4.2+	0.9-3+	0.3-0.6
Room 25 fill	El Paso Brownware		1	one convex edge lightly abraded and rounded	9.4+	4.8+	0.5
Room 26 fill	El Paso Brownware	1			2.6+	1.4+	0.5
Room 27 fill	El Paso Brownware	4			1-3.1+	1-2+	0.3-0.4
Room 28 fill	El Paso Brownware	3			1.8-5.3+	1.12.5+	0.4-0.5
Room 29 floor	El Paso Brownware	1			2.9+	2.7+	0.6
Room 31 fill	El Paso Brownware		1	one convex edge lightly abraded and rounded	2.7+	2+	0.5
Room 31 fill/floor	El Paso Brownware		1	one convex edge lightly abraded and rounded	4.3+	3.8+	0.7
Extramural Feature F.1	El Paso Polychrome	9			2.2-4.1+	1.5-2.5+	0.3-0.5
Extramural Feature F.18	El Paso Polychrome	1			7+	5.6+	0.4
Extramural Feature F.35	El Paso Brownware	1			4.9+	3.2+	0.5
Extramural Feature F.36	El Paso Brownware	13			1.8-6.6+	1.5-5.1+	0.3-0.6

Table C.4. Attributes of Sherd Palettes with Pigment, continued.

Provenience	Ceramic type	Sherds with Ochre	Edge Modification	Note	Length cm	Width cm	Thickness cm
Extramural Feature F.36	El Paso Polychrome		1	one convex edge lightly abraded and rounded	8.7+	8.2+	0.8
Extramural Feature F.42	El Paso Polychrome	2			6-16.8+	3.7-10+	0.5
Extramural Feature F.47	El Paso Brownware	2			1.5-2.5+	1-1.5+	0.3-0.4
Extramural Feature F.51	El Paso Polychrome		1	pigment extends over one convex edge	3.1+	2.5+	0.4
Extramural Feature F.54	El Paso Polychrome	8			1.5-5.8+	0.9-5+	0.3-0.5
Extramural Feature F.55	El Paso Polychrome	2			4.6-8.9+	3-5+	0.3
Extramural Feature F.56	El Paso Polychrome	30			1-14+	1-5.5+	0.4-0.6
Extramural Feature F.56	El Paso Polychrome		1	pigment on both sides, trapezoidal, three sides moderately abraded and squared, narrow end incomplete	6.3+	4.5	0.5
Extramural Feature F.56	El Paso Polychrome		1	one straight edge moderately abraded and squared	6.4+	5.6+	0.5
Extramural Feature F.56	El Paso Polychrome		1	pigment on both sides, rectangular, concave sides lightly abraded, incomplete at ends	5.6+	3.1	0.5
Extramural Feature F.60	El Paso Brownware	1			1.6+	1.2+	0.3
Extramural Feature F.65	El Paso Brownware	6			4.8+	1.1+	.3-.5
Extramural Feature F.85	El Paso Polychrome	1			2.5+	2.5+	0.5
Extramural Feature F.94	El Paso Brownware	1			3.4+	2.2+	0.4
Extramural Feature F.114	El Paso Brownware	1			5.1+	4.4+	0.4
Extramural Feature F.118	El Paso Brownware	3			2.2-3.8+	1.9-2.5+	0.4-0.5
Extramural Feature F.118	El Paso Brownware		1	pigment on both sides, one convex edge lightly abraded, rounded	6.2+	4.5+	0.4
Extramural Feature F.123	El Paso Brownware	2			3.4-4.2+	1.9-2.4+	0.5-0.6

Table C.4. Attributes of Sherd Palettes with Pigment, continued.

Provenience	Ceramic type	Sherds with Ochre	Edge Modification	Note	Length cm	Width cm	Thickness cm
Extramural Feature F.128	El Paso Brownware	1			2.3+	1.1+	0.3
Extramural Feature F.135	El Paso Brownware	2			3-3.2+	2.4-2.5+	0.5
Extramural Feature F.139	El Paso Brownware	1			2+	1.6+	0.4
Extramural Feature F.140	El Paso Brownware	2			0.8-1.7+	0.5-1+	0.4
Extramural Feature F.197	El Paso Brownware	1			1.2+	.8+	0.5
Extramural Feature F.203	El Paso Brownware	11			2-5.3+	1.1-4+	0.4-0.6
Extramural Feature F.203	El Paso Brownware		2	one convex edge lightly abraded and rounded	3.5-12.5+	2.1-8.8+	0.4-0.7
Extramural Non-feature	El Paso Brownware		4	one edge lightly abraded and irregular	1.5-2.5+	0.7-2.1+	0.3-0.4
Extramural Non-feature	El Paso Brownware	13			1.5-5+	1-3.1+	0.3-0.5

Table C.5. Attributes of Utilized Sherds.

Provenience	Ceramic Type	No. Used Edges	Used Edge	Edge Shape	Length cm	Width cm	Thickness cm
Room 3 fill	Chupadero B/W	1	rounded edge	convex edge	3.5+	2.8+	0.6
Room 7 floor	El Paso Brownware	3	beveled edges, rounded notch	triangular shape with notch	8.7	4.9	0.5
Room 18 fill	El Paso Brownware	1	beveled edge	convex edge	1.8+	1.5+	0.3
Room 22 fill	El Paso Brownware	1	bidirectional beveled edge	convex edge, subrectangular	4.6	4.4	0.4
Room 25 fill	El Paso Polychrome	2	rounded edges	convex edges, oval shape	15.1	7.5	0.5
Room 25 fill	El Paso Brownware	2	rounded edges	convex edges, oval shape	7.5	3.8	0.3
Room 25 fill	El Paso Brownware	1	rounded edge	convex edge	4.4+	2.3+	0.4
Room 25 fill	El Paso Brownware	2	beveled edges	convex edges, triangular shape	1.7+	1.1+	0.2
Room 25 fill	El Paso Brownware	1	beveled edge	convex edge	2+	1.7+	0.4

Table C.5. Attributes of Utilized Sherds, continued.

Provenience	Ceramic Type	No. Used Edges	Used Edge	Edge Shape	Length cm	Width cm	Thickness cm
Room 25 fill	El Paso Brownware	1	beveled edge	straight edge	1.1+	0.9+	0.3
Room 25 fill	Seco Corrugated	2	beveled edges	convex edges, triangular shape	3.8	2.5	0.7
Room 25 floor	El Paso Polychrome	2	beveled edges	beveled on opposite sides and at ends of a convex edge, rectangular shape	8	3.2	0.5
Room 25 floor	Casas Grandes Polychrome	2	rounded edges	convex edges, oval shape	5+	3.5	0.5
Room 25 floor	Playas Red Gouged	1	rounded edge	convex edge, rectangular shape	11.6	5.4	0.5
Room 26 floor 1	Casas Grandes Polychrome	2	beveled edges	convex and concave edges, rectangular shape	7.4	3.4	0.5
Room 27 fill	El Paso Polychrome	1	rounded edge	convex edge	2.3+	1.6+	0.3
Room 28 fill	El Paso Brownware	1	bidirectional beveled edge	convex edge	2.4+	1.4+	0.3
Room 31 fill	El Paso Polychrome	1	beveled edge	convex edge	4.7+	3.8+	0.6
Room 31 fill	El Paso Brownware	1	beveled edge	convex edge	1.6+	1.4+	0.5
Room 31 fill	El Paso Brownware	1	beveled edge	convex edge	1.6+	0.7+	0.3
Extramural Feature F.1	El Paso Polychrome	1	beveled edge	convex edge, oval shape	3.4+	3+	0.3
Extramural Feature F.54	El Paso Polychrome	1	beveled edge	convex edge	2.6+	1.7+	0.4
Extramural Feature F.55	El Paso Polychrome	2	beveled edges	plano-convex shape, reused, originally oval	12.2	2.6	0.5
Extramural Feature F.55	El Paso Polychrome	2	rounded edges	convex edges, subrectangular	5.9	4.3+	0.5
Extramural Feature F.55	El Paso Polychrome	1	beveled edge	convex edge, oval shape	5.3+	3.8	0.3
Extramural Feature F.55	El Paso Polychrome	4	3 round edges, 1 beveled edge	3 convex edges, 1 concave edge, rectangular shape	8.4	4.6	0.5
Extramural Feature F.60	El Paso Brownware	1	beveled edge	convex edge, rectangular shape	2.8	2.2	0.4
Extramural Feature F.94	El Paso Polychrome	1	rounded edge	convex edge	3+	2.7+	0.4
Extramural Feature F.118	El Paso Brownware	1	beveled edge	convex edge	1.2+	1+	0.3
Extramural Feature F.123	El Paso Brownware	1	beveled edge	convex edge, subrectangular	9.4	6.6	0.4

Table C.5. Attributes of Utilized Sherds, continued.

Provenience	Ceramic Type	No. Used Edges	Used Edge	Edge Shape	Length cm	Width cm	Thickness cm
Extramural Feature F.139	Ramos Polychrome	2	beveled edges	convex edges, oval shape	13.3	4.6	0.5
Extramural Feature F.131	El Paso Polychrome	1	rounded edge	convex edge	4.1+	1.8+	0.4
Extramural Feature F.140	Casas Grandes Polychrome	1	rounded edge	convex edge, rectangular shape	3	5.5	
Extramural Feature F.159	El Paso Polychrome	1	beveled edge	convex edge	4.2+	2.4+	0.5
Extramural Feature F.159	El Paso Brownware	2	beveled edges	convex edge perpendicular to straight edge	1.5+	1.1+	0.4
Extramural Feature F.203	El Paso Polychrome	1	beveled edge	convex edge	5.6+	2.5+	0.7
Extramural Non-feature	El Paso Polychrome	1	rounded edge	convex edge	2.7+	1.6+	0.7
Extramural Non-feature	El Paso Brownware	1	beveled edge	convex edge	1.8+	1.5+	0.4
Extramural Non-feature	El Paso Brownware	1	beveled edge	convex edge, rectangular	2.8	2.5+	0.4
Extramural Non-feature	El Paso Brownware	1	beveled edge	convex edge	1.5+	1.1+	0.5
Extramural Non-feature	El Paso Brownware	1	beveled edge	convex edge	2+	0.7+	0.3
Extramural Non-feature	El Paso Polychrome	1	beveled edge	convex edge	1.2+	0.6+	0.4

Table C.6. Attributes of Modified Sherds of Uncertain Use.

Provenience	Ceramic type	Light to Moderate Abrasion, Rounded Profile of Edge	Moderate to Well-abraded, Square Profile of Edge	Length cm	Width cm	Thickness cm
Room 3 fill	El Paso Brownware	adjoining convex edges, incomplete		4.6+	2.8+	0.4
Room 5 floor	El Paso Brownware	convex edge, incomplete		1.8+	1.8+	0.5
Room 6 fill	El Paso Polychrome	convex edge, incomplete		3.7+	3.6+	0.3
Room 6 fill	El Paso Polychrome	convex edge, incomplete		2.9+	1.5+	0.4
Room 6 fill	El Paso Brownware	convex edge, incomplete		2.8+	1.5+	0.5
Room 6 floor 2	El Paso Polychrome	rounded end of sherd, convex edges, incomplete		4.8+	3.2	0.4
Room 6 floor 2	El Paso Polychrome		convex edge, incomplete	4+	2.9+	0.5

Table C.6. Attributes of Modified Sherds of Uncertain Use, continued.

Provenience	Ceramic type	Light to Moderate Abrasion, Rounded Profile of Edge	Moderate to Well-abraded, Square Profile of Edge	Length cm	Width cm	Thickness cm
Room 6 floor 2	El Paso Polychrome		convex edge, incomplete	4.9+	2.5+	0.4
Room 11 floor	El Paso Polychrome		straight edge, incomplete	3.2+	3.1+	0.5
Room 11 floor	El Paso Polychrome	rectangular shape		6	4.3	0.3
Room 13 fill	El Paso Polychrome	rectangular shape		8.2	4	0.5
Room 17 floor	El Paso Brownware	convex edge, incomplete		1.1+	.9+	0.2
Room 18 fill	El Paso Brownware	convex edge, incomplete		2.4+	2.4+	0.4
Room 18 fill	El Paso Brownware	straight edge, incomplete		2.8+	2+	0.5
Room 18 floor	El Paso Brownware	irregular edge, incomplete		5.9+	5.2+	0.5
Room 18 floor	El Paso Brownware	adjoining convex edges, incomplete		4.2+	3.3+	0.4
Room 19 floor	El Paso Polychrome	convex edge, incomplete		4.2+	3.5+	0.4
Room 22 fill	El Paso Brownware	irregular edge, incomplete		4.1+	2.3+	0.4
Room 22 fill	El Paso Brownware	convex edge, incomplete		3.5+	.5+	0.3
Room 22 fill	El Paso Brownware	adjoining convex edges, incomplete		5.4+	3.6+	0.4
Room 23 fill	El Paso Brownware	convex edge, incomplete		3+	1.5+	0.5
Room 23 fill	El Paso Brownware	straight edge, incomplete		1.6+	1.1+	0.3
Room 25 fill	El Paso Polychrome	rounded end of sherd, irregular edges, incomplete		6	5.6+	0.8
Room 25 fill	El Paso Brownware	convex edge, incomplete		2.2+	1.5+	0.5
Room 25 fill	El Paso Brownware	convex edge, incomplete		4+	2.5+	0.5
Room 25 fill	El Paso Brownware	adjoining convex and irregular edges, incomplete		3.7+	2.6+	0.2
Room 25 fill	El Paso Brownware	adjoining convex and irregular edges, incomplete		5.5+	2.5+	0.6
Room 25 fill	El Paso Brownware	adjoining convex and irregular edges, incomplete		6.6+	5.6+	0.7
Room 25 fill	El Paso Brownware	convex edge, incomplete		3+	2.5+	0.3

Table C.6. Attributes of Modified Sherds of Uncertain Use, continued.

Provenience	Ceramic type	Light to Moderate Abrasion, Rounded Profile of Edge	Moderate to Well-abraded, Square Profile of Edge	Length cm	Width cm	Thickness cm
Room 25 fill	El Paso Brownware	adjoining convex edges, incomplete		3+	2.7+	0.4
Room 25 fill	El Paso Polychrome		convex edge, incomplete	3.6+	2.5+	0.6
Room 25 fill	El Paso Brownware	irregular edge, incomplete		6.9+	5.9+	0.8
Room 25 fill	El Paso Brownware		straight edge, incomplete	2.4+	2.4+	0.4
Room 27 fill	El Paso Polychrome	convex edge, incomplete		3.2+	1.6+	0.4
Room 27 fill	El Paso Brownware	rounded end of sherd, convex edges, incomplete		3.8+	2.2	0.6
Room 27 fill	El Paso Brownware	convex edge, incomplete		5.4+	.5+	0.4
Room 27 fill	El Paso Brownware	convex edge, incomplete		2.3+	2+	0.4
Room 27 fill	El Paso Brownware	convex edge, incomplete		3.2+	2.4+	0.4
Room 27 fill	El Paso Brownware	convex edge, incomplete		2.9+	2.4+	0.4
Room 28 fill	El Paso Polychrome		adjoining convex edges, incomplete	2.5+	1.5+	0.4
Room 28 fill	El Paso Brownware	convex edge, incomplete		1.4+	1.3+	0.3
Room 29 floor	El Paso Brownware		straight edge, incomplete	1.4+	1+	0.4
Room 31 fill	El Paso Brownware	convex edge, incomplete		4.4+	3.9+	0.5
Room 31 fill	El Paso Brownware	convex edge, incomplete		3.1+	2.7+	0.3
Room 31 fill	El Paso Brownware	convex edge, incomplete		3+	1.4+	0.4
Room 31 fill	El Paso Brownware	convex edge, incomplete		3.8+	2+	0.5
Room 31 fill	El Paso Brownware		convex edge, incomplete	1.3+	0.7+	0.4
Extramural Feature F.1	El Paso Polychrome	irregular edge, incomplete		9.5+	5.6+	0.6
Extramural Feature F.1	El Paso Brownware	convex edge, incomplete		2.1+	1.7+	0.5
Extramural Feature F.1	El Paso Brownware	convex edge, incomplete		2.2+	1.9+	0.3
Extramural Feature F.1	El Paso Brownware	rounded end of sherd, convex edges, incomplete		3.1+	2.2+	0.3
Extramural Feature F.1	El Paso Brownware	convex edge, incomplete		2.7+	1.5+	0.5
Extramural Feature F.3	El Paso Polychrome	convex edge, incomplete		2.2+	1.2+	0.3

Table C.6. Attributes of Modified Sherds of Uncertain Use, continued.

Provenience	Ceramic type	Light to Moderate Abrasion, Rounded Profile of Edge	Moderate to Well-abraded, Square Profile of Edge	Length cm	Width cm	Thickness cm
Extramural Feature F.7	El Paso Brownware		convex edge, incomplete	4+	2.5+	0.5
Extramural Feature F.9	El Paso Brownware	convex edge, incomplete		5+	3.6+	0.5
Extramural Feature F.18	El Paso Polychrome	convex edge, incomplete		9.8+	7.9+	0.6
Extramural Feature F.18	El Paso Polychrome		convex edge, incomplete	2.6+	2.3+	0.5
Extramural Feature F.20	El Paso Polychrome	convex edge, incomplete		2.8+	1.2+	0.3
Extramural Feature F.20	El Paso Polychrome	rounded end of sherd, convex edges, incomplete		4.4+	2.8+	0.4
Extramural Feature F.24	El Paso Brownware	rectangular, one end rounded, other end incomplete		6.5	7.5+	0.4
Extramural Feature F.48	El Paso Brownware	adjoining convex edges, incomplete		5+	4.2+	0.5
Extramural Feature F.51	El Paso Polychrome	rounded end of sherd, convex edges, incomplete		5.3+	4.7	0.7
Extramural Feature F.54	El Paso Brownware	rounded end of sherd, convex edges, incomplete		3.5	2.3+	0.4
Extramural Feature F.55	El Paso Polychrome	adjoining convex edges, incomplete		1.7+	1.7+	0.3
Extramural Feature F.55	El Paso Polychrome	adjoining convex edges, incomplete		2.3+	1.6+	0.4
Extramural Feature F.55	El Paso Polychrome	oval shape		6+	5	0.4
Extramural Feature F.56	Gila Polychrome	rectangular shape		6.4	3.6	0.5
Extramural Feature F.82	El Paso Brownware	convex edge, incomplete		4+	1.5+	0.5
Extramural Feature F.118	El Paso Brownware	convex edge, one end of irregularly shaped sherd		12.5	6.5	0.5
Extramural Feature F.121	El Paso Brownware	convex edge, incomplete		2.3+	1.7+	
Extramural Feature F.121	El Paso Brownware	straight edge, incomplete		2.4+	2.3+	0.5

Table C.6. Attributes of Modified Sherds of Uncertain Use, continued.

Provenience	Ceramic type	Light to Moderate Abrasion, Rounded Profile of Edge	Moderate to Well-abraded, Square Profile of Edge	Length cm	Width cm	Thickness cm
Extramural Feature F.131	El Paso Polychrome	convex edge, incomplete		3.6+	2.4+	0.3
Extramural Feature F.135	El Paso Brownware	convex edge, incomplete		4+	2+	0.2
Extramural Feature F.139	El Paso Brownware		straight edge, incomplete	1.6+	.9+	0.3
Extramural Feature F.140	El Paso Polychrome	convex edge, incomplete		2.6+	2+	0.4
Extramural Feature F.140	El Paso Brownware	convex edge, incomplete		1.7+	1.3+	0.4
Extramural Feature F.140	El Paso Brownware	straight edge, incomplete		2.4+	1.9+	0.5
Extramural Feature F.140	El Paso Brownware	convex edge, incomplete		2.3+	2+	0.4
Extramural Feature F.141	El Paso Brownware	convex edge, incomplete		3.3+	2+	0.4
Extramural Feature F.145	Seco Corrugated	convex edge, incomplete		4.6+	1.9+	0.5
Extramural Feature F.145	El Paso Brownware		straight edge, incomplete	1.3+	1.1+	0.5
Extramural Feature F.159	El Paso Brownware	convex edge, incomplete		1.5+	1.2+	0.4
Extramural Feature F.159	El Paso Brownware	convex edge, incomplete		1.7+	1.2+	0.4
Extramural Feature F.159	El Paso Brownware	convex edge, incomplete		2.5+	2+	0.7
Extramural Feature F.203	El Paso Brownware		convex edge, incomplete	3.5+	3.1+	0.4
Extramural Feature F.203	El Paso Brownware	convex edge, incomplete		2.4+	2+	0.3
Extramural Feature F.203	El Paso Brownware		convex edge, incomplete	2.5+	2.2+	0.3
Extramural Feature F.203	El Paso Brownware	convex edge, incomplete		4.7+	2.1+	0.4
Extramural Feature F.203	El Paso Brownware	convex edge, incomplete		4+	3.1+	0.4
Extramural Feature F.203	El Paso Brownware	convex edge, incomplete		2.8+	1.7+	0.4
Extramural Non-feature	El Paso Brownware	convex edge, incomplete		2.6+	2.1+	0.4
Extramural Non-feature	El Paso Polychrome	convex edge, one side of subrectangular sherd		9	5.6	0.5
Extramural Non-feature	El Paso Brownware	straight edge, incomplete		4.5+	3.6+	0.5
Extramural Non-feature	El Paso Brownware	convex edge, incomplete		2.9+	1.3+	0.4
Extramural Non-feature	El Paso Brownware	convex edge, incomplete		2.2+	1.1+	0.5
Extramural Non-feature	El Paso Polychrome	convex edge, incomplete		2.5+	2.4+	0.3
Extramural Non-feature	El Paso Brownware	convex edge, incomplete		1.9+	1.7+	0.5

Table C.6. Attributes of Modified Sherds of Uncertain Use, continued.

Provenience	Ceramic type	Light to Moderate Abrasion, Rounded Profile of Edge	Moderate to Well-abraded, Square Profile of Edge	Length cm	Width cm	Thickness cm
Extramural Non-feature	El Paso Polychrome	rounded end of sherd, convex edges, incomplete		5.1+	3.4+	0.5
Extramural Non-feature	El Paso Brownware	convex edge, incomplete		.8+	0.5+	0.5
Extramural Non-feature	El Paso Polychrome	irregular edge, incomplete		3.5+	2.9+	0.4
Extramural Non-feature	El Paso Brownware	rounded end of sherd, convex edges, incomplete		2.6+	2+	0.6
Extramural Non-feature	El Paso Polychrome	rounded end of sherd, convex edges, incomplete		4.5+	4.6	0.3
Extramural Non-feature	El Paso Polychrome	adjoining convex edges, incomplete		2.9+	2.8+	0.6
Extramural Non-feature	El Paso Polychrome	irregular edge, incomplete		7+	5+	
Extramural Non-feature	El Paso Polychrome	irregular edge, incomplete		5.5+	4+	
Extramural Non-feature	El Paso Brownware	convex edge, incomplete		8.6+	52+	0.7
Extramural Non-feature	El Paso Polychrome	convex edge, incomplete		4+	3+	0.4
Extramural Non-feature	El Paso Brownware		convex edge, incomplete	4.2+	2.9+	0.4
Extramural Non-feature	El Paso Brownware		convex edge, incomplete	2+	1.3+	0.5
Extramural Non-feature	El Paso Polychrome	convex edge, incomplete		4.3+	4.2+	0.4
Extramural Non-feature	El Paso Polychrome	convex edge, incomplete		6.5+	4.4+	0.5
Extramural Non-feature	El Paso Brownware	convex edge, incomplete		4+	1.6+	0.5
Extramural Non-feature	El Paso Polychrome		convex edge, incomplete	4.1+	2.5+	0.5
Extramural Non-feature	El Paso Polychrome	convex edge, incomplete		2+	0.7+	0.4
Extramural Non-feature	Seco Corrugated		convex edge, incomplete	2.4+	2.3+	0.6
Extramural Non-feature	El Paso Brownware		straight edge, incomplete	2.9+	2.2+	0.4
Extramural Non-feature	El Paso Polychrome	convex edge, incomplete		2.6+	1.9+	0.5

Table C.7. Sherds Evidencing Vessel Repair.

Provenience	Ceramic type	Repair
Room 3 floor	Seco Corrugated bowl	4 mm hole ground smooth, cylindrical
Room 7 floor	El Paso Polychrome bowl	rim ground and rounded
Room 22 fill	El Paso Polychrome jar	6 mm hole drilled from one side
Room 25 fill	El Paso Polychrome jar	4 mm biconical hole
Room 31 fill	El Paso Polychrome bowl	rim ground and square
Extramural Feature F.18	El Paso Brownware jar	3 mm hole drilled from one side
Extramural Feature F.28	El Paso Polychrome jar	rim ground and rounded
Extramural Feature F.51	El Paso Polychrome jar	2 mm biconical hole
Extramural Feature F.55, F.128, F.135	Ramos Polychrome jar	rim ground and rounded, 7 sherds
Extramural Non-feature	Tucson Polychrome jar	four, 2.5-3 mm repair holes either side of old break, 4 sherds
Extramural Non-feature	El Paso Polychrome jar	rim ground and rounded
Extramural Non-feature	El Paso Brownware jar	rim ground and rounded

APPENDIX D

ABRADERS BY TYPE AND PROVENIENCE

Table D.1. Attributes of Mano-like Abraders.

	Provenience	No.	Condition	Weight (gr)	Length (cm)	Width (cm)	Thickness (cm)	Use Wear
Sandstone Mano-like Abrader	Room 6, fill	1	complete	184	6.8	5.7	3.4	oval outline, wedge-shaped profile, bifacial with slightly convex surfaces
	Room 22, fill	1	complete	279	8.4	6.3	3.4	roughly subrectangular outline, battered to shape, single flat grinding surface
	Room 25, fill	1	complete	347	7.6	7.3	4.6	trapezoidal outline, battered to shape, bifacial, flat grinding surfaces
	Extramural Feature F.106	1	fragment	89	6.9+	4.7+	2.3	rounded edge, lightly ground to shape, flat to convex grinding surface with parallel striations
	surface refuse	1	complete	1,050	11.3	10.8	8.1	roughly circular, wedge-shaped profile, bifacial with one flat and one slightly convex surface
Granite Mano-like Abrader	Room 29, floor	1	complete	1,175	12.8	10.3	6.5	unshaped cobble, bifacial, one slightly convex surface, one roughly flat surface, both surfaces smooth but show little wear

Table D.2. Attributes of Nodular Active Abraders.

	Provenience	No.	Condition	Weight (gr)	Length (cm)	Width (cm)	Thickness (cm)	Use Wear
Nodular Quartzite Active Abrader	Room 1, fill	1	complete	183	8.6	3.4	3.4	nodule with abrasion and polish on convex surface near one end
	Extramural Feature F.55	1	complete	52	4.9	4.2	1.4	nodule with light abrasion on flat surface
	surface refuse	1	complete	36	4.2	2.5	2.1	nodule with both ends of a convex surface showing grinding, parallel striations, and greenish blue pigment
Nodular Limestone Active Abrader	Room 30, floor	1	fragment	104	7.4	4.7+	1.9	nodule with light grinding on convex surface

Table D.2. Attributes of Nodular Active Abraders, continued.

	Provenience	No.	Condition	Weight (gr)	Length (cm)	Width (cm)	Thickness (cm)	Use Wear
Nodular Scoria Active Abrader	Rooms 5,7, 11, 18, floor	4	complete	46 - 158	4.7 - 11.2	2.8 - 8.6	2.8 - 4.3	two nodules with single flat surface; one nodule with two flat surfaces; one with two flat and two nodules with convex surfaces
	Rooms 1, 2, fill	2	complete	42 - 206	5.8 - 9.6	4.9 - 9.1	3.1 - 3.9	rectangular piece with single flat surface; irregular piece with single concave surface
	Room 17, fill	1	fragment	31	4.7+	3.8+	2.8	nodule single flat surface
	Extramural Feature F.87	1	complete	13	3.2	2.6	2	entire nodule, convex surfaces
	Extramural Feature F.7, F.63	2	fragment	6 - 15	2.8+ - 3.9+	2.3+ - 3	1.3+ - 1.8+	one nodule with single flat surface; one nodule with two convex surfaces
	surface refuse	1	complete	24	6.2	2.7	2.5	diamond shaped, faceted, six convex surfaces
	surface refuse	1	fragment	52	6.2+	4.2+	3.5	nodule with single flat surface

Table D.3. Attributes of Tabular Active Abraders.

	Provenience	No.	Condition	Weight (gr)	Length (cm)	Width (cm)	Thickness (cm)	Use Wear
Tabular Sandstone Active Abrader	Room 26, floor 1	1	complete	61	4.5	3.9	2.2	trapezoidal shape, bifacial, flat surfaces
	Room 6, fill between floors 1, 2, Room 18, floor	2	fragment	4 - 25	3.1+ - 6.4+	1.7+ - 4.3+	0.5 - 1.3+	one with single flat surface; one with flat to slightly convex surface
	Rooms 25, 31, fill	2	complete	7 - 34	2.4 - 6.2	2.4 - 3.6	0.9	one circular with single flat surface; one subrectangular, bifacial with a convex surface and a slightly concave surface

Table D.3. Attributes of Tabular Active Abraders, continued.

	Provenience	No.	Condition	Weight (gr)	Length (cm)	Width (cm)	Thickness (cm)	Use Wear
Tabular Sandstone Active Abrader	Rooms 7, 25, 27, fill	3	fragment	3 - 54	2.9+ - 7.3+	1.3+ - 4.8+	0.5 - 1	one bifacial with two flat surfaces; two bifacial with convex surfaces tapering to pointed, rounded edges
	Extramural Feature F.55	1	complete	17	5	3.8	0.7	irregular shape, bifacial with two flat surfaces, one edge beveled from use
	Extramural Feature F.1, F.9/131, F.94	3	fragment	5 - 25	2.7+ - 4.3	2 - 3.4+	0.6 - 2.2	one bifacial with flat to slightly convex surfaces; one bifacial with convex surfaces tapering to rounded edge; one with a single convex surface
	surface refuse	2	fragment	6 - 71	3.7+ - 7.4+	2+ - 3.9+	0.5 - 1.5	one bifacial with two flat surfaces, one rounding to sharp edge; one with slightly concave surface and two rounded edges
Tabular Quartzite Active Abrader	Room 31, floor, F.153	1	fragment	151	5.4+	3.7+	4	bifacial, one slightly convex surface, one flat surface
	Room 13, fill	1	fragment	56	6.2+	3.4+	2.1	single flat to convex surface
	Extramural Feature F.54	1	fragment	25	4.3+	3.1+	1.9+	single flat surface

Table D.4. Attributes of Tabular Passive Abraders.

	Provenience	No.	Condition	Weight (gr)	Length (cm)	Width (cm)	Thickness (cm)	Use Wear
Tabular Sandstone Passive Abrader	Room 3, 6, 25, fill	3	fragment	32 - 497	5.6+ - 15.1+	4.4+ - 8.3+	1.5+ - 4.8	one bifacial with two flat surfaces with scattered impact fractures; one with single flat surface; one with flat to slightly concave surface
	Extramural Feature F.41	1	complete	210	9.2	6.9	2	trapezoidal shape, slightly concave oval surface in center of one surface

Table D.4. Attributes of Tabular Passive Abraders, continued.

	Provenience	No.	Condition	Weight (gr)	Length (cm)	Width (cm)	Thickness (cm)	Use Wear
Tabular Sandstone Passive Abrader	Extramural Feature F.118	1	fragment	123	10.5+	7.5+	1.3	single flat surface
Tabular Quartzite Passive Abrader	Room 17, 21, 31, floor	4	fragment	8 - 182	4.1+ - 15.0+	2.8+ - 8.7	0.3+ - 1.9+	one bifacial with two flat surfaces, parallel striations on one surface; one with single flat to slightly concave surface; one with few random striations; one with single flat surface and striations at different angles
	Room 13, 31 fill	4	fragment	11 - 71	4.5+ - 5.2+	2.8+ - 4.2+	0.5+ - 4.3+	four with single flat surface, one with parallel striations
	Extramural Feature F.1	1	complete	71	9	4.7	0.9	rectangular, bifacial with two flat surfaces, one with red pigment
	Extramural Feature F.42, F.55, F.121, F.434	5	fragment	14 - 301	4.4+ - 13.5+	2.9+ - 7.1+	0.5+ - 3+	two with single flat surface, one with striations at different angles; one with single flat surface, parallel striations and few impact fractures; one with single flat to concave surface and parallel striations; one with concave surface with few striations and impact fractures
	Surface Refuse	7	fragment	7 - 295	3.3+ - 19.2+	1.8+ - 9.9+	0.9+ - 3.2+	three with single flat surface and parallel striations, one with a few impact fractures; two with a single flat surface and a few impact fractures, one with a few striations at different angles; one with single flat to convex surface and a few impact fractures; one with single convex surface and striations at different angles

Table D.5. Tabular Nonspecific Abraders.

	Provenience	No.	Condition	Weight (gr)	Length (cm)	Width (cm)	Thickness (cm)	Use Wear
Tabular Sandstone Nonspecific Abrader	Room 15, 17, floor	2	fragment	21 - 45	3.7+ - 6.8+	2.2+ - 3.6+	1.5 - 1.6	one bifacial with one convex and one concave surface; one with single flat surface
	Room 18, 25, 28, 31, eroded pueblo, fill	8	fragment	2 - 78	2.0+ - 6.8+	1.1+ - 5.2+	0.7+ - 2.3	two bifacial with two flat surfaces; four with single flat surface; two with single slightly concave surface, one with parallel striations
	Extramural Feature F.1, F.9, F.9/131, F.50, F.55, F.87, F.94/127, F.114, F.131, F.203	11	fragment	5 - 73	2.3+ - 7.2+	1.4+ - 4.4+	0.7 - 1.8	one bifacial with one flat and one slightly concave surface; eight with single flat surface; one with single flat to slightly convex surface; one with single slightly concave surface
	Surface Refuse	2	fragment	19 - 43	3.5+ - 5.0+	3.4+ - 3.5+	1.7 - 1.8	one with single flat surface; one with single slightly concave surface with parallel striations
Tabular Quartzite Nonspecific Abrader	Room 13, 17, floor	2	fragment	1 - 16	2.8+ - 3.4+	1.1+ - 2.8+	0.3+ - 1.0+	one with single flat surface with parallel striations; one with single flat to slightly concave surface
	Room 22, 25, fill	2	fragment	14 - 36	5.1+ - 6+	3.4+ - 5.8+	0.5+ - 0.9+	two with single flat surface, one with parallel striations
	Surface Refuse	1	fragment	9	6.6+	2.5+	0.3+	single flat surface

APPENDIX E

SHELL, FOSSIL AND STONE ORNAMENTS BY PROVENIENCE

Table E.1. Attributes of shell and fossil ornaments.

Category	Provenience	Material	Number	Dimensions (mm)	Remarks
Whole Shell Pendant	Room 30, posthole F.246	*Glycymeris* sp.	1	10.3 x 8.9 hole 1.3 x 1.8	perimeter ground to oval shape, umbo ground down to reveal suspension hole
Whole Shell Bead	Room 20, floor	*Nassarius iodes*	2	8.4 - 9.5 x 4.3 - 5.2	irregular hole punched in lip, burned
	Room 1, 17, 20, 31, floor	*Olivella dama*	4	10.3 -15.8 x 5.2 - 7.5	spire ground away
	Room 20, floor, pit F.343	*Olivella dama*	1	9.7 x 5.1	spire ground away
	Room 13, roof	*Olivella dama*	1	11.6 x 6.4	spire ground away
	Room 22, 24, 25, fill	*Olivella dama*	12	11.1 - 12.9 x 5.2 - 6.3	spire ground away
	Room 25, fill	*Olivella dama*	2	12.1 - 12.6 x 6.4 - 6.5	spire ground away, holes cut on sides for suspension
	Extramural Feature F.1, F.17, F.24, F.54, F.203, F.395	*Olivella dama*	14	9.9 - 14.1 x 5.0 - 6.7	spire ground away
	disturbed soil above Extramural Feature F.117	*Olivella dama*	1	15.9 x 6.8	spire ground away
	disturbed soil above Extramural Feature F.117	*Olivella dama*	8	10.8 - 15.3 x 5.8 - 7.5	spire ground away, burned
	Extramural Feature F.40, F.87, F.136	*Olivella* sp.	3	6.9 - 7.7	aperture fragment
	Room 21, floor	*Olivella* sp.	1	7.4	midsection fragment
	Room 22, fill	*Olivella* sp.	1	8.1	midsection fragment
	Extramural Feature F.203	*Olivella* sp.	2	5.5 - 7.2	midsection fragment
	disturbed soil above Extramural Feature F.117	*Olivella* sp.	1	5.4	midsection fragment, burned
Shell Disc Bead	surface refuse	*Laevicardium elatum*	1	12.5 x 2.3 hole 3.2	biconically drilled
	Room 3, fill	cf *Glycymeris* sp.	1	10.6 x 3.4 hole 2.3	biconically drilled

Table E.1. Attributes of shell and fossil ornaments, continued.

Category	Provenience	Material	Number	Dimensions (mm)	Remarks
Shell Disc Bead	surface refuse	cf *Glycymeris* sp.	1	9.8 x 5.3 hole 2.5	biconically drilled
	Room 25, 31, fill	marine shell	3	3.9 - 4.3 x 1.3 - 1.9 holes 1.3 - 1.6	biconically drilled
	Room 31, fill	marine shell	1	3.7 x 1.0 hole 1.6	unifacially drilled
	Extramural Feature F.27	marine shell	1	3.9 x 0.8 hole 1.7	biconically drilled
	Extramural Feature F.203	marine shell	1	4.9 x 1.6 hole 1.9	biconically drilled, shallow 1.4 mm wide groove across center on one from wear
	Extramural Feature F.8/82/135, F.203	marine shell	2	3.7 - 4.4 x 0.8 - 1.6 holes 1.9 - 2.0	unifacially drilled
	surface refuse	marine shell	2	4.1-4.8 x 1.5 - 2.0 holes 1.3 - 1.9	biconically drilled
	surface refuse	marine shell	1	4.2 x 1.7 hole 1.4	biconically drilled, shallow 0.5 mm wide groove across center on one from wear
	disturbed soils above Extramural Feature F.117	marine shell	2	5.2 - 6.0 x 1.2 - 2.1 holes 2.2 - 2.3	biconically drilled, burned
	disturbed soils above Extramural Feature F.117	marine shell	1	5.7 x 1.8 hole 2.3	biconically drilled, shallow grooved 1.1 - 2.2 mm wide across center of one face, burned
	disturbed soils above Extramural Feature F.117	marine shell	4	4.2 - 5.8 x 0.9 - 1.4 holes 1.9 - 2.3	unifacially drilled, burned
Shell Fragment	Room 21, floor	*Conus* sp.	1	12.9 x 10.7	midsection fragment
	Extramural Feature F.139	*Glycymeris* sp.	1	12.8 x 5.3	fragment of shell with ground circular edge, burned
Tubular Shell Bead	Extramural Feature 118	Vermetidae marine worm casing	1	14.1 x 9.7	ends ground flat and polished

Table E.1. Attributes of shell and fossil ornaments, continued.

Category	Provenience	Material	Number	Dimensions (mm)	Remarks
Tubular Fossil Bead	Extramural Feature F.123, F.140	Scleractinia branch coral	2	9.0 - 13.1 x 3.6 - 5.2 holes 1.8 - 1.9	tubular, square ends, light abrasion and polish, one circular and one subrectangular cross-section
	disturbed soils above Extramural Feature F.117	Scleractinia branch coral	53	complete items 6.6 - 14.4 x 2.8 - 4.7 holes 1.4 - 2.1	8 complete, 45 fragments: surfaces lightly ground smooth, light polish, ends ground square, roughly circular to subrectangular cross-section, burned

Table E.2. Attributes of stone ornaments.

Category	Provenience	Material	Dimensions (mm)	Remarks
Pendant	Room 5, floor	sandstone	19.1 x 16.0+ x 3.5	fragment of roughly circular and possibly natural pebble with partially drilled 2.7 mm hole.
	extramural feature F.123	schist	14.2+ x 14.3+ x 2.8	proximal, subrectangular fragment, broken though 2.6 mm biconically drilled hole, light abrasion of surfaces and edge
	surface refuse	limestone	8.9+ x 7.2+ x 3.3	proximal fragment broken through 3.3 mm biconically drilled hole, abraded and somewhat smooth
	disturbed soil above extramural feature F.117	quartzite	30.9 x 19.0 x 7.1	irregular, flat pebble with a 3.6 mm hole that may be natural
	disturbed soil above extramural feature F.117	lignite	7.3+ x 8.5 x 3.5	proximal fragment broken through 1.2 mm biconically drilled hole, abraded and polished
	Room 1, floor	turquoise	10.0 x 10.1 x 2.8	triangular with rounded corners, partially drilled 2.2 mm hole on one surface, faces and edges smooth and lightly polished
	Room 5, floor, posthole F.256	turquoise	12.2 x 8.0 x 2.0	oval fragmented and reworked pendant, broken through first hole, redrilled and broken again, biconical holes of about 1.4 mm, faces and intact edges smooth and lightly polished

Table E.2. Attributes of stone ornaments, continued.

Category	Provenience	Material	Dimensions (mm)	Remarks
Pendant	Room 2, fill	turquoise	10.7+ x 11.4 x 4.1	fragment of distal end of oval pendant or possibly pendant blank, abraded smooth and polished
	extramural feature F.1	turquoise	11.2 x 8.8 x 2.5	oval pendant with 1.8 mm biconically drilled hole near one end, abraded smooth and polished
	Extramural Feature F.36	turquoise	8.1+ x 4.1+ x 2.1	circular fragment, faces and edges abraded smooth and lightly polished
	extramural feature F.123	turquoise	7.8+ x 5.8+ x 2.6	midsection of pendant broken through 0.8 mm biconically drilled hole, faces and one edge abraded smooth and polished
	extramural feature F.203	turquoise	8.5+ x 5.2+ x 2.1	proximal fragment, broken through hole, redrilled and broken through second hole, biconically drilled 0.6 and 0.9 holes, abraded smooth
	Extramural Feature F.419	turquoise	9.8+ x 7.8+ x 2.3	rounded corner fragment of pendant, faces and edges abraded smooth
Bead	Room 25, fill	turquoise	6.4 x 5.4 x 2.2	plano-convex bead formed from broken pendant, biconical 1.0 mm hole, abraded smooth and polished
Pendant Blank	Room 1, posthole F.221	turquoise	10.2 x 5.8 x 2.5	subrectangular with abraded and lightly polished faces, irregular lightly abraded edges
	Room 31, fill	turquoise	14.9 x 8.9 x 4.7	roughly oval with abraded and lightly polished faces, irregular lightly abraded edges
Scrap	Room 1, floor	turquoise	13.0 x 4.5 x 5.4	irregular piece with one smooth facet
	Room 33, fill	turquoise	7.0 x 3.9 x 1.3	unmodified piece
	Extramural Feature F.203	turquoise	7.5 x 5.0 x 5.6	irregular piece with three abraded smooth facets
	Extramural Feature F.203	turquoise	7.5 x 5.5 x 6.0	rectangular piece with one abraded facet
	surface refuse	turquoise	16.7 x 9.8 x 6.6	irregular piece with one abraded smooth facet

APPENDIX F

FLOTATION SAMPLES BY PROVENIENCE

Table F.1. Flotation Sample Provenience with Counts of Carbonized Seeds and Other Non-wood Items.

Provenience	volume (ml)	maiz cupule	maiz kernel	maiz leaf/stalk	common bean	common/tepary bean	cucurbit rind	gourd rind	melon loco seed	mesquite seed/exocarp	platy-opuntia seed	datil seed	dropseed seed	amaranth seed	chenopodium seed	cheno-am seed	portulaca seed	Other
Room 1, floor	1400	18	6	0	0	0	0	0	0	0	0	0	1509	699	0	0	0	645 grass stems
Room 1, floor, hearth F.204	1900	0	0	0	0	0	0	0	0	0	0	0	3852	576	0	0	72	2322 grass stems
Room 2, floor	1700	0	0	8	0	0	0	0	0	0	0	0	2	0	0	0	0	95 grass stems
Room 2, floor, hearth F.233	900	1	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	88 grass stems
Room 3, floor	1500	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22 grass stems
Room 4, floor	1400	2	0	0	0	0	1	0	0	0	0	0	5	0	0	0	0	97 grass stems, 3 unidentifiable seeds
Room 4, floor, hearth F.248	600	1	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	5 grass stems
Room 5, floor	1200	0	0	1	0	0	0	0	0	0	0	0	7	0	0	0	0	3 reed stems, 2 grass stems, 2 unidentifiable seeds
Room 6, upper floor	900	5	5	0	0	0	0	0	0	0	0	0	1420	10	0	0	0	
Room 6, lower floor	1300	0	2	0	0	0	0	0	0	0	0	0	13	12	0	0	1	11 grass stems
Room 6, lower floor, hearth F.257	1500	1	0	0	0	0	0	0	0	0	0	0	449	5	0	0	0	1 reed stems, 16 grass stems, 1 unidentifiable seed
Room 7, floor	1500	0	0	0	0	0	0	0	0	0	0	0	70	14	0	0	0	31 grass stems, 1 unidentifiable seed
Room 11, floor	1500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12 grass stems, 3 unidentifiable seeds
Room 11, floor, hearth F.305	1400	1	4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1 grass stem

Table F.1. Flotation Sample Provenience with Counts of Carbonized Seeds and Other Non-wood Items, continued.

Provenience	volume (ml)	maiz cupule	maiz kernel	maiz leaf/stalk	common bean	common/tepary bean	cucurbit rind	gourd rind	melon loco seed	mesquite seed/exocarp	platy-opuntia seed	datil seed	dropseed seed	amaranth seed	chenopodium seed	cheno-am seed	portulaca seed	Other
Room 12, floor	1500	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58 grass stems
Room 13, floor	1700	643	5564	0	0	223	0	0	0	0	0	0	1	1	0	0	0	2726 grass stems
Room 13, floor	850	0	267	0	408	3544	0	0	0	0	0	0	2	0	0	0	0	882 grass stems
Room 13, floor, hearth F.314	1000	0	4	7	0	0	0	0	0	0	0	0	4	0	0	0	0	9 grass stems, 1 unidentifiable seed
Room 15, floor	1200	0	0	0	0	0	0	1	0	175	0	0	56	1	0	0	0	48 grass stems
Room 15, floor, hearth F.325	1450	0	0	0	0	0	0	0	0	16	0	3	29	0	0	0	0	1 caltrop seed, 63 grass stems
Room 15, floor, pit F.328	1400	0	1	0	0	0	0	92	0	20	0	0	763	1	0	0	0	2 yucca leaves, 1 reed stem, 107 grass stems, 1 caltrop seed, 1 mallow seed, 3 unidentifiable seeds
Room 16, floor, hearth F.329	1400	2	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Room 17, floor	1600	0	1	6	0	3	0	0	0	0	0	0	26	1	0	0	0	1 mallow seed, 13 grass stems, 6 unidentifiable seeds
Room 17, floor, hearth F.330	1700	2	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2 grass stems
Room 18, floor, hearth F.332	800	0	0	29	0	0	0	0	0	0	0	0	19	1	0	0	0	8 grass stems
Room 18, floor, pit F.335	1400	2	0	0	0	0	0	0	0	1	0	0	3	1	0	0	1	3 grass stems
Room 19, floor	1850	84	13	0	0	0	1	0	0	0	0	5	39	0	0	0	81	20 grass stems

Table F.1. Flotation Sample Provenience with Counts of Carbonized Seeds and Other Non-wood Items, continued.

Provenience	volume (ml)	maiz cupule	maiz kernel	maiz leaf/stalk	common bean	common/tepary bean	cucurbit rind	gourd rind	melon loco seed	mesquite seed/exocarp	platy-opuntia seed	datil seed	dropseed seed	amaranth seed	chenopodium seed	cheno-am seed	portulaca seed	Other
Room 20, floor	3300	3	2	0	0	1	0	0	0	0	1	0	34	0	0	0	3	343 grass stems, 2 unidentifiable seeds
Room 20, floor, hearth F.340	700	48	3	8	0	0	0	0	0	0	0	0	17	1	0	0	0	81 grass stems
Room 21, floor	1200	13	8	0	0	0	0	0	0	4	0	0	4	1	0	0	0	1 yucca leaf, 2 grass stems, 3 unidentifiable seeds
Room 22, fill	500	18	1	0	0	0	0	0	0	3	0	0	1	2	0	0	0	12 grass stems
Room 22, fill	1400	16	8	0	0	0	0	0	0	0	0	0	2	0	0	0	0	8 grass stems
Room 25, fill	1400	66	10	4	0	22	0	0	2	19	1	0	164	11	0	0	20	2 yucca leaves, 1 grass seed, 212 grass stems, 2 unidentifiable seeds
Room 25, fill	1450	7	43	0	0	0	0	0	0	2	0	7	33	1	0	0	20	3 grass stems, 2 unidentifiable seeds
Room 25, floor	1500	6	7	0	0	0	0	0	0	2	0	0	1	1	0	0	0	11 grass stems, 2 unidentifiable seeds
Room 25, floor, hearth F.362	1800	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2 grass stems
Room 26, fill	900	14	12	1	0	0	0	0	0	0	0	0	2	1	0	0	0	11 grass stems, 6 unidentifiable seeds
Room 26, floor 1	1200	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6 grass stems, 3 unidentifiable seeds
Room 26, floor 1, hearth F.369	1300	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Room 26, floor 2, hearth F.373	1300	6	31	0	0	0	0	0	0	0	0	0	18	1	0	0	1	1 mallow seed, 19 grass stems

Table F.1. Flotation Sample Provenience with Counts of Carbonized Seeds and Other Non-wood Items, continued.

Provenience	volume (ml)	maiz cupule	maiz kernel	maiz leaf/stalk	common bean	common/tepary bean	cucurbit rind	gourd rind	melon loco seed	mesquite seed/exocarp	platy-opuntia seed	datil seed	dropseed seed	amaranth seed	chenopodium seed	cheno-am seed	portulaca seed	Other
Room 27, fill	900	3	2	1	0	0	0	0	0	1	0	0	0	0	0	0	0	7 grass stems
Room 27, floor, hearth F.374	1200	0	8	0	0	0	0	0	2	0	0	0	0	2	0	0	0	16 grass stems
Room 28, fill	1600	16	7	0	1	0	0	0	8	2	0	0	6	1	0	0	0	7 grass stems
Room 29, floor	1500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Room 29, floor, hearth F.391	1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 grass stem
Room 29, floor, hearth F.392	1700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 grass stem, 1 unidentifiable seed
Room 29, floor, pit F.389	1400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 grass stem
Room 31, fill	1700	0	1	0	0	0	0	0	0	0	0	0	0	7	0	0	3	2 grass stems, 2 unidentifiable seeds
Room 31, floor	1750	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3 grass stems, 1 unidentifiable seed
Room 33, floor, hearth F.435	1400	22	11	0	0	0	0	0	0	3	0	1	3	2	0	0	0	3 caltrop seeds, 45 grass stems, 3 unidentifiable seeds
Extramural Feature F.1	1300	19	9	0	0	0	0	0	0	0	1	0	2	1	0	1	0	1 unidentifiable seed
Extramural Feature F.2	1600	4	4	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
Extramural Feature F.3	1400	7	2	0	0	0	0	0	0	0	19	0	1	1	0	0	0	4 barrel cactus seeds, 2 grass stems, 1 unidentifiable seed
Extramural Feature F.7	1800	12	2	0	0	1	0	0	0	11	0	4	0	0	0	0	0	7 grass stems, 14 unidentifiable seeds
Extramural Feature F.7	1000	3	0	0	0	0	0	0	0	0	0	0	4	7	0	0	4	2 grass stems

Table F.1. Flotation Sample Provenience with Counts of Carbonized Seeds and Other Non-wood Items, continued.

Provenience	volume (ml)	maiz cupule	maiz kernel	maiz leaf/stalk	common bean	common/tepary bean	cucurbit rind	gourd rind	melon loco seed	mesquite seed/exocarp	platy-opuntia seed	datil seed	dropseed seed	amaranth seed	chenopodium seed	cheno-am seed	portulaca seed	Other
Extramural Feature F.9	1400	17	22	0	0	0	0	0	33	0	0	0	5	1	0	0	3	10 grass stems, 3 unidentifiable seeds
Extramural Feature F.10	1700	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1 grass stem
Extramural Feature F.11	300	54	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3 grass stems, 3 unidentifiable seeds
Extramural Feature F.12	1650	158	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1 unidentifiable seed
Extramural Feature F.14	1450	105	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2 grass stems
Extramural Feature F.16	1300	2	2	2	0	0	0	0	0	1	0	0	0	2	0	0	0	3 unidentifiable seeds
Extramural Feature F.18	1800	13	3	3	0	1	0	0	0	0	0	0	1	1	0	1	2	1 saltbush fruit, 2 grass stems
Extramural Feature F.19	1700	27	5	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Extramural Feature F.20	650	122	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4 unidentifiable seeds
Extramural Feature F.22	1400	18	12	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1 cf lechuguilla leaf tip, 31 grass stems, 9 unidentifiable seeds
Extramural Feature F.27	1300	1	1	0	0	7	0	0	4	4	21	0	1	0	0	1	2	2 grass stems, 15 unidentifiable seeds
Extramural Feature F.28	1100	7	5	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1 grass stem
Extramural Feature F.30	800	6	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
Extramural Feature F.35	1750	2	5	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1 saltbush fruit, 1 grass stem, 1 unidentifiable seed
Extramural Feature F.36	1000	76	19	0	0	3	0	0	0	0	0	0	6	1	3	0	13	26 grass stems, 1 unidentifiable seed
Extramural Feature F.38	750	6	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0	2 grass stems

Table F.1. Flotation Sample Provenience with Counts of Carbonized Seeds and Other Non-wood Items, continued.

Provenience	volume (ml)	maiz cupule	maiz kernel	maiz leaf/stalk	common bean	common/tepary bean	cucurbit rind	gourd rind	melon loco seed	mesquite seed/exocarp	platy-opuntia seed	datil seed	dropseed seed	amaranth seed	chenopodium seed	cheno-am seed	portulaca seed	Other
Extramural Feature F.40	2000	15	19	7	0	0	0	0	0	0	11	0	1	1	0	1	1	2 buffalo gourd rind, 1 peppergrass seed, 1 grass stem
Extramural Feature F.41	1650	5	11	0	0	4	0	0	0	0	0	0	1	0	0	0	0	3 grass stems, 4 unidentifiable seeds
Extramural Feature F.42	1750	11	3	2	0	0	0	0	0	4	0	0	1	0	0	0	0	3 grass stems, 1 unidentifiable seed
Extramural Feature F.45	1550	36	4	2	0	0	0	0	0	0	0	0	6	0	0	0	0	8 grass stems
Extramural Feature F.47	2000	4	6	3	0	0	0	0	0	0	0	0	2	18	0	0	1	1 sideoats grama seed, 1 caltrop seed, 10 grass stems
Extramural Feature F.47	1900	2	13	0	0	0	0	0	0	0	8	0	1	1	0	0	0	2 grass stems
Extramural Feature F.50	1550	18	14	1	0	0	0	1	0	2	1	0	2	0	0	0	1	6 grass stems
Extramural Feature F.51	2150	3	1	0	0	0	1	0	0	2	0	0	0	0	0	0	0	1 yucca leaf, 3 unidentifiable seeds
Extramural Feature F.52	1500	153	6	0	0	0	0	0	0	0	0	0	3	0	0	0	0	2 grass stems
Extramural Feature F.54	1150	2	5	0	0	0	0	0	0	4	6	0	1	14	0	0	2	4 yucca leaves, 1 yucca leaf fiber, 29 grass stems, 2 unidentifiable seeds
Extramural Feature F.55	1500	107	8	0	0	1	0	3	0	0	1	1	0	1	0	0	1	3 yucca leaves, 4 yucca leaf fibers, 2 sideoats grama seeds, 1 peppergrass seed, 9 grass stems, 14 unidentifiable seeds

Table F.1. Flotation Sample Provenience with Counts of Carbonized Seeds and Other Non-wood Items, continued.

Provenience	volume (ml)	maiz cupule	maiz kernel	maiz leaf/stalk	common bean	common/tepary bean	cucurbit rind	gourd rind	melon loco seed	mesquite seed/exocarp	platy-opuntia seed	datil seed	dropseed seed	amaranth seed	chenopodium seed	cheno-am seed	portulaca seed	Other
Extramural Feature F.56	1600	18	15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3 grass stems, 2 unidentifiable seeds
Extramural Feature F.59	1250	3	3	0	1	1	0	0	0	0	0	0	2	0	1	0	2	3 unidentifiable seeds
Extramural Feature F.60	1300	15	3	0	1	2	0	0	0	0	0	0	0	0	0	0	0	4 grass stems, 2 unidentifiable seeds
Extramural Feature F.65	1500	9	32	0	1	2	0	0	97	0	0	1	67	102	0	0	21	2 yucca leaves, 13 yucca leaf fibers, 3 cf sotol leaf, 2 saltbush fruits, 2 caltrop seeds, 26 grass stems, 30 unidentifiable seeds
Extramural Feature F.68	1500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 yucca leaf fiber, 1 grass stem
Extramural Feature F.70	1200	6	5	0	0	7	0	0	0	0	0	0	2	0	0	0	0	9 grass stems, 1 grass seed, 4 unidentifiable seeds
Extramural Feature F.77	1650	686	41	0	0	0	0	0	0	0	0	0	6	3	0	0	2	1 sunflower family seed, 1 mallow seed, 2 grass stems, 1 unidentifiable seed
Extramural Feature F.79	1600	1	6	0	0	0	0	1	0	0	0	0	0	0	0	0	2	2 spurge seeds, 1 unidentifiable seed
Extramural Feature F.80	1200	34	23	0	0	5	0	8	4	0	0	3	2	0	0	5	0	1 grass stem, 3 unidentifiable seeds
Extramural Feature F.84	1900	46	6	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1 cf mustard family seed
Extramural Feature F.85	2100	61	67	0	0	0	0	1	0	0	0	0	1	1	0	0	0	

Table F.1. Flotation Sample Provenience with Counts of Carbonized Seeds and Other Non-wood Items, continued.

Provenience	volume (ml)	maiz cupule	maiz kernel	maiz leaf/stalk	common bean	common/tepary bean	cucurbit rind	gourd rind	melon loco seed	mesquite seed/exocarp	platy-opuntia seed	datil seed	dropseed seed	amaranth seed	chenopodium seed	cheno-am seed	portulaca seed	Other
Extramural Feature F.86	1500	2	10	2	0	0	0	0	0	0	0	0	5	1	0	0	0	1 tornillo pod, 1 spurge seed, 3 grass stems, 3 unidentifiable seeds
Extramural Feature F.87	1550	11	79	0	8	55	0	0	0	0	0	0	1	1	0	0	1	17 grass stems, 5 unidentifiable seeds
Extramural Feature F.92	1400	1	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3 unidentifiable seeds
Extramural Feature F.96	1450	7	15	0	0	1	0	0	6	0	0	0	2	0	0	0	0	2 grass stems, 1 unidentifiable seed
Extramural Feature F.105	1000	13	3	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2 unidentifiable seeds
Extramural Feature F.110	2000	16	22	2	0	0	0	0	0	23	0	0	2	3	0	122	0	7 yucca leaf fibers, 1 mallow seed, 9 grass stems, 1 grass seed, 6 unidentifiable seeds
Extramural Feature F.111	1900	5	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2 grass stems, 1 unidentifiable seed
Extramural Feature F.115	2100	3	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1 mesquite pod, 1 grass stem, 1 unidentifiable seed
Extramural Feature F.117	1400	23	9	0	0	1	0	0	0	0	0	0	3	0	0	1	0	3 grass stems, 5 unidentifiable seeds
Extramural Feature F.118	1600	10	34	0	0	10	0	0	0	0	0	0	2	0	0	0	0	13 grass stems, 1 unidentifiable seed
Extramural Feature F.121	1550	35	1	0	0	0	0	0	0	3	0	0	0	0	0	0	1	4 grass seeds
Extramural Feature F.128	2600	2	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	1 cf mustard family seed
Extramural Feature F.131	1300	32	3	0	0	0	0	2	1	9	1	0	1	4	0	0	0	5 yucca leaf fibers, 13 grass stems

Table F.1. Flotation Sample Provenience with Counts of Carbonized Seeds and Other Non-wood Items, continued.

Provenience	volume (ml)	maiz cupule	maiz kernel	maiz leaf/stalk	common bean	common/tepary bean	cucurbit rind	gourd rind	melon loco seed	mesquite seed/exocarp	platy-opuntia seed	datil seed	dropseed seed	amaranth seed	chenopodium seed	cheno-am seed	portulaca seed	Other
Extramural Feature F.135	3700	44	7	0	0	0	0	0	36	0	0	0	1	1	0	0	0	3 grass stems
Extramural Feature F.136	3400	12	11	0	0	0	0	0	0	37	0	0	8	12	0	0	7	3 mesquite pods, 24 caltrop seeds, 117 mallow seeds, 11 cf violet seeds, 134 grass stems
Extramural Feature F.139	600	14	9	0	0	1	0	0	0	0	0	1	2	0	0	0	4	1 hedgehog seed, 2 grass stems
Extramural Feature F.140	1200	3	6	0	2	0	0	0	0	8	1	0	23	2	0	1	1	2 grass stems, 7 unidentifiable seeds
Extramural Feature F.148	1700	488	5	0	0	0	0	0	0	0	2	0	1	0	0	0	0	1 yucca leaf, 1 mallow seed, 4 cf ragweed seeds, 7 grass stems, 1 unidentifiable seed
Extramural Feature F.150	2050	23	6	0	0	0	0	0	0	0	0	0	1	6	0	23	9	6 grass stems
Extramural Feature F.151	1600	23	2	0	0	0	0	0	0	4	0	0	10	62	0	0	24	7 grass stems
Extramural Feature F.159	4100	266	12	0	7	0	0	0	0	3	75	3	16	9	0	0	2	1 mallow seed,1 cf crown of thorns seed, 1 reed stem, 33 grass stems, 3 grass seeds
Extramural Feature F.161	2800	12	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
Extramural Feature F.163	4300	10	2	0	0	0	0	0	0	0	0	0	0	2	0	0	1	3 grass stems, 1 grass seed, 4 unidentifiable seeds
Extramural Feature F.166	1750	5	3	0	0	0	0	0	0	3	0	0	1	0	1	0	0	1 grass stem, 1 unidentifiable seed

Table F.1. Flotation Sample Provenience with Counts of Carbonized Seeds and Other Non-wood Items, continued.

Provenience	volume (ml)	maiz cupule	maiz kernel	maiz leaf/stalk	common bean	common/tepary bean	cucurbit rind	gourd rind	melon loco seed	mesquite seed/exocarp	platy-opuntia seed	datil seed	dropseed seed	amaranth seed	chenopodium seed	cheno-am seed	portulaca seed	Other
Extramural Feature F.167	3400	9	1	0	0	0	0	0	0	4	0	0	0	0	0	0	0	2 grass stems, 2 unidentifiable seeds
Extramural Feature F.174	1500	22	4	0	1	0	0	0	0	8	0	0	6	0	0	0	1	4 grass stems, 1 unidentifiable seed
Extramural Feature F.203	1500	15	6	1	0	0	0	0	0	9	0	0	0	2	0	0	0	3 caltrop seeds, 69 grass stems
Extramural Feature F.203	2000	40	21	0	0	1	1	0	0	228	14	2	2	2	0	1	4	5 mesquite pods, 10 caltrop seeds, 55 grass stems, 1 grass seed, 5 unidentifiable seeds
Extramural Feature F.203	1600	17	11	2	0	0	0	0	0	0	0	0	0	0	0	0	1	1 hedgehog seed, 2 grass stems, 1 unidentifiable seed
Extramural Feature F.376	1000	10	1	0	0	0	0	0	0	4	0	0	1	0	0	0	0	5 grass stems
Extramural Feature F.377	950	11	6	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1 grass stem
Extramural Feature F.378	1300	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4 unidentifiable seeds
Extramural Feature F.382	2200	4	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	2 grass stems
Extramural Feature F.394	3600	41	6	2	0	1	0	0	0	15	0	0	2	1	0	0	0	5 grass stems
Extramural Feature F.429	700	1	0	0	0	163	0	0	0	0	1	0	13	0	0	0	1	4 grass stems, 3 unidentifiable seeds

Table F.2. Flotation Sample Provenience with Counts of Wood Identifications.

Provenience	mesquite	saltbush	creosotebush	cottonwood	oak	lechuguilla stalk
Room 3, floor	0	0	0	20	0	0
Room 4, floor	0	0	0	15	0	7
Room 4, floor, hearth F.248	1	0	0	2	0	13
Room 5, floor	0	0	0	20	0	0
Room 6, lower floor	16	0	0	4	0	0
Room 6, upper/lower floor, hearth F.257	2	0	0	19	0	0
Room 15, floor, pit F.328	5	0	0	0	0	7
Room 17, floor	10	0	0	0	0	0
Room 17, floor, hearth F.330	20	0	0	0	0	0
Room 18, floor, hearth F.332	24	0	0	0	0	0
Room 18, floor, pit F.335	9	0	0	0	0	1
Room 19, floor	15	0	0	0	0	0
Room 20, floor	4	0	0	0	0	6
Room 20, hearth F.340	0	0	0	1	0	9
Room 21, floor	16	0	0	0	0	0
Room 22, fill	14	1	0	0	0	0
Room 22, fill	19	1	0	0	0	2
Room 25, fill	20	0	0	0	0	0
Room 25, floor, hearth F.362	15	0	2	0	0	0
Extramural Feature F.1	15	0	5	0	0	3
Extramural Feature F.2	15	6	0	0	0	0
Extramural Feature F.3	5	3	0	0	0	0
Extramural Feature F.10	20		0	0	0	0
Extramural Feature F.12	10	5	0	0	0	0
Extramural Feature F.14	14	0	0	0	0	0
Extramural Feature F.18	11	0	0	0	0	0
Extramural Feature F.19	20	0	0	0	0	0
Extramural Feature F.20	14	0	0	0	0	0
Extramural Feature F.30	10	0	0	0	0	0
Extramural Feature F.35	11	1	0	0	0	0
Extramural Feature F.38	10	0	0	0	0	0
Extramural Feature F.40	13	0	0	0	0	0
Extramural Feature F.47	11	0	0	2	0	0
Extramural Feature F.51	11	0	0	0	0	2
Extramural Feature F.54	13	1	0	0	0	0
Extramural Feature F.55	14	0	0	0	0	0
Extramural Feature F.56	16	0	3	0	0	0
Extramural Feature F.59	12	0	0	0	0	0
Extramural Feature F.60	16	0	0	0	0	0

Table F.2. Flotation Sample Provenience with Counts of Wood Identifications, continued.

Provenience	mesquite	saltbush	creosotebush	cottonwood	oak	lechuguilla stalk
Extramural Feature F.65	11	0	4	0	0	0
Extramural Feature F.87	14	2	0	0	0	2
Extramural Feature F.105	11	1	0	0	0	0
Extramural Feature F.110	10	0	0	0	0	0
Extramural Feature F.111	12	0	0	0	0	0
Extramural Feature F.115	15	0	0	0	0	0
Extramural Feature F.117	15	2	0	0	0	0
Extramural Feature F.121	12	0	0	0	0	0
Extramural Feature F.131	11	0	0	0	0	3
Extramural Feature F.135	15	1	0	0	0	0
Extramural Feature F.136	10	0	0	0	0	0
Extramural Feature F.140	10	0	0	0	0	0
Extramural Feature F.148	19	1	0	0	0	0
Extramural Feature F.150	11	0	0	0	0	0
Extramural Feature F.159	10	7	0	0	0	0
Extramural Feature F.163	16	0	0	0	0	0
Extramural Feature F.166	18	2	0	0	1	0
Extramural Feature F.167	25	0	0	0	0	0
Extramural Feature F.203	18	0	2	0	0	0
Extramural Feature F.382	15	2	0	0	0	0
Extramural Feature F.394	13	2	0	0	0	0

APPENDIX G

FAUNAL REMAINS BY PROVENIENCE

Table G.1 Faunal Remains by Provenience.

Provenience	Aves eggshell	Aves bone	*Callipepla* sp	*Callipepla* cf *squamata*	Leporidae	*Sylvilagus* sp	*Lepus californicus*	Rodentia	*Spermophilus* cf *spilosoma*	*Dipodomys* sp	*Dipodomys ordii* or *merriami*	cf *Peromyscus* sp	*Neotoma* sp	cf *Canis* sp	*Canis latrans*	Artiodactyla	*Odocoileus* sp	small mammal	small-medium mammal	medium mammal	medium-large mammal	large mammal	Other	Total Bone
Eroded Pueblo floors							2												1	1	4			8
Room 4, fill						1													1					2
Room 5, fill																			1					1
Room 6, fill							1																	1
Room 10, fill																				1				1
Room 11, floor	10																							0
Room 13, roof fill																			2					2
Room 13, floor	1																							0
Room 14, fill																			2					2
Room 17, floor																			1					1
Room 18, fill					1																			1
Room 19, fill							3												9			1		13
Room 19, floor																			1					1
Room 20, floor, F.341							1																	1
Room 21, fill	1						3												14	5				22
Room 21, floor					2															4			1 cf *Crotaphytes collaris*	7
Room 22, fill	20			2	3	5	35						2					6	46	20				119
Room 23, fill						1	2												1	1				5
Room 24, fill													1						2					3
Room 25, fill	2	2	2	1	59	148	771	7	1	3	1	1	8	1		2	1	15	1769	273	21	18	1 Colubridae	3105

Table G.1 Faunal Remains by Provenience, continued.

Provenience	Aves eggshell	Aves bone	*Callipepla* sp	*Callipepla* cf *squamata*	Leporidae	*Sylvilagus* sp	*Lepus californicus*	Rodentia	*Spermophilus* cf *spilosoma*	*Dipodomys* sp	*Dipodomys ordii* or *merriami*	cf *Peromyscus* sp	*Neotoma* sp	cf *Canis* sp	*Canis latrans*	Artiodactyla	*Odocoileus* sp	small mammal	small-medium mammal	medium mammal	medium-large mammal	large mammal	Other	Total Bone
Room 27, fill					1	1													14	2				18
Room 27, floor																			3	1				4
Room 28, fill																	2		2	1				5
Room 29, fill																				1				1
Room 31, fill					7	4	26												302	51	11	4		405
Room 31, floor					1		1												7	13				22
Room 31, floor, F.153					1		3												14				1 Passeriformes	19
Room 31, floor, F.156							1												2					3
Room 31, floor, F.157																			3					3
Room 31, floor, F.171																			1					1
Room 33, fill																			1	3				4
Extramural Feature F.1			1		13	16	171	1		1	2		2					2	343	87	2	2	1 *Dipodomys* cf *spectabilis*	644
Extramural Feature F.2																			1					1
Extramural Feature F.6							1												1					2
Extramural Feature F.9					1		9												47	15	1			73
Extramural Feature F.11								1										1	1					3
Extramural Feature F.12																			4					4
Extramural Feature F.17																			1					1
Extramural Feature F.18																			2					2
Extramural Feature F.19							1												4		1			6

Table G.1 Faunal Remains by Provenience, continued.

Provenience	Aves eggshell	Aves bone	*Callipepla* sp	*Callipepla* cf *squamata*	Leporidae	*Sylvilagus* sp	*Lepus californicus*	Rodentia	*Spermophilus* cf *spilosoma*	*Dipodomys* sp	*Dipodomys ordii* or *merriami*	cf *Peromyscus* sp	*Neotoma* sp	cf *Canis* sp	*Canis latrans*	Artiodactyla	*Odocoileus* sp	small mammal	small-medium mammal	medium mammal	medium-large mammal	large mammal	Other	Total Bone
Extramural Feature F.20					2		17												41	14	2	5		81
Extramural Feature F.21							1												2					3
Extramural Feature F.30																					1			1
Extramural Feature F.33					1														6					7
Extramural Feature F.35							1																	1
Extramural Feature F.36					3	1	5				2							4	53	6				74
Extramural Feature F.38																			1					1
Extramural Feature F.40					1		2												3					6
Extramural Feature F.44																		1						1
Extramural Feature F.47							4													2				6
Extramural Feature F.49							1																	1
Extramural Feature F.50	240																		1					1
Extramural Feature F.52	2																							0
Extramural Feature F.54															7				2					9
Extramural Feature F.55						1	1												12	6				20
Extramural Feature F.56					1	29	149			1								1	113	48				342
Extramural Feature F.57													1											1
Extramural Feature F.59							1																	1
Extramural Feature F.60							4												8	1		1		14
Extramural Feature F.63							1												2			5		8
Extramural Feature F.65					3		16												58	25	10			112

Table G.1 Faunal Remains by Provenience, continued.

Provenience	Aves eggshell	Aves bone	*Callipepla* sp	*Callipepla* cf *squamata*	Leporidae	*Sylvilagus* sp	*Lepus californicus*	Rodentia	*Spermophilus* cf *spilosoma*	*Dipodomys* sp	*Dipodomys ordii* or *merriami*	cf *Peromyscus* sp	*Neotoma* sp	cf *Canis* sp	*Canis latrans*	Artiodactyla	*Odocoileus* sp	small mammal	small-medium mammal	medium mammal	medium-large mammal	large mammal	Other	Total Bone
Extramural Feature F.66							1												1					2
Extramural Feature F.78								1											5					6
Extramural Feature F.80							2												6					8
Extramural Feature F.81							1																	1
Extramural Feature F.82																			2					2
Extramural Feature F.87													1						4	1	1			7
Extramural Feature F.93							1												16		2			19
Extramural Feature F.94					2	2	18												63	15			1 Carnivora	101
Extramural Feature F.96					1																			1
Extramural Feature F.104																		1	3	2				6
Extramural Feature F.105					1														1		1			3
Extramural Feature F.111					1	3	1												13	3	4			25
Extramural Feature F.117							2												5		1			8
Extramural Feature F.118						1	2												20	7		1		31
Extramural Feature F.121																		1						1
Extramural Feature F.123					1	15	15											13	32	3	2			81
Extramural Feature F.125							1																	1
Extramural Feature F.127																			1		1			2
Extramural Feature F.128																		1						1
Extramural Feature F.131					3	2	10				1								91	1				108
Extramural Feature F.135					1		3												18					22

Table G.1 Faunal Remains by Provenience, continued.

Provenience	Aves eggshell	Aves bone	*Callipepla* sp.	*Callipepla* cf *squamata*	Leporidae	*Sylvilagus* sp.	*Lepus californicus*	Rodentia	*Spermophilus* cf *spilosoma*	*Dipodomys* sp.	*Dipodomys ordii* or *merriami*	cf *Peromyscus* sp.	*Neotoma* sp.	cf *Canis* sp.	*Canis latrans*	Artiodactyla	*Odocoileus* sp.	small mammal	small-medium mammal	medium mammal	medium-large mammal	large mammal	Other	Total Bone
Extramural Feature F.136																		1	2					3
Extramural Feature F.139		2					7												10	4	2			25
Extramural Feature F.140					2	6	13												85	14				120
Extramural Feature F.150						1	6												73	2				82
Extramural Feature F.159																			1					1
Extramural Feature F.163							2												11	1				14
Extramural Feature F.174							1												7	1	7			16
Extramural Feature F.203	2				21	40	158	1	1		2					1		21	455	47			1 *Spermophilus* sp	748
Extramural Feature F.382	1						1																	1
Extramural Feature F.395							1																	1
Surface Refuse					2	9	29						1					2	95	30	11		1 *Terrapene ornata*	180
Total	279	4	3	3	135	286	1509	11	2	5	8	1	16	1	7	3	3	70	3925	712	85	37	7	6833