NewsMAC

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Current Research on the Archaic in New Mexico

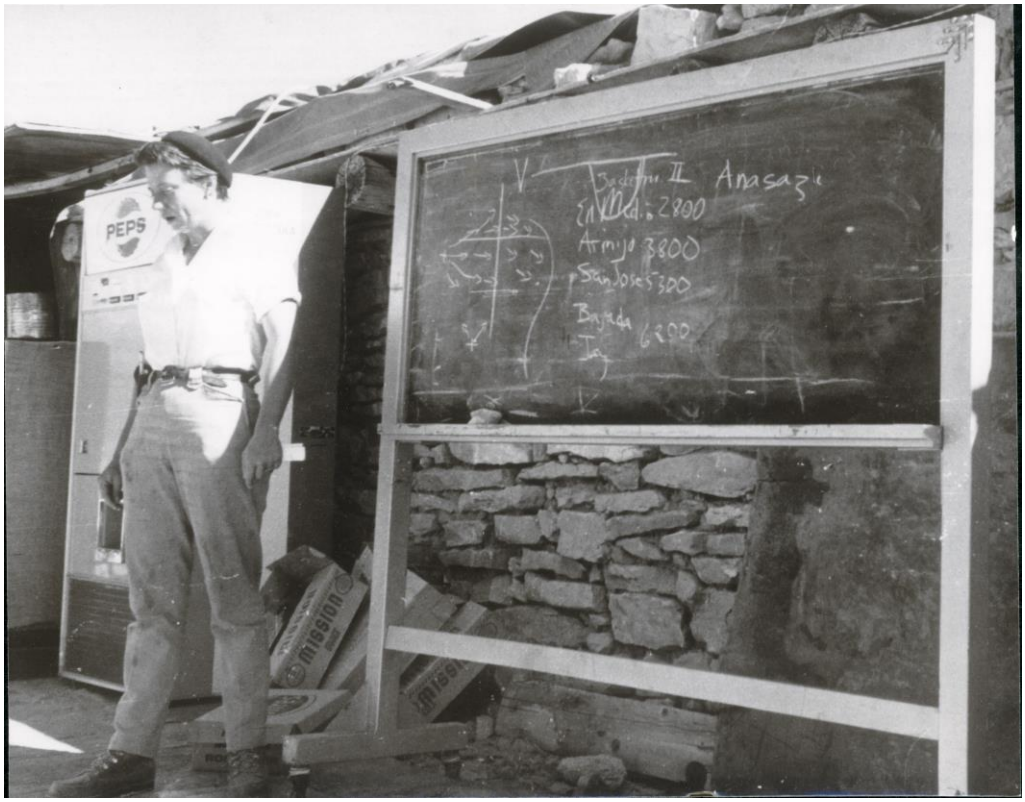
Contents

INTRODUCTION

Bradley Vierra, Editor
Statistical Research Inc.

The topic of this issue of NewsMac is current research on the Archaic in New Mexico. There can be no discussion of the topic without mentioning the seminal work of Dr. Cynthia Irwin-Williams and the Anasazi Origins Project. The Anasazi Origins Project was initiated by Cynthia as part of a long-term research program to identify the Archaic hunting and gathering predecessors of Pueblo culture. This work was conducted in the Arroyo Cuervo area located northwest of Albuquerque, New Mexico. The field work for the original Anasazi Origins Project (AOP I) began during the summer of 1966 and was completed by the summer of 1971. The work conducted during the summers of 1970 and 1971 also included long range surveys into the adjacent Puerco River Valley. Excavations were carried out at about 18 major archaeological sites, consisting of both open air and rockshelters: Armijo Shelter, Casa Redondo, Collier Dune, Cuervo Shelter, Dunas Altas, En Medio Shelter, Mosca Dunes, Mud Lump, Ojito Dune, Ojito Shelter, Sandoval Springs, Shelten's Shelter, Sky Village, Tompsett Shelter and Westover Shelter. All of these sites were located in the Arroyo Cuervo area; however, work was also conducted at the Moquino and Jackpile sites located near Laguna, New Mexico, and some limited testing with the analysis of previously collected materials from the La Bajada site near Cochiti, New Mexico. Besides the excavations, a number of sites were tested and surveyed with archaeological materials also being collected from various locales in the Arroyo Cuervo area. A second field campaign was conducted during the summers of 1982 to 1986. This is referred to as the AOP II project. Most of the work consisted of archaeological survey and infield collections, with a limited amount of excavation and some new documentation of the earlier AOP I sites. All the collections are currently curated at Eastern New Mexico University.

Editor's note: Please save your money for a new edited book on the Southwest Archaic due out next year from the University of Utah Press.



Dr. Cynthia Irwin-Williams at the Armjo Shelter Field Camp in 1967.

REFLECTIONS ON CYNTHIA IRWIN-WILLIAMS
AND THE ANASAZI ORIGINS PROJECT

Patrick Beckett, COAS Publishing
Karen Adams, Crow Canyon Archaeological Center
Rex Adams, Laboratory of Tree-Ring Research, retired

All of the authors were involved in various positions, years, and sites during Cynthia Irwin -Williams (CIW) Anasazi Origins Project (AOP I). The AOP I was to identify and sequence the Archaic through to the early development of the Anasazi culture in the Arroyo Cuervo region northwest of Albuquerque, New Mexico. Although CIW conducted some survey work in the Arroyo Cuervo region as early as 1964, major archaeological work did not begin in the region until the summer of 1966 with excavations at En Medio and Armijo rock shelters. This resulted in her 1968 publication with S. Tomkins, "Excavations at En Medio Shelter, New Mexico."

The 1966 and 1967 summer surveys and excavations at the Armijo and Shelton shelters, Sandoval Springs, Collier Dunes, Mud Lump, Querencia Cliff, Ojito Dunes, and Dunas Altas sites, along with the excavations of the La Bajada site 45 miles north of the Arroyo Cuervo region. These surveys and excavations resulted in approximately 450 sites located and an archaeological continuum from 5,000 B.C. to the early known Anasazi culture in the Arroyo Cuervo region. All of these activities were carried on from her Armijo campsite with the exception of the La Bajada excavation which was supplied from Armijo.

The 1967 season started out with the construction of a kitchen with a cement floor and wooden frame built by Pat Beckett, who had arrived early to wire the camp, along with the camp cook, Floyd Westover. The cement was poured by hand on the bare top of the mesa where CIW had her 1966 knapping area, new cement covering this activity. The wooden enclosure with tables served as the meal area and a location for CIW's talks to the staff and students on the area's Oshara Tradition (see above photo)

By the summer of 1967, the Armijo base camp had grown to a summer tent city with about 100 students mostly from east coast universities, a large Army surplus generator, which supplied electricity to the stone lab, the cook-shack refrigerators, and each wood-floor eight-person tent with a low wattage light bulb.

Each morning the crew would be fed and they could prepare their lunch which was mostly peanut butter and jelly sandwiches, in addition if you were lucky thick slabs of baloney. Floyd, the cook for all those years, was an old Army cook. The young ladies would go in and try to impress and induce culture to this old man. When they found out that he could recite the end of the poem to them, it soon ended. Floyd the old cowboy cook held a master's degree in geology from the University of Wyoming. You never played penny ante poker with him; if he lost, you got chicken necks for dinner. Each day was between 10-12 hours in the field at the various sites.

1967 was the installation of two Pepsi soda machines, sodas were 25 cents. CIW did not want Pepsi to fill the machines as they wanted their drivers to service them. CIW had them deliver the first machine through Rio Rancho roads (only two model homes then) and associated arroyos and locked gates and where the hidden keys were (approx. 30 miles of dirt or no roads). Pat and CIW then went back to Pepsi for the delivery of a second machine and the manager said they would deliver the machine if we would escort the driver out to the site and

back and then asked if we could fill them as needed and handed us the keys.

After delivery CIW asked: "Pat could you fix this second machine to take fifty cents?" I said it was just a matter of flipping the dip switches until you found the right combination. Once the combination was found, CIW said to put Coors in the Mountain Dew bin, Schlitz in the root beer bin etc. An "Out of Order" sign was then placed on the machine as the site was on Governor King's land and no booze was allowed. It wasn't long before all the vaqueros working on the ranch and the ranch foreman knew of the Pepsi machines and each evening they would arrive to drink beer with the field crew. You could see the ranch road for several miles from Armijo so if someone spotted a King vehicle, a mad dash was made around camp to pick up the beer cans.

CIW's former students, colleagues, and friends always remember her Bastille Day parties every July 14 (the beginning of the French Revolution and a National French holiday), which she had celebrated when she excavated sites as a student in France. Colleagues and friends would start arriving early in the day and into the early evening, for supper and drinking. Besides beer, there was a drink called Clang Juice: 1/3 pineapple juice; 1/3 grapefruit juice; 1/3 190 proof grain alcohol. Why Clang Juice? Three drinks and you "clanged" to the ground. Occasionally people would be fished out of the fire pit or the pond.

In 1968 work continued on a number of sites from the year before. In addition, new sites Dunas Altas (1968), next to the Armijo camp, and the Moquino (1968) and Jackpile (1969) sites, north of the Laguna Reservation, were started. Additional sites in 1968 and 1969 included Sky village, Casa Redondo, Mosca Dunes and the Thompsett, Westover and Shelten's shelters. The work continued on the excavation sites through the summer of 1969, with the addition of the Fresnal Shelter site in 1969 being excavated west of High Rolls, NM in south central NM.

Work in the following years continued west into the Rio Puerco valley (AOP II) where a number of Anasazi sites were surveyed, tested and some later excavated in her Puerco River Project, thus essentially ending CIW's archaic excavations, but not her love for the Archaic.

CIW had great success in obtaining grants from national organizations such as the National Science Foundation, National Institute of Health, National Endowment for the Humanities and the National Geographic Society. It was also amazing at the large number of small local organizations that would donate small grants, supplies, etc., for her projects. She was indeed a great multitasker running a large number of sites at the same time, giving national and local lectures and fulfilling her reports for the various granting organizations.

She was unique in her innovation in the field by using natural and arbitrary levels within natural levels, consistent use of the metric, and the use of the Mexican water line level (brought from her work at Valsequillo) for critical measurements of true levels, etc.

CIW had a true loyalty to her students and they generally returned that loyalty many fold. She and her staffs trained literally hundreds of students most of which either went on in the field or became successful leaders in other fields. Her archaic Oshara Tradition and other work have generally held the test of time.

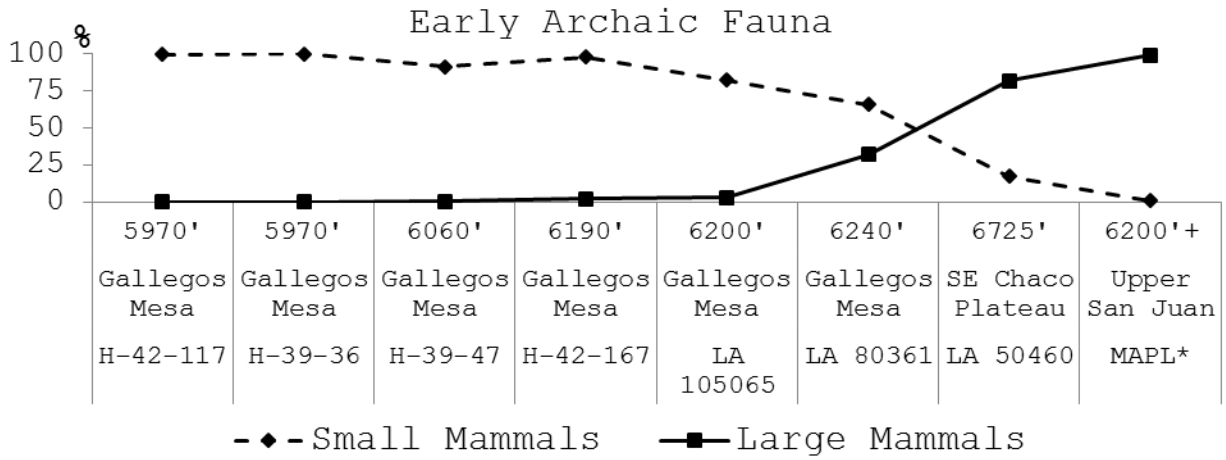
EARLY ARCHAIC SUBSISTENCE IN THE SAN JUAN BASIN

Timothy Kearns
Woods Canyon Archaeological Consultants

Irwin-Williams (1973:17) noted that the subsistence strategy of the Early Archaic of northwest New Mexico was based on extensive mixed foraging and hunting. A recent effort to address this broad generalization and quantify the subsistence base of the Early Archaic period in the San Juan Basin met with limited success. Early Archaic subsistence included a mix of large and small game and gathered seed resources. Despite the large stemmed projectile points that characterize the Jay and Bajada phases, hunters generally took more cottontails, jackrabbits, and rodents than deer and antelope. This varied depending on location and early hunters differentially targeted small mammals over artiodactyls or artiodactyls over small mammals. A sample of 10 sites with sufficient numbers of faunal elements (Figure 1) indicates that prey selection was largely dictated by elevation and vegetation. Small mammals (lagomorphs and rodents) were targeted in the lower elevation central basin grasslands, most likely coincident with the warm season seed harvest. Large mammals (artiodactyls) were most often taken in the higher elevation pinyon-juniper woodland and sage steppe settings, probably by hunters from fall-winter camps. This was not static; a mix of small and large mammals was taken at LA 80361 in the grasslands of Gallegos Mesa (Ayers and Sanderfur 1998) suggesting that hunting strategies and prey selection were likely situational and varied with seasonal and episodic availability of prey species.

The vegetal component of the Early Archaic diet is poorly documented in the basin where macrobotanical remains are rare at Early and Middle Archaic sites and coprolites are nonexistent. Only four charred seed taxa, *Chenopodium* sp., Cheno-am, *Portulaca* sp., and *Juniperus* sp., were recovered from 51 flotation samples from nine Early Archaic sites (Figure 2). The weedy annuals dominate the assemblage and the juniper seeds may have been a food resource or incidental additions from burned structures or fuel. Grasses are conspicuous in their absence, particularly in the 28 samples from the central basin. Preservation likely accounts for the scant seed remains, not aboriginal plant use. Milling equipment is present in Early Archaic assemblages by ca. 8410±220 B.P. and commonly occurs in later contexts (Anderson et al. 1984; Ayers and Sandefur 1998; McClellan et al. 1983; Marshall 2000; Stirniman 2003; Wiens 1994; Zamora 2000). On Gallegos Mesa, milling equipment was present in 72.7 percent of the Jay phase assemblages (Vogler 1993:133).

Despite years of excavation, specific data relevant to Early Archaic subsistence practices in the San Juan Basin remain elusive. Preservation is undoubtedly an issue. More intensive sampling of potential early contexts and collection of larger flotation samples may enrich the botanical data. The faunal assemblages are dominated by indeterminate bone specimens and while more rigorous analysis may bolster the number of identified species, larger samples from additional sites are clearly necessary.



*Mid-America Pipeline Loop: LA 27092, LA 79076, LA 80320.

Figure 1. Proportion of small and large mammals in Early Archaic assemblages, San Juan Basin. From Anderson et al. (1984); Ayers and Sandefur (1998); Marshall (2000); McCellan et al. (1983); Stirniman et al. (2003).

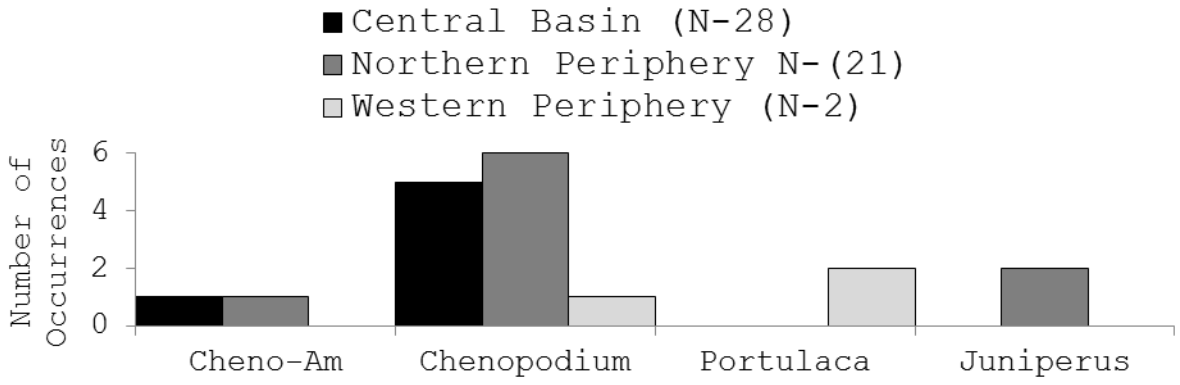


Figure 2. Occurrence of charred seed taxa in Early Archaic flotation samples, San Juan Basin region. From Eckman et al. (2001); McClellan et al. (1983); Marshall (2000); Matthews 1999); Reed (1999); Stirniman et al (2003).

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THE HILLTOP BISON SITE (LA 172328): A MIDDLE ARCHAIC BISON PROCESSING SITE IN THE SAN JUAN BASIN

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Introduction

LA 172328, the Hilltop Bison Site, is a multicomponent Middle to Late Archaic period site located roughly 12 miles south of Bloomfield, NM in the vicinity of the area locally known as Hilltop in San Juan County, New Mexico. The site was recorded as a new discovery in October 2011 by archaeologists from the University of New Mexico, Office of Contract Archaeology (OCA) during the pedestrian survey phase of the MAPL WEP III pipeline project (Gerow and Mattson 2013). Excavations at LA 172328 occurred in response to potential impacts from the proposed pipeline construction and were conducted by OCA in August-September 2013. OCA identified two pit structures, a large extramural cluster of 15 hearths, and an animal processing activity area that consisted of a single hearth associated with the remains of multiple individual Bison (*Bison bison*). Radiocarbon assays suggest that the site dates between 3550-4150 BP. The initial site recording identified a low density surface lithic scatter with 65 flakes, and a basal fragment from a San Rafael type projectile point.

Geological Setting

The area is a high point topographically, with 360 degree views for miles. The site is situated on a rounded ridge which extends southwest to northeast as a linear formation. Located on the mesa above the west fork of Kutz Canyon, the structural component of the landform is a remnant uplift of both the San Jose and the Nacimiento Formations (Manley, Kim, Scott and Wobus USGS 1987). The San Jose Formation, located above the Nacimiento Formation, is heavily eroded in the San Juan Basin and, at the site location, is decomposed, eroded and mostly gone. Portions of the San Jose Formation are witnessed on the upper reaches of Angel Peak, five miles to the east, and of Huerfano Mountain 10 miles to the south.

The landform is located in the northeast periphery of the Chaco dune field. The Chaco dune field deposits identified by Wells (et al 1990), and summarized by Forman (et al 2001), result from three episodes of depositional activity over the past 20 thousand years. These episodes account for the three aeolian stratigraphic units.; Qe1 was deposited upon Late Pleistocene alluvium before 12 thousand years ago (ka), and exhibits a well-developed paleosol in cross-section; Qe2, between 5.6 and 2.8 ka, was deposited on the Qe1 pedogenic surface and exhibits a weak soil development horizon and a diffused interface with the overlying depositional episode.; Qe3 was deposited from 1.9 ka to present (Wells et al 1990: 528,531).

At the site, the interface between the overlying aeolian deposits of the Chaco dune field and the decomposed bedrock was roughly one meter below the existing ground surface. The cultural deposit is located at 35-55 cmbs and contained nearly 90% of recovered cultural materials and is likely situated in the Qe2 aeolian depositional unit identified by Wells (et al 1990). The degree of compaction and structural stability in this deposit suggest pedogenesis and, thus, some degree of environmental stability at that time. The charcoal in this deposit was very finely broken down to the consistency of silt sediment, which may contribute to the interlocking of sand grains and the compaction of the sediment, however, the same degree of compaction was recognizable in excavation units containing less charcoal. Moreover, a slight reddish oxidization of the sediment is noticeable in this

deposit across the site, specifically in areas with less charcoal content, and is considered the likely indicator for a previous stabilized surface with weak soil development.

Paleo-Environment

The paleo-environmental analysis of pollen from woodrat middens in Chaco Canyon by Betancourt and Van Devender (1981), combined with Hall's (1977) analysis of the alluvial pollen record, point to a semiarid climate of desert shrub grassland with scattered concentrations of pinyon and juniper woodlands throughout the Holocene period in the San Juan Basin (Hall 1988). This is supported, in part, by the ongoing macro-botanical analysis done by Pam McBride of samples collected at LA 172328 where juniper seeds, sage, and goosefoot were identified.

Excavation, Site Structure and Artifact Assemblages

To mitigate the impacts to the site, the width of the MAPL WEPL III pipeline construction corridor was constricted as it passed through the site boundaries. The result was a ~55 foot- wide corridor that required subsurface testing for buried culture resources. The excavations uncovered two pit structures, an associated extramural area with a cluster of 15 hearths and an associated animal processing activity area. The first pit structure, Pit Structure 1, was almost circular in shape and measured 3.5 x 4 meters, and contained a total of 10 sub floor intramural features, 6 hearths and 4 storage pits. The structure was in good condition providing clear resolution of the residual footprint. In addition, seven postholes were identified circling the structure at the interface between cultural fill and native sediments. The spacing of the postholes was in near-even intervals with a single gap located on the east side of the structure, possibly indicating an entrance. Artifacts located inside the structure that help define the occupational surface consisted of a basin metate with a one-hand mano set in the basin and numerous expedient flake tools. No diagnostic projectile types were recovered from the interior boundaries of the structure. However, a hearth (Feature 15), located along the southern interior edge of the structure footprint, had an Armijo Stemmed type projectile point in association, but the projectile point was found 50 centimeters south of and outside the structure boundary. The radiocarbon assay of materials from this hearth suggests a date of 3555 -3385 BP, which is contemporary with the Armijo type projectile point (Irwin-Williams 1973), but brings into question whether the hearth is an intrusive feature in the structure. Additional materials from sub-floor hearths in the structure are currently being processed and will likely clarify the suggested time of occupation.

The second pit structure, located 12 meters north of Pit Structure 1, was poorly defined, measured 4 x 3.6 meters, and contained two sub-floor hearth features. No date is available for Pit Structure 2 at this time.

The extramural area, consisting of a cluster of 15 hearths, was located slightly to the east, but evenly spaced between the two structures. A large quantity of fire-cracked rock was located throughout the area between the structures. The hearths consisted of basin types, at times overlapping, covering an area measuring roughly 4.5 meters in diameter. Radiocarbon assays of macro-botanical remains from the hearths returned a date range of 4150-3980 BP suggesting a Middle Archaic period occupation. Artifacts found in direct association with the hearths consisted of San Rafael and Sudden Side Notch type projectile points (Holmer 1978, 1980).

The faunal processing activity area was located five meters east of Pit Structure 1. The area measured roughly 3 x 3 meters and a single hearth was the central component. Tools associated with the faunal processing area consisted of a single large bidirectional core, possibly for producing expedient flake tools, flat tabular sandstone fragments (anvil/netherstones), and alluvial cobbles (manuports) that were located in direct association with split, fractured long bones, and are considered to be tools utilized in the processing of the animals.

Ultimately, an assemblage of 21 projectile points and point fragments, 7,532 pieces of debitage, 45 bifaces, 14 unifaces, 66 flake tools, 130 groundstone artifacts and fragments, 8 manuports, 10 core tools and 35 cores were recovered. Only six of the projectile points had sufficient remaining attributes to be considered diagnostic and these consist of two Armijo Stemmed types that were recovered from the upper elevations of the cultural

deposit and two Sudden Side Notch types and two San Rafael types that were recovered in association with the cluster of 15 hearths at the lowest depth of the cultural deposit.

The groundstone tools at the site consist of basin metates and expedient one-hand manos, both common Archaic technologies used in the processing of resources. The flaked stone tools were manufactured mostly from locally available silicified wood and quartzite and the only non-local or exotic toolstones were Jemez Mountain obsidians (Shackley 2014) recovered from the upper elevations of the cultural deposit associated with the Armijo component.

Faunal Assemblage

Although the faunal analysis is ongoing, some general inferences are possible. The taxa represented at this site include dog/coyote, deer, gopher, jackrabbit, cottontail and bison. The largest contributors to the ca. 10,300 bone fragments are those identified as very large mammal/large ungulate/*Bison bison*. These groups of identified remains are almost certainly all associated with *Bison bison*, for which at least three adult individuals are represented. Limb elements comprise the majority of the remains from this group, including phalanges and all of the larger long bone elements. Also present, but in substantially smaller quantities are fragments of the innominate, ribs, vertebrae, and skull. Past zooarchaeological analyses in the San Juan Basin have only noted trace amounts of bison in the archaeological record, mainly from sites in the Chaco area such as Atlatl Cave (Gillespie 1982), Sheep Camp Shelter (Gillespie 1984), and Ashislepah Shelter (Simmons 1984). Akins (1985) also summarized the appearance of bison from Ancestral Puebloan sites, noting that bison were noted at six sites, again all in very small quantities.
The faunal remains exhibited multiple methods of processing. Several cut marks are present, although the degree of surface erosion has obliterated most of the evidence for cut marks on these remains. Hard-hammer percussion marks, which leave more substantial marks, are observed on numerous long bone fragments. The presence of these percussion marks suggests that the long bones were processed for marrow extraction and possibly for rendering bone grease from the shaft fragments. Given the relative abundance of appendicular elements relative to axial elements, one possible interpretation is that the portions with the highest utility in terms of meat, yellow marrow, and grease yields were transported to the site. Under this classic interpretation, limb portions were removed from the carcass and transported to the site for further processing while the remaining bones from the carcass were left behind at the butchering site. Foot elements, such as carpals and phalanges, are present as "rider" elements attached to and transported as part of packages with higher utility elements, such as tibiae and femora. Conversely, those portions could have been processed at a different location on site but not within the excavation corridor.

Lithic Diagnostic Artifacts

The Armijo projectile point type is a Late Archaic period, Oshara Tradition set of types defined by Irwin-Williams (1973) and placed in a temporal range from approximately 3800 – 2800 BP. Variants of this set of types are broadly distributed in northern New Mexico (which includes the San Juan Basin). The Sudden Side Notch and San Rafael types were defined by Holmer (1978, 1980) at Sudden Shelter in central Utah. The San Rafael types from Sudden Shelter were located in Strata 15 and 16 bracketed by date ranges of 4425 BP – 3535 BP, and the Sudden Side Notch types were located in Strata 7, 9, 13 and 14 bracketed by date ranges of 6310 BP – 4670 BP (Holmer 1980: 21, table 1).

In New Mexico, Sudden Side Notch and San Rafael type projectile points have been documented geographically across the northern part of the state and as far south as Mt. Taylor. They have been found with San Jose types of the Oshara Tradition, in the northern Rio Grande Valley (see Vierra 2013: 149-150), and in the San Juan Basin (Elyea and Hogan 1993). Although dated contexts containing the Sudden and San Rafael types are not common in New Mexico, they were found at the Moquino Site, near Mt Taylor, NM, from the 4a Zone deposits which dated to 3920 BP (Beckett 1997: 14) and in the San Juan Basin from site LA 16197 where they were found in deposits with a hearth that dated to 4045 BP (Elyea and Hogan 1993). At the Moquino Site, Beckett (1997) specifically notes the absence of Oshara types from the 4a Zone deposits at the Moquino Site,

NM and points out, in contrast, that the Sudden and San Rafael types were associated with Cochise types found in southern New Mexico and southeast Arizona. The stratified cultural deposits in Sudden Shelter contain associated diagnostic types related to the Great Basin (Holmer 1980), the Colorado Plateau and Colorado Mountains (Black 1991), and the Northern Great Plains (Frison et al 1976), however, the Oshara Tradition types are absent from that assemblage.

The Hilltop Bison Site offers a unique opportunity for research into the transitional period of the Middle –Late Archaic in the San Juan Basin. The suggested site occupations during the Middle Archaic and Late Archaic periods compare favorably with previously dated sites in the region and are due, we suggest, to the presence of a stable environment that supported local populations of large mammals such as Bison. The well-preserved faunal remains and the intact site features contribute significantly to existing regional data and knowledge about subsistence strategies for this time period. Furthermore, the presence of a large bison faunal assemblage provides concrete evidence that the San Juan Basin was able to sustain a bison population during the Middle—Late Archaic transitional period. The presence of the Sudden Side Notch and San Rafael projectile point types suggests different approaches to hunting technology, adaptations for hunting bison, different cultural populations, or a combination of the three (Figure 1). Our research is ongoing.

Figure 1. Projectile Points.

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DESPERATION RANCH: THE CAVE CREEK MIDDEN SITE REVISITED

Jesse Ballinger, Statistical Research Inc.
Jonathan Mabry, City of Tucson Historic Preservation Office

In cooperation with archaeologists from the Coronado National Forest and students at the University of Arizona, in late September the Arizona Archaeological and Historical Society (AAHS) undertook excavations at the Cave Creek Midden site at Desperation Ranch in southeastern Arizona. Located on a privately-owned property adjacent to Coronado National Forest, the site was first excavated by E.B. "Ted" Sayles and Ernst Antevs in 1936 and is the type site for the Chiricahua Stage of the Cochise Culture (Sayles and Antevs 1941). AAHS seeks to radiocarbon date the archaeological deposits and reinterpret the site stratigraphy and paleoenvironmental background using contemporary methods. Project Research Directors include Dr. Mary Prasciunas (Westland Resources/AAHS), Dr. Michael Diehl (Desert Archaeology/AAHS), and William Gillespie (Coronado National Forest/AAHS).

The efficacy of renewed investigations at archaeological type sites is firmly established (Meltzer 2006; Waters 1986; Wills 1986). Few projects can promise to make substantial contributions to our knowledge of prehistory more so than reinvestigations of those select few sites that steered the earliest concepts about it. The Middle Archaic is among the least understood and vitally important time periods in the prehistory of the American Southwest because it encompasses the apparent human recolonization of the desert borderlands underway by 4000 B.C., followed by the introduction of agriculture no later than about 2100 B.C. (Merrill et al. 2009), developments that set the stage for complex societies in southwestern North America.

Archaeological, radiocarbon, and stratigraphic information from Desperation Ranch will provide important new details about the cultural, technological, and paleoenvironmental conditions that accompanied those developments. Questions developed to guide work at the site include: 1) what is the area, sequence, character, age, and completeness of archaeological deposits at the site; 2) does pre-2100 B.C. evidence of maize

exist at the site; 3) how do the stratigraphy, pollens, and fauna inform us about paleoenvironments at the site; and 4) do older cultural or paleoenvironmental deposits exist at the site? Notably, 1936 excavations discovered an impact-fractured Clovis point in the lowest archaeological stratum (Sayles and Antevs 1941).

The September session of fieldwork exposed a thick sequence of well-developed cienega soils overlying high-energy alluvium. A dense concentration of fire-cracked rock, formal ground stone tools, and flaked stone tools were encountered at the approximate depth where Sayles and Antevs identified the "midden" (Figure 1). Trench walls did not reveal pit features within or below the black cienega clays. Rather, the orientation of a number of bison elements associated with the stone artifacts indicate that they accumulated on an activity surface that witnessed the processing of both plants and big game. A single, poorly-made dart point was associated with the bison. The amount of time represented in the archaeological sequence is not yet known, but bone preservation may permit radiocarbon dating. Volunteers also spent a segment of the September field session surveying the site area, a significant portion of which extends into the Coronado National Forest. Projectile points from the site surface include Chiricahua, San Pedro, and a wide varietyof other Archaic and Formative types.

AAHS recognizes financial and in-kind support from Tony and Rene Donaldson; Dan and Cathy Arnit; Jaye, Eldon, and Jean Smith; Katherine Cerino; David Mehalic, Friends of Cave Creek Canyon; Arizona State Museum; Coronado National Forest; University of Arizona Argonaut Archaeological Research Fund (AARF); University of Arizona Accelerator Mass Spectrometry (AMS) Lab; University of Arizona Bureau of Applied Research in Anthropology (BARA); Archaeology Southwest; Desert Archaeology, Inc.; Westland Resources, Inc.; and Statistical Research, Inc.

Figure 1. Stone artifacts and bison bone exposed in stratigraphic trench at Desperation Ranch.

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Editor's Note: Yep, I snuck in this article from across the AZ/NM border.

THE MIDDLE ARCHAIC IN THE BOOT HEEL REGION OF NEW MEXICO

Chris Turnbow
Gas Company of New Mexico

The Boot Heel region of southwestern New Mexico is well known for its large late Quaternary lakes of Animas, Playas, and Cloverdale as well as the Hatchita (Los Moscos) lake just to the east in Mexico. Geomorphic investigations indicate the lakes had high stands ranging from 65 to 250 km^2 during the last glacial maximum around 18,000 to 20,000 BP; however, lower stands are recognized from 5000 to after 1000 BP. These lakes formed beaches, sand and gravel spits, and deltas. Krider (1998:283) recorded four separate stands at Lake Cloverdale. Its highstand occurred during the last glacial maximum. Three lower stands were estimated to occur between 5000 and 2000 BP, around 1000 BP, and after 1000 BP. Van Devender and Wiseman's (1977:20) faunal data from Howell's Ridge Cave also suggest the presence of Lake Playas around 4500, 3000, and 1100 to 500 BP.

Questions of how changes in these water bodies affected Archaic populations of the region were the focus of several investigations in the Boot Heel (Formby 1986; Kurota and Cohen 2010; Turnbow et al. 2008). In general, quantitative survey data indicate that while Paleoindian and Early Archaic occupations were rare, there was a dramatic increase in the number and intensity of components during the Middle Archaic (5500 to 3500

BP) followed by a decline during the Late Archaic (3500 to 1800 BP). The rise the Middle Archaic closely correlates with identified lake stands dating between 5000 and 3000 BP.

Middle Archaic components in the Boot Heel are principally recognized by morphological diverse forms collectively classified as Pinto/San Jose (5900 to 3500 BP in the Southwest) (Justice 2002:133; Loendorf and Rice 2004:24-27) (Figure 1). Other Middle Archaic point types identified in the project area include Chiricahua (4800 and 2200 BP), Gypsum Cave (4400-2100 BP) (Figure 3), and Cortaro (4500-4000 BP) (Huckell 1995:139, 1996; Lorentzen 1998:144; Mabry and Faught 1998:79).

Concentrations of Middle Archaic projectile points are located on the margins of the Quaternary lakes. Fromby (1986:102) reported the collection of 447 Pinto/San Jose and 69 Gypsum points in southwestern New Mexico. The greatest concentrations of these points occurred around Lake Animas and Lake Playas with smaller numbers found in scattered sites of 300 m^2 or less in the deserts and mountainous areas of the region.

Similar results were documented by the University of New Mexico's Office of Contract Archeology (OCA) during more recent and systematic surveys of roads and US-Mexico border fences in the Boot Heel (Kurota and Cohen 2010; Turnbow et al. 2008). Of the Native sites with diagnostic artifacts recorded during the survey, 60% were interpreted as Archaic in age. With the loss of diagnostic artifacts from collecting over the years, that number is likely low. Of those, 13 of the 31 Middle Archaic sites (but 31 of the 64 points) were clustered around the margins of the late Quaternary lakes, now expansive grass-covered playas (Figures 2 and 3). Moreover, surveyed space around the lakes represented only a small percentage of the overall project.

Following the introduction of maize into the Southwest by 4100 BP, farming was integrated into the economic base with substantial farming settlements known just beyond the Boot Heel by 3250 BP (Roney and Hard 2004). Although similar sites have not yet been confirmed in the Boot Heel, coring of an Animas Creek cienega near the Gray Ranch produced corn pollen associated with a radiocarbon date of 3400 BP (Fish et al. 2006:26). There is also a potential that the largest and most intensively occupied of the Middle Archaic sites, ideally located near lake deltas, were involved in early farming activities.

Late Archaic/Early Agricultural period components in the Boot Heel were recognized by stemmed and corner-notched projectile points that conform to the San Pedro (3200-1350 BP) and Cienega (1800-1350 BP) projectile point styles. In contrast to the Middle Archaic, only 25 Late Archaic projectile points, occurring on 21 sites, were observed during the recent surveys. Lake side Late Archaic sites represent less than half of those dating to the Middle Archaic. Most are characterized by low tool diversity. Some contain fire-cracked rock filled pits. Although two found along the lake beds may be candidates for farming settlements, the general appearance of Late Archaic occupations is suggestive of short term use.

Changes in the number and intensity of Middle to Late Archaic occupations in the Boot Heel may have been in response to periods of effective precipitation and the creation of sizeable, persistent lakes. Data from the surveys revealed Middle Archaic populations established their largest and most permanent sites along the edge of the Quaternary lakes. Given the adequate moisture and good alluvial fans extending into the lakes, later Middle Archaic groups may have been involved in early farming. Smaller camps typically lie beyond the immediate vicinity of the lakes. Characterized by reduced tool diversity, they are assumed to represent short term occupations. By the Late Archaic, however, occupations around the lakes seem to have diminished and the overall numbers of sites in the Boot Heel may have also declined even though rather permanent lake stands are assumed to have existed sporadically during the period.

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Please contact the author for a full list of references.

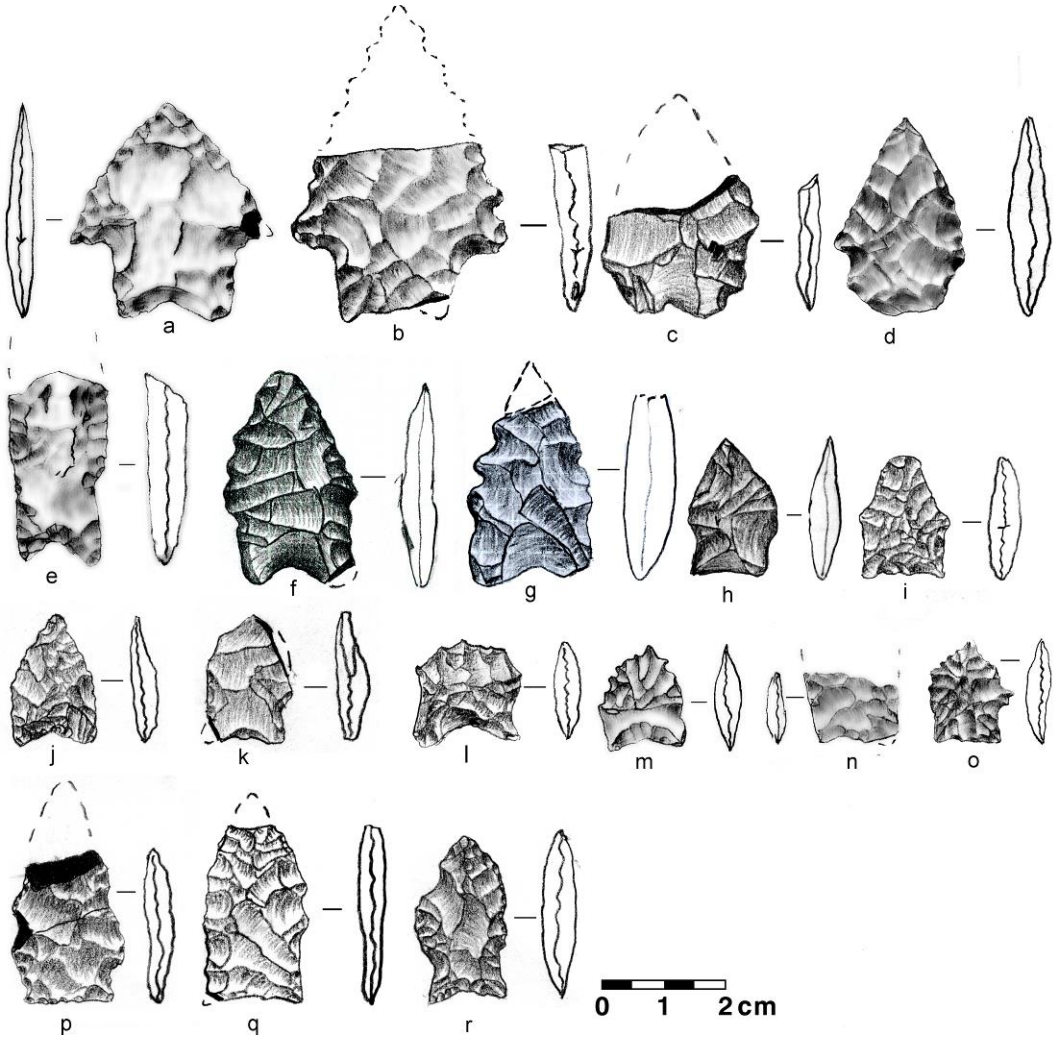

Figure 1: Pinto/San Jose points recorded by OCA surveys in the Boot Heel (Kurota and Cohen 2010; Turnbow et al. 2008). Drawn by Alex Kurota.

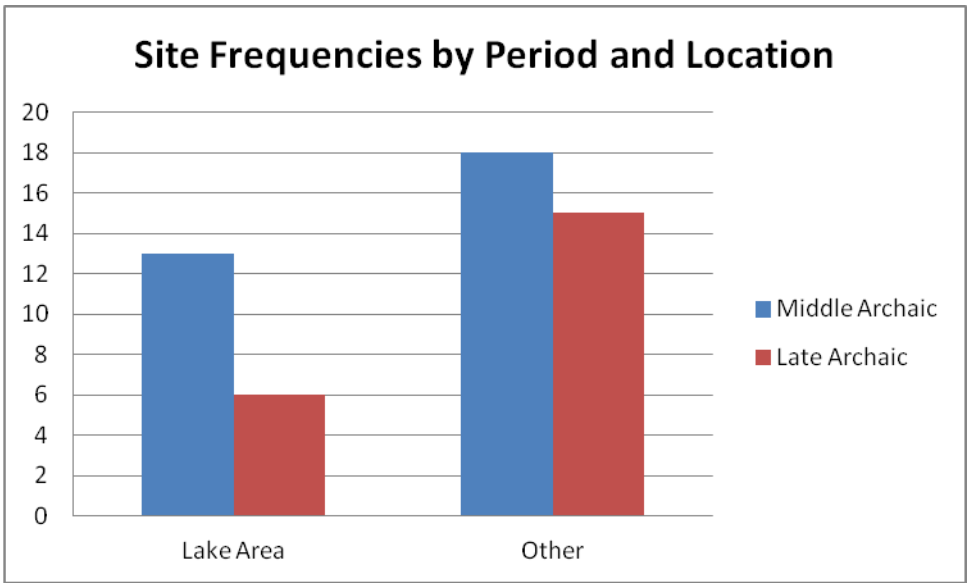

Figure 2. Site Frequencies by Period and Location

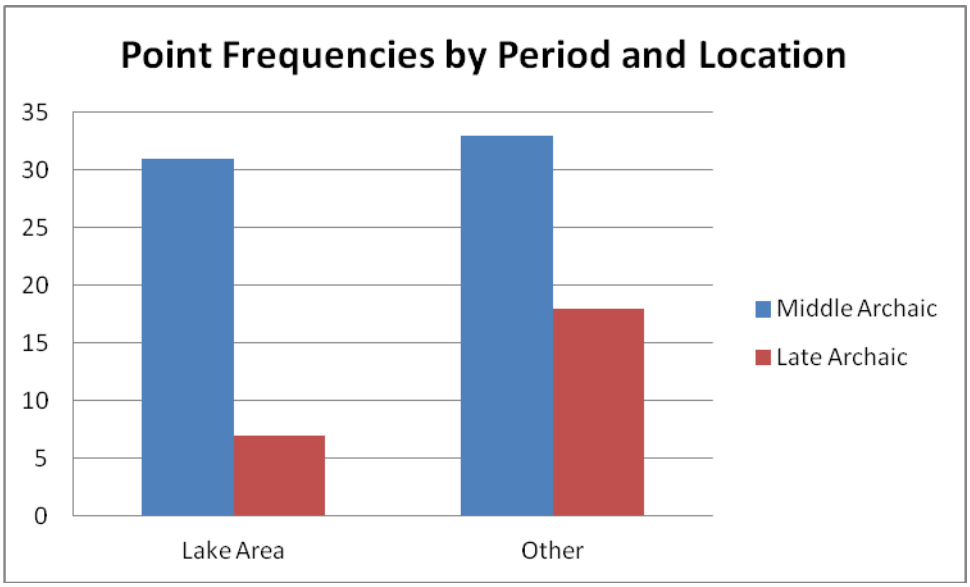

Figure 3. Point Frequencies by Period and Location

PROJECTILE POINT TECHNOLOGY:
UNDERSTANDING THE RELATIONSHIP BETWEEN TOOL DESIGN AND HUNTING TACTICS

Bradley Vierra
Statistical Research Inc.

Stone tipped spears have been common hunting weapons for 100,000 years. Although fluted points were initially used across North America during the late Pleistocene, they were subsequently replaced with a variety of lanceolate, stemmed and notched points during the Holocene. This replacement represents the Paleoindian to Archaic period transition which was associated with significant changes in regional resource structure. No one would deny that important changes in foraging strategies and hunting technology occurred during this time period. Many of the studies involving Paleoindian and Archaic projectile points have focused on typology, raw material availability, tool use-life, and land use.

It is not uncommon to find isolated projectile points lying on the ground surface in the American Southwest. Yet, these points represent over 10,000 years of human occupation and are certainly not evenly distributed across the landscape. Indeed, the landscape has changed radically over those 10,000 years and the way that people have made a living has also changed. These changes likely affected projectile point technology, tool design, and the specific tactics used to hunt game. Around the world, there are two basic types of hunting tactics that can be implemented. An intercept tactic involves lying in wait and allowing the animals to come to you; whereas, an encounter tactic involves traversing the landscape in search of animals. Given the diversity of projectile point designs found in the American Southwest and the requirements placed on points used for different hunting tactics, an important question is *what is the relationship between tool design and hunting tactic*?

For intercept hunting, I expect that hunters may often strike at their prey from relatively close quarters and will anticipate and plan how and where an animal will be struck. I expect that points designed for intercept hunting will be designed to dispatch an animal as quickly and efficiently as possible in order to increase the chances of success and decrease the risk of bodily injury to the hunter. Thus, I expect that points designed for intercept hunting will be designed in a manner that enhances their ability to cleanly penetrate an animal so the animal can be dispatched quickly from close range. For encounter hunting, by contrast, I expect that a hunter may often have to strike at their prey in a more opportunistic fashion as prey are spotted on the landscape. As such, a hunter involved in encounter hunting may often have to strike an animal from a greater distance with less anticipation and planning regarding where and how to initiate the attack, potentially resulting in a higher risk of missing a target and damaging a weapon during an unsuccessful attempt. Thus, I expect that points designed for encounter hunting will favor durability over penetration (sensu Cheshier and Kelly 2006; Hughes 1998) as more attempts at striking a target may be necessary in encounter hunting.

In applying this approach to projectile points in the northern Rio Grande valley, I concluded that Late Paleoindian points were primarily designed for penetration efficiency. This is an important factor when hunting bison at close quarters, the principal prey of Late Paleoindian hunters in the region. In contrast, Early and Middle Archaic projectile points appear to have been designed for durability. That is, a wider range of animals were hunted from a greater distance which increased the number of target misses and the need for more durable projectile points. Lastly, Late Archaic points appear to be intermediate between Paleoindian and Early-Middle Archaic in terms of penetration efficiency and durability. The greater diversity in projectile point types during the Late Archaic suggests that specific points were designed to hunt particular game species according to variable hunting tactics. This diversified strategy probably reflected an attempt to increase hunting return rates

by broadening the range of prey species that were hunted. This approach to hunting eventually set the stage for the adoption of the bow and arrow, although this shift appears to have occurred much later in the southern deserts than the northern woodlands of the American Southwest (Vierra 2013; Vierra et al. 2012).

Vierra (2012) also contrasted Jay, Bajada and San Jose projectile points from the northern Rio Grande valley with a sample from the lower Rio Grande valley in the southern Tularosa Basin. This study was interested in identifying potential differences in hunting tactics when comparing woodland settings in the northern Rio Grande vs. playa settings in the southern deserts. More specifically, would these two settings be characterized by an emphasis on point durability and encounter hunting to the north, vs. penetration efficiency and the intercept hunting of game around playas to the south? The results indicate that that both Early and Middle Archaic points from the southern desert tended to be much thinner than their northern woodland counterparts. Therefore the study provided some tentative support for the importance of penetration efficiency for intercept hunting, vs. durability for encounter hunting. Although researchers generally consider that contracting stem and large side-notched projectile points are most characteristic of the Middle Archaic along the Borderlands, it appears that San Jose style points actually dominate the collection from the southern Tularosa Basin.

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SERENDIPITY AND OLD CORN IN LA CAÑADA ALAMOSA

Karl Laumbach
Human Systems Inc.

The 2011 season was our final effort at the Cañada Alamosa. The Cañada Alamosa Project is partnership between Human Systems Research, Inc. and the Cañada Alamosa Institute, a 501 © 3 non-profit developed by the landowners at the time, Dr. Dennis and Trudy O'Toole. After six seasons at the Victorio Site, excavation in 2011 focused on the alluvial slope of the Montoya Site (Figure 1). The geomorphology of the Montoya site is markedly different from that of the other three sites. The Montoya Site is the only site located on the western side of the canyon and the remnant river terrace on which it was built abuts directly to the steep canyon wall. In contrast, the Victorio and Kelly Canyon Sites are built on terraces with little or no active slope while the Pinnacle Ruin was laboriously constructed with rock terraces supporting rooms on a steep, rocky uplift.

While the Montoya Site is positioned on a river terrace of the same age as the lower terrace on the Victorio Site, only the eastern portion of that terrace is exposed, as the western portion is composed of a slumping alluvial slope that originates on the steep cliff wall. As there was evidence that the slope might have obscured room blocks and/or other archaeological features, the 2011 season was dedicated to testing the depth and the nature of that slope. Previous work had defined Mimbres and Socorro Phase components. Several test excavation units were placed in the slope and in one instance a buried Mimbres room block was located and tested. In others the first 30 centimeters exhibited a dark organic soil and a relatively high artifact assemblage while the lower levels consisted of a compacted non-organic soil containing few artifacts. Feature 15 followed that pattern but was excavated to greater depth in an effort to locate the interface of the slope materials with the underlying terrace.

Feature 15 is located on the upper slope (Figure 1). It consists of a one by two meter excavation unit oriented north-south on the east trending slope. Excavation was accomplished in 20 cm levels using trowels, shovels, and, when necessary, a digging bar. The first 5 cm of fill (20 to 25 cm bd., Stratum A) consisted of modern eolian sand. Between 25 and 75 cm bd, from the midpoint of Level 1 to the lower portions of Level 3 (Stratum B), a dark organic soil was exposed containing poorly sorted gravels and very little visible carbonate. Below 75 cm bd the soil was much lighter in color and was permeated with a calcium carbonate to approximately 145 cm bd (Stratum C) where a layer of concentrated calcium carbonate (calcrete) was present at the interface (Stratum D) with the surface of the ancestral stream terrace. The surface of the stream terrace undulated with final depths ranging from 167 cm bd to 185 cm bd.

The soils contained several fragments of latite throughout and there was occasional evidence of rodent disturbance. Soil samples were taken by the geologist, Dr. Virginia McLemore. Additional soil samples were taken for pollen and carbon isotope analysis at 20 cm intervals from the surface to the bottom of the unit. Culturally sterile layers were reached in the stream terrace gravels below the interface between the overlying soils and the top of the ancestral gravel terrace.

One hundred eighty-four artifacts were recovered throughout the fill. The lithic artifacts were distributed throughout the fill. Forty-five sherds were recovered, thirty-nine of them in Level 3 or above, with five more in Levels 4 and 5. One brown ware sherd was found in the lowest level (Level 7). Painted ware was confined to the upper levels and included sherds of Red Mesa Black-on-white and Mimbres Transitional Black-on-white (ca. A.D. 900-1000). Other artifacts included bone and shell. The bone was confined to seven fragments in the lower levels (5, 6, and 7).

The surprise came at the bottom of the unit where fragments of corn cobs were found in the calcrete formed at the interface of the consolidated soil and the ancestral stream terrace. Associated with a few flakes and some

animal bone, the corn proved to be some of the oldest in the American Southwest. The macrobotanical analysis of the flotation and charcoal samples recovered during the 2011 season was done by Dr. Richard Holloway of Quaternary Research. Corn cob fragments from Feature 15, Level 7 were given expedited attention and added to Dr. Holloway's photogrammetric data base for the Cañada Alamosa Project.

A sample from one of the cobs from Feature 15 was sent to Beta Analytic for dating. The resulting conventional radiocarbon age was 3610 ± 30 BP (Beta 329232). This came as a great surprise as we were expecting a date in the 10th century to match the sherds found in the uppermost organic levels. I immediately called Linda Cordell and asked her what the gold standard was for old corn in the Southwest. Linda was really excited and introduced me via email to Dr. Maxine McBrinn who had calibrated the corn dates used in the final edition of Archaeology of the Southwest (Cordell and McBrinn 2012). Linda also told me that I absolutely must send in a second sample to verify the first.

Dr. Maxine McBrinn utilized the CalPal calibration to adjust the date to 3925 ± 30 BP. A sample from the second cob fragment was subsequently submitted (corn sample 11-262). The second cob yielded a conventional radiocarbon date of 3640 ± 30 BP (Beta 330166) and a calibrated date of 3973 ± 55 BP.

These dates place the corn from the Montoya Site among the very earliest occurrences of corn in the southwest (Cordell and McBrinn 2012; Merrill et al. 2009). I understand that even earlier dates have recently been determined for corn at Las Capas in Arizona.

The final comment is that the upper levels of the slope can be said to be alluvial in that there is definitely a down slope movement of soil and artifacts caused by water action. However the in-place soil development obvious in the profiles of Features 15 and other tested features on the slope suggest that the majority of the slope material slumped off of the upper slope within a fairly short period of time. Dr. Curtis Monger, Soil Scientist, at New Mexico State University has suggested that the slump may have been an indicator of a climatic event. "Slumps" of this nature have been termed colluvial wedges by Dr. Lee Gile, a mentor of Dr. Monger and a principal in the Desert Project which extensively tested and dated soil deposition in southern New Mexico. Colluvial wedges are found at the bottom of steep slopes where it is common to find poorly sorted colluvial sediments that were deposited when vegetation was sparse. Giles attributed many of the colluvial wedges along the fan terraces astride the Rio Grande to the mid-Holocene "Altithermal." Thus it is a distinct possibility that this geomorphic event occurred shortly after the Late Archaic occupation and contributed to the preservation of the old corn.

Regardless of the geomorphic origin of the slope, the question remains "was the corn deposited on or near the surface of the ancestral stream terrace or was it carried there by rodents?" Although several Late Archaic style projectile points have been recovered from the surface of the site, excavations in the upper levels have found only limited evidence of Archaic period features but include corn cupules from a roasting pit that dated to 2150 BP or almost 2000 years later than the early corn. This suggests that the Archaic component associated with the early corn may be deeply buried. Although future excavations are required to verify or refute the context of the corn, it is clear that the extensive slope may contain a large and early horticultural component at the Montoya Site. Currently the Montoya Site and the "Old Corn Site" near Zuni (Huber 2005:36.1-33) are among the very few "open" non-rock-shelter sites to produce early corn.

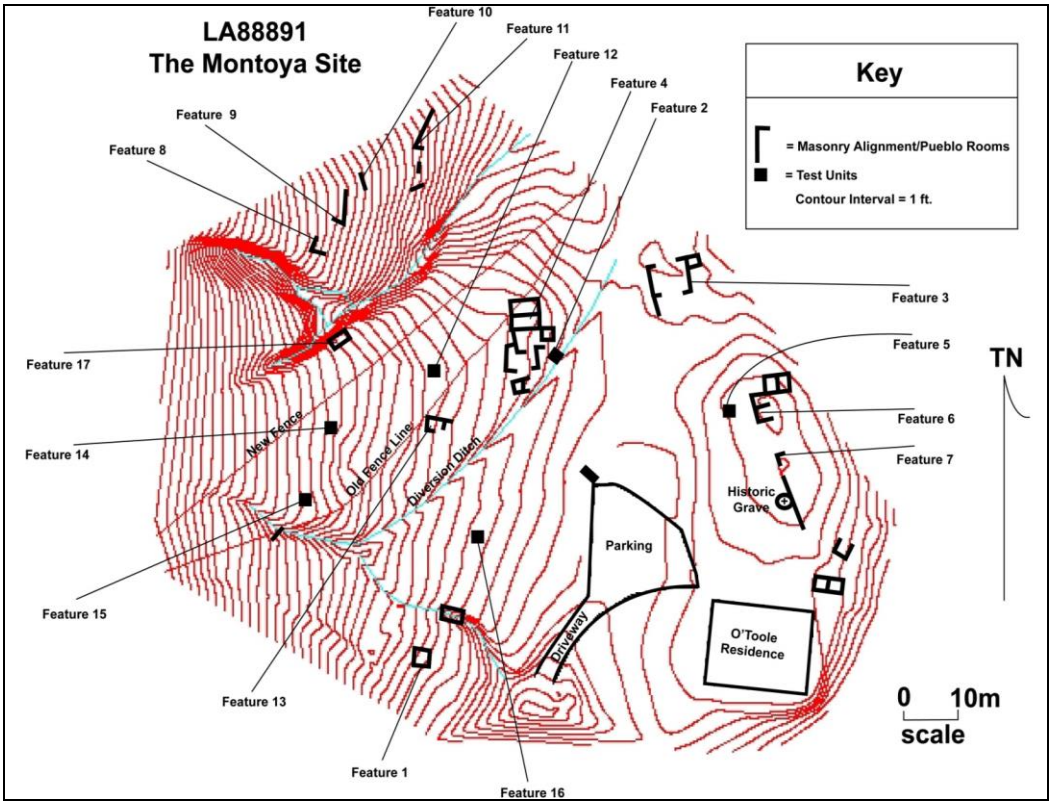

Figure 1. The Montoya Site.

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EARLY AGRICULTURE IN THE SOUTHERN BASIN AND RANGE COUNTRY

Robert Hard, University of Texas, San Antonio
John Roney, Colinas Cultural Resources Consulting

In May and June, 2014 Robert Hard, John Roney, and Art MacWilliams directed a University of Texas at San Antonio project investigating two Early Agricultural period sites in southwestern New Mexico and southeastern Arizona. This project was funded by the University of Texas at San Antonio.

LA 162023 is a massive late Archaic midden located in the boot heel region of southwestern New Mexico. Its most distinctive characteristic is a 120 meter by 90 meter deposit of dark, ashy soil which is barren of vegetation and is littered with thousands of lithic and ground stone artifacts. The site is located at the toe of a long alluvial apron, near the margin of Laguna de Las Moscas. Although it is not associated with any modern source of permanent water, auger testing suggests that a cienega may have once been present adjacent to the site. A large number of late Archaic/Early Agricultural period projectile points have been found on the surface, and limited test excavations have yielded two radiocarbon dates in the first millennium B.C. Ethnobotanical recovery includes charred fragments of maize as well as mesquite beans and grass seeds.

The site is only about 80 kilometers from Cerro Juanaqueña, a large fortified hilltop village that also dates to the Early Agricultural period. Associated with the floodplain of the Río Casas Grandes, Cerro Juanaqueña included abundant evidence of maize agriculture. At the Forest Home and Wood Canyon sites, about 80 kilometers to the north, Chris Turnbow has excavated several Early Agricultural period pithouses in a pinyon-juniper setting, which also contained evidence of maize. However, most other projects in the area have failed to produce evidence of early agriculture. These findings underscore variability in the role of early agriculture, a theme that we hope to continue to explore at LA 162023.

The second site we investigated in 2014 is Round Mountain, a large cerro de trincheras site overlooking the floodplain of the Gila River, just over the state line in Arizona. Round Mountain rises 200 meters above the floodplain. On its summit prehistoric peoples built almost two kilometers of terraces and rubble berm walls. Near the center of this complex, on south and southeast facing slopes just below the summit of the mountain there are 16 stone circles which we assume were individual family dwellings. Abundant lithic debitage and a large number of ground stone artifacts confirm intensive residential occupation. A single radiocarbon date falls between 500 and 400 BC. Esoteric artifacts including two stone pipes and a rectangular stone mortar or tray further link these remains to the Early Agricultural period Cienega phase. Their occurrence along the Gila River further expands the geographic range of distinctive patterns of human behavior associated with early agriculture along the Río Casas Grandes in northwestern Chihuahua, at La Playa in northern Sonora, and along the Santa Cruz River in the Tucson Basin.

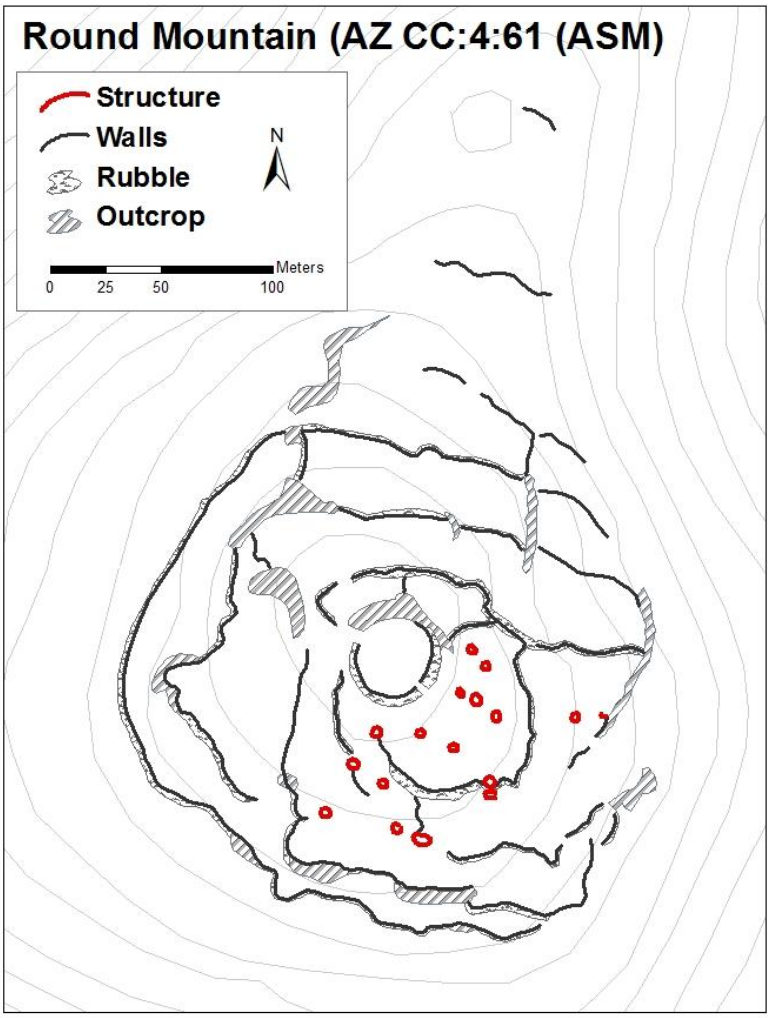

Figure 1. Round Mountain Site

MOBILITY, SUBSISTENCE AND STORAGE IN LATE PRE-CERAMIC, NEW MEXICO

Jim Railey
SWCA

The late pre-ceramic time frame (roughly 2500 B.C.-A.D. 500) was, overall, an interval of increased precipitation and greater natural resource abundance compared to earlier post-Pleistocene times (Berry and Berry 1986:312–314; Blum et al. 1994; Cordell and McBrinn 2012:125; Hall 1990, 2010; Hall and Penner 2013; Hogan 1983, 1994; Johnson and Holliday 2004:291; Mallouf 2005; Mason et al. 2004; Mehringer 1967; Mehringer et al. 1966; Oldfield and Schoenwetter 1975; Petersen 1981; Polyak and Asmeron 2001; Smith 2002; Smith and McFaul 1997; Toney and Anderson 2006; Toomey 1993; Toomey et al. 1993; Wendlund and Bryson

1974). These conditions led to somewhat of a population boom across present-day New Mexico and the Southwest, and people were able to occupy and utilize much more of the landscape than was possible in earlier Archaic times (Berry and Berry 1986; Carmichael 1986; Mallouf 1985, 2005:219; Miller and Kenmotsu 2004:226; Railey 2013, in preparation; Railey et al. 2011; Walth and Railey 2011:352–366). As a result, archaeological sites of this time period are abundant and distributed rather ubiquitously across the landscape.

There was, however, appreciable variation among late pre-ceramic people in New Mexico in terms of mobility, subsistence, and storage strategies. Many continued a time-honored lifeway where food was obtained through foraging, collecting, and hunting. This was especially the case for those living in (or seasonally using) basin and lowland deserts, where farming was (at best) a challenge, wild food resources were scattered, and high mobility was necessary to wrest a living from the land. Others, however, had begun making the switch to a more farming-dependent lifeway, especially in places where sufficient water and fertile soils were available to grow crops, and local resource abundance and concentration of wild food resources made reduced mobility (necessary for farming) possible. This sharp distinction between mobile foragers and more settled early farmers may be somewhat of an over-simplification of how things actually played out in late pre-ceramic times, but it is at least useful as an analytical device for understanding archaeological variability for this time period in New Mexico.

Depending on which of these prevailing lifeways late pre-ceramic peoples pursued, they left behind different kinds of sites (cf. Binford 1980). Mobile hunter-gatherers' camps were typically occupied on a short-term basis. Although they provisioned many of their camps with ground-stone milling tools, the occasional small storage pit, and other evidence of some level of advanced planning, they invested little in constructing shelters and other facilities. The apex of housing at short-term camps typically consisted of rather expedient brush huts, similar to the wickiups that survived into historic times among many Great Basin groups and some Apache (Figure 1). These are marked by small, shallow, dish-shaped basins, although it is likely that many more such huts have left no traces archaeologically. Basin-shaped pits and burned rock at these sites evidence earth-oven baking, which became a common cooking technique in post-Pleistocene times (Thoms 2009; Wandsnider 1997). In some areas repeated pit baking at particular spots resulted in massive accumulations of burned rock; these burned-rock "middens" usually occur in foothill and mountain areas in southern New Mexico, where sufficient firewood and key food sources (such as agave hearts and cholla buds) were concentrated, and plant-food remains are often well-preserved at such sites (e.g., Jones et al. 2010; Miller et al. 2011). But at most hunter-gatherer sites subsistence remains are rare to absent, because storage (if it even occurred at a site), processing, and consumption of plant foods did not involve sustained, spatially focused facilities or activity areas where concentrations of plant-food remains might otherwise have accumulated (O'Laughlin and Lundquist 2012:279, 281). Even when hunter-gatherers repeatedly occupied a site, there was often little continuity in the spatial arrangement of huts, cooking pits, and activity areas. As a result, the remains of repeated occupations are often spread out in a more-or-less random pattern at hunter-gatherer sites, and thick, anthropogenic middens with abundant artifacts are usually absent. These typical camps of late pre-ceramic, mobile hunter-gatherers are among the many thousands of artifact scatters, with or without preserved features (and sites with pit features but no artifacts), which archaeologists have recorded in New Mexico over the years. These sites may yield radiocarbon dates, and their lithic artifacts may reflect patterns of raw material use, on-site flaking activities, tool-use, and site function. But they often provide little in the way of direct subsistence evidence, and sorting out materials and spatial patterning relating specific occupation episodes can be a challenge at best.

In contrast, the habitation sites of New Mexico's early farmers often exhibit very different characteristics. Residential base camps and hamlets were occupied on a sustained basis, through multiple seasons and years. Early farmers often invested more effort in constructing shelters than did mobile hunter-gatherers, resulting in huts and pit houses that were larger and often deeper, more substantial, sometimes contain special features (such as benches, carefully prepared hearths, deflectors, plastered floors, or support posts), and are thus more visible archaeologically. Because residential sites were occupied on a sustained basis, many contain thick, anthropogenic middens with abundant artifacts. Food remains—both plant and animal—are usually more abundant and easily discovered at the residential sites of early farmers than their hunter-gatherer counterparts,

since sustained occupation often promoted more spatial continuity in terms of activity areas, including food-preparation loci, storage pits, and refuse areas.

Late pre-ceramic farming groups were not evenly distributed across New Mexico. They appear to have been somewhat more widespread in northern New Mexico, based on evidence from the Zuni area (Damp et al. 2000; Huber and Van West 2006; Zuni Cultural Resource Enterprises 2000), the San Juan Basin and its surrounding highlands (e.g., Brown 1991:655-656; Irwin-Williams 1973; Kearns and McVickar 2007; Railey 2008; Railey and Acklen 1999:77-110; Simmons 1982, 1983; Vogler et al. 1983), the Albuquerque Basin and vicinity (Railey, in press; Vierra 2008a; Vierra and Ford 2006; Walth and Railey 2011), and the eastern mountain slope in the Cimarron District (Kirkpatrick and Ford 1977). But even in some of these areas early farmers may have shared the neighborhood with more mobile foragers, and some groups may have mixed farming, foraging, and mobility in a variety of strategies (Hogan 1994; Railey, in press; Vierra 1990; 1994). And in some vast swaths of northern New Mexico, such as the northern Rio Grande Valley and the Great Plains to the east, the hunter-gatherer lifeway apparently persisted through the end of pre-ceramic times—and beyond (Hill et al. 1995; Post 2002, 2013; Sebastian and Larralde 1989; Vierra 2008b; Vierra and Ford 2007).

In southern New Mexico, early maize occurs in a variety of (mostly upland) settings (Dick 1965; Kemrer 1998; Lentz 2006; Lentz et al. 3013MacNeish 1993:319; Martin et al. 1954; Martin et al. 1952; Tagg 1996; Upham and MacNeish 1993; Upham et al. 1987; Wills 1988:108-109). But farming-based communities with archaeologically rich, residential sites appear to have been more restricted geographically, to highland areas where conditions were just right: where vertically arrayed resource zones were closely packed, and where there were streams flanked by floodplains wide enough to farm in (Campbell and Railey 2008; Railey 2010; Turnbow 2000). Elsewhere, across the desert lowlands of the Jornada region and in some of the more rugged highland areas, people continued a more mobile, hunter-gatherer lifeway (albeit with some minor use of maize here and there) until well after the introduction of ceramics in the mid-first millennium A.D. (Miller and Kenmotsu 2004; Railey 2013; Railey et al. 2011).

Most early farmers were still mobile to some extent, albeit their mobility was more "logistical" than their hunter-gatherer counterparts (cf. Binford 1980). Still, archaeologically many of the early farmers' small sites resemble the camps of more mobile foragers. But other sites are more obviously "logistical" and task-specific. An example is a late pre-ceramic component, dating to the middle of the first millennium B.C., at the Holiday site, in the Enchanted Hills area of Rio Rancho (Railey 2012). Here, small, spatially discrete hut camps were set up to exploit the abundant chalcedony nodules that litter this area. In contrast to the many thousands of flaked-stone artifacts (mostly debitage) and several hammerstones found in and around three hut components excavated at this site, there were virtually no ground-stone milling tools or evidence of much else other than flaking of the local tool stone. The Holiday-site assemblage indicated a major production goal was late-stage bifaces and projectile-point pre-forms, many of which were apparently carried away to be notched and hafted as dart tips elsewhere.

Who the occupants of the Holiday site were remains an open question, but one possibility is that the site was occupied by task groups based in the nearby Rio Grande or Jemez River valley, where farming was in full swing by the first millennium B.C. Other late pre-ceramic sites in the vicinity of Holiday, and overlapping in time with its lithic-workshop occupation, appear more typical of residentially mobile hunter-gatherers. These sites contain ground-stone milling tools, scrapers, and other implements suggesting a wider variety of tasks than is apparent at Holiday-but similarly contain only small, expedient huts (Railey 2012:428-439). This suggests the possibility that early farmers and more residentially mobile hunter-gatherers co-existed in the Albuquerque Basin during late pre-ceramic times, or that lifeways fluctuated during this period depending on a variety of factors (Railey, in press).

Storage was a strategy pursued by both hunter-gatherers and early farmers, and plant foods suitable for storage included carbohydrate sources in the form of dried or parched wild seeds, mesquite pods, edible roots, or (when present) maize, or protein sources such as piñon nuts, walnuts, or acorns from shin oaks. Late pre-ceramic peoples practiced underground storage, using cylindrical and bell-shaped pits, but the context of storage varied

according to the prevailing mode of mobility and subsistence. Bell-shaped pits are one of the most distinctive feature types. They are a global phenomenon, appearing in post-Pleistocene times in both the Old and New Worlds (e.g., Andersson 1973[1934]:171–174; Avari 2007:28; Campbell and Railey 2008; Currid and Navon 1989; DeBoer 1988; Flannery 2009:20; Gronenborg 1997; Huckell 1995; Huckell et al. 1995; Huckell et al. 2002; Mabry and Doolittle 2008:64; Peregrine and Ember 2001:34; Railey 1999:460–464; Wasylikowa et al. 1993:156; Wilson 1987[1917]; Winter 2009:28–29). Bell-shaped pits continued in use into historic times (Currid and Navon 1989:67; Wilson 1987[1917]), and are still used today in some remote places such as the Sahel in Africa (Gronenborg 1997). The bell shape has a functional performance, as it minimizes the surface-to-volume ratio, which enhances preservation of grains and other food stored within (DeBoer 1988:3). Underground pits provided the added function of concealing valuable stores from potential competitors and enemies—an especially crucial consideration for mobile groups (DeBoer 1988). Bell-shaped pits are usually associated with farming dependence, and in the Southwest appeared no later than the second millennium B.C. (Huber and Van West 2006; Huckell et al. 2002:145).

Bell-shaped storage pits were not the sole property of early farmers in late pre-ceremic New Mexico, however, as they also occur in small sites apparently occupied by mobile hunter-gatherers, in both the northern and southern parts of the state (Figure 2). But these tend to be distinctly smaller on average than bell-shaped pits found at early farming sites (Table 1), and this probably reflects differences in storage strategies between mobile hunter-gatherers and less-mobile farmers. With respect to mobile foragers, Morgan (2012) identified low intensity, dispersed storage as *caching*, which he distinguishes from *central place foraging*. The latter involves intensive, bulk storage at a village or base camp, usually in larger facilities (be they bell-shaped pits, some other pit form, ceramic vessels, or aboveground granaries). Caching typically involved "stowing relatively small amounts of food in a broad range of places throughout a group's foraging radius" (Tushingham and Bettinger 2013:533), and sometimes the same group employed both caching and central-place storage, depending on the nature and distribution of wild food resources, seasonality, and degree of mobility. These same factors structured peoples' choices about which foods to exploit, and relate directly to strategies for food acquisition and storage. Bettinger (1999a, 1999b, 2001; 2009; Tushingham and Bettinger 2013) has developed a front-back loaded model that accounts for the risks and benefits associated with different kinds of stored resources and relating to variable mobility strategies. Specifically, front-loaded resources are those that require a lot of acquisition and/or processing time and energy prior to storage, but comparatively little handling time is required for consuming them once they are removed from storage. Back-loaded resources entail the opposite: less effort is expended to collect and/or prepare them for storage, but after removal from storage more handling time is required to process and prepare them for consumption. Also, back-loaded resources are often less concentrated in specific patches than front-loaded ones, and thus are widely available within a group's foraging range. Tushingham and Bettinger (2013) argue for a positive correlation between degree of mobility on the one hand, and a focus on back-loaded resources and dispersed, small-scale caching on the other. The reason is simple: for more mobile groups there is a greater risk that any one store of food will go unused. This risk stems from scheduling uncertainties or complications that may prevent a group from returning to a food cache, or theft by enemies or competitors (which small-scale, mobile groups are often poorly prepared to defend against). Thus, high investment in back-loaded resources reduces risk for mobile foragers and spreads that risk over more, smaller, and dispersed caches rather than in larger, fewer storage facilities.

For early farmers the opposite situation obtained. Maize and other domesticated crops are heavily front-loaded resources, requiring tilling, planting, and tending—steps that are largely unnecessary in the exploitation of wild plant foods (although native peoples sometimes practiced habitat management, such as intentional burning, to increase the productivity of some wild plant foods, such as seed-bearing weeds and grasses). Reduced mobility, a greater residential commitment to long-term habitation sites, and the consequent lowered risk of losing or failing to access food caches meant that early farmers could invest in central-place storage strategies, including larger storage pits.

Of course, New Mexico's late pre-ceramic past was probably more complicated than this. Some groups may have engaged in multi-pronged strategies, emphasizing front-loaded resources (such as farmed maize) and central-place storage while encamped at their residential sites, while also pursuing a back-up or supplemental

strategy involving logistical mobility, collection of back-loaded (wild) food resources, and more dispersed storage in numerous, but smaller, cache pits. It also appears that some early farmers may have sought to enhance the protection of their food stores, including maize, by caching them away from residential sites. In the western San Juan Basin, for example, storage pits are conspicuously absent at some Basketmaker II residential sites (e.g., Railey 2008; Vogler et al. 1983), but were found in abundance at the early Basketmaker II Dog Leg site (LA 6448), was a centralized storage locale that also included human burials with exotic marine-shell grave goods (Kearns and McVickar 2007:4[21-26]).

The presence of human burials at this site was perhaps not coincidental. Cemeteries served an important function in that they provided a spatial focus for group-level ceremonies, and the resting places of the ancestors symbolized and reinforced peoples' claims to their homelands and the critical resources contained therein (Charles 1985; Charles and Buikstra 1983; Goldstein 1976; Hodder 1982:104; Saxe 1970; Saxe and Gall 1977). Such claims were sometimes further enhanced by turning ceremonial spaces—including burial grounds—into monuments. Such may have been the case at the Late Archaic site of Punto de los Muertos, an apparent stone mound in Carlsbad (Wiseman 2003a, 2003b). This unusual site contained burials and grave goods, and may have constituted a spatially fixed, symbol of claims to critical resources along the Pecos River by a group of otherwise highly mobile, hunter-gatherers.

In summary, the late pre-ceramic time frame in New Mexico was a dynamic period of variation and change. It was the crucible out of which the more impressive developments of the subsequent Ancestral Pueblo and related cultures of later prehistory emerged. But the late pre-ceramic was not simply a preamble to the great ruins and other sites for which the archaeology of the Southwest is best known. It was a world that emerged out of a long tradition of mobile, hunter-gatherer lifeways. Its conditions both imposed constraints on, and provided opportunities for, its inhabitants. And its future was not pre-ordained. Recent archaeological discoveries have fleshed out many new details about New Mexico's late pre-ceramic cultures, and future efforts will, no doubt, continue to bring this fascinating chapter of our state's past into the light of knowledge and understanding.

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RECENT INVESTIGATIONS INTO THE ARCHAIC OF THE JORNADA REGION OF SOUTH-CENTRAL NEW MEXICO

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The Archaic prehistory of the Jornada region of south-central New Mexico, Trans-Pecos Texas, and northern Chihuahua has been the subject of archaeological investigations since the 1920s. Prior to the mid-1990s, much of our knowledge of Archaic Period material culture and settlement was acquired through excavations in caves and rockshelters in the Hueco, Organ, and Sacramento Mountains (Alves 1930; Cosgrove 1947; Human Systems Research 1972; Johnson and Upham 1988; MacNeish 1993: Wimberley and Eidenbach 1981). While providing important collections of well-preserved perishable items and projectile points that aided in the development of cultural sequences, the emphasis on rockshelters provided a fragmentary and biased picture of Archaic settlement across the vast desert and mountain landscapes of the Jornada.

The past decade has produced an impressive amount of information on Archaic sites and material culture throughout the central basins, alluvial fans, foothills, and mountain valleys of the Jornada region. The number of chronometric dates for Archaic components has increased by an order or magnitude since the Richard MacNeish's 1993 summary of the Chihuahua Archaic. The combined work of several CRM consultants working on Fort Bliss Military Reservation with the support of the Environmental Division – including VersarGMI (formerly Geo-Marine, Inc.), Statistical Research Inc., TRC, and Lone Mountain Archaeological Services, Inc. – has produced dozens of reports describing Archaic settlements and components. The New Mexico Department of Transportation (NMDOT) sponsored several mitigation projects or the reporting of earlier projects in the northern Sacramento Mountains (Campbell and Railey 2008; Lentz 2004; Oakes 2006). Comprehensive regional overviews (Hogan 2006; Miller and Kenmotsu 2004) and academic research projects (McBrinn 2005) have provided further insights into Archaic settlements, lifeways, and social identities.

Given the immense amount of information generated by these and other investigations, a contemporary synthesis is in order. It is a somewhat daunting endeavor. Archaic settlements and features are described in hundreds of reports, but it is often a challenge to tease out and isolate discrete settlements and temporal periods among the broad, multicomponent palimpsests that characterize the Archaic archaeological record of much of the Jornada. However, a few signature sites have been investigated. Recent excavations on Fort Bliss identified two significant Archaic settlements, LA 170280 and LA 91759 (Graves et al. 2014). LA 170280 is a Keystone phase ("late" Middle Archaic) village with spatially discrete clusters of hearths and deep pits and a high proportion of groundstone tools with length and grinding surface areas similar to settlements with low to intermediate agricultural rankings. The inferred horticultural nature of the settlement is supported by the identification of maize pollen from a pit dating to 3660 +/- 30 BP (cal 2135 – 1945 BC). LA 91759 is a Hueco phase (terminal Late Archaic) settlement dating between 50 BC and AD 150. The settlement consists of several closely spaced pithouses sharing a common extramural area with hearths and storage pits. Chipped stone and faunal densities are equal to those observed as Ceramic period agricultural villages, and overall the terminal Late Archaic settlement of LA 91759 looks remarkably similar to settlements of the subsequent Mesilla phase with the obvious exception that ceramics are absent. This brings up an intriguing question of whether demographic, environmental, or social pressures and processes led to increased sedentism, social aggregation, and occupational intensity prior to the advent of ceramics and intensive agriculture.

Other relevant studies include an update and review of the Keystone Dam site (Vierra 2009), the Middle Archaic village settlement along the Rio Grande valley first reported by Tom O'Laughlin in 1980 and subsequently designated the type site of the "late" Middle Archaic Keystone phase (MacNeish 1993). Vierra examined the chronology, houses, and material culture of Keystone Dam Site 32 and updated the interpretation of the site based on new data and insights regarding early agriculture and settlement in the Southwest obtained during the 30 years since O'Laughlin's 1980 publication. Excavations at High Rolls and Fallen Pine shelters were reported by the Office of Archaeological Studies (Lentz 2004; Oakes 2006). Both shelters have extensive Late Archaic deposits and features and contributed insights on subsistence and projectile point sequences, including the first macrobotanical identification of tobacco. SWCA produced an impressive 1000 page volume on the excavation of 15 sites along US Highway 70 in the Hondo Valley of the northern Sacramento Mountains (Campbell and Railey 2008). Several sites investigated as part of the highway expansion project had substantial Late Archaic occupations consisting of multiple pits with well-preserved subsistence remains and high maize ubiquity measures among flotation and pollen samples. Spatial analysis and chipped stone analysis of the El Arenal site in the southern Tularosa-Hueco basin yielded specific insights into regional mobility and settlement duration during the Late Archaic Arenal phase (Miller 2007).

Data from these sites, and several hundred additional sites and features situated among larger multicomponent sites, all contributed to a database of radiocarbon dates, feature types, architectural data, and subsistence remains compiled by Tim Graves. Analyses of these data by the author for a chapter contribution to Vierra's upcoming Southwest Archaic volume have identified several trends and transitions that are significant for understanding the Jornada Archaic, as well as having wider implications for the southern Southwest. A revised period and phase sequence has been developed that is based on trends and transitions among the 3890 archaeological radiocarbon dates compiled by Tim Graves and the author. This summary of chronometric data adds a new dimension to our conceptions of the Late Archaic, including the identification of a previously unknown hiatus in adoption and spread of maize. Studies of rock art and the dating of perishable items from

ritual deposits in caves have generated new insights concerning the timing and nature of certain beliefs and their accompanying ritual material culture among Late Archaic groups.

Three Late Archaic phases are identified. There is noteworthy synchronicity between these phases and the revised Late Archaic sequence of the Sonoran Desert (Gregory 2001; Mabry 1998, 2005). In fact, the similarities in the timing of certain subsistence trends and technological traits suggest that the Jornada could be considered an eastern variant of the San Pedro phase of the southern Southwest. However, the Jornada Late Archaic also reveals some divergent trends indicating that there was likely more than one pathway guiding the transition from foraging to farming in the southern deserts.

Of specific interest is the identification of a distinct 500 year-long hiatus in several feature types and landforms between 2200 and 2700 BP. Occupation of upland caves and rockshelters, the construction and use of plant baking pit (burned rock middens), and use of storage pits essentially disappear from the archaeological record during this interval, designated as the Arenal phase. Of further interest is that a gap in the distribution of radiocarbon dates for maize also occurs during this interval. It is important to note that the absence of certain features, technologies, and subsistence practices does not mean that the Jornada region was abandoned during the Arenal phase. Several lines of evidence show that there was a shift, or reversion, to more residentially mobile settlement organization similar to that of the Middle Archaic. This gap in age estimates is also present among the series of dates from Cerro Juanaqueña and other early agricultural sites in northern Chihuahua (Hard and Roney 2005), and therefore may represent a broader regional phenomenon across the southeastern Southwest.

An important yet underappreciated aspect of Archaic settlement involves the increasing evidence for group aggregation, feasting, rock art, and other facets of social and ritual organization. New insights from the Jornada region establish that material evidence of such social practices exist as early as 5000-4500 BP. Evidence of group aggregation and communal feasting is first found among the burned rock middens of the mountain foothills between 4500 and 4000 BP (Miller et al. 2012). Massive burned rock middens with very low rock fracture rates indicate that such facilities were used to bake large quantities of Agavaceae plants, during just one or two use episodes, for both food and for fermentation into mescal.

The social dimensions of Archaic settlement are also manifested in rock art and ritual landscapes. The first visual expressions of cosmology in the form of rock art and mobiliary art, perhaps accompanied by placemaking, occurred during this pivotal interval of the Jornada Archaic. The earliest identifiable rock art may date to the Middle Archaic, although the problems in directly dating petroglyphs and pictographs hinder the confirmation of such associations. Several rock art styles and iconographic expressions date to the Late Archaic (Schaafsma 1980), including the distinctive Diablo Dam or Shumla style.

A remarkable collection of perishable items was recovered from Ceremonial Cave in the Hueco Mountains the late 1920s and early 1930s (Alves 1930; Cosgrove 1947). Several items from the cave have been dated, including hafted projectile points, prayer sticks (pahos), and tablitas or painted wood panels (Miller 2014) and the majority of hafted points and prayer sticks consistently date from 2300 to 1800 BP. While many of the items reflect hunter-gatherer technology of the period that were cached or discarded during temporary occupations, several of the items were situated within one or more exceptional ritual deposits (Creel 1997). The presence of prayer sticks dating to 2200-1900 BP confirms the antiquity of the ritual deposits and establishes that the ritual use of caves may have origins among the hunter-gatherer and early horticultural groups of the Hueco phase.

These and other interpretations show that there have been major gains in our understanding of the Middle and Late Archaic periods of the Jornada region over the past decade. Perhaps most significantly, the Jornada Archaic can now be securely placed within the broader Archaic traditions of the Southwest.

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