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BOOK REVIEWS

The 1969 Texas Archeological Society Field School at Blue Creek, Moore County, in the Texas Panhandle

Jim Couzzourt and Beverly A. Schmidt-Couzzourt

DEDICATION

to

Camp Boss Charles Bandy

A "dedication" should deal with dedication, and when we think of dedication to the Texas Archeological Society, one friend stands out and stands tall despite his having been restricted to a wheelchair. But from that wheelchair, he managed to continue his long service to the society, contributing valuable experience and knowledge while ignoring his physical limitations. To us, he is the symbol of dedication. If you will, he is symbolic of many of us, who come to the society restricted by limited knowledge and experience but armed with enthusiasm and the desire to learn and grow and do what we can to help meet the goals we share with the society. We gratefully dedicate this article to the late Charles Bandy, friend and colleague, and Blue Creek Camp Boss.

ABSTRACT

Under the direction of Dr. Jack T. Hughes, the Texas Archeological Society held its 1969 field school near Lake Meredith (then called Sanford Reservoir) in the Texas Panhandle. More than 200 participants conducted excavations at four Panhandle Aspect sites situated along steep bluffs ovelooking Blue Creek in southeastern Moore County. The Blue Creek project provides abundant new and important archeological data that furthers our understanding of one of the more interesting, yet enigmatic, cultures to inhabit our state and the Southern Plains.

Three of these sites are architectural hamlets or villages; the fourth is a cemetery probably associated with one or more of the nearby sites. Additionally, testing was carried out in a rich talus-slope midden area below the structure complex at 41MO35 (LMRA 145).

Two of the sites, 41MO36 (LMRA 146) and 41MO37 (LMRA 147), are relatively small hamlets with individual, free-standing structures. Both sites appear to have a large dwelling as their focal points, surrounded by smaller structures, perhaps auxiliary structures or dwellings. The third architectural site, 41MO35, has at least two separate contiguous-walled, linear multi-room structures, with the Midden Area testing downslope. The fourth site (LMRA 242) produced four burials and evidence of two vandalized burials. The human remains are all of young people: two adolescents, a toddler, and an infant.

INTRODUCTION

This article, originally prepared as an unpublished report in 1988, presents the more important discoveries made by Texas Archeological Society (TAS) crews during the 1969 field school in the Texas Panhandle. For reasons irrelevent to this paper, the entire project collections and documentation files had lain virtually untouched since their shipment in 1969 to the Panhandle-Plains Historical Museum (P-PHM) in Canyon. During casual examinations of some of the materials and files, we decided that something should be done with the collections. We offered our services to the TAS and the P-PHM, and undertook a curation project aimed at preserving and

protecting the Blue Creek field school materials. The P-PHM was not directly involved in the field school and had no curation responsibility beyond serving as the repository.

As proposed to and accepted by the TAS, our original intent was to perform basic curation services and to write a limited "curation" report. We considered our efforts to be preliminary in nature: in essence, we would pave the way for a formal, more complete synthesis to be done in the future.

When we became more deeply involved in the project, and the more we realistically considered the prospects of any future formal and thorough report being tackled by other interested parties, the less optimistic we became. We believe, hopefully erroneously, that this article may well be the only study ever published about the important Blue Creek field school and its fascinating archeology. Thus, we finally decided to expand our "curation" report into the relatively complete but still preliminary report you have before you. We have gone well beyond the scope of our original proposal, yet we know we have barely scratched the surface of the potential knowledge contained in the artifact collections, the burials, and the architectural features so diligently exposed, recovered, and recorded by TAS crews. The authors take full responsibility for the interpretations as well as the misunderstandings. Few references are used, being limited to those sources which should be available to the reader without extensive archival and private library searching. In large part, we rely on our combined training and experience, for most of which we are grateful to the TAS, Jack Hughes, and the late Bill Harrison. We hope the reader enjoys reading this paper with even half the enjoyment we had in putting it together. If that happens, and the reader learns something about Texas Panhandle archeology along the way, then our major goal will have been accomplished.

Field School Organization, Methodologies, and Fieldwork Protocols

Perhaps the most important thing to keep in mind when considering our paper is that the Blue Creek field school was a very early one, a truly developmental and even experimental milestone in the growth and maturity of what may well be the most successful archeological program of its kind in this country. The TAS field school (TASFS) program has developed into an invaluable training/investigative tool and resource. To us—and many professionals concur—the value and signficance of the contributions of the TAS to Texas and regional archeology cannot be overestimated. The TASFS system and philosophy has been widely copied and adopted by other archeological societies as a model for their own avocational/professional training and investigative programs.

But like all endeavors, the TASFS has had to undergo a series of changes, similar to human growth and developmental sequences—infancy, adolescence, and maturity. The first TASFS was held in 1962. According to Richmond et al. (1985:107 and Figure 1), the Blue Creek project (called the Sanford Recreational Area field school) was the eighth in the series. Although many changes had taken place since the 1962 TASFS to improve and increase the scientific value of the program, the 1969 TASFS was still an experiment, with the training of crew members taking high priority. Experiences and lessons learned during this field school, and others, contributed to the special committee report submitted to the TAS Board of Directors in 1971, from which the field school program's modern guidelines were developed (Richmond et al. 1985:113).

The location for the eighth TASFS was proposed by Dr. Jack Hughes, then of West Texas State University, Canyon (now West Texas A&M University); he also served as the Project Archeologist. Jim Word was Field School (Committee) chairman, and Charles Bandy served as camp boss. Richmond et al. (1985) do not list a "sponsor," but the National Park Service (NPS) at Sanford Recreational Area (SARE, but now Lake Meredith Recreational Area [LMRA or LAMR]) served as the "host," and provided access and support, as well as the critical authorization permit.

According to Richmond et al. (1985:107), some 204 participants enjoyed the stimulatingly variable Panhandle weather and the challenging Panhandle Aspect archeology at Blue Creek. The TAS would not return to the Panhandle until the attendance record-breaking 1987 and 1988 field schools at the Buried City on the Courson Ranch (Hughes 1991).

The TAS investigated a prehistoric cemetery (LMRA 242) and three architectural sites (41MO35-37), plus extensive middens associated

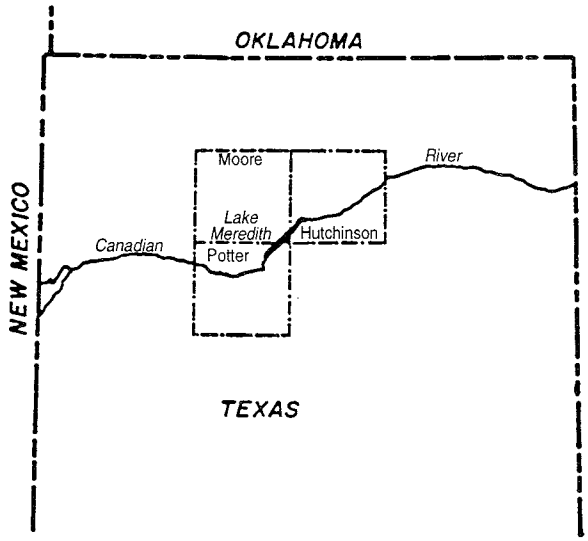


Figure 1. Location of Lake Meredith in Moore, Hutchinson, and Potter counties of the Texas Panhandle.

with one of the ruins. All the sites are located on the western blufftops overlooking Blue Creek in Moore County, perhaps 3 km from the main lake body (Figures 1 and 2).

With the possible exception of the cemetery, the sites were already recorded in the files of both the NPS and the P-PHM. There is some confusion in the site numbering systems, and some explanation is necessary to prevent misunderstanding in later sections. Those who worked at Blue Creek will recall the acronym SARE, then the official NPS prefix code for Lake Meredith (Sanford Reservoir) archeological sites. Since 1969, the NPS system has changed twice, first to LMRA (from Lake Meredith Recreational Area), and later to LAMR when the NPS discovered it was already using LMRA as a designation for another facility. However, the last change was not generally known outside of NPS circles, and we were not aware of it while completing lab work. Too, during the period when the LMRA acroynm was current, there was an increase in regional archeological activity and many sites, along with collections, were recorded using the LMRA prefix. In current Lake Meredith files and artifact collections, the LMRA prefix has been changed to LAMR, although some files, records, and artifacts retain the LMRA prefix. The Blue Creek project and cataloguing terminology uses LMRA exclusively.

The sites also have a P-PHM designation, different from the NPS system. Site LMRA 145 is site A677; LMRA 146 is A678; and LMRA 147 is A679. In addition, the architectural sites have Texas Archeological Research Laboratory (TARL) numbers: LMRA 145 is 41MO35; LMRA 146 is 41MO36; and LMRA 147 is 41MO37. The cemetery, LMRA 242, apparently was never assigned any number other than the NPS designation. In this paper, we will use the TARL site numbers for reference, along with the NPS acroynm for LMRA 242.

Since the collections belong to the NPS, the LMRA prefix was maintained for primary cataloguing. Superficially, the LMRA prefix choice is simple. However, our system becomes complicated because surface collecting by NPS personnel continues, and occasionally artifacts from LMRA sites are confiscated by the NPS from park visitors. The only way we saw to prevent numbering problems was to select specific, unassigned artifact numbers from each site for our use, normally choosing the next available number in the NPS files at the time we began our work. Our numbers, then, became *lot* numbers, or a modified version of that common system. Each catalogued specimen or group of specimens from a Blue Creek project site bears the same "artifact" number but has its own individual "lot" number.

The system is best understood by illustration: Blue Creek Project catalogued specimen LMRA 145-90-1.1= LMRA 145-90 (site-specimen number) + 1.1 (lot 1, specimen 1). All LMRA 145 (41MO35) artifacts bear the designation LMRA 145-90, but each specimen or group of specimens will have different lot/specimen numbers. Lot numbers are determined mainly by provenience, as a different lot number was assigned for each level of each square, including unit by unit surface collections. Unprovenienced specimens were also given individual lot numbers. Groups of similar specimens (such as Alibates lithic debris) were given single lot and specimen numbers, as were groups of very similar artifacts from identical proveniences, these also being given an additional terminal letter code (i.e., LMRA 145-90-15.22 A, B, C, etc.). The burials from LMRA 242 did not receive catalogue numbers, although TAS-collected artifacts and other materials from at least two of the burials do have our catalogue numbers, which terminate with specimen LMRA 242-1-18.1. We specified in our scope of work that we would not examine the human remains, which were at the time already boxed and

identified by field feature number.

The crew division and assignment system used at Blue Creek is one still utilized by the TAS: a Site (or Area) Supervisor directed investigations at a specific site, assisted by Crew Chiefs. Crews themselves varied in number as participants came and went and field needs changed. The Site Supervisor for 41MO35 was Dr. E. Mott Davis; Dessamae Lorrain directed the work at 41MO36; and Billy R. Harrison, in his supervisory debut, was in charge at 41MO37. Cecil Calhoun supervised the excavations of the burials at LMRA 242. In addition to excavation duties, Billy R. Harrison and Miles Locke conducted the transit/alidade surveying for all sites. Crew chiefs, some of whom found themselves drafted to the position without prior warning, are too numerous to list here.

TAS did not have a cook trailer in 1969, but it did have an Army surplus tent and some field kitchen equipment. Cooking duties were shared by many members, including Camp Boss Bandy, Jim Word, and others. The food was said to have been excellent. The NPS provided potable water for camp use; there was no electricity.

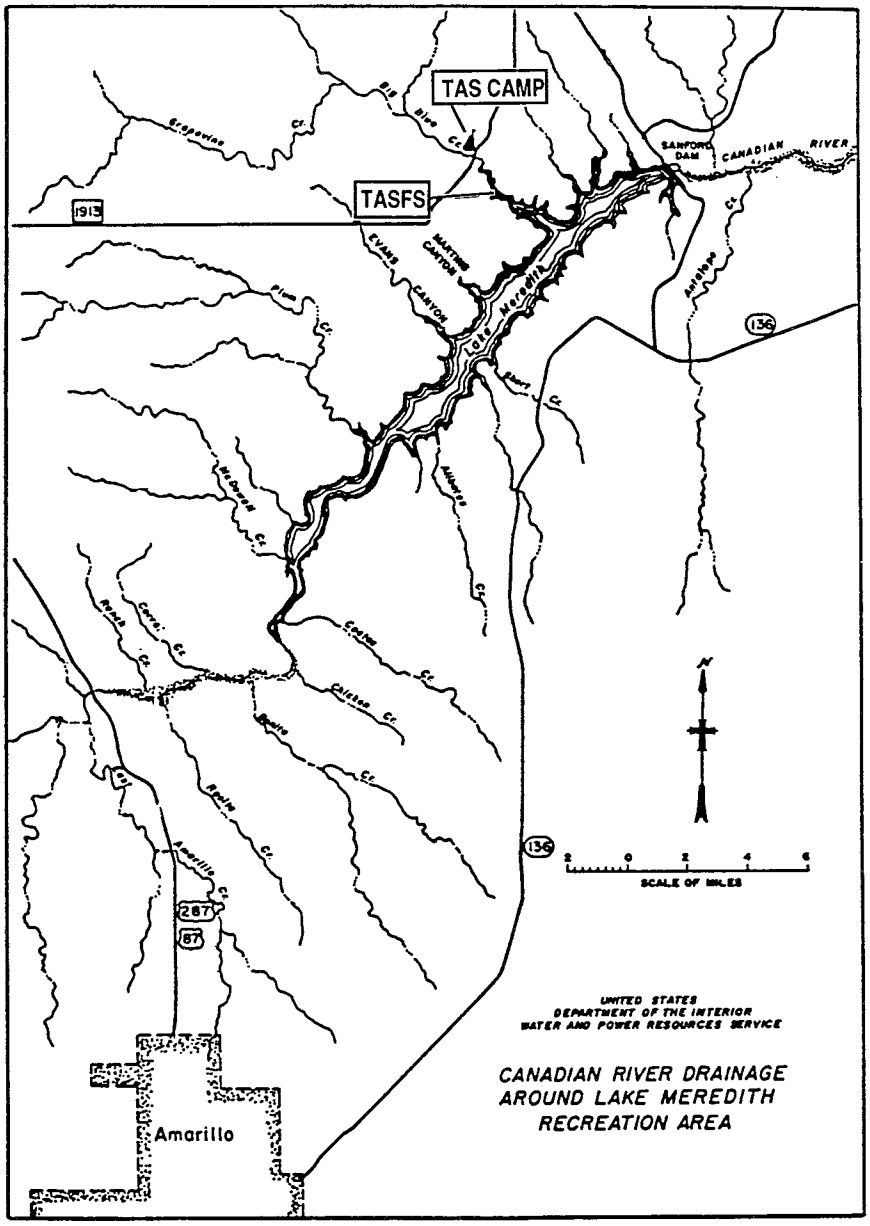


Figure 2. General location of the TAS campsite and Blue Creek field school archeological sites.

Site excavation forms were provided by the TAS, using standard formats, and level and square records were routinely used along with burial record forms. A standard graph paper was supplied for maps and sketches (although scales used on those drawings vary considerably). Crew chiefs and site supervisors kept field notes, but no specific system was used or requested. The quality of those notes varies, as it always does, and contents range from bare verbal descriptions of some activities to thorough, highly detailed, and illustrated journals.

One of the more valuable practices encouraged by some supervisors and crew chiefs was the keeping of daily logs or personal journals by crew members. This was not a widely adopted practice, but these journals proved very informative and useful for understanding and appreciating virtually every aspect of the field school. In some cases, when

more formal documentation such as level records failed to clarify certain finds, supporting data could be found in the journals. Occasionally, important observations appear in the logs that did not appear on any document/form.

Logs and notes kept by crew chiefs and supervisors are generally very good and of professional quality; some are excellent. Unfortunately, one entire set of field notes and presumably other documentation (maps, sketches, photos) is missing: those of the 41MO36 site supervisor. Those records were apparently destroyed in a fire some time after the field school.

Site 41MO36 was a very complex and complicated site; indeed, its complexity led to a near-panic situation toward the end of the field school as feature after feature was uncovered and crews had to be switched from other areas to work here. Because of the site's complexity and the lack of detailed documentation from portions of the site, there are serious problems in understanding and attempting to describe some of its architectural features, especially those that appear to have been part of a large dwelling.

One very important documentation standard now routinely practiced by the TAS, but conspicuously absent at Blue Creek, is field photography, complete with scales, directional markers, etc. No one was assigned at any site to take photos, and the photographic record collection found in P-PHM files and later assembled from individual sources is very limited. Many of these are simply general shots of people and landscapes. The site and feature photographs typically have no scales/arrows and were not framed with the archeology (or subsequent interpretation) in mind.

In addition to photographs and a few slides, there are two reels of 16 mm movie film taken by Martha Hughes. After much repair (the film is now very brittle) we were able to view the movies, seeking clues to many unanswered questions. However, the movies deal mainly with the camp life and people, with very little archeology in focus or foreground. We have assembled a collection of available photographs, slides, and negatives pertaining to the Blue Creek TASFS in a non-acidic album to be included with the permanent documentation collection.

Certain general mapping problems could not be resolved from project documentation. The "project prime datum" (our term), from which all stakes were shot and to which all elevations are tied, is the "top flange of [a] gas well" located on private land generally west of the site complex. No project map shows the location of that datum, however, or ties other site datums to it.

The elevation datums map (which has two datums for LMRA 242) indicates the spatial relationships of each site elevation datum to the others and to one of the LMRA 242 datums, which apparently served as a tie-in with the prime datum. Elevations for the prime datum and the site datums are given, and the site datums are called "origin[s] of 10-foot grid system," which makes their location critical. However, this elevation datums map does not depict the locations of the sites, other than LMRA 242, whose southeast grid corner is located 800 feet north of its "origin" stake, which is not its elevation datum.

There are computer-generated topographic maps of each site, with grid stakes/elevations plotted on them. These are not tied to the elevation datums (except possibly for 41MO37's map, which has a line angling north-northwest from a western stake to an unknown point off the map). Using the U.S.G.S. quadrangle, the gas well prime datum can be located, and the elevation datums for each site are known (at least on paper). Except for LMRA 242, which is located 800 feet north of its datum, the site grids cannot be linked to their elevation datums because that information is missing.

The individual sites of the Blue Creek complex are close together. The approximate distance between the two most widely separated sites, 41MO37 on the south and 41MO35 on the north, is 450-520 m. Site 41MO36 is between them, but closer to 41MO35. LMRA 242 is 120 m west of 41MO36. All site elevations are below the assumed 3125 feet elevation at prime datum; differences range from about 90 feet to 120 feet, reflecting the gradual downward slope of the uplands to the creek valley rim adjacent to the sites.

The topographic change of each site is not significant, inasmuch as the landforms selected for habitation are flat. The localities afforded good visibility but not much "defense," except from the creek valley. If attacked from the northwest through the southwest (the approach any sensible hostile would use), the Blue Creek defenders would find themselves with the steep, rough bluff slopes at their backs. Instead of having defense in mind, it seems more likely the site localities were selected with an eye on monitoring their crops in the

floodplains below.

During the 1969 assault, crews gridded each site into ten-foot squares (3.05 x 3.05 m); the grid center is called stake NS/EW. Each site was later surveyed with a transit/alidade and stake elevations recorded. Surface collections were made square by square. As a training exercise, crew members were asked to draw field sketch maps of their sites. In some cases, site record forms were completed by "students." The site and feature maps/sketches used for this paper relied heavily on those sketches done by field crews, with adaptations as needed.

Excavation units were usually ten-foot squares, occasionally broken into five-foot quadrants.[1] The southwest corner was the control stake or pin for each unit. Six-inch balks were left unexcavated inside unit grid lines. This occasionally created mapping problems within the units because measurements were frequently taken from the balk margins instead of from grid lines.

In the field, dirt was screened through 1/4-inch hardware cloth, although not all excavated soil was screened at all sites. At 41MO36, for instance, during the late-week "panic" (see below), all screening was abandoned, except for occasional spot-checking, in order to expose features. Frequently, too, the dirt was soaking wet, making screening difficult to impossible in any case.

Artifacts were bagged in paper sacks marked with the appropriate provenience, often including a separate provenience card as a further control. Special or selected artifacts or materials were further "bagged" with materials ranging from gum wrappers to plastic garment packaging sleeves. A few sacks have incorrect proveniences, or in some cases the provenience listed on the sack differs from that listed on the enclosed card. Many sacks were stored away while wet. In the P-PHM storage boxes, sacks had torn open and their contents scattered and occasionally mixed with other sacks. Every attempt has been made to correct provenience errors, and resolve the problem of spilled materials; unsolved problems constitute artifacts of "unknown provenience."

Most organic materials (plant and animal remains) were not specially protected or preserved in the field, and some were occasionally packed away while wet. Some of these—notably antler tools/materials—did not survive recovery and storage well or at all. Several other bone and antler materials were so badly decayed that they could not be adequately repaired.

All the bone and antler tools and many of the unidentified faunal remains were treated by the authors with PVAc (this includes the few human remains found in sacks from LMRA 242 and 41MO37). When gluing was necessary, PVAc was used, if possible, or else Duco cement or Elmer's. These materials and artifacts were then repackaged in new foil and other protective materials, such as bubble-pack and flexible plastic foam.

Limeaway was used to remove calcareous coatings from lithics and other materials; occasionally a strong muratic acid was employed for massive lime deposits. Acids were not used on ceramics unless testing for calcareous temper or paste inclusions.

Most of the site materials were rebagged in new sacks that included the original sack label and control card. Groups of materials were separated in Ziplock or sealed plastic sandwich bags, each with an enclosed catalogue number card. In the case of soil or charcoal/ash samples, care was taken to avoid contamination during rebagging. Site collections were placed in appropriately marked storage boxes, and in accordance with P-PHM standards, artifacts have been separated from other materials and placed in specially marked site boxes. Larger artifacts, such as manos and metates, remain in the general site collection boxes.

For our analysis, catalogue forms were designed for quick and easy artifact/material identification and attribute listing. Forms were created for each major class of tool/material (lithic, ceramic, organic), along with those for special classes, such as battered and ground stone. The completed catalogue form collections are bound in color-coded site volumes along with copies of other site records and reside with the collections at the P-PHM.

Artifact identifications and descriptions follow those systems taught to the authors by our mentor, Dr. Jack T. Hughes, which is a functional approach. With the Panhandle Aspect toolkit, the first step is to determine the artifact's primary function, and

[1]Provenience information was collected during the TAS field school using foot and inch measurements, rather than the metric system. The foot and inch measurements are retained throughout the text, while general descriptions of distances have been changed to meters and kilometers.

with multi-functional tools, consider other identifiable functions (e.g., scraper-graver, graver-spokeshave, etc.). Unidentifiable fragments are lumped in an "unclassified" category.

There are some gaps in the identification of site artifactual remains, especially among the organics. Specimen collections at the P-PHM and Killgore Research Center, WTAMU, and several text sources, were employed to make bone identifications, but many small bones and fragments are not classifiable. In our opinion, a potential master's thesis awaits some enterprising graduate student interested in the prehistoric diet and subsistence strategies of the Blue Creek site inhabitants.

ENVIRONMENTAL BACKGROUND

Detailed studies and descriptions of the Lake Meredith area, the Canadian River Valley, and the Texas Panhandle are avaiable in many publications, and only an overview is presented here. For a thorough study of the Canadian River environment as it pertains to the Panhandle Aspect culture, the reader is referred to Lintz (1986).

Terrain

The Panhandle is located within the High Plains section of the Great Plains Province. Probably the most obvious Great Plains physiographic feature in the Panhandle is its seemingly interminable, often table-top flat, and usually treeless plain. The Canadian River, gathering its headwaters in southeastern Colorado and cutting an east-west swath through the plains, is the southernmost of the Great Plains tributaries feeding into the Mississippi River drainage. Now reduced to a sometimes dry relic of its former sweep and power, the Canadian has cut a wide, steep-banked valley across the level plains, creating deep, rough canyons and arroyos that produce a rugged landscape, appropriately known as the "breaks." To the modern rancher, the breaks are a curse: grassless, difficult to traverse, locales of active erosion, and wonderful places for cattle to hide, making roundups wearying, time-consuming, and expensive. To the prehistoric peoples roaming the plains and the river valley, the breaks were no doubt greately appreciated: abundant game seeking shelter in the canyons or food in the bottomlands; its suitability for horticulture; exposed and readily accessible clay and lithic resources, including the famous Alibates flint deposits; and access from the high caprock/plains to the fuel, tool, and food resources in the fertile bottomlands.

The Lake Meredith terrain can be divided into four major zones: bottomlands, steep slopes, uplands, and sandhills, all of which are found at or near the Blue Creek site complex. Bottomlands consist of the Canadian River and its tributaries and their active flood plains, alluvial terraces, and alluvial fan deposits (Etchieson and Couzzourt 1987:2-2). Soils in these areas are sandy, while terraces contain some reworked Redbed materials and alluvium/colluvium with the sands. While much of this zone is subject to periodic flooding, small areas, especially the terraces, are suitable for limited horticulture. The field school sites are located near such terraces and bottomlands. Sites are rarely located in the bottomlands, primarily because of the threat of sudden flooding.

The steep slopes line canyon walls in the river valley and tributary canyons. Small benches occur at various areas along these bluffs, which are often strewn with dolomite and sandstone boulders, slabs, and rubble. Grasses and other vegetation are limited. Because of the steepness of most of this zone, sites are rare, although middens can be located on slopes and benches immediately below blufftop sites (e.g., the Midden Area at 41MO35).

The upland zone has two subareas: canyon rims and the plains. Promontories along the rims that allow unrestricted views of the stream valleys contain numerous prehistoric sites (Etchieson and Couzzourt 1987:2-2). Rim-situated sites are more frequent than sites located on the broad grassland expanses extending away from the rims. Perhaps the latter sites are more numerous than we know, but are more difficult to locate because of deeper topsoils with more intensive grass cover and less erosion. The Blue Creek sites are on or very near the canyon rim; others, including one or more Panhandle Aspect hamlets/villages, are located along the same rim system (Etchieson 1981).

There is one unusual topographic setting in the lower Blue Creek Valley. The west rim is usually quite steep-walled with a limited steep-slope zone, but the east bank, from just below the crossing of FM 1913, near the TAS campsite, is a much more extensive and much less steep zone between the bottomlands and the barely traceable caprock or uplands rim. This large area of badlands, or breaks, contains numerous sites (ranging in age from

Paleoindian to Historic times), but there are no known Panhandle Aspect habitation sites there, only open camps. While the archeological data are far from comprehensive, it seems that eastern steep slopes and uplands were preferred habitats for the foraging camps of pre-Late Prehistoric peoples, especially Archaic nomads.

The sandhills zone is present on the uplands and along the valley walls in the bottomlands; large dunes also sometimes occur along stream channels. Sandhills most often are small patches of stabilized dunes, with occasional blowouts, especially on the upland plains (Etchieson and Couzzourt 1987:2-2). These sandhills frequently contain archeological materials in mixed contexts, ranging from Paleoindian points to Historic trash. The upland areas away from the rim, particularly on the Blue Creek west bank, have eolian dunes. Some of the "terraces" in the valley bottomlands here may actually be stabilized dunes.

Water

The Canadian River immediately comes to mind as the region's major water source. However, the river tends to be brackish, saline, and loaded with sediments (indeed, one of the early names for the Canadian is "Cimarron," Spanish for "red"). All along the river upstream from Lake Meredith are saline or gypsum springs that empty into it.

More dependable as a fresh water source, at least in the prehistoric past before agriculture and municipalities began draining it, is the Ogallala Aquifer. This vast underground sweet-water resource is well known to West Texans and inhabitants of the Great Plains, and it is a major source for drinking and irrigation water for several million people. The Canadian River, however, cuts through it, allowing it to drain in the form of springs and seeps into the river and tributary valleys. Now, after decades of natural and artificial draining, the Ogallala is losing water, many or most of its springs have dried up, and local area water tables are becoming dangerously low.

Blue Creek derives some of its flow from the Ogallala; the rest comes from an extensive drainage system on the plains north and west of its head. Blue Creek was considered a dependable, flowing creek prior to the late 1960s. But by 1969, the springs had all but dried up or became intermittent at best, and the spring rains had not been steady or sufficient enough to maintain the flow.

Regardless of its present condition, Blue Creek (labeled on some maps as Big Blue Creek) obviously was a dependable source of water in the prehistoric past, as evidenced by the many sites, including permanent hamlets or villages, lining its rims: it must have been a Canadian River in miniature, but with better water. To our knowledge, there remain few, if any, still-active springs along the creek valley in proximity to the site complex excavated by TAS. There are only a very few playa lakes on the uplands in the immediate area. These ephemeral, shallow, but often quite large basins dot the plains and obviously were important water sources in the recent and prehistoric past. Game, especially bison herds, relied on them for (seasonal) watering holes near the grassland feeding areas, and hunters took advantage of the situation. Many of the bison whose remains litter Panhandle Aspect sites were probably taken at or near playa lakes.

Flora

Blair (1950:110) places the Lake Meredith uplands and the High Plains in the Shortgrass Plains District of the Kansan Biotic Province. Green (1986:4) states that the Canadian River Valley represents an extension of the Mesquite Plains District into the Shortgrass Plains District.

Lintz (1986:68-74 and Table 9) lists more than 70 useful plant species found near Lake Meredith. Some of the most common, and almost certainly prehistorically utilized, plants in the Blue Creek/Canadian River area include: hardwoods for tools and fuel; wild fruits/berries; edible grasses and other seeds; grasses for thatch and mats; reeds and canes; and cacti.

While native plant species are still abundant in the area, the shores of Lake Meredith, as well as stretches of the river valley, are being altered by non-native species, especially salt cedar (tamarisk), Russian thistle (tumbleweed), and noxious weeds. This invasion is the direct and indirect result of inundation and fluctuating lake/river levels (Etchieson and Couzzourt 1987).

Fauna

Mammalian fauna characteristic of the Kansas Biotic Province include bison, coyote, badger,

skunk, prairie dog, and rabbits. Others found in the province include whitetail and mule deer, antelope, bobcat, black bear, mountain lion, timber/lobo wolf, kit fox, raccoon, and many species of rodents. Except for the bison, wolf, bear, and possibly the mountain lion (?), these species can still be found in the Panhandle. The remains of almost all of the above species—and more—can be found in prehistoric Panhandle Aspect middens.

The province has 14 species of lizards, 31 species of snakes, aquatic turtles, but only a single species of land turtle. The most well known of the reptiles include the collared lizard, horned toad, skink, diamondback and prairie rattlers, king and bull snakes, and the common box turtle. Of these, the most important prehistoric resource is the land turtle, whose carapace remains are especially common in Panhandle Aspect middens.

Bird species lists for the Panhandle are lengthy because the region is a major flyway for various migratory fowl. Perhaps the most common of the useful species in the region are the wild turkey, two species of quail, and several species of hawks and owls. The prehistoric use of birds by any of the Panhandle cultures is poorly known, but judging by the limited numbers of bird remains at sites, it does not seem that birds played a major role in prehistoric diets.

Equally scarce in prehistoric Panhandle middens are fish remains. Several species of fish are native to Panhandle waters, but their bones are conspicuously absent in archeological contexts. Fish do not appear to have been an important dietary resource during the Panhandle Aspect.

Freshwater molluscs, however, are commonly found in prehistoric Panhandle sites. Mussels are common in the Canadian River, and can attain very large size (Etchieson and Couzzourt 1987:2-3). Land snails, however, are almost never encountered in cultural context, and when found probably do not represent food resources. In the Panhandle, mollusc shells are commonly found in Panhandle Aspect sites, where they were used as food, tools (scoops/spoons, "corn-shellers," scrapers), and ornaments (beads, pendants, gorgets).

Climate

The Panhandle has a dry steppe climate with an average annual precipitation of about 51 cm, some 79 percent of which occurs between May and October in the form of thunderstorms. Annual precipitation is extremely variable, ranging from almost 94 cm in 1960 to 25 cm in 1970 (Etchieson and Couzzourt 1987:2-4).

Panhandle thunderstorms are often spectacular or even devastating, producing heavy rainfall and flooding, crop-destroying and car-smashing hailstorms, and multiple tornadoes or hurricane-force straight winds. These are, however, sporadic and rare events, such as occur in virtually every other part of the Southwest and the state.

Panhandle temperatures are, on the whole, rather pleasent, ranging from a mean maximum of about 93 degrees F to a mean minimum of about 22 degrees F. Extremes occur, of course, but the Panhandle summer heat and winter cold are typically dry, with humidity exceeding about 40 percent only during rare periods.

The Panhandle is famous for its winds. We have no dependable data on "wind-free" days or average annual wind speeds, but we suspect that the former would be fewer than 30 days and the latter would not exceed 15 miles per hour. The prevailing southwesterly winds, funneling through the narrow, steep-walled canyon surrounding Lake Meredith, are major causes of wave-induced erosion of archeological resources along the shoreline (Etchieson and Couzzourt 1987).

Geology

This aspect of the Lake Meredith environmental setting is thoroughly covered by Douglas K. Boyd (1987), and the reader is referred to his work for more information. With respect to the geological setting of the Blue Creek sites, of particular relevance are the abundant, readily available lithic resources in the region.

Forming the Caprock for much of the High Plains in the Lake Meredith area is the Alibates dolomite. This hard, resistant, gray to white stone erodes as boulders and slabs from thick beds. The slabs, often relatively thin and angular, were an easily accessible and immediately usable resource for house walls or foundation construction, as well as for grinding implements. Dolomite slabs or boulders were also used as "nutting" basins, while larger outcrops and boulders sometimes have grinding basins and/or mortar holes in them (Etchieson and Couzzourt 1987; Etchieson 1981).

Various sandstones occur throughout the river valley and its tributaries; much of this stone is Triassic or Permian in age, and its quality and usefulness are variable. Some sandstone outcrops or ledges tend to fracture or weather into slabs, which were used for metates. Sandstone slabs occasionally occur as wall/foundation members in Panhandle Aspect structures, but dolomite was clearly the stone of choice at most sites. In areas where dolomite was not readily available, and sandstone was, the latter was the dominant construction material.

The most widely known and publicized Lake Meredith-area lithic resource is Alibates flint. Actually an agatized dolomite, Alibates flint occurs as massive lenses or veins/sheets within the Permian Alibates Formation. The flint veins occur within the upper member of the formation, where two beds of dolomite form the resistant Caprock.

Alibates is one of the more easily recognizable lithic raw materials because of its typically banded array of bright colors, including: reds, maroons, whites, browns, grays, and purples; other common colors include orange/yellow/gold, blue, and a blood red that approaches black. Banding is the salient hallmark of Alibates, but there is considerable variation within and throughout the deposits, as some Alibates is swirled or mottled, and other pieces appear to be solid-color, usually white or one of the darker colors. Alibates occasionally has crystalline veins or impurities, and pseudo-geodes also occur; some veins and nodules contain sizable, high-quality quartz crystals and amethysts. Both transluscent and opaque Alibates flakes are common, and it is usually glass-like and easily worked; however, some Alibates is virtually a grainy-textured quartzite. All of these kinds of Alibates, including two small amethyst crystals from vein impurities, are represented in the Blue Creek lithic assemblage.

More commonly found in the Palo Duro Canyon area, Tecovas jasper (also called Tecovas flint and Quitaque flint) outcrops in the Lake Meredith area. Of Triassic age, Tecovas jasper occurs in the Tecovas Formation, a zone of shale and sandstone beds underlying the massive, widespread sandstones of the Trujillo Formation, the source of much of the sandstones used by prehistoric peoples in the area.

Like Alibates, Tecovas has a wide range of bright colors and textures, some not easily distinguishable from varieties of Alibates. Typically, Tecovas jasper is opaque, mottled, or swirled. Colors are bright orange to dark red, although frequently yellow, white, cream or beige, purple, and even blue. A Tecovas "quartzite" also occurs that is very similar in texture and general apperance to Alibates "quartzite" and Dakota orthoquartzite. Artifacts made of Tecovas comprise only a small percentage of the Blue Creek collections, but it is not unusual to find small amounts of Tecovas in sites of all ages in the core of the Alibates quarries region.

The lithic identification problem is complicated by the existence of "flints" and jaspers in the widespread, abundant local gravels. Most of these gravels are associated with the Pliocene Ogallala Formation, and constitute an invaluable lithic resource that was widely utilized by prehistoric peoples. The gravels, easily accessible on eroded hilltops and slopes, at the base of Ogallala exposures, and throughout the river and tributary valleys, are composed of a vast range of lithic materials, many of which have Rocky Mountain origins. Cherts, jaspers, quartzites, sandstones, and schists are common; also present are hornfels, chalcedony, opaline, silicified wood, rhyolite, agate, hematite, and limonite.

Rocks from the gravels were used for tools of all kinds, but especially for boiling stones, manos, hammers, choppers, abraders, pigments, and hearth stones. Crushed quartzitic or granitic pebbles were a favorite source of ceramic tempering aplastic, particularly among Panhandle Aspect potters. At 41MO35, unaltered gravel pebbles and cobbles were used as flooring or floor-leveling fill, as well as a fill for wall construction at the three habitation sites. Other gravel uses include polishing or rubbing stones, beads and pendants, "axes," bolas and slingstones, "rabbit rocks," and "charmstones."

Another resource exposed in river and tributary valleys is clay, most abundant in Permian and Triassic beds. Ceramic-quality clays can be found in many localities in the Lake Meredith area, and in playa lake beds dotting the uplands. Some of the area clays are micaceous (Alvin Lynn, personal communication, 1986), and much local pottery, especially that of the Panhandle Aspect, tends to have a micaceous paste (or temper). Clays were also used for house superstructure daubing. Hearths and other interior features are often clay-plastered.

Occasionally, Panhandle Aspect pipes were made from a high-quality, very fine-grained stone that resembles catlinite. The stone is slightly more coarse-grained than the typical catlinite, and the local stone's colors also tend to be lighter: pink,

beige, or tan, although reds do occur. The stone used, however, is apparently an argillaceous siltstone or similar sedimentary rock, that may be found in the shale-siltstone-mudstone beds of the Permian or possibly even the Tecovas/Trujillo Formation deposits. This particular stone type must be very rare, and its source or sources have not been identified.

Imported lithic materials include obsidian from New Mexico, cherts from Central Texas and Oklahoma (and perhaps also New Mexico and Colorado), turquoise, and, rarely, greenstone in the form of celts or celt blanks. Other seemingly exotic materials occur, but the full range of raw materials contained in the rich local gravels is not known.

CULTURAL OVERVIEW OF THE PANHANDLE ASPECT

Only a single culture's remains were archeologically identified at the sites excavated during the Blue Creek TAS Field School: the Panhandle Aspect, a manifestation of the Plains Village tradition in the Southern Plains. This section provides an overview of the Panhandle Aspect, adapted in part from Etchieson and Couzzourt (1987:3-4 to 3-6); the reader is referred to Lintz (1986) for a comprehensive discussion of the Panhandle Aspect.

Without question, the Panhandle Aspect is the best known and most widely investigated prehistoric culture in the Texas Panhandle. The total of known Panhandle Aspect (PA) sites numbers in the several hundreds. This includes open camps, a severely neglected class of PA site.

Architecture

The most intensely studied PA sites are the architectural villages, hamlets, and isolated structures along the Canadian River in the central Texas Panhandle. Unfortunately, most have been vandalized, either partially or thoroughly, and many have been destroyed or severely damaged by natural or man-induced causes, including erosion, oil and gas activity, road building, private and commercial construction, periodic flooding, and long-term inundation.

Panhandle Aspect villages can be characterized as relatively large complexes composed of slab-lined pit houses or surface structures, sometimes occurring as multi- and contiguous-room "pueblos," usually with auxiliary rooms or buildings (labelled cists, bins, etc.). Hamlets are smaller groups of dwellings and other structures. For our purposes, a village housed 10 or more family units. Thus, Blue Creek sites 41MO36 and 41MO37 are hamlets, while 41MO35 appears to be a village.

Isolated structures may be homesteads, or "fieldhouses," that perhaps were seasonally occupied. They are scattered throughout the PA region. Villages are typically located on high ground (the dolomite and sandstone-capped bluffs), but can be found on lower alluvial terraces as well. Isolated homesteads occur in all topographic and landform settings.

Room sizes, shapes, and designs vary considerably, as do construction techniques, from site to site, and there is often much variation within a site. Dwellings range from quite large and spacious (10 x 10 m and larger) square/rectangular constructions to small (2-4 m on a side or in diameter) square, rectangular, D-shaped, or circular rooms. Some dwellings, usually of apparent seasonal occupation, are oval in shape; others, as at 41MO36, are D-shaped. Some of the smaller structures doubtlessly served as storage facilities, although rooms of similar size sometimes contain domestic hearths and trash.

There are a few PA structures that used almost no slabs in their construction. These have walls made of palisaded posts and adobe, but the absence or scarcity of slabs in wall construction tends to be the only significant difference between them and other slab-lined PA structures. Such sites usually occur in areas devoid of locally available outcrops of suitable rock, as at the Greenbelt Lake and Jack Allen sites (Lintz 1986:356-359). Both sites are located about 2 km or more from the nearest slabby dolomite or sandstone outcrop. Others, however, have been found in the Canadian River Valley near Lake Meredith where dolomite and sandstone slabs were readily available (see Room 1 at the Footprint site [Green 1986:117, 125, 144-145]).

Occasionally, PA sites have dwellings with walls constructed of combined slabs and posts. The Footprint site had one such structure with vertical and stacked slabs placed along the outside of a spaced, palisade-like wall (Green 1986). The Kit Courson site on Wolf Creek has a combined caliche boulder/palisade wall construction.

Construction techniques for PA structures are

as variable as room designs. The most common slab wall constructions involve: (a) single rows of vertical or on-edge slabs lining the interior face of a shallow pit; (b) double rows of slabs outlining a pit or set in trenches to enclose a room whose floor is at, or slightly below, the original ground level; and (c) combinations of vertical and stacked slabs, sometimes with the vertical tier serving as a foundation for upper tiers of stacked slabs. There is precedent for two and possibly even three tiers of vertical slabs, though this technique is uncommon. Wall collapse makes it all but impossible in many cases to reconstruct upper-tier construction techniques. The slab foundations may be encased in clay/adobe mortar, often with a rubble fill added between double-slab rows. Small slabs, amorphous chunks, and river cobbles are often used as chinking, and occasionally small slabs or cobbles were used to brace the bases of vertical slabs (a technique used at 41MO35 and in the large cist at 41MO37).

Slab foundations were used to support superstructure walls or wall sections composed of vertical poles or wattles, which probably had smaller branches and twigs woven into them; the wall was then plastered over with mud or clay. Bundles of reeds or grasses may have also been used in wall superstructures. In some cases, walls may have been built entirely of coursed tiers of slabs in mortar, although this is uncommon. The large house, or at least the large cist and the south house wall, at 41MO37 *seems* to have been constructed in this manner.

The partitioning of main rooms into smaller divisions occurs infrequently. Sometimes partition walls are made of poles; other walls are slabs. Rarely, Panhandle Aspect sites evidence mud or adobe partition construction, but these are not well preserved. Partition walls apparently were used at 41MO35, but these may have separated main rooms instead of creating "new" rooms or divisions within a larger room.

Roofs were probably very similar to wattle-and-daub upper wall sections, being supported by crossbeams laid atop vertical posts set in the house interiors. The number of interior support posts varies from house to house, with as few as two postholes in smaller houses to as many as eight, or more, in very large houses. In general, circular or oval houses do not often produce evidence of roof-support postholes, although exterior small postholes are sometimes found, suggesting a brush-arbor type roof, perhaps similar to a wickiup. Fired or burned clay chunks or masses near the centers of collapsed houses attest to the use of clay to line and protect a central roof smokehole.

Square or rectangular dwellings usually have east-facing entryways constructed of, or lined with, vertical slabs. Of varying length, depth, and width, the entryways were like tunnels, presumably to help control draftiness, and perhaps to limit and control access. Some entryways are carefully and substantially constructed (such as that at 41MO37), while others are simple gaps in house walls, especially in circular and oval structures. Ancillary or auxiliary structures (i.e., the 41MO37 cist) often lack obvious entrances or wall gaps. In a few instances, large rooms, such as those at the Saddleback Ruin (a large contiguous-room village), have no definable entryways and may have been entered from the roof.

House interior design and features range from barely detectable tamped-down floors, to elaborately constructed systems of a plastered central channel edged by raised lateral benches. Other interior features include "altars" set into the west or rear wall, carefully made clay-lined central fire pits, and collared or curbed "cold traps" at the entryway-wall. Roof support posts are often carefully set into the plastered benches and/or channel.

Pits

At some Panhandle Aspect sites, large, well-made cache or storage pits occur outside structures. They range from bell-shaped to plastered and floored. Stone-lined cists or bins are often attached to main house walls, often on the east wall, adjacent to or incorporating the entryway. The large cist attached to the 41MO37 house is different in character because of the massiveness of its slab construction. Storage or cache pits inside houses are common, while slab-lined pits or bins are infrequent within house walls; slab-lined pits sometimes contain burials.

Subsistence

The PA people relied heavily on bison hunting and horticulture, augmented by gathering and procurement of other wild game and plants. Their dependence on horticulture is not well established, but analyses by Habicht-Mauche et al. (1994:299) of the stable carbon values of human remains from the Antelope Creek phase indicates that "more than

half the calories (>60%) must have been supplied by maize, cactus, or other C4 plants such as amaranth." Virtually every PA site has bone implements thought to have been used in horticultural activities, along with frequent evidence of maize. Direct evidence of beans and squash is more limited.

Trade

Trade with Southwestern groups and, to a lesser degree, with other Plains Village groups played some role in PA subsistence. It seems clear that the local peoples took advantage of the Alibates flint and the High Plains bison herds and traded with Pecos and Rio Grande-area Puebloan groups. The most obvious Southwestern trade goods found in PA sites include: painted and glazed pottery, obsidian, Olivella and other shell beads, and turquoise. These materials are frequently scattered in trash middens or among the domestic trash inside houses. Olivella and other shells beads, as well as turquoise beads or pendants, occasionally accompany burials, but Southwestern pottery sherds nearly always litter middens and structures, but rarely occur with burials or in caches. Complete obsidian tools are very rare in PA assemblages; the material is usually found as lithic debris.

The pottery, ornaments, and exotic lithic material may have been trade incentives or goodwill gifts from Puebloan groups. As the painted vessels do not appear to have been valuable per se to the PA peoples, it must have been what the vessels contained that they emphasized (perishables). Lintz (1986:261-262) speculates that the main trade item returning in pots (and perhaps also in skin bags or basketry) from the Southwestern pueblos was corn, both for seed and for consumption. After examining sherds representing 11 trade vessels from the Ozier site (a PA village on the north shore of Lake Meredith 5-6 km from the Blue Creek complex), David Snow (n.d.) (quoted in Crabb [1968]) observes that:

> Jar forms are dominant in the collection, in contrast to the intra-regional situation in the Rio Grande where bowls are the dominant "trade" form during the period indicated [A.D. 1350-1450] (as well as the dominant form produced). Rio Grande vessel form distribution outside the region is seldom reported and a comparison with other collections might be a useful approach to the dynamics of the socio-economic system(s) through which Rio Grande vessels were moved eastward.

Lithic Tool Kit

Panhandle Aspect lithic tools reflect a Plains heritage. The tool kit includes small triangular arrowpoints of the Washita, Fresno, and, less commonly, Harrell varieties, as well as large, very thin, beautifully executed oval knife blades, and the resharpened (hence beveled) versions, often referred to as "Harahey," diamond-beveled, or four-beveled knives. These are clearly very effective bison processing tools. Snub-nosed end or end/side scrapers are also part of the PA tool assemblage. Additionally, the lithic tool kit contains a wide range of implements, including drills, gravers, spokeshaves, multi-function tools, and retouched flakes.

One other flake "implement" seems characteristic of the Panhandle Aspect: the "guitar-pick" preform or blank. Sometimes referred to as a "scraper," this odd retouched flake is very distinctive: it is a triangular to subtriangular or ovate flake that usually is slightly to moderately curved or even twisted in long-axis profile. The bulb of percussion usually forms the apex of the triangle, and the distal end of the flake (the wider "base") has been snapped off. Blade edges are almost always convex; the base may be convex or straight. Retouching is minimal, unifacial, and coarse, being limited to edges and the base; retouching seems to most often occur on the ventral face. The limited retouch suggests these pieces are unfinished. Jack Hughes (personal communication, 1984) thinks these specimens were made on a mass-production basis, with at least some of the retouch "applied" by expediently pressing the flake's thin sides against a hard, angled surface, and perhaps raking the edges along that surface instead of using a billet or antler-tine flaker. This is an effective retouching technique (which has been replicated by Hughes and others) that also tends to produce abrasions or "wear" (usually unidirectional) along the flaked edges. Given this, we opt to classify the "guitar-pick" as an arrowpoint preform or blank.

Bone and Shell Tools and Ornaments

Other diagnostic tools in the PA assemblage include bone horticultural implements, usually

fashioned from bison bones, including the scapula hoe, the tibia digging stick tip, and the "squash knife." Other bone or antler tools include a variety of awls and perforators (often made from deer/antelope metapodials, bison ribs, and other elements), rib rasps, pins, needles, and miscellaneous spatulate or pointed forms. Polished or worn bone fragments are common in middens, and soft-hammer billets and antler-tine flakers are found in several contexts. Antler sections were apparently intended for stone tool hafts. Bone or antler jewelry tends to be scarce, but small, thin, sawed and polished bone disc beads are more common than tubular bone beads.

Shell tools and adornment objects also occur with frequency. Disc beads and pendants were made from local mussel shells, and occur along with specimens made from imported Olivella. The most common shell implement is a worn mussel valve, often called a scraper, scoop, or corn-sheller. Valve edges are worn and sometimes serrated; interiors are sometimes scratched or abraded, presumably from use as scoops.

Dating

Radiocarbon dates from several PA sites, augmented by the dating of Puebloan wares, indicate that the culture dates from A.D. 1200 to 1450. Unfortunately, no radiocarbon dates were obtained during the Blue Creek TASFS. Lintz (1986:178-191) provides a detailed examination of both absolute and relative dating for the Panhandle Aspect.

Origins and Development

That the PA people were a Plains Villager group is amply evident in their tool kits, their villages and house constructions, and their dependency on bison and horticulture. But where did they come from, what happened to them, and where did they go? Perhaps the best origins theory is one that postulates an in situ development from an indigenous Plains Woodland population, possibly with the integration of peoples as well as cultural traits and ideas from other areas (see Lintz 1986:218-237 for a full discussion of this issue).

The single most important factor in the development of the PA culture can (perhaps arguably) be summarized in one word: bison. The migration into the Panhandle region by substantial herds of bison led directly or indirectly to a major change in subsistence patterns, one that had already occured on the Great Plains to the north, where considerable evidence indicates an adaptation to bison hunting among Plains Woodland groups.

The archeological literature of the Great Plains indicates that horticulture was established long before bison hunting became a major part of some Plains lifeways. Maize cultivation may have been practiced in the region even before the Plains Village peoples came into the Panhandle, although the scanty studies of Panhandle Woodland archeology have yet to produce any direct evidence of horticulture. There is a strong relationship between horticulture and sedentism (see Price and Gebauer 1995:3-19), especially as a dietary dependence on cultivated products increases.

PA peoples were unquestionably dependent to some degree on domesticated crops. It was apparently the availability of abundant protein, and the many other beneficial products of the bison, that "anchored" the PA economy and ensured its survival in an area where rainfall is at best unpredictable. When crops failed, there were buffalo roaming the grassy plains, and unlike in the regions occupied by the Puebloans, food on the hoof was readily at hand. If droughts were prolonged and the plains grasses did not prosper, the bison, too, would disappear, leaving the PA farmer-hunters in a precarious situation.

As to what happened to the PA culture and where they went, only guesses can be hazarded. Their decline—obviously the result of highly complex environmental and social circumstances—may have been created in part by prolonged droughts and depredations by hostile Apachean groups. Population stresses, affected by declining food production and diminishing numbers of bison, are possibly also major contributing factors in the overall decline of the culture (see Lintz 1986:237-253).

Current ideas dealing with the decline and subsequent dispersal of the PA peoples suggest that they migrated out of the region in the late 15th century, probably heading east and northeast onto the Great Plains, following the retreating bison herds and seeking more promising horticultural environments. They may have eventually become one of the Pawnee or Wichita groups (Jack and David Hughes, personal communications, 1985).

It is clear that there was not a significant aboriginal population in the Panhandle when Vasquez

de Coronado came through in 1541. By then, the horticultural populations had been largely supplanted or replaced by wandering Apachean groups, who led a completely "portable" existence by following and hunting bison and trading with Puebloan groups. The Apache would, in turn, be driven out by the Comanches and others in the 1700s. Then the Europeans came, taking over the plains for their livestock, usurping the fertile valleys for their homesteads, and driving out the nomadic Plains hunter-warriors.

The Blue Creek investigations do not shed any light on the major origins-decline problems. However, the archeological information obtained concerning PA peoples living within the core culture area is important, as it represents an invaluable contribution to the growing storehouse of knowledge concerning one of the more significant prehistoric groups that lived in what is now the state of Texas.

SITE LMRA 242: THE CEMETERY

There is no general description of LMRA 242's topography or environs, but available information indicates the site was situated on the northern flank of a gently sloping plain leading to the bluffs overlooking Blue Creek. Erosion here was less severe than at the other TASFS sites, and the grass cover was denser. From a distance, the treeless, featureless plain seems a lonely place, windswept without shelter, and fully open to nature and the heavens. It commands an impressive view of the Blue Creek Valley and 41MO35-37.

According to the elevation datums map, LMRA 242 is 120 m west of 41MO36, while 41MO35's elevation datum is some 150 m to the north; 41MO37 is ca. 300 m to the southeast. Clearly, the cemetery is within easy walking (and carrying) distance from all the Blue Creek complex sites.

All the remains found at LMRA 242 are of young people: an infant, a toddler, and perhaps two adolescents. The cemetery appears to have been chosen to receive the remains of a select group of younger individuals (in the sense of a peer group?). Where are the burials of the adults living in the Blue Creek community? It is entirely possible, if not probable, that there are burials in the area that escaped detection by TAS crews, other legitimate surveyors, and vandals.

Of all the archeological sites and remains we have seen, this site produces emotions, impressions, and thoughts that are not in the least scientific. Picturing the lonely windswept hillside at LMRA 242, and examining the field drawings and photographs of the pathetic, tiny figures lying curled in their sandy graves, we conclude that LMRA 242 is/was a special place. Was it simply the easier digging because of deeper, sandier, less gravelly soils that brought the grave diggers here? Or was it the fact that the site is on higher ground than any of the nearby hamlets, and that in spring and summer, its sands hold rainwater and give birth to waves of wildflowers, which do not flourish in the rocky, gravelly redbed soils along the blufftop edges?

Methods

The immediate area of LMRA 242 was surveyed by crew members utilizing both visual and "pokey rod" techniques to define burial cairns. Subsurface probing did reveal at least one buried rock cairn and possibly a second, but the careful survey revealed virtually no surface or buried evidence of cultural materials or cultural activity other than the burials. Features were flagged as they were found during the survey. The grid datum was chosen and the grid then laid out; datum and corner stakes were shot in and tied to an elevation datum of 4.9 feet below the prime datum. The highest recorded stake elevation (W50/EW) is -2.9 feet at the western edge of the east-west baseline, while the lowest is -7.6 feet at the eastern edge (E50/EW). Other elevations indicate a west-to-east slope of 4.7 feet; from the datum there is a southerly slope of 0.4 feet, followed by a rise of 1.0 foot to the north, with a dipping trend toward the northwest.

In all, six features (Features 1-6) were found and recorded at LMRA 242; five of these were subsequently excavated. In addition, a "stratigraphic test" was excavated in unit W10/N40 at the north end of the grid (Figure 3). With the exception of Feature 5, features tend to be aligned roughly north-south, with Feature 1 to the south, and Feature 6 about 55 feet away to the north; Feature 5 is located some 60 feet west-southwest of Feature 1.

Each feature was cleared of grass and the rock clusters or cairns then drawn on sketch maps. Excavations were generally in 6-inch levels, and level records were completed for each level. Documentation is virtually complete for this site, except for missing photographs and slides.[2] In addition to level

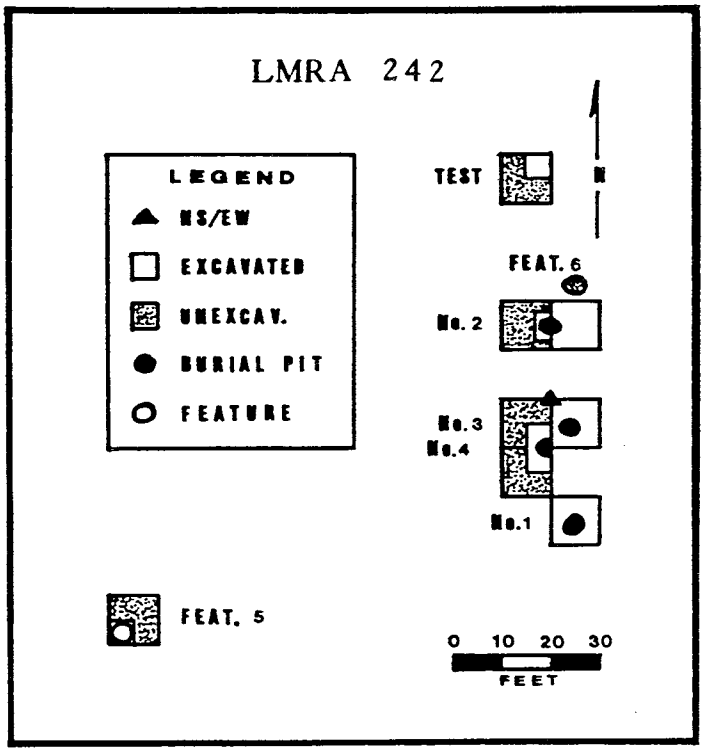


Figure 3. Site LMRA 242 grid and feature plan.

feature/artifact records were completed. Only one formal photo log was found in the records, but the photographs were not included.

Artifacts and other materials were bagged by level/feature, while the human remains were either jacketed and removed en bloc, or were removed in the field and placed in burial boxes. A few human skeletal elements were found in collection bags, but they have since been placed in the appropriate burial boxes. Currently, the recovered human remains are housed in the Panhandle-Plains Historical Museum. We have not examined the remains for this paper, leaving these specialized analyses to be completed by a bioarcheologist. In the text, descriptions of human remains will be provided by using data and observations from the field documentation.

Feature 1

Located in unit S30/NS, Feature 1 was a surface cairn of dolomite slabs/fragments measuring roughly 0.8 m east-west and 0.45 m north-south. Included in the dolomite cluster were a few sandstone fragments. The cairn is a roughly oval accumulation of stacked or piled slabs and fragments; its only disturbance is a narrow looter's hole along the southern margins of the cairn.

The crew noted Borger Cordmarked sherds among the stones, and subsequent excavation revealed the presence of pottery sherds from a single vessel or large vessel fragment reaching to the bottom of the burial pit. These sherds are considered grave goods (Feature 4 also has a vessel or large fragment associated with it).

The rock cairn apparently extended to the bottom of level 1. There is some question, however, as to the exact vertical extent of the cairn and/or other rocks, as some records state that the cairn ended just above the bottom of level 1, with the burial pit beginning immediately underneath the cairn and more visible in level 2. Another record, however, lists "dolomite rocks" as deep as level 3 in the pit fill.

From the surface to a depth of about two inches, there was a thin layer of dark humus; below was a red sandy, probably eolian, soil. Level 1 in the cairn had two Borger Cordmarked pottery rim sherds, 14 neck-shoulder sherds, 38 body sherds, and 10 small sherds. The sherds were mixed in with, and beneath, the cairn stones in the burial pit fill; significantly, none were found outside the burial pit.

The soil color and texture changed in level 2 to a compact lighter red-colored sand with some gravel inclusions. The burial pit outlines were difficult to trace. A "white chalky" zone or lens in level 1 was absent in level 2, but was found in other units in the cemetery area, and may represent a zone of percolated caliche or possibly decomposed dolomite. Level 2 contained one pottery neck sherd, 11 body sherds, and six small sherds of the same vessel represented by sherds in other levels.

Level 3 was partially excavated, only for the purposes of fully exposing Feature 1. According to the field notes, a single body sherd was recovered

[2]Several photographs were lost between the time the Couzzourt's submitted them with the paper to then-Bulletin editor Jimmy Mitchell in 1988, and the time the present BTAS editor received the MS from Mitchell in May 1995.

from "beneath the final layer of burial stones."

The burial pit is oval, 1.2 feet northeast-southwest and 1.6 feet northwest-southeast. The depth of the pit was less than 2.0 feet, since it extended from the base of the rock cover (at or near the bottom of level 1) to a maximum depth of 2.35 feet bs. Tracing the pit was difficult, as the matrix into which the pit was dug and the fill were very similar: "light brown and tan sand and gravel" for the surrounding sediments and "light brown sand and gravel" for the pit fill. The bottom of the pit was probably oval and basin-shaped with relatively steep edges in the upper portion; there were no gouge or "pick" marks.

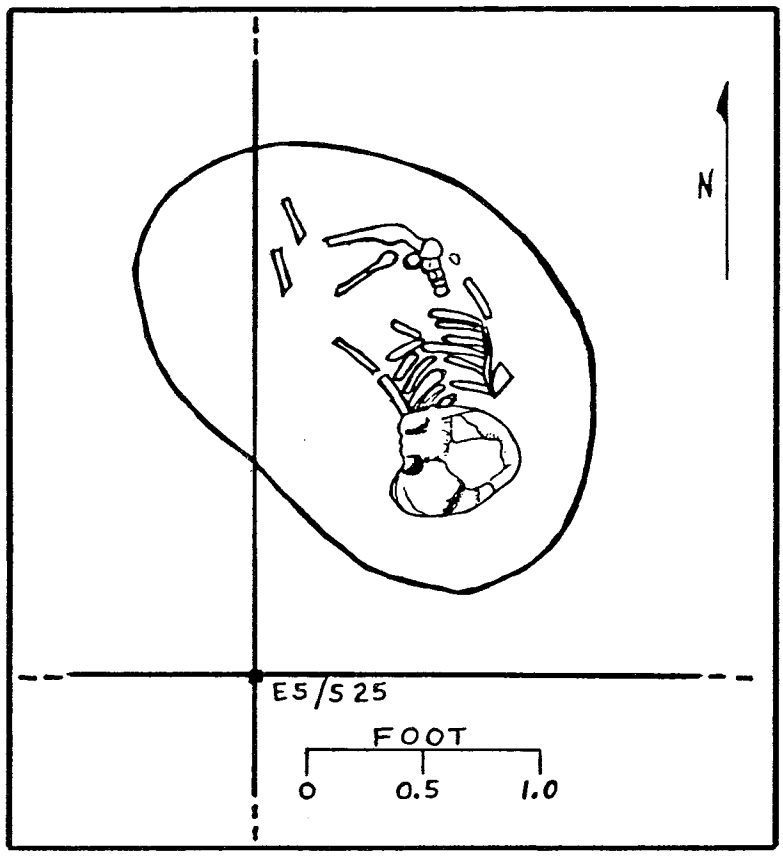


Figure 4. Feature 1 and Burial 1, LMRA 242.

The human remains are from an individual estimated at less than five years of age at death. Bone preservation is good, and all major bones are present; the phalanges are missing. The body is oriented northwest-southeast in a semi-flexed position, with the head facing west (Figure 4). The skeleton lay on its left side, with the right shoulder rolled to the right side.

The presence of Borger Cordmarked sherds throughout the burial pit (Table 1), and their absence in the surrounding soil, strongly suggests that they are from an intentional grave offering. Much of the vessel is missing (two rim sherds and a number of body sherds are present), indicating that only a large fragment of the vessel was placed with the feature. The comparatively small size of the sherds (the largest measures only 51 x 35 mm) implies the vessel was shattered, perhaps deliberately, but also this may simply reflect the result of over 500 years of weathering; many of the sherds from the vessel do fit together, however. A complete Borger Cordmarked vessel was found in direct association with an adult skeleton (one of seven individuals in a large pit) in Burial Pit B at the Footprint site (Green 1986:80).

The Borger Cordmarked vessel is a short-necked globular olla with a slightly constricted mouth; its lip is slightly flattened, and the neck cord-marking extends onto the lip. The cord marks are shallowly impressed and slightly smoothed over; individual cords are approximately 3 mm in diameter. The vessel interior is smoothed but lumpy, while the paste is soft and crumbly. It was tempered with abundant amounts of crushed quartzose rock, with many large inclusions. All sherds are carbon-stained on the interior, and about one-third are also carbon-stained on the exterior. Sherd thickness ranges from 2.5 to 7 mm, with the maximum thickness at the neck-shoulder juncture.

Feature 2

This feature, marked on the surface by a large pothole with slabs and fragments cast onto the surrounding surface and backdirt piles, covers the western half of unit N10/NS and probably the eastern edge of unexcavated unit W10/N10 (see Figure 3). The pothole was oval-shaped, suggesting this was the original shape of the exposed cairn. The cairn

Table 1. Cultural Materials from LMRA 242

	BURIAL No. 1 (S30/NS)	BURIAL No. 2 (N10/NS)	BURIAL No. 3 (S10/NS)	BURIAL No. 4 (S10/W10; S20/W10)	W5/ N45
Arrowpoint—Washita	_	_	1	2	-
Debitage—Alibates	_	1	_	1	-
Debitage—Other	_	1	_	-	1
Borger Cordmarked—Rim	2	_	_	12	-
Borger Cordmarked—Neck	15	_	_	5	-
Borger Cordmarked—Body	51	_	_	106	-
Borger Cordmarked—Fragments	16	_	_	38	-
Bison Tibia Digging Tool	_	_	_	1	-
TOTALS	84	2	1	165	1

had some large (more than two feet in length) dolomite slabs (and one large quartzite cobble), but most were much smaller slab fragments or amorphous chunks.

Level 1 in unit N10/NS apparently contained two lithic flakes and one bone fragment, but the collection bag contains only a single very small flake fragment and a highly weathered and leached unidentifiable piece of bone. The soil was sandy and reddish-brown in color; dolomite fragments and gravels were also present.

Only the southeastern quadrant of level 2 was removed in unit N10/NS; no cultural materials were found. However, according to TASFS field notes, a "rather compact lens of caliche or limestone began approximately 0.7' below the surface and continued to the floor." It was not disturbed by potholes. The actual depth reached in level 2 is not clear, the possibilities including either 1.0 foot or 2.7 feet bs. There is a profile done for the southeast quadrant of N10/NS which clearly defines the pothole and strongly implies that the burial was removed entirely by the pothunters, eradicating all traces of the original burial pit.

Records for adjacent unit W10/N10, into which the same pothole extends, indicate that another infant burial (Burial No. 2) was recovered in Feature 2. The small burial was located in the northeastern part of the southeast unit quadrant. A semicircle of stones was removed by crew members until a burial pit outline was exposed at about 0.2 feet; we assume that the implied depth is 0.2 feet below the semicircle of rocks.

The burial pit also extended into the lower edge of the northeast quadrant of the unit. The skull was exposed at a depth of 1.9 feet (elevation -4.8 feet), with the femur at 2.25 feet bs. The burial pit measured 1.5 feet north-south and 3.5 feet east-west, bottoming at 2.3 feet bs.

The burial pit contained the skeletal remains of an infant, aged at "6 months or less." The infant was flexed and lying on its right side, skull on its chest, with knees and forearms pointing south. Major bone preservation was good, although the bones of the spinal column were absent. No apparent grave goods were found in association with this burial, either in in the grave fill or the surrounding soil.

Feature 3

This apparently undisturbed burial in unit NS/ S10 was marked by a large pile of "articulated" dolomite slabs and fragments measuring 3.8 feet

east-west and 3.0 feet north-south. The cairn apparently reached a depth of 1.4 feet bs.

Levels 1 and 2 had no artifacts. A well-made Washita arrowpoint (LMRA 242-1-3.1) was found in the burial pit at about 1.4 feet bs. According to one burial report, the grave was dug into sterile soil, with the pit first noted in the lower part of level 3, to ca. 2.0 feet bs. As with Burial No. 2, the grave pit was larger than the actual burial, which was 2.75 x 0.8 feet.

The burial is a primary interment of an adolescent, perhaps 10-12 years of age; the body is flexed, oriented east-west with the head to the east and face to the south. The skeleton was complete, but some of the bones were broken. The bagged mandible (LMRA 242-1-3.2) is missing the left side from the first bicuspid back. All the other teeth are intact, including an impacted third molar. The ascending ramus and condyle are fractured and were left unrepaired to facilitate examination of the third molar. Dental X-rays were taken of the fragment, revealing that the roots of all but the first molar are not fully formed. The cuspids are not fully erupted. There is little wear on any of the teeth, except for minor abrasion on the incisal edges of the central incisors and lighter wear on the laterals. There is some evidence of irritation, possibly infection, at the third molar socket which has caused some bone loss and erosion. There is no other pathology.

The two bagged maxillary teeth (LMRA 242-1-3.3) are very similar to those in the mandible and are undoubtedly from the cranium of the same individual. The first molar is fully formed, while the second bicuspid's roots are not fully formed; there is very little occlusal wear.

The arrowpoint is a small, thin, triangular side-notched Washita point, well made of Alibates and symmetrically shaped. It measures 27 x 16 x 2.2 mm, with a stem length of 7.5 mm and a neck width of 6 mm. It is widest at the base, which is concave, and the blade edges are straight. The notches are about one-third the way from the base to the tip and are perpendicular to the midline. Because the Washita is a complete specimen, we interpret it as a grave offering, and, as with the two Washita points found in Burial No. 4, not evidence of violence.

Feature 4

This feature is roughly centered in the northeast quadrant of S20/W10 and the southeast quadrant of S10/W10 (see Figure 3). It is a large, somewhat scattered, oval cairn 5 feet northwest-southeast by 3-3.5 feet northeast-southwest. Most of the cairn slabs/fragments are dolomite, but there are also several fragmented large sandstone slabs, along with quartzite pebbles and cobbles, placed on the cairn.

After the removal of the grass cover, a number of Borger Cordmarked sherds were noted mixed with the slabs; these sherds appeared mainly in the southern half of the cairn. The cairn extended through level 1 and the upper part of level 2, with the exception of a small sandstone slab in level 3. The majority of the Borger Cordmarked sherds were found intermingled with the cairn rocks in level 1, although sherds were dispersed in small amounts in levels 2-4.

The bottom of the rock cairn was just above the bottom of level 2. Some pottery sherds occurred underneath the rock cairn and in the burial pit, which was first detected in the lower part of level 2. One end of a bison tibia digging stick tip, "intruding vertically" from level 3, was in the NE quadrant of S20/W10, near the edge of the burial pit.

In level 3, the bison tibia tool (LMRA 242-1-15.1) was wedged between three small sandstone fragments. According to the excavation records: "crew suggests sandstone may have been placed to support hoe in vertical position." Recovered from the southeastern quadrant of unit S10/W10 in the burial fill was a complete, well-made Washita arrowpoint. Another complete Washita in the same unit and quadrant was found in level 4 in the burial pit at a depth of 1.48 feet bs. Neither arrowpoint was in direct contact with the human remains, and there is no evidence for the points being the cause of death. The flaking is crisp and sharp on both tools, with no signs of wear or use damage.

The pit measured 2.8 feet northwest-southeast and 2.0 feet northeast-southwest. The fill was similar to the surrounding soil except it was sandier and lighter in color, and had less clay and small gravels. The upper part of the burial pit had steep upper walls that began immediately below the lower limits of the rock covering, and there was no apparent evidence of gouges or "pick" marks. The pit was excavated through a compact caliche lens to reach sand and gravel deposits in level 4. The bottom of this pit was apparently squared, not basin-shaped.

The body was flexed and lying on its left side, and there was no indication of post-interment dis-

turbance except rodent activity. The body was oriented northwest-southeast, with the head facing northeast. Bone preservation was good, but some ribs were missing, along with most of the bones of both hands.

The estimated age of the individual is unknown, but a cursory examination of the remains in 1986 by Dr. Doug Owsley (Smithsonian Institution) suggests that Burial No. 4 was 13-15 years old (Billy R. Harrison, personal communication). Judging by the size of the flexed body and the relatively small burial pit, the young man seems to have been rather small in stature.

Artifact Descriptions, Feature 4

Washita point, LMRA 242-111.1 (S10/W10, SE quadrant, level 3): The point is complete. Blade edges are straight; base is concave. Side notches are placed one-third of the way from the base to the tip and are not symmetrical; one is perpendicular to the midline, and the other is perpendicular to the blade edge; both are squared; Alibates. Size: 35 x 18 x 2 mm; widest at base; neck width 7.5 mm; stem length 7.2 mm.

Washita point, LMRA 242-1-12.1 (S10/W10, SE quadrant, level 4): The point is complete. Blade edges are are slightly convex; base is concave. The notches are placed low on the blade, about one-fifth of the way from base to tip; they are small and narrow and perpendicular to the blade edges; Alibates. Size: 40 x 16 x 2 mm, with a neck width of 9 mm; stem length, 7.0 mm.

Bison tibia digging tool tip, LMRA 242-1-15.1 (S20/W10, NE quadrant, level 3): The tool is complete. The proximal epiphysis has been removed just below its juncture with the shaft; the shaft was then split lengthwise to just below its midpoint, with a portion of the posterior interior shaft then removed. The distal end is intact, although a hole has been cut or drilled into the center of the articulating surface and cancellous tissue from the interior of the lower shaft has been removed. The tibia has a few butchering marks on all surfaces except the epiphysis, but the exterior surfaces of the tool are worn and polished; the distal end of the tool has use damage. Heavily weathered, discolored, and slightly rodent-gnawed and rootlet-etched. Length is 228 mm; epiphysis measures 78 x 52 mm.

Borger Cordmarked vessel fragment, LMRA 242-1-9.2, -10.1, -13.1, -14.1, -15.2, -16.1, -18.1 (various proveniences): The vessel fragment is shattered, but all sherds in the collection belong with this vessel. Included are 12 rim sherds; five neck-shoulder sherds; 106 body sherds; and 38 small fragments (n=161). Despite the large number of sherds, the vessel is not complete; the sherds seem to represent a very large fragment, or about half the original vessel. Rim sherds indicate a short-necked form (40 mm from lip to neck-shoulder flare) with a slightly constricted mouth; it has a direct rim with an uneven, slightly flattened lip. The cordmarking is clearly impressed, with a vertical pattern on the neck but overlapping on the body; the cords vary in size. Most of the vessel body is carbon-stained, quite heavily in some places, but part of the upper body is orange in color from oxidation; the rest of the vessel fragment is tan to dull medium brown. The interior is smoothed but lumpy and is also blackened on the entire inner surface. Weathering has exposed temper on the interior in some places; temper is abundant, consisting of fine to coarse crushed quartzose rock with additional sand (and perhaps mica) inclusions. Paste is soft and crumbly and seems slightly porous. Largest sherd is 55 x 45 x 5 mm. Vessel thickness ranges from 3 to 8 mm at the neck-shoulder.

In many respects, this vessel resembles that found in Burial No. 1; both are short-necked ollas with slightly constricted mouths. Again, a fragmentary vessel was used as a burial offering. Unfortunately, the method of placement of the vessel has not been determined, although the presence of sherds below the cairn implies that at least part of the vessel fragment was placed with the individual prior to the construction of the cairn.

Feature 5

Located in unit S50/W90, this feature was marked by an undisturbed 3 x 5 foot oval pile of dolomite slabs protruding from the ground surface; two sandstone slabs or fragments and a few quartzite cobbles were also in the cairn. Two of the dolomite slabs were vertically oriented, but formed no pattern.

The cairn extended to the bottom of level 2, but most of the rocks were on the surface in level 1. Excavations reached 3.7 feet bs, but no burial pit, artifacts, or human remains were uncovered beneath

the rock pile. The function of this rock feature is unknown; it does not differ in construction from those covering the known burials at LMRA 242.

Feature 6

This feature was a circular pile of rocks and slabs scattered about a large pothole that was thought to be a completly destroyed burial cairn; no excavations were conducted. TAS records state that undescribed "human bone" was found on the surface in backdirt, but this material was apparently not collected.

Stratigraphic Test

This excavation (W10/N40) was intended to provide stratigraphic information for interpreting the context of the burial features at LMRA 242. The unit was excavated to 3.67 feet below the control pin. The upper zone encountered was an eolian sand and colluvium, followed by alternating layers of light tan wind-blown sand and colluvium, a coarser sand with small gravels, and at the bottom Pleistocene gravels overlying large slabs of dolomite that were part of the bedrock.

SUMMARY

LMRA 242 was utilized as a cemetery. Why this locale was preferred as the location for a cemetery is not clear—all that can be said is that the site is not within the immediate perimeter of a village. However, it is not distant from the other Blue Creek sites, and it would not have been difficult to carry the remains to LMRA 242, or collect and bring the rocks used to cover the graves.

What is important was the *apparent* preference to bury young people here, and the placement of grave goods with three of the four burials. We have no doubt that the artifacts found in the grave fill are deliberate "offerings." There is no occupational debris at LMRA 242, and thus virtually no chance of accidental artifact inclusions in the burial fill, particularly when the artifacts found in the features include three complete arrowpoints and a complete (though used) tibia digging stick.

As Lintz (1986:41) notes, "associated grave goods are scarce" in Panhandle Aspect burials. He further states that "prepubescent children were interred with grave goods more often (33%) than were adults (22%)." That is also the case at LMRA 242. "Children were frequently buried with jewelry (shell beads, turquoise beads, conch shell pendants) and rarely with utilitarian objects (Lintz 1986:41)," while the opposite seems characteristic of adult burials. At LMRA 242, however, Burials No. 1 and 3, both very young children, were accompanied by a pottery vessel fragment in the cairn, and an arrowpoint in the fill of Burial No. 3. Both kinds of artifacts are usually considered purely utilitarian objects. In light of Lintz's (1986) overall burial findings, the inclusion of a pottery vessel fragment, two arrowpoints, and a tibia digging stick tip with Burial No. 4 implies that he was considered an adult by his peers, regardless of his chronological age. Lintz (1986:173-174) also notes differences in grave goods according to a sexual division of labor. Males tend to have utilitarian objects such as arrow points and ceramic vessels in their graves, while tibia digging stick tips tend to be with females. At LMRA 242, however, the only discovered tibia tool was associated with the Burial No. 4 male.

Jack Hughes (personal communication, 1984) has speculated that tibia digging tools in Panhandle Aspect graves may have been used to dig the grave pits. The direct association of the tools with death may have led to a spiritual or superstitious decision to leave the tools with the deceased, inasmuch as the implements were then considered "unfit" for subsequent gardening activities.

TEST PITS WEST-NORTHWEST OF 41MO36

TAS surveys located "several" surface-visible piles of rock on a sand-capped ridge about 100 m west-northwest of 41MO36. Since these clusters resembled the burial cairns at LMRA 242, a crew was detached from the cemetery site to investigate them.

The two most promising rock clusters had 10-foot squares placed over them. These units were not tied in to the overall Blue Creek grid system and have no field designation other than "Testpit WNW of 146." The rock clusters apparently do not relate to any recorded prehistoric site, and no diagnostic artifacts were found in or near them.

Test pit 1

Located approximately 85 m west-northwest of 41MO36, this unit had two separate but partly overlapping rock clusters, with the upper portions of one cluster visible on the sandy grass-covered surface. The larger oblong cluster is ca. 5 feet in length and 3 feet in width; it is oriented northwest-southeast. The second oval to oblong cluster is about 5 feet in length and 2 feet in width; it is oriented east-west, and its eastern end overlaps with the northwestern end of the first cluster. The 1.0 foot-thick rock clusters are mainly dolomite chunks or possibly slab fragments and quartzite pebbles; a few Permian siltstone slabs and a conglomerate "slab" were deep in the pile. Very faint pit outlines may have been present at the lower margins of the clusters, but the TAS records are equivocal. This unit was excavated to "Pleistocene gravels" at approximately 3.0 feet bs. With the exception of a few Alibates flakes in the upper 0.5 foot, no artifacts, charcoal, ash, or bone were encountered in the test pit.

Test pit 2

This unit was placed about 50 feet west of the first test, or 100 m west-northwest of 41MO36. It was placed over a cluster of apparently burned quartzite pebbles. The excavations documented a 1.0 foot thick deposit of burned quartzite pebbles (0.3-0.4 feet in diameter) approximately 5 feet in diameter. The pebbles did not overlie a pit, and charcoal or ash was absent. A single Alibates flake was found on the surface, and a small unburned bone fragment came from a depth of 0.3 feet in test pit 2.

SUMMARY

During the TAS Field School, the rock clusters in Testpit 1 were speculated to have been a "tepee ring" that had been scattered by erosion and deflation. We do not share that opinion, since to our knowledge, tepee ring rocks are not usually aligned in clusters or pits; furthermore, the rocks were not in a circular arrangement, but appeared as two distinct clusters instead of a single unbroken arc. Like the rock clusters, however, tepee ring sites in the Panhandle are often virtually devoid of artifacts, and most activity seems to have occurred outside the tepee. A possible firepit at the site would lend credence to the Test pit 1 rock clusters being part of a tepee ring. The quartzite cluster in Test pit 2, though, more closely resembles a boiling stone dump, rather than a hearth or a firepit designed to heat boiling pebbles for cooking or other uses, as there were no traces of charcoal and burned earth as would be expected if the pebbles had been heated in situ. In summary, the function of the rock features here has not been established.

41MO37 (LMRA 147): "THE ROCKPILE"

This is the southernmost of the architectural sites in the Blue Creek complex. Its nearest neighbor, 41MO36, is about 270 m to the north along the bluffs, separated by a series of erosional gullies and narrow canyons. Blue Creek's floodplain and cultivatable terraces border 41MO37 on the east, the north, and the south, where the creek makes a sweeping bend before broadening its channel and eventually merging with Lake Meredith waters about 800 m to the southeast.

Immediately north of the site, underlying beds of dolomite have been exposed by erosion, drying and cracking into literally tons of loose slabs, boulders, and rubble. Other dolomite exposures form the southern end of the site and the steep bluff edges/slopes to the immediate east. The slab and rubble-strewn slopes below the bluff have midden deposits, much like the midden area at 41MO35. The gently rising, undulating plains lie to the west, merging in the distance with low ridges. Gravels are abundant in the plains soils, along the ridges, and in exposed areas above the dolomite. Outcrops and quarries of Alibates flint and other lithic resources are within easy walking distance along the Canadian River breaks.

The terrain at 41MO37 is relatively level. The site grid datum (NS/EW) elevation is 8.2 feet below the prime datum, and is consistent across the central part of the site. Beyond the central zone (about 750 m^2), the relatively thin soil cover atop the bedrock slopes gently in all directions before reaching a bluff/canyon edge or gully. A few mesquites and cacti dot the uplands, and junipers grow in the gullies and canyons below the caprock.

The site is dominated by a large rectangular, slab-lined structure with mounded walls, centered on the highest ground near the bluff edge. The main

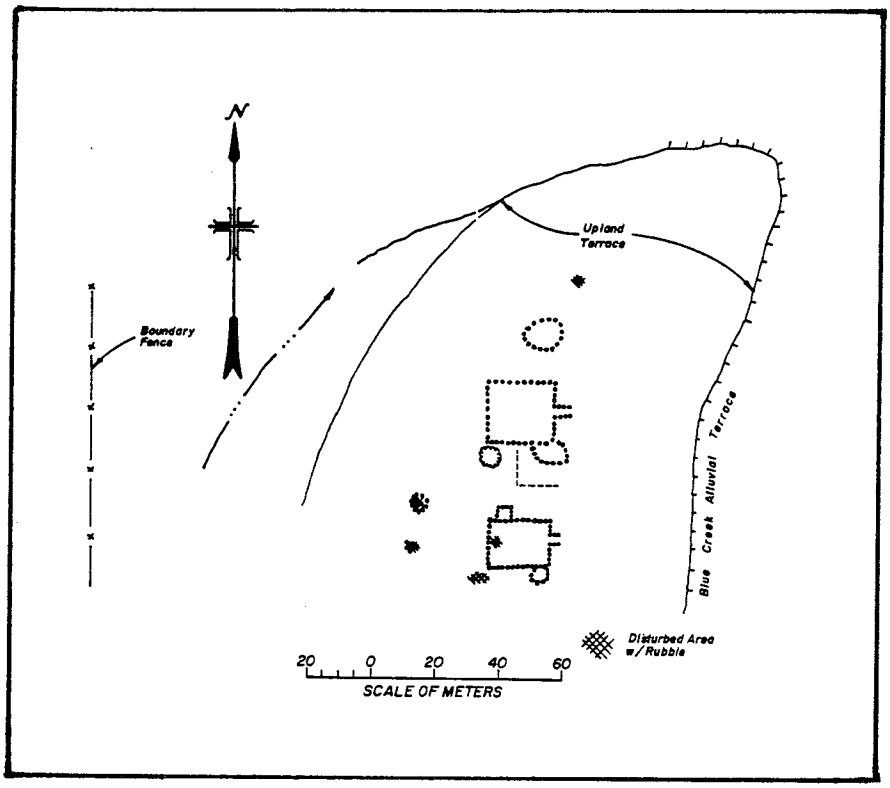


Figure 5. Site 41MO37 as drawn by Meeks Etchieson in 1980.

structure is flanked on the north and south by other features (all potted before 1969), most drawn by TAS members as roughly circular to possibly D-shaped, or square, slab ruins; smaller rockpiles were described as "cists."

Meeks Etchieson visited the site during his Lake Meredith Off-road Vehicle and Erosion survey in September 1980 (Figure 5). He could still trace the outline of the TAS-excavated central house and its entryway. Etchieson (1981:54) further described a second relatively large (5.5 m^2) house, also with an eastward-facing entryway, constructed 25 to 30 m south of the main structure. He noted that the smaller house had a possible circular cist attached to its southeast corner, plus a square cist on the north wall near the northwest corner. TAS records make no direct reference to this other large structure. Perhaps it was still covered by sand and debris from the large excavated house. The field records also do not mention the (older?) walls depicted by dashed lines on the Etchieson sketch; these walls apparently originate from the excavated house's south wall.

Three to five other, smaller, disturbed areas "with rubble" were present on the site (see Figure 5). One may be a circular slab-lined structure about 15 m north of the main house. The shape of this structure is unclear as it was badly vandalized, with slabs thrown out all around its perimeter, transforming it into an almost meaningless scatter of slabs, some of which were still vertically oriented in 1980 (Figure 6).

In an aerial photo of the site taken by Etchieson, there are a number of other suspicious low mounds and clusters of slabs; there may be as many as nine slab structures at 41MO37. The layout of structures at 41MO37 may be similar to that at 41MO36: a large, central structure surrounded by smaller structures (both living quarters and storage facilities) of varying design and function.

The central ruin had a tremendous amount of dolomite and other debris along and surrounding the still-visible walls (Figure 7). Slabs were most heavily concentrated in the southeast sector, the location of the house's southeast corner and an attached large cist or room. Excavations uncovered inconclusive evidence of another, apparently similar cist at the southwest corner of the house, while a slab feature (the "window") lay buried under collapsed slabs and rubble in the middle of the house west wall.

The Central House

TAS focused on the large central house, because it promised to provide important knowledge concerning Panhandle Aspect architectural features and techniques at this site specifically, and at the Blue Creek complex generally. Despite much vandalism, the lower house walls were still standing in some areas. The interior of the structure had been eroded and/or potted, but some important wall and interior features were relatively intact.

Figure 6. View north-northwest across east edge of vandalized structure, north of 1969 excavations. Note potted feature at right and low, slabby mound at left, probably another structure. Photo courtesy of Meeks Etchieson and the Bureau of Reclamation.

Figure 7. View across 41MO37 from south-southeast to north-northwest, taken by Etchieson in 1980. The large mesquite marks the south wall of the main house excavated by the TAS. Note the height of the rubble mound at the base of mesquite. The ruins of the smaller square house are at the left-center, while the vertical slabs of the "circular" ruin lie to the right of the main house. Site 41MO36 is on the sloping bluff in the distance, just to the left of the creek.

Dimensions of the almost square structure, minus the entryway and attached cist(s), are approximately 27 feet east-west by 25 feet north-south, or 675 square feet of living space (Figure 8). The excavated entryway extends 6 feet from the east side of the structure. Orientation of the house is west-northwest (rear) to east-southeast (front), similar in orientation to some of the 41MO36 structures.

In constructing the house, the builders excavated a roughly square pit from 0.5-1.0 feet bs, reaching ca. 0.2 feet into the upper level of a yellowish sandy clay zone. A ca. 1.0 foot wide trench was then dug along the margins by deepening the pit by 0.6-1.0 feet. Undressed dolomite slabs were then placed vertically (long axis erect or on-edge) into the trench, forming (at least) two parallel rows of erect footing slabs. In some places along the wall, the footing slabs were three slabs thick. These footing slabs were braced front and rear by smaller slabs or quartzite cobbles wedged into the trench. Additionally, stacks of horizontally-laid slabs were substituted for vertical members. Some thin slabs were also laid flat along the bottom of the trench to form a flooring of sorts, or possibly to prevent anticipated sagging or slumping of the vertical slabs, although this was not consistently employed as an architectural technique.

Interstices between the double rows of slabs and the trench walls were filled with soil and rubble, and possibly a clay mortar. The wall foundation was then plastered over with a clayey soil mixture. Although most of this plaster had disappeared, it was a light-colored, hard-when-dry, sandy clay. This was probably the yellowish sandy clay underlying the house and exterior living surfaces.

The filled, chinked, and plastered slab foundation wall was perhaps as much as 1.5-1.67 feet thick. No portion of the upper wall(s) has survived, but judging by the sheer masses of slabs and rubble littering the wall outlines, inside and outside the house, and despite heavy pothunting, the upper wall must also have been substantial. We surmise that the upper walls were constructed by raising tiers of stacked horizontal slabs, cemented in mortar, above the massive foundation wall. A lower tier of vertical slabs in the upper wall is also likely. Although postholes were not found along the foundation wall, it is possible that the lower wall had vertical poles in its construction that helped support the roof and brace upper-level wall sections. Almost no daub was found along the walls, suggesting that

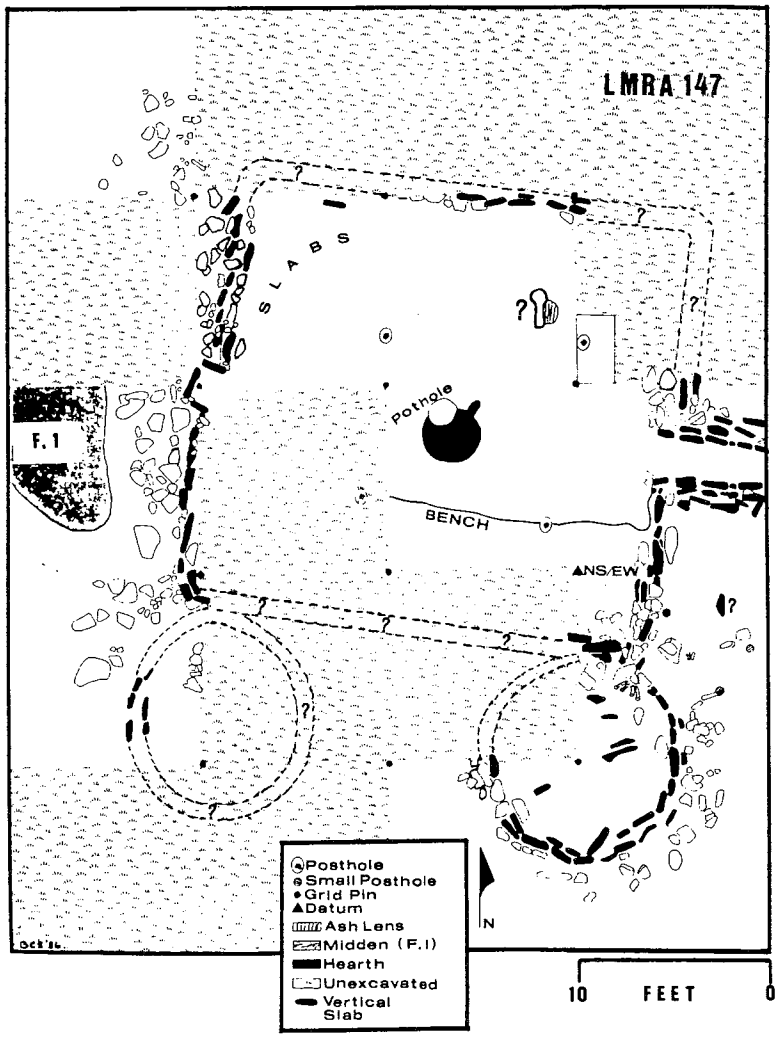


Figure 8. The main structure at 41MO37. Only the major wall slabs and features are depicted, but some field-recorded collapsed slabs are shown to illustrate collapse patterns.

this house had no wattle-and-daub construction in its upper wall, relying instead on heavily mortared slabs for its entire height. The walls may have reached 5 feet in height, which, combined with the pit floor and an elevated roof, would have provided ample interior headroom.

The structure's exterior west wall (and perhaps other wall sections) may have had an earthen bank piled up against it. A brown sandy loam—similar to sediments in the wall trenches and house interior—was apparently heaped up against the wall to an uncertain height, sloping down to ground level. Such an exterior soil bank (with small-diameter postholes) was identified against the wall of a circular dwelling and attached circular cist at the Chicken Creek site (Schmidt-Couzzourt 1983:14). This was probably a common construction technique in Panhandle Aspect structures. The most likely purpose for such an earthen bank was to strengthen, seal, or protect the lower wall foundations, and the soil bank provided access to the roof during initial structure construction, as well as for subsequent repairs.

How was the roof built? At 41MO37, no recognizable portion of the roof or its construction materials has survived, but archeological evidence from other Panhandle Aspect sites suggests the following:

1. Wattle-and-daub roofing was used, perhaps covered with bundles of thatch. Masses of burned and unburned daub, with and without wattle and grass impressions, have been found at several sites, and wattle-impressed daub was found at 41MO37.

2. Layers of sod or dirt were probably laid over a pole/stick framework. The thickness and composition of the sediments comprising the house fill attest to the use of this construction technique.

3. Roofs (and probably walls) were combustible. Charred beams, poles, sticks, and grass have been found lying above, underneath, and between floors of Panhandle Aspect structures. Fire must have been a constant threat to Panhandle Aspect houses. One obvious source of fire is the roof smokehole, that, according to archeological evidence, was frequently plastered with adobe or clay "fireproofing." Evidence of smokehole mortar/daub was found in interior

unit W10/EW, where the roof may have collapsed. There is no clear evidence that this house's roof burned, however.

While no conclusive archeological evidence is available, the roof was likely made of wattle and sod. The house had very substantial walls and (probably) four interior roof-support poles, suggesting a pole framework was laid atop the large support poles, and from the support poles to the top of the wall. The roof would then have been finished by weaving in smaller saplings or sticks, and covering that with sod, adobe plaster, and bundles of thatch. The roof was probably low-angled, but not flat, and the walls seem too massive and high to have merely served as a base for a wickiup superstructure.

Structure Floor(s)

House floors in Panhandle Aspect structures range from well-made (and long-lasting) clay-plastered floors to a leveled area simply covered with sand or fresh soil, with or without tamping. When new floors were needed, or current floors became covered with trash, floors were sometimes freshly filled and plastered; in some cases, new floors were created by adding fresh sand/dirt, with no attention given to resurfacing. Consequently, some floors are easy to identify, while others are visible as minor soil changes or only in patches, or as concentrations of cultural debris.

The main house at 41MO37 did not appear to have carefully made, well-plastered floors, but the initial separation between the yellowish sandy clay subsoil matrix and the first floor fill was poorly defined. If the floor was plastered, only a relatively thin plaster was used, one that apparently contained little durable clay. The floor was also subject to erosion and the activities of pothunters. In fact, several "small" pits, an unmapped "small trench," and an old 1.5 foot-square pit in W10/N10 (in the north-central part of the house), were the result of pothunting. Most of W10/N10, and perhaps portions of W10/EW, N10/NS, and W20/N10 were disturbed by pothunters.

Nevertheless, the TAS work uncovered a few undisturbed features that permit a reconstruction of major house interior design. Like many excavated and reported Panhandle Aspect houses, this house also had a central channel and low raised lateral benches.

The channel is a basal central floor which runs the length of the structure from the entryway to the west wall. It frequently seems to mark the first, original prepared house floor, although occasionally the channel may have been excavated into subsoil from a previously prepared original floor. The channel usually contains a central hearth (often plastered); the major roof-support posts were frequently erected in the channel. The channel may be marked by the construction of elevated platforms (benches) on either side, also extending from the front wall to the rear wall. These elevated surfaces vary in height, from only a few inches to well over a foot. Like house floors, both benches and channels are sometimes well plastered, and also occasionally resurfaced.

At 41MO37, the benches and channel were only thinly plastered. The southern bench and its channel edge at the channel were traceable, but the northern bench was not located, probably because of vandalism and erosion/deflation (see Figure 8). The house interior may have been laid out to have the bench/channel design before the house pit was dug. There is little evidence of floor resurfacing.

Elevation of the channel is about 9.9 to 10.0 feet below the prime datum; the benches' top averaged -9.5 feet in elevation (0.4 feet above the channel). The tops of still-standing wall slabs comprising the "window" feature (see below) are at -8.0 to -8.2 feet; a single mapped wall slab in the center of the north wall is at -8.2 feet, while mapped slabs in the east wall range from -7.3 to -8.2 feet.

At the wall/channel juncture, and just inside the house at the entryway, there appears to have been a hard-packed raised "sill" outlining a depression in the channel floor. Such raised sills or "steps" and depression features are found in several Panhandle Aspect structures, and are often well made and plastered. The depressions are usually considered to be cold traps.

The house had a central hearth, located in the channel just east of the center of the house. Circular and basin-shaped in profile, the hearth was ca. 2.7 feet in diameter and extended 0.6 foot below the channel (-10.6 feet in elevation). With indistinct edges, and not clay-plastered, it was filled with charcoal, ash, and burned earth, as well as a few burned rocks. Near the hearth were 53 very small, crumbly pieces of brown or tan sandy clay, probably remnants of the plastered smokehole. There is a vertical dolomite slab set into the channel floor

and at the hearth's northeastern edge; the slab may have been a deflector.

A probable bench was exposed in the southern half of unit W10/EW, at an elevation of -9.4 or -9.5 feet. Part of the same bench was identified in the southwestern quadrant of unit NS/EW, with a possible small extension along the inside of the house wall just south of the entryway juncture. This extension, elevated above the channel floor but below the bench top (-9.75 feet), may be part of a packed or plastered curbing associated with the channel/entryway/"cold trap" depression system. The NS/EW south bench segment lines up well with that mapped in W10/EW, and is parallel with the house lateral walls.

However, no clear trace of a bench could be located on the north side of the channel. A raised or mounded layer of "light-colored sandy clay" was noted just inside the north wall, sloping down toward the channel area, and probably represents melted wall mortar.

Three main interior roof-support postholes were found in the central structure at 41MO37. One posthole, in W10/EW, was set partly in the bench and partly in the floor channel. It was about 40 cm in diameter at the top and reached into the subsoil at -11.0 feet in elevation. It had a small flat slab at its base (to prevent sagging?) and a small bone awl set into its north edge. The posthole in N10/NS was slightly over 30 cm in diameter, tapered to a rounded V-shaped base, and reached over a foot into the subsoil. The third interior posthole was in the balk between W20/N10 and W10/N10, although it had been disturbed by pot hunting.

A possible shallow posthole, and a depressed and compressed area created from the collapse of the post, was recorded in the eastern half of unit W10/N10 (see Figure 8). The area of disturbance was about 3.0 feet long and over a foot wide, and an ash lens is associated with it. The base of the feature was at about -10.4 or -10.5 feet, about the same depth as the wall trench for the north house wall. The post apparently fell across an ash pit, abruptly cutting off its western edge.

If the pit in the eastern portion of unit W10/N10 was also a posthole, it indicates that five (the fourth main posthole is undoubtedly in unexcavated unit W20/EW) posts were used to help support the roof. The erection of four interior main support posts tends to be the customary practice in Panhandle Aspect structures, but fewer as well as more have been found in single dwellings at other sites.

Cultural materials were collected from the floor surface around the hearth and, presumably, from atop the bench(es). A few artifacts were found as much as 0.3 feet below the supposed bench level, but these may be associated with new, thin, floors or the trampling of materials into an existing floor. Materials are infrequent below -10.0 feet (the elevation of the channel).

There is no indisputable evidence of an "altar" or rear (west) wall platform in this structure. Only unit W20/N10 was excavated in the area where such features have been reported in Panhandle Aspect structures, and no "altar"/platform was recorded as such. The term "altar" connotes a religious practices, but there is no substantive archeological evidence available to indicate that "altars" held religious significance or were used for religious and ceremonial practices by Panhandle Aspect peoples. "Altars" may have been storage platforms, bench extensions, or some other practical construction. However, there is inconclusive but tantalizing evidence that this house did have a special feature in the central west wall (see "the window," below).

Entryway

The large house at 41MO37 has an entryway that runs east-southeast. It is constructed of double and triple rows of closely set vertical slabs (Figure 9). The still-standing entryway was surrounded by fallen slabs and fragments, and may have had more than a single tier of slabs in its construction. No evidence of a wall trench is recorded, but excavations likely were not sufficiently deep to reveal the trench. Field notes indicate that a small pile of rocks "blocked the entrance," but it is not clear if this blockage was intentional or part of the general wall collapse; the entryway had also been damaged by pothunting activities.

As excavated, the entryway is ca. 6.0 feet in length; it may extend beyond the excavation units, however. From a maximum interior width of almost 3 feet at the wall juncture, the passage tapers to slightly more than 2 feet wide at its eastern end. It has a basin-shaped floor of hard-packed red clay (Permian clays), which was also found in considerable amounts in the soil immediately adjacent to its walls, especially on the north side. A possible cache of three Alibates knives (one complete but in two pieces) was located on the entryway floor at or very near its juncture with the house.

Figure 9. View to southwest across entryway, unexcavated western area of cist, and unit W20/EW. Note the height of "rockpile" and depth of depression in house interior, but absence of "rockpile" at upper right, near the southwest corner of the house.

The "Window"

The "window" feature is located in the center of the house's west wall, directly opposite the entryway, where the discovery of two opposing vertical wall slabs turned 90 degrees to the wall axis in the extreme southwest corner of unit W20/N10 (Figure 10) signalled an unusual architectural feature. Charles Bollich's Daily Log entries for June 18, 20, and 22, 1969, are informative about the "window" feature:

> As we trowel down in the 0-0.5' level, the west wall of the structure is beginning to show up very distinctly, with almost a continuous line of dolomite slabs in both the interior and exterior of the structure and dolomite slab rubble in between. There seems a break in the wall in the extreme southwest corner of the square; at the break, a vertical slab is present that is perpendicular to the other slabs. A similarly placed slab is visible about 1.2 feet to the south in the adjacent square which is yet to be excavated. The placement of these slabs strongly suggests a window or opening in the west wall . . . .
>
> No cultural debris was recovered in the 0-0.5 foot level. However, in the 0.5-1.0 level, and specifically in a zone ranging from 8-10 inches below the highest elevation in square W20/N10 (-8.9 feet), we recovered what appeared to be a cache of flint flakes and tools. Definite artifacts included a side scraper and a snubnosed scraper. The soil at this level was somewhat harder and more reddish in color. Below this level, the soil was easier to trowel and completely devoid of artifacts or flint chips. On the exterior or west end of the "window," as we were troweling the wall to prepare it for a profile drawing, we encountered a large reddish sandstone slab that sloped inward at an angle of 65 degrees. The slab is approximately 19 inches long, 2.5 inches thick, and at least 12 inches wide; it may be wider, but the lower portion is still embedded in soil. To the south, the sandstone slab is supported by two small wedgelike dolomite slabs that keep it from falling forward into the window cavity. The wedges are squeezed between the sandstone slab and the vertical dolomite slab that marks the south side of the window. The north side of the sandstone slab is unsupported and slants away slightly to the west of the vertical slab marking the north side of the window.
>
> In viewing the sandstone slab, I get a strong impression that it is in place and was used to close the window. It seems improbable that the slab would have fallen into the exact position needed to close the opening and that the two small wedgelike dolomite slabs would have fallen into place to prevent the sandstone slab from falling forward. Also, other than this sandstone slab, no others were found in square W20/N10 and no others are apparent in the remaining wall in the adjacent square to the south. The fact that the sandstone slab is higher in width than a comparable-sized dolomite slab adds further to the argument.
>
> I also feel that the evidence suggests that this feature is a window rather than a door. The cache of tools and flint chips could or probably do mark the base of the opening. If they do, this base seems too high to be the floor of a doorway. Although the floor of the structure (house) has not been definitely identified, the level of the fire hearth (in W10/EW at -10.0 feet) suggests that it was well below the suspected base of the window. Also, a window ledge would be a convenient place to store a cache of tools and flakes, but a doorway would be just the opposite.

In general, Bollich's reasoning makes sense. However, the cache (at -9.0 to -9.3 feet elevation) was located above the level of the central hearth (which was at -10.0 feet), and lay on a hard reddish soil layer, perhaps on a relatively low altar, bench,

or hard-packed passageway to the exterior. From all evidence, then, we opt for a raised altar feature that extended into the house from the "window," flanked on either side by the channel.

The original appearance of the window feature is unknown. If the sandstone slab functioned as a closure, then the upper "frame" of the window was low in the wall (top elevations of the vertical slabs were -8.1 feet). As a window or ventilator, the feature would let in light and would promote cross-ventilation when the entryway was opened; when in place as a closure, the slab would prevent wintertime draftiness. The window's location coincides with Feature 1, a large trash midden several feet west of the house's back wall, suggesting the occupants discarded trash out of it.

The 41MO37 window feature is reminiscent of Room III at the Footprint site (41PT25), a few miles away on the Canadian River. This room had a "special stone slab" at the rear of a feature ("altar") in the center of its west wall. The dolomite slab had two outsized and stylized human feet or footprints carved into it, facing the interior of the house.

Lintz (1986:354-355) describes a square slab-lined structure at the Cottonwood Creek Ruins that also had a "window" feature. The house had a central firepit, channel, and benches; its north wall was composed of double slabs, while the east and west wall had single slabs (the south wall was eroded away). Roof-support postholes were near the corners of the structure, and two tandem holes were inside near the entryway. The walls had three central gaps; the eastern and northern gaps had slabs forming an entryway. The 0.56 m west wall gap, however, had a single slab centered between two vertical slabs placed perpendicular to the wall slabs; the single slab "closed the gap."

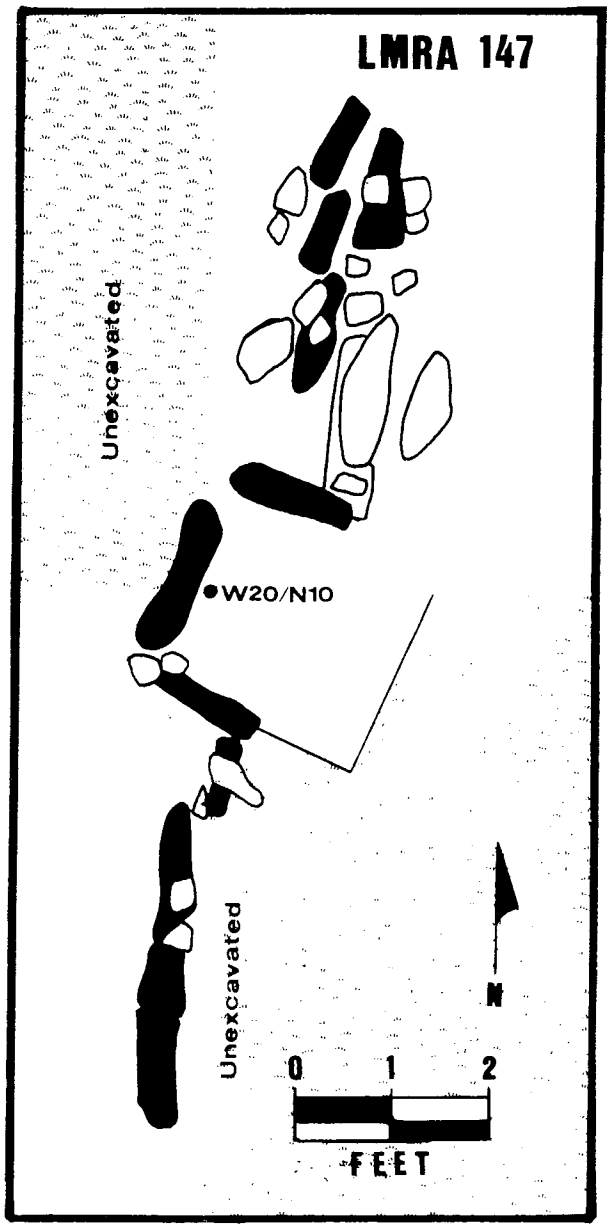


Figure 10. Detailed map of "window" at 41MO37. Wall slabs just north of the feature are stacked, and the slabs outside the wall tend to slope to the west, as if they collapsed outward from the wall and fell onto an earthen bank.

Attached Storage Cist

A circular slab-lined storage cist (10 feet in diameter) was attached to the house's south wall at or near its southeast corner. The feature lay undisturbed beneath an enormous pile of collapsed slabs and rubble; a few in situ vertical slabs were visible at the outer edges (Figure 11). It is difficult to explain the sheer massiveness of the rock pile comprising the cist, but wall collapse surely contributed to the stone pile.

In design and construction, the cist's lower wall closely resembles that of the main house: a double row of closely set and aligned vertical slabs, supported by smaller "chink" rocks wedged at their bases; rubble fill may have been used. The lower course was covered with a light-colored sandy clay mortar, and a hard-packed floor was prepared with the same soil. Slightly above the floor, but below the rubble, was a sizable deposit of wind-blown sand. The masses of fallen slabs probably represent tiers of horizontally laid slab masonry cemented and encased in mortar.

Figure 11. Southeastern quadrant of attached cist, unit S20/NS cleared and gridded for mapping. Many slabs have already been removed from the unit; note slabs in other portions of "rockpile." Trowel points north.

A few vertical slabs were found in the floor (see Figure 8), possibly remnants of a low partition wall that divided the cist into two compartments for separation of stored materials. Too, these slabs may have supported a brush/wattle floor or platform, upon which certain materials (such as corn) would have been placed for drying. Air circulating under the platform would promote faster drying and prevent food loss from dampness-induced molds and fungi.

The cist did not have a hearth or scatters of burned rock, and household-related archeological materials were sparse in the fill and on the floor. A cache of four antler billets or haft blanks on the floor is the most notable find.

A roof, probably similar in basic construction to that of the main house, was laid atop the completed cist. A 0.167 foot diameter charred pole or stick lay on the cist floor, along with chunks of charcoal, probably from burned wattles; no daub was found inside the feature, although one piece was recovered just outside the house wall. Although field records are sketchy, two possible postholes were noted in the cist, one in unit S20/NS (0.5-1.0 feet from the cist's wall), and the other in the extreme southeast corner of the unit between two bedrock exposures. Conceivably these are roof-support postholes.

No constructed entryway or noticeable gap was found in the excavated cist walls. Thus, how the cist was accessed is unknown; perhaps access was gained by roof entry. The Structure 2 storage cist at the Chicken Creek site (Schmidt-Couzzourt 1983:14-15, 46), which shared a contiguous wall section with the Structure 1 dwelling, was of similar construction to the 41MO37 cist. It was circular-shaped with a maximum diameter of 9 feet. Its lower wall was constructed of massive dolomite slabs and boulders, tightly chinked with smaller slabs and chunks, while postholes were placed along its exterior, presumably to support a wattle (?) roof; it had no entryway. An earthen bank was piled against portions of its wall, and it did not have a prepared floor; the interior contained a massive, amorphous, mound of clay up along one wall section. The contents of the cist were primarily perishables, including bison horn cores, an antler section, and a bone awl.

The 41MO37 cist (and probably the house as well) was deliberately cleaned out by occupants when the site was abandoned. It may have contained perishables, including bone tools (the antler billet cache), seasonably-gathered wild fruits, seeds, other plants, dried or jerked meat, and hides. The wind-blown sand deposit underneath most of the collapsed wall debris, and in the cist's bottom, is evidence of a prolonged drought.

Possible Attached Cist, Southwest Corner

This possible cist, marked by a double row of vertical dolomite (exterior row) and sandstone (interior row) slabs at the extreme southwest corner of the house, occurs in the center of unit S10/W30. A few fallen slabs were also scattered in the unit, but most of these are near the house wall, west of the possible cist wall. The outer row of vertical slabs is about 4.0 feet in length; its arc and projected diameter, if complete, would have a size and shape comparable to the cist to the east. The use of sandstone slabs to form an inner wall segment is also noted in the principal cist feature discussed above.

POSSIBLE EAST-WALL "BIN"

This enclosure or "bin" was formed by a row (or rows) of now scattered slabs that extended from the house's southeast corner to the southeast end of the entryway, forming a triangular "bin." Few

details are available about the size or shape of the "bin," or of its contents. Such "bins" or storage areas were common attachments to the fronts of Panhandle Aspect houses.

FEATURE 2

Feature 2 consists of three external postholes. They are in unit S10/NS, adjacent to the southeast house wall and between the entryway and the cist's northeastern wall.

Posthole #1 is a few inches outside the house wall, about one-third of the way from the house corner to the entryway. It was 0.4 feet in diameter and 0.2 feet in depth. Posthole #2 is in the unit's southeast quadrant, ca. 4 feet from the cist wall. It was 0.25 feet in diameter and 0.17 feet deep. The posthole was filled with small "flakes" of red sandstone and dolomite, whose purpose (if any) is unknown. Posthole #3 was spaced to form a right triangle with postholes #1 and #2. It was placed to a depth of 0.9 feet, penetrating the yellowish clay zone. With a 0.4 foot diameter, the posthole's profile indicates it was tapered to a narrow rounded base. It was filled with charcoal and apparently burned in place.

FEATURE 3

Feature 3, between postholes #1 and #2, was comprised of a thick oval quartzite hammerstone, with a horizontally-placed bone awl to one side, and a vertically-set bone awl next to the horizontal awl. The feature was in level 2 (at elevations of -8.7 to -8.9 feet). The Feature 2 postholes were at the same elevation.

A large metate fragment and a nearby mano were recovered near the base of level 2 in S10/NS. Both groundstone tools lay within the "triangle" formed by the Feature 2 postholes.

The "trough" metate (specimen LMRA 147-31-11.10) is about 50 percent of a sandy dolomite slab that has been heavily ground on one face, and percussion-shaped into a rough rectangle. It measures 32.5 x 37.0 x 12.8 cm, and has sloping sides and a concave bottom. The metate was cached at the house for continued use as a grinding slab.

The mano is an elongated quartzite cobble measuring 15.4 x 8.5 x 3.8 cm (LMRA 147-31-11.11). Its ends are battered and crushed, with both faces pecked and ground.

Figure 12 depicts the spatial relationship of the features and groundstone tools. The location of the grinding implements, the postholes, and the awls/mano feature, provide clues concerning what the postholes *may* have supported: a roof overhang or separate roof over an outdoor working area. This would have helped to protect the alcove formed by the house wall, the entryway, and the cist from both prevailing southwesterly and wintertime northerly winds. Too, the spot is convenient to the storage cist, where corn and other foodstuffs would have been kept. If this interpretation is sound, the possible "bin" wall would have passed right through the activity area, forming an obstacle to efficient work and freedom of movement. However, the deposition of the metate and mano, and the erection of the posts for a roof alcove may postdate the "bin."

While midden deposits, scattered burned rocks, and charcoal stains were noted away from the speculated work area, the suggested alcove contained relatively little midden debris or evidence of burning/fires. This is consistent with a work/plant-grinding area, which would be kept clear of midden and open fires.

In deposits outside the structure, midden trash was found on the surface, in a brown sand below the wind-blown sand/humus cover, and atop the yellowish sandy clay subsoil; its thicknesses varied from unit to unit. The yellow subsoil, present in units excavated outside the house, undulated considerably and was occasionally intruded by bedrock, reddish clays, and rocks. Sediments and midden deposits are clearly thicker on the south side of the house, where, presumably, the prevailing winds deposited more dust and sand along the windbreak caused by the "rockpile."

Two units were placed outside the house walls, one (W30/N20) off the northwest corner, the other (N10/E10) east of the northeast corner. Unit W30/N20 contained cultural materials primarily in level 1, with a "light-colored" soil in level 2.

Cultural deposits are deeper in N10/E10: a thin sand/humus overlies a 0.4-0.75 foot thick midden zone. The midden was deposited on a yellow-brown sandy clay and a coarse yellowish "riverine" sand, both essentially sterile. The midden zone had ash and charcoal lenses and scattered cultural materials, including fractured boiling pebbles.

Midden trash deposits were extensive (at least one foot in thickness) from the east wall to the cist, and along the south wall to the rear of the house.

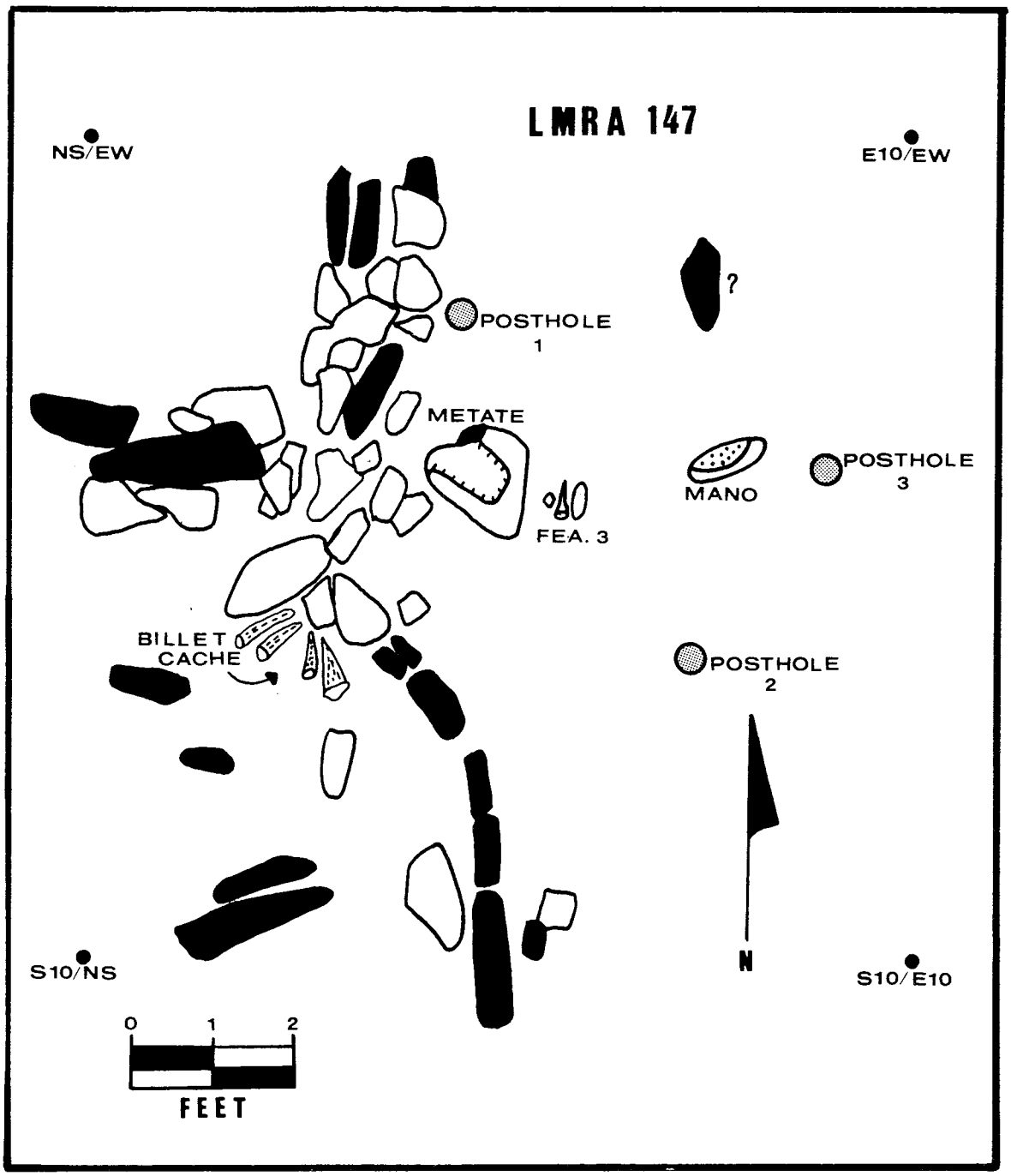


Figure 12. Features 2 and 3.

Units S10/NS and S20/NS also evidenced fires, cooking, and perhaps tool-making areas, while Unit W10/S20 had abundant midden materials, including stains and lenses of charcoal, ash, burned earth, and boiling pebble fragments. The frequency of Alibates tools and debitage indicate that flintknapping occurred by the house's south wall.

The sheet midden probably reached more than 30 feet south of the main house wall. It suggests that the surface surrounding the house, particularly the southern side, was used for daily outdoor activities. The house "yard" was a very busy place. Too, the house may have been occupied for a long time, perhaps two or more generations, resulting in

a relatively thick blanket of accumulated trash, activity remains, and features extending some distance from the house.

It is commonly accepted that Panhandle Aspect houses were used principally for shelter and storage, with many, if not most, routine activities taking place outside. The very limited exterior area excavated at 41MO37 amply attests to the heavy use of the immediate environs for all manner of domestic activities.

FEATURE 1

This feature was marked by a row of still-vertical west-wall slabs, a row of outwardly-fallen slabs, and much collapsed wall debris in unit W30/EW. An earthen bank was also detected piled against the house wall, as evidenced by soil color/texture changes, and downward-sloping fallen wall slabs lining the upper bank all along the wall (Figure 13).

A buried trash midden (Feature 1) was identified in the northwestern quadrant of W30/EW. The midden occurred as a basin-shaped deposit oriented south-southeast to north-northwest. The upper portion of the midden, 0.3-0.5 feet bs, parallels the present surface, with the lower midden deposits extending to 1.67 feet bs. The midden lies above, but partly within, the yellowish clay zone.

Feature 1 had midden debris, including broken lithic tools, many organic remains (mainly shattered bone), 121 Borger Cordmarked sherds, and more than 1,000 flakes. Charcoal and ash were abundant, and thin lenses of these are indicative of either dumps or in situ fires. Cracked quartzite boiling pebbles were scattered throughout the deposit. Feature 1 likely ran the length of the adjacent unit (W30/N10), and the dump is conveniently located outside the "window" in the west wall and within easy pitching distance from the structure. It is also near the west-wall earthen bank, where trash-producing activities took place.

DISTRIBUTION OF HUMAN BONES

Unit S20/NS had a large dolomite slab that was thought to cover a human burial. However, a mandible found under the slab is actually a fragmentary bison jaw. Nevertheless, at least nine human bones were found in this area of the site: six in S20/W10 and three in S20/NS. The most complete elements are:

1. LMRA 147-31-95.19 (S20/NS, L.1): Terminal phalanx, right toe or robust thumb; adult range.

2. LMRA 147-31-81.21 (S20/NS, L.2): Almost complete third phalanx, right middle or third finger (missing certain attachment scars); adult range.

3. LMRA 147-31-102.10 (listed as S10/NS, L. 3, SW quadrant, but assumed to be S20/NS): Proximal end and part of body, metacarpal, middle finger, probably right hand; adult range.

4. LMRA 147-31-1.20A (S20/W10, L.1): Proximal end and body of first phalanx, third finger, right hand (?); adult range.

5. LMRA 147-31-4.38 (S20/W10, L.2): Second phalanx, right thumb; robust adult range.

6. LMRA 147-31-4.39 (S20/W10, L.2): Distal end and body of metacarpal, right index finger; adult range.

Figure 13. Probable earthen bank against house west wall, and Feature 1 trash midden (foreground), level 2. The house wall is marked by a large light-colored slab at right, apparently erected on edge; also note outwardly-sloping collapsed slabs lining the bank.

Except for one, these bones are heavily weathered and leached; most epiphyses are damaged. A small, poorly preserved ulna fragment and a weathered vertebra fragment from the same area suggests the presence of a disturbed burial below level 3; the midden zone is heavily riddled by rodent burrows. Another possibility is that burials along a house wall were covered by wall slabs, as was documented at 41OC27 (Hughes and Hughes 1987:96, 104). This large Plains Village period pithouse was abandoned and then used as a "charnel house" or mass-burial locus. The house was robbed of its wall slabs, which were used for a relatively massive cairn to cover the burials along its southeast wall.

DISTRIBUTION OF CULTURAL MATERIALS

In general, the house interior and the storage cist were virtually devoid of cultural materials, while midden areas surrounded the house. The heaviest concentrations of cultural material occur southeast of the house, along the southern wall and more than twenty feet away from the wall, and in a large trash pit off the west wall, but it is likely that trash and activity-area debris completely surround the house.

Inside the structure, the cultural materials present were most common between 0-1.0 feet bs. Two factors probably account for this distribution: (1) vandalism caused artifacts to be concentrated at that depth, and/or (2) the structure roof was used as a place to discard broken tools and other trash, and when the roof collapsed these materials ended up on top of the floor. Interior units W10/N10 and W20/N10 had very few artifacts, while the more centrally placed unit W10/EW, with the hearth and possible bench features, contained higher amounts of cultural material. Unit NS/EW had only three knives (in the entryway) and a maul-pounder.

The scarcity of materials from inside the house and the storage cist suggests that the house was deliberately stripped of desirable or useful tools and other materials, then abandoned. That a fallen slab or two overlay the cache of antler billets (see Figure 14) in the cist may indicate that the cist—and possibly the house—was in disrepair at the time of abandonment.

Surface collections were carried out in 10 x 10 foot squares over a 140 x 110-120 foot area around NS/EW. Artifacts were scarce on the surface, mainly occurring in small clusters in a 110 x 50 foot area by grid point NS/EW. These clusters probably coincide with other structures, but they could represent pothunter discard piles.

ARTIFACTS

The tool assemblage from 41MO37 is typical for the Panhandle Aspect. The arrowpoints are Washita (n=10) and Fresno (n=17) varieties (Table 2). The Washita points have lateral notches placed at the midpoint or lower on the blade, and occasionally they are perpendicular to the blade edge rather than to the midline. They have concave bases.

Preforms are generally fragmentary, indicating they were broken during manufacture. "Guitar-pick" preforms are also common. Ovate knives (n=9) outnumber beveled knives (n=2). No complete beveled knife was recovered, only a single complete oval knife (in two pieces) is in the assemblage, and the knife fragments are from broken oval knives

End-side scrapers (n=13) are more common than snub-nosed and side scrapers. Scraper categories were defining by considering the original intent of the flintknapper, the degree of distal bit convexity, and the observable emphases on scraping edges. Retouched flakes have shallower angles, are less well worked, and seem more suitable for cutting or perhaps shaving/planing than scraping; they also tend to be thinner and more subject to fracture when used as scrapers.

Other flake tools include spokeshaves, gravers, and multi-function tools. They are primarily single-use expediency tools, made on suitable flakes, that were discarded after use. The flake tools were retouched principally to produce a desired functional edge. Utilized flakes are also common; they are sharp flakes used without modification, creating a dulled and minutely "retouched" edge or edges.

Drills and perforators were made from flakes, with retouch restricted to the worked edges. The 41MO37 drills are poorly worked, with original flake scars present on one or both faces; completely retouched diamond-profiled bits are rare.

Debitage from the site consists overwhelmingly of small tertiary flakes and fragments of

Table 2. Distribution of Cultural Materials from 41MO37

Description	N10/E10	NS/EW	S10/NS	S20/NS	S20/W10
Dartpoint	-	-	-	1	-
Arrowpoint, Washita	1	-	2	1	-
Arrowpoint, Fresno	4	-	2	2	3
Arrowpoint, Unclassified	-	-	1	1	2
Preform/Blank	5	2	-	-	4
Knife, Ovate	-	3	-	-	-
Knife, Beveled	-	-	1	-	-
Knife, Unclassified	-	-	-	-	2
Scraper, End-End/Side	-	-	2	-	4
Scraper, Side	-	-	1	-	1
Scraper, Unclassified	3	2	1	1	5
Drill/Perforator	-	-	1	-	2
Graver	-	-	-	-	1
Spokeshave	-	-	1	-	1
Denticulate	-	-	-	-	-
Retouched Flake	5	-	19	11	10
Multifunctional Tool	-	-	-	-	1
Quarry Blank/Biface	-	-	-	-	1
Debitage, Alibates	57	176	398	444	735
Debitage, Tecovas	2	-	1	5	7
Chopping Tool	-	-	-	-	-
Hammer/Anvil/Maul	2	3	4	-	3
Mano	-	-	1	1	2
Metate	-	-	1	-	1
Misc. Ground/Pecked Stone	-	-	-	-	1
Stone Pipe	-	-	-	1	-
Borger Cordmarked	-	-	3	2	40
Ceramics, Unclassified	-	-	-	-	-
Daub	-	-	1	-	2
Bone Tool, Digging	-	-	2	1	2
Bone Tool, Perforating	-	-	1	1	1
Bone Tool, Other	-	1	1	1	6
Bone, Large Mammal	-	-	4	3	4
Bone, Bird/Rodent	-	-	1	-	5
Bone, Fish	-	-	-	-	-
Bone Scrap	17	2	272	247	768
Antler Billets/Hafts	-	-	4	-	-
Turtle Carapaces	-	-	-	-	-
Turtle, Carapace Segments	-	-	1	-	4
Mussel Shell, Utilized	-	-	1	2	2
Mussel Shell, Scrap	3	6	45	29	35
Plant, Other	-	-	-	-	-
TOTALS	99	195	772	754	1655

Table 2. *(Continued)*

Description	S10/W30	W30/EW	W10/EW	W10/N10	W20/N10
Dartpoint	-	-	-	-	-
Arrowpoint, Washita	-	4	1	-	-
Arrowpoint, Fresno	2	1	1	1	-
Arrowpoint, Unclassified	-	2	2	-	-
Preform/Blank	2	5	-	-	-
Knife, Ovate	-	2	-	-	-
Knife, Beveled	-	1	-	-	-
Knife, Unclassified	-	3	-	-	-
Scraper, End-End/Side	-	3	-	-	2
Scraper, Side	-	1	-	-	-
Scraper, Unclassified	4	6	1	-	1
Drill/Perforator	-	4	-	-	-
Graver	-	2	1	-	-
Spokeshave	-	3	-	-	-
Denticulate	-	-	-	-	-
Retouched Flake	14	35	9	2	3
Multifunctional Tool	-	1	-	-	-
Quarry Blank/Biface	-	-	1	-	-
Debitage, Alibates	223	1051	72	32	65
Debitage, Tecovas	-	1	2	-	-
Chopping Tool	-	1	-	-	-
Hammer/Anvil/Maul	-	3	-	-	-
Mano	-	-	-	-	-
Metate	-	-	-	-	-
Misc. Ground/Pecked Stone	-	1	2	-	-
Stone Pipe	-	-	-	-	-
Borger Cordmarked	3	127	-	-	-
Ceramics, Unclassified	-	-	-	-	-
Daub	-	-	53	-	-
Bone Tool, Digging	-	-	-	-	-
Bone Tool, Perforating	1	-	3	-	-
Bone Tool, Other	1	7	4	-	-
Bone, Large Mammal	-	25	-	-	-
Bone, Bird/Rodent	-	25	-	-	-
Bone, Fish	-	23	-	-	-
Bone Scrap, All	16	564	17	2	11
Antler Billets/Hafts	-	-	-	-	-
Turtle Carapaces	-	?	-	-	-
Turtle, Carapace Segments	-	101	-	-	-
Mussel Shell, Utilized	2	8	-	-	-
Mussel Shell, Scrap	15	88	5	3	-
Plant, Other	-	-	-	-	-
TOTALS	283	2098?	174	40	82

Table 2. *(Continued)*

Description	W30/N20	Excav. Total	Surface Total	Site Total
Dartpoint	-	1	-	1
Arrowpoint, Washita	-	9	1	10
Arrowpoint, Fresno	-	17	-	17
Arrowpoint, Unclassified	1	9	1	10
Preform/Blank	1	19	4	23
Knife, Ovate	-	6	3	9
Knife, Beveled	-	2	-	2
Knife, Unclassified	1	6	3	9
Scraper, End-End/Side	1	13	-	13
Scraper, Side	-	3	-	3
Scraper, Unclassified	3	27	10	37
Drill/Perforator	1	8	1	9
Graver	1	5	-	5
Spokeshave	-	5	4	9
Denticulate	1	1	-	1
Retouched Flake	12	123	68	191
Multifunctional Tool	1	5	-	5
Quarry Blank/Biface	-	2	1	3
Debitage, Alibates	362	3615	1169	4784
Debitage, Tecovas	-	18	6	24
Chopping Tool	1	2	3	5
Hammer/Anvil/Maul	-	16	3	19
Mano	-	4	1	5
Metate	-	2	-	2
Misc. Ground/Pecked Stone	-	3	-	3
Stone Pipe	-	1	-	1
Borger Cordmarked	6	181	1	182
Ceramics, Unclassified	1	1	-	1
Daub	-	56	-	56
Bone Tcol, Digging	-	5	-	5
Bone Tool, Perforating	-	7	1	8
Bone Tool, Other	-	21	-	21
Bone, Large Mammal	2	38*	-	38*
Bone, Bird/Rodent	-	31*	-	31*
Bone, Fish	-	23	-	23
Bone Scrap	-	1916*	5	1921*
Antler Billets/Hafts	-	4	-	4
Turtle Carapaces	-	?	-	?
Turtle Carapace Segments	5	111	-	111
Mussel Shell, Utilized	-	15	-	15
Mussel Shell, Scrap	-	229	-	229
Plant, Other	-	+	-	+
TOTALS	400	6560*	1285	7845*

+ Denotes presence of modern seeds
* Denotes a minimum number
? Number uncertain

Alibates. Three fragments of quarry blanks/bifaces and several core fragments indicate use of the Alibates quarries for raw knapping materials. Tecovas flint accounts for less than 1 percent of the lithic debris, and obsidian is absent.

Grinding implements are uncommon. Represented are metates, grinding slabs, and manos. Many of the manos have also been used as hammers. Hammerstones are made from quartzite pebbles and cobbles, and one thick Alibates core evidences battering. One maul-pounder, a very large cobble or "boulder," was used to break thick bones to obtain marrow and to produce fragments for bone-grease production. It could also have been used to drive stakes or posts, shape large, thick slabs, or pulverize clays.

Stone pipes in the Blue Creek TASFS collections are quite rare, but 41MO37 had a single pipe fragment (LMRA 147-31-95.9), along with pieces of the stone raw material (LMRA 147-31-95.17). Both items were in the same unit and level, which implies the pipe was manufactured on site.

The ceramics from 41MO37 are from Borger Cordmarked vessels. The vessels are globular, with slightly constricted mouths and short necks; they are undecorated. They are tempered with fine to coarse crushed quartzose rock and sand; mica flecks may indicate a micaceous clay paste or the use of crushed granitic rocks for temper.

One ceramic (LMRA 147-31-83.8F) from W30/EW, level 2 (Feature 1), is a small, thin piece of fired untempered clay that has faint cordmarking on one face. It was finger-molded and extremely crumbly, and could be a gaming piece or a test-firing piece. Another fired clay lump was recovered from S20/NS.

Mussel shell fragments are relatively common, and apparently represent food debris. A few shell fragments have worn or ground edges, but no complete "shell scraper" is in the collection. These tools are common in Panhandle Aspect sites, and are sometimes called "corn shellers," although their exact uses are speculative.

Antler tools are represented mainly by the cache of four billet/haft blanks in the cist. These specimens (LMRA 147-31102.6 to 9, S10/NS, SW quadrant, "inside corn bin," level 3) are similar in all respects. Each has been trimmed or ground smooth at the cut distal end, and then cored to hollow the shaft; smaller tines near the distal ends were cut and removed. The billets measure 143-171 mm in length; 23-36 mm in width; and 22-39 mm in thickness (Figure 14). The antler bases are rather small for flaking billets, and the holing of the interiors strongly suggests they were intended as hafts for knifes or scrapers.

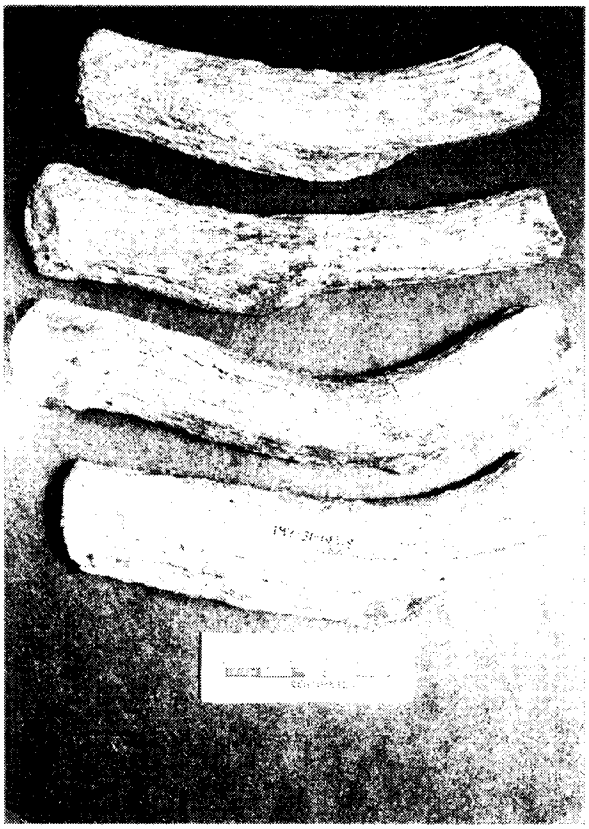


Figure 14. Antler billet/haft cache (LMRA 147-31-102.6 to 9), 41MO37.

Bone tools include fragments of worn/polished scapula (probably bison) hoes or possibly "squash knives." Two digging tools are made from large bison limb fragments, but tibia digging stick tips are absent. Awls and splinter awls/perforators were made from deer/antelope metapodials, suitable fragments of other limbs, or possibly from ribs. Included in the tools are six fragments of bison-rib "rasps." Additionally, the bone tool assemblage has a number of small bone fragments with polish, wear, and chipping; most are from bison bones (Figure 15).

Bone is abundant, although mainly unidentifiable because they were shattered, presumably for the purpose of boiling to obtain marrow/bone grease. About 60 bone fragments have butchering marks.

At least 30 bison bones were identified, most in the Feature 1 Midden. They are principally from lower legs or fragmented ribs, but also include two bison teeth fragments. In general, these bones were

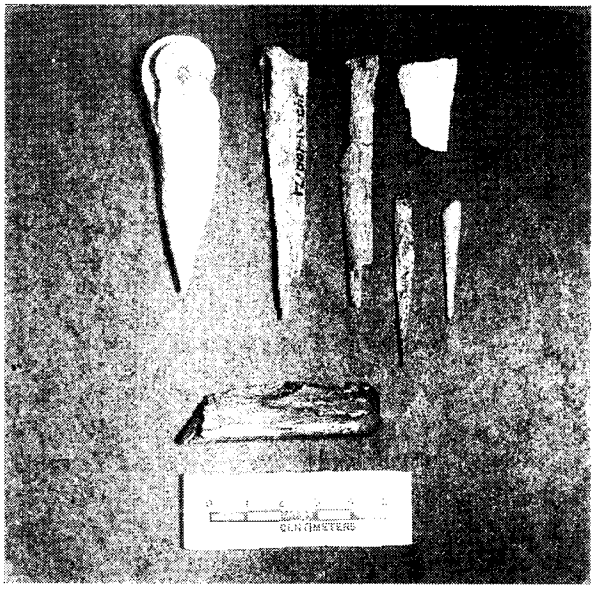


Figure 15. Bone awls, awl fragments, and chisel-like polished bone tool from 41MO37: awls: top, left to right (LMRA 147-31-41.2, -100.21, and -45B.14) and lower right (-96.16 and -48.2); awl butt fragment, top right (-88.5); bone tool with chisel-like bit, lower row (-95.21).

fractured for marrow and bone grease extraction. Deer and antelope are represented by at least eight identifiable bones (primarily long bones), one tooth fragment, and a small amount of antler fragments.

Rodent bones are relatively abundant, and include rabbit (both cottontail and jackrabbit), gopher, prairie dog, and smaller, unidentified species. Broken limbs, innominate fragments, mandibles, and teeth are the most common elements. The larger rodents almost certainly represent food remains; the smaller, mouse-sized species and gophers may simply be deceased intruders or ruin occupants.

Bird bones are rare, and unidentified to species. Presumably some birds were acquired for their feathers; their small amount of available meat was probably of little consequence to Panhandle Aspect bison hunters.

There is a group of 23 bones classified as "possible fish bones" that were found in the Feature 1 midden. These small, fragile bones do not resemble any other bone material in the Blue Creek collection, and one is clearly a fish vertebra. Their use as human food is questionable, however, since they could have been carried to the site by a predator or scavenger after humans had abandoned the house.

The hapless and helpless common land turtle *(Terrapene ornata)* is an easily procured source of meat. The shell makes a convenient rattle or bowl, and segments and complete carapaces are common in Panhandle Aspect sites, as is the case at 41MO37 (see Table 2). However, of the 106 total carapace segments, 101 came from the Feature 1 midden; this may represent one complete but shattered carapace. Less than 12 percent of the segments were burned, and none were otherwise altered.

SUMMARY

Of the various Panhandle Aspect structures investigated by the TAS at Blue Creek, the 41MO37 house was the best construction, built with an air of planning and permanence about it. The house had little subsequent building, additions, or major repairs. Wall and other construction techniques were the same for the main house, the entryway, and the large cist. Floor fills, plasters, and wall mortars were similar in all parts of the structure. A red clay was used in the entryway, the only recorded use of that material.

The lifespan of the house, or length(s) of occupation(s), was not established. The house was likely deliberately and peacefully abandoned, and its cist cleaned out at the same time. The empty cist, with a definable deposit of wind-blown sand on its floor, might indicate the cause of site abandonment: crop failure and exhaustion of stored food resources. There is no evidence of a conflagration, and the house slowly and gradually collapsed on itself.

It is difficult to link 41MO37 with either of the other two complex sites or the LMRA 242 cemetery. There are architectural and artifactual commonalities between 41MO37 and 41MO36, more so than between 41MO35 and the other two sites, but in general the broad similarities in activities represented by artifacts, features, and other archeological data at the three architectural sites reflect a shared Panhandle Aspect culural lifeway. At 41MO37, activities represented include:

1. Hunting of bison and other large mammal game, and procurement of other, smaller game (possibly by trapping); bison remains are clearly dominant.

2. Manufacture of procurement and processing implements and the repair of tools and equipment.

3. Killing and major initial butchering/processing of bison and other large game off-site, with select game portions brought back to the site for further processing.

4. Gathering and processing of wild plant foods, freshwater molluscs, and land turtles.

5. Horticulture, including processing and storage of cultivated (and gathered) foodstuffs.

6. Manufacture of horticultural and domestic use tools from game animal bones. Some raw materials, such as antlers, may have been gathered from non-kill sources.

7. Processing of bones and other animal matter for marrow and grease.

8. Cooking via direct fires in hearths and by the boiling-stone method. This apparently involved roasting or barbecue techniques, as well as boiling in ceramic vessels.

9. Hide processing and curing.

10. Ceramics were probably made at the site, as evidenced by finds of fired clay lumps, one with temper, and possible unprocessed clays.

11. Woodworking, as indicated by many tools with cutting, shaving, and planing edges.

12. Music and/or weaving: bone rasps may have been either musical instruments or weaving implements. Bone awls and other polished bone tools may indicate weaving, mat-making, or basketry.

13. Pipe-making, as evidenced by a broken ground-stone pipe and debris from the same unique raw material. What was smoked in the pipe(s) is not known.

14. Utilization of the Alibates flint quarries, and the production of blanks or bifaces, probably at the quarries, for major flint knapping supplies.

15. Utilization of locally available lithic resources for virtually all tools, and for structure construction.

Except for two fragments of perforated mussel shell, tentatively identified as jewelry, all recovered artifacts and materials from 41MO37 are of a practical nature, designed and used for survival and routine activities of daily living. No non-local (Southwestern) artifacts were found at the site; thus, except possibly during bison hunts and gathering rounds, these people did not travel much.

Artifact Descriptions

Table 2 presents major artifact and material culture categories. It does not include hammerstone fragments, "lithic samples," or other miscellaneous materials. Under "Debitage, Alibates," all Alibates specimens—cores/fragments, primary flakes, secondary flakes, bifacial thinning flakes, tertiary flakes, and burned flakes—are combined into a single class. The "Debitage, Other" class includes quartzites, Potter chert, and other unidentified stone types. Polished, cut/incised, and worn/abraded bone specimens are included as "Bone Tool, Other." With "Preforms/Blanks," "guitar-pick" preforms are lumped with the other preforms.

LMRA 147-31-76.1 (W10/N40, Surface): Very small Washita point, missing a corner of one basal tang. Alibates. Size: 13 x 10 x 2 mm (Figure 16, second row, far right).

LMRA 147-31-45.1 (S10/NS, L.2, "outside wall"): Fresno-like arrowpoint. Small, thin, fully worked triangular unnotched point, missing the tip. Its blade edges are convex, with a concave base forming long basal "ears." Alibates. Size: 25 x 17 x 3 mm (see Figure 16, 3rd row, 4th from left).

LMRA 147-31-4.1 (S20/W10, L.2): Unclassified arrowpoint. It is a long, narrow specimen with intermittent but high-quality retouch, and one corner was not worked; the base is sinuous. The point resembles a specimen in Green (1986:37 and Figure 8N), classified as a Fresno. Alibates. Size: 35 x 15 x 3.5 mm (see Figure 16, 3rd row, 2nd from left).

LMRA 147-31-3.1 (W30/N20, L.1): A Washita point that was reworked into a small, delicate drill, awl, or perforator; possibly a bow drill tip. The reworked narrow blade is twisted and use-dulled. Alibates. Size: 20 x 17 x 2 mm (Figure 17, left column, 3rd from top).

LMRA 147-31-45B.4 (S10/NS, L.2, "outside wall"): Preform or unfinished scraper. This is an ovate object with a convex base and edges, tapered

Figure 16. Arrowpoints from 41MO37. Dart point, top left (147-31-81.1); Washita arrowpoints, top two rows; Fresno arrowpoints, bottom two rows.

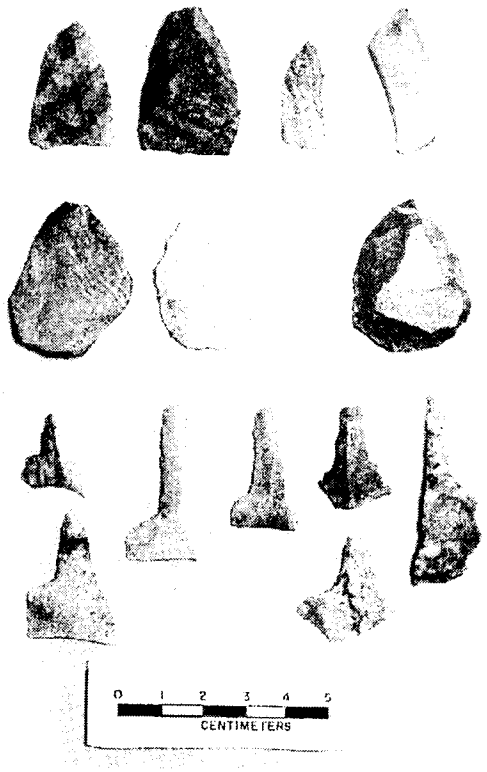


Figure 17. Preforms, Scraping, and Drilling tools from 41MO37. Preforms/Blanks and Scrapers, top two rows; Drills/Perforators, bottom two rows.

to a rounded tip. The edges are crudely retouched by percussion, with slight use-scarring along one lateral edge; cortex remains in the center of one face. Dakota quartzite. Size: 39 x 29 x 10 mm (see Figure 17, 2nd row, right).

LMRA 147-31-43.1, 43.2, 43.3 (NS/EW, L.2, entryway): Group of 3 oval knives; one is complete but broken and the others are end fragments. The complete specimen has an intact platform at one end that was shaped by percussion, with little pressure retouch on the edges; the distal end is dulled. The other knives have only minimal pressure retouch on the edges; one has no use wear. Alibates. Size: the complete knife is 104 x 55 x 11 mm; the others are 82 x 56 x 16 mm and 72 x 59 x 12 mm (Figure 18).

LMRA 147-31-31.1, 31.2 (W20/N10, L.2, "window"): Scrapers. Specimen -31.1 (Figure 19, top row, left) is a large curved flake that expands from the proximal to the distal end. Its lateral edges are steeply chipped on the dorsal face, while the distal end is less than 2 mm thick and retouched only at the corners. Specimen -31.2 (Figure 19, bottom row, right) is an end-side or snub-nosed scraper. Alibates. Size: 71.5 x 37 x 13 mm and 44 x 30 x 6 mm.

LMRA 147-31-100.6 (S10/W30, L.2): Scraper. This is a complete flake, with convex lateral edges and a straight distal end. It is sinuous in profile, with the distal half convexly curved. The scraper has minor retouch on one edge, near the proximal end, as well as retouch or use-wear on the other; use-nibbling is present at the distal end. Alibates. Size: 57 x 32 x 7 mm (see Figure 19, top row, center).

LMRA 147-31-96.4 (W10/EW, "floor"): Arrowpoint preform, broken during manufacture, and reworked into a burin-like graver. The tool is on a thin flake, with a convex pressure-flaked edge and one face thinned. The diagonal fracture forms a stout beak, and the fractured edge has been further retouched to emphasize the beak, which is dulled and faceted. Burned Alibates. Size: 23 x 15 x 4 mm.

LMRA 147-31-83.37 (W30/EW, L.2, Feature 1): Flake side-scraper with spokeshave. The flake is almost complete, with the longer edge unevenly convex and unworked except for a concave spoke-

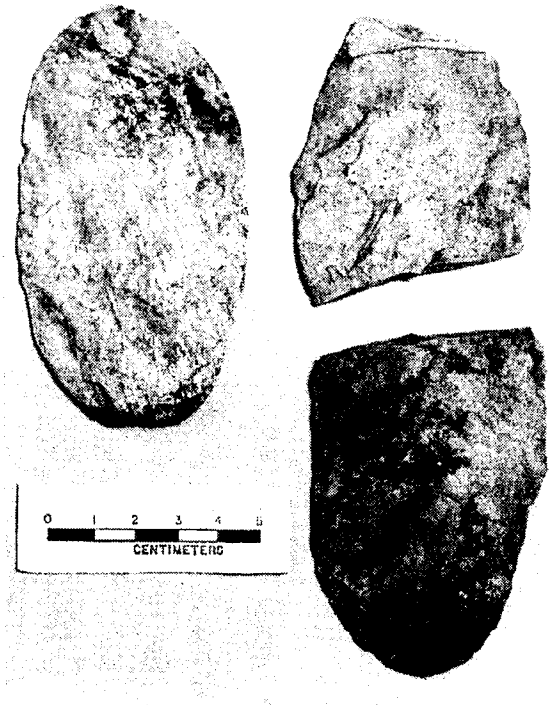


Figure 18. Cache of Oval knives found in the entryway, 41MO37. Top left, LMRA 147-31-43.1A/B (two pieces); top right, -43.3; bottom, -43.2.

Figure 19. Scraping implements from 41MO37.

shave bit chipped into the dorsal face near its midpoint; the bit has wear. The other edge is sinuous, with steep retouch on dorsal face, along with resharpening scars and use-dulling. Alibates. Size: 66 x 40 x 11.6 mm.

LMRA 147-31-83.31 (W30/EW, L.2): Heart-shaped nodule or concretion of dense, fine-grained calcareous stone, possibly a dolomite or caliche. Worn, weathered, and soot-blackened face is almost entirely covered by pecking indentations; the other face is unworked. Size: 73 x 56 x 24.5 mm.

LMRA 147-31-96.14 (W10/EW, L.2): Unifacially ground thin slab (grinding/abrading implement). The shallow basin is in the center, with a ground area about 15 cm in diameter. Dolomite. Size: 33 x 27.5 x 4-19 cm.

LMRA 147-31-4.63 (S20/W10, L.2): Large worn nodule or rounded "slab" with a convex "bottom" and unevenly flat "top," possibly a specialized abrader for bone tools. It has a narrow, shallow basin ground into the center of the flatter face, with more pronounced grinding forming broad grooves at both basin ends. Ground area: 15 x 8.5 cm length-width; depth of grinding varies from 9-18 mm in grooves. Dolomite. Size: 34.7 x 24.8 x 9.2 cm; minimum thickness 3.6 cm.

LMRA 147-31-64.1 (W10/N10, Surface): Very large and heavy cobble mano fragment. It is biconvex, but with one face much flatter than the other; the flatter face is heavily ground, with considerable pecking, almost completely ground down. Quartzite. Size: 92 x 59 x 52.5 mm.

LMRA 147-31-4.64 (S20/W10, L.2): Groundstone implement. The tool was made from a large cobble that was split lengthwise. One face was highly worn and weathered, but only lightly ground; it was also battered and carbon-stained. Quartzite. Size: 122 x 83 x 75 mm.

LMRA 147-31-33.3 (NS/EW, L.1): Maul/pounder. Very large, heavy, dense boulder, with the large end heavily battered. There are also abrasions along one edge. Quartzite. Size: 200 x 142 x 78-114 mm.

LMRA 147-31-101.12 (W30/N20, L.2): Body sherd from possible miniature vessel (?). The exterior has been smoothed but shows faint cordmarking; it is dark brown in color. The sherd's interior was wiped and slightly polished, and a series of shallow grooves or gouges are visible. The sherd has a very sparse temper with a porous paste; a few sand grains are visible under 10X lens. Size: 22 x 17.5 x 4-5 mm.

LMRA 147-31-4.50 (S20/W10, L.2): Bison limb fragment, split for marrow extraction, then sharpened to a point on its interior face. The cancellous tissue at that end is worn smooth, while it is unaltered at the opposite end; the tapered end has use-wear on both faces. Size: 20 x 8 x 1.5 cm (Figure 20, left).

LMRA 147-31-72.1 (S10/NS, NW quadrant, L.2, interior of cist): Medial ridge and remnants of blade of bison scapula hoe. Although weathered and root etched, small patches of polish and striations are visible on the blade. The distal end is beveled and rounded. Size: 22.3 x 8.0 x 2-7 cm (see Figure 20, right).

LMRA 147-31-41.3 (S20/NS, SW quadrant, L.2, "outside wall"): Scapula hoe or "squash knife." Distal fragment of bison scapula blade, heavily worn or abraded to increase the strength and durability of the edge; abrasion striations are visible on the tool. Size: 11.3 x 4.0 x 1.1 cm.

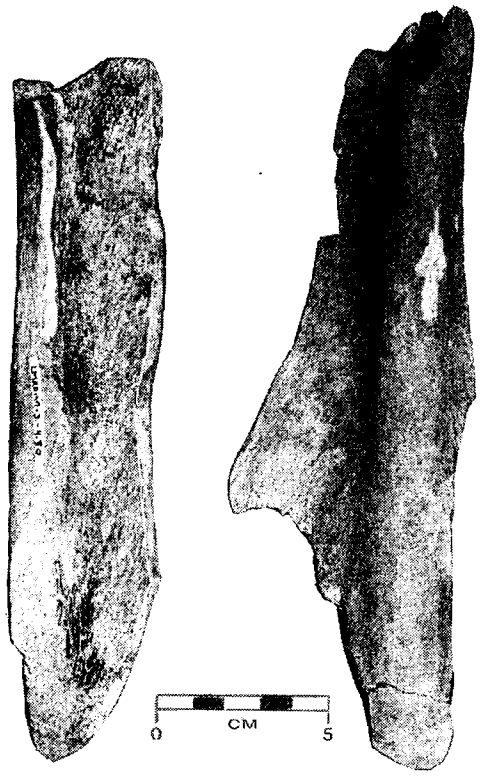


Figure 20. Bison bone tools, 41MO37:bison scapula hoe/digging tool, right (LMRA 147-31-72.1); split/fractured limb bone digging tool, left (-31-4.50).

LMRA 147-31-83.9 (W30/EW, L. 2): Weaving tool (?). The tool is the proximal end and epiphysis of a small antelope rib. One edge of the shaft or blade has a series (15) of irregularly spaced narrow, shallow notches that extend for 45 mm. There are three groups of two notches, spaced about 1 mm apart; other single notches range from 4.5 to 2.5 mm apart; notches vary in size but are about 1 mm wide and 0.5-1 mm deep. By the epiphysis are a series of regularly spaced cutmarks. The rib also has a few cutmarks on both faces and light polish striations. Size: 151 x 16 (shaft) x 3-7 mm (Figure 21, left, oriented vertically).

LMRA 147-31-83.126 (W30/EW, L.2): Medial fragment of bison rib that was purposely cut and snapped at one end; the other end is irregularly fractured. One lateral edge has a series of 16 grooves or notches, each no more than 2 mm deep and 1-1.8 mm wide, tapering toward the lower end of the cut. The grooves are unevenly separated, ranging from 2.5 to 5.5 mm. Each *face* of the rib also has a group of five shallowly (about 0.5 mm) incised lines that are perpendicular to the rib's long axis. These lines oppose each other, and are roughly centered on the rib face. The lines range from 14 to 24 mm in length, with the lines in one group tending to be shorter than the other. Perhaps a second set of simi-

lar lines (2 mm apart) is found on one face at the fractured end. Both rib faces are weathered, but there are areas of faint polish on both. Size: 83 x 32 x 11 mm (see Figure 21, bottom).

LMRA 147-31-83.56 (W30/EW, L.2): Bison first phalanx, right side, complete except for minor trowel damage. There are tiny cuts on the interior face that may be from a stone tool. The bone has a streak of dull gray-brown matter running diagonally across the distal end, from one side to the other, and a few spots of a similar stain can be seen under 10-power lens along the extreme distal-left edge.

LMRA 147-31-83.57 (W30/EW, L.2): Bison first phalanx, split length-wise by a sharp blow to the center of the anterior face, shattering the bone, although it is in place; the interior cancellous tissue is intact. The split is clean, as if the toe were cut by a saw, but no longitudinal cutmarks are evident. The shaft edge and anterior may be polished.

LMRA 147-31-83.58 (W30/EW, L.2): Bison second phalanx, right, split almost all the way through. There are possible cut marks on the lower portion of the distal end.

LMRA 147-31-83.32A/B (W30/EW, L.2): Two fragments of mussel shell, each with small punched holes that may be for suspending or lacing shells (Figure 22, bottom right).

41MO36: "WALLS RUNNING TO NOWHERE!"

Site 41MO36 is a cluster of ruins on a relatively large and broad spur overlooking expansive floodplains and alluvial terraces. Soils on this spur appear to be deeper than at the other two architectural sites. The gently sloping site surface is bordered on the west by a low gravelly ridge, and on the north, east, and south by the bluff rim. The terrain of the central axis is flat, showing a drop of 1.5 feet from stakes W30/N50 to E30/S30. Most of the site's structures are located within this 100 to 120-foot central zone.

Underneath a thin wind-blown sand cover is a gravelly reddish-brown sandy loam. The loam then blends with a coarse riverine sand mixed with lenses and chunks of caliche and other calcareous mate-

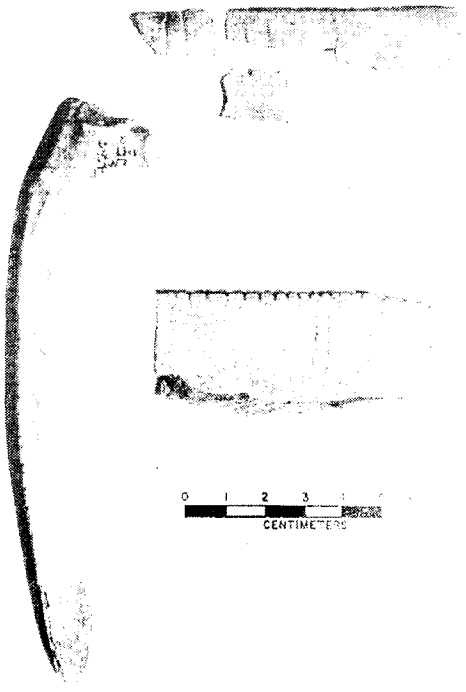


Figure 21. Site 41MO37 bone tools: Notched antelope rib, left; Bison rib "rasp" fragments, top; Bison edge-notched and face-cut rib, bottom.

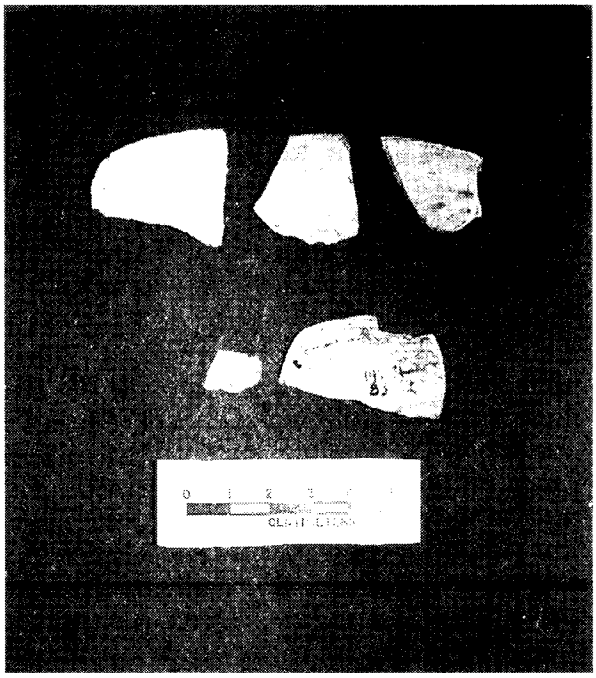


Figure 22. Worked Mussel Shell from 41MO37: Fragments of shell scrapers or corn-shellers, top row; Holed shell fragments, bottom row.

rial, which in turn overlies a bedrock of dolomite and conglomerate. Dolomite boulders and slabs from rim exposures dot the steep slopes, which also contain midden deposits. The creek valley, some 90 feet below, is broad and suitable for horticulture (Figures 23 and 24).

Site 41MO36 has at least seven architectural features, most of which had been vandalized. Four to six of the slab-lined structures appear to have been dwellings; one badly potted structure may represent a slab-lined cist or a slab-capped burial (Hughes [Field Trip Record, 3/9/68] mentions the "Dee Shipman skeleton," that was "excavated" from the structure "nearest the rim" at 41MO36, and donated to the P-PHM several years prior to 1968).

Although the site had been vandalized by pothunters, it did contain definable architecture. Consequently, the TAS selected it for excavation since it promised to provide comparative architectural data on the "pithouse" type of Panhandle Aspect site, which could provide information on the regional developmental sequence of architectural forms when compared with data from the other two Blue Creek complex architectural sites.

The grid datum (NS/EW) was placed in the approximate center of the cluster of structures. The most promising features were selected for excavation after the grid was laid out and surface collections made.

While two and possibly three of the site structures were easy to excavate and interpret, one, Feature 8, was described as consisting of "walls within walls" and "walls running off to nowhere!" Factors that led to confusion include erosion, wall collapse, vandalism, rodent burrowing, and multiple prehistoric construction episodes. Another contributing element was the field decision towards the end of the Field School to concentrate on uncovering and tracing out walls. Crews abandoned all but spot-screening and were instructed to excavate without such conventional controls as squares and levels.

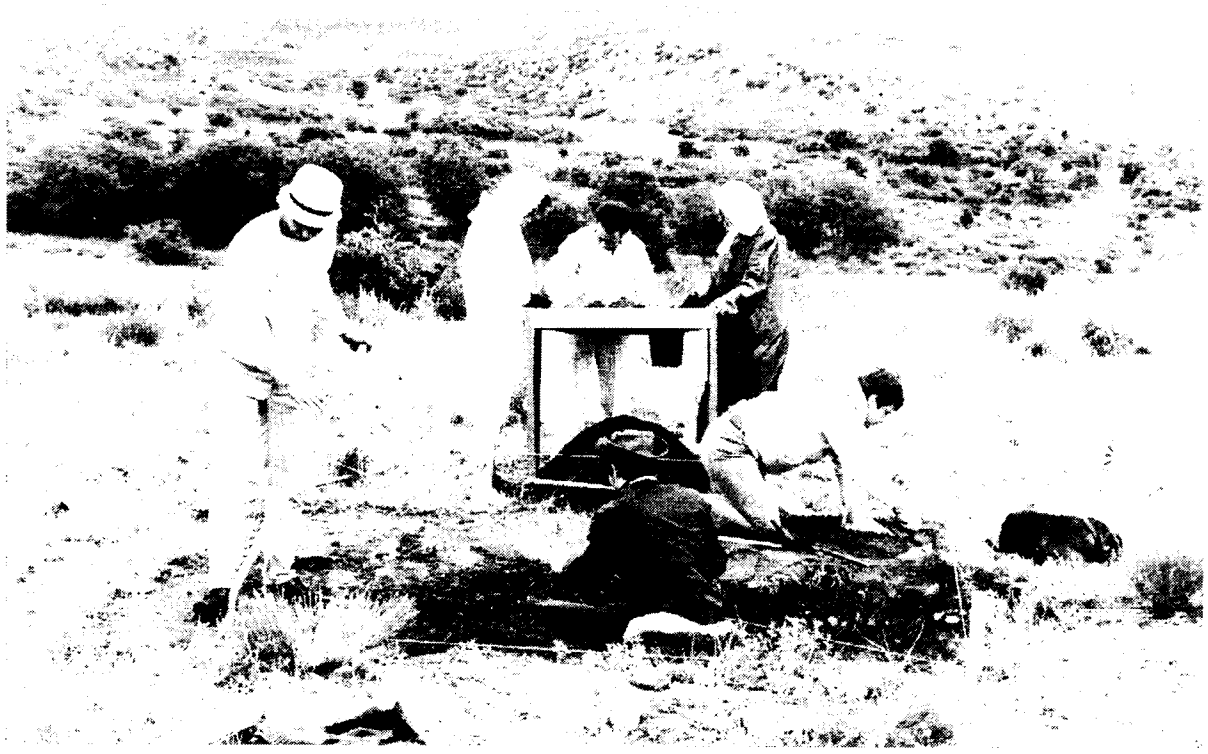


Figure 23. View east to creek valley and floodplain. The crew is opening excavations of Feature 9 (W10/N30).

Figure 24. View southeast across the site on the first day of excavations. Lake Meredith is in the distance at right-center. The cluster of trees at the bluff base is on a terrace east of 41MO37.

The screening decision is understandable, but we (who attempted to piece this puzzle together) lament the decision to abandon controls. When controls are sacrificed, documentation must inevitably follow, and follow it did. There are gaps in records, and level problems, some still incomprehensible. Overall, the excavations and mapping of Features 6 and 7 are reasonably well documented, and the architecture and sequence of events/occupations of these structures is understood. However, our understanding and interpretation of Features 8 and 9 is not complete. The site plan (Figure 25) depicts our interpretations of the four slab-lined structures excavated by TAS.

Each structure and feature is described below. The feature designations from field records are as follows:

Features 1 and 6: Feature 1 is a large pothole or series of potholes in the interior of a slab-lined structure. Feature 6 is the designation given to the structure itself and is the designation used herein.

Features 2 and 9: Feature 2 is a potted area in and around a slab-lined structure. The structure was called Feature 9, which is the designation used here.

Features 3, 4, and 5 are potted slab-lined structures in the southern and southeastern parts of the site. They were not excavated, and they are not shown in Figure 25 because they were not adequately described. They cluster around the eastern and southern margins of Feature 8. Each appears to have been a small (between 6 x 6 and 10 x 10 feet) slab-lined structure with a square or D-shaped outline; one may have been circular or oval.

Feature 7: This is a potted slab-lined structure that was excavated by the TAS.

Feature 8: This was a large rectangular house, apparently similar in some respects to the house at 41MO37. It had a large depression inside its walls, but it is not clear if it is the result of natural forces or vandalism. Feature 8 includes Feature 10.

Feature 10 is the designation given to a surface-visible arrangement of slabs that appeared to represent a circular storage pit or cist. Actually, Feature 10 is the northwest corner of Feature 8, probably representing the final construction episode.

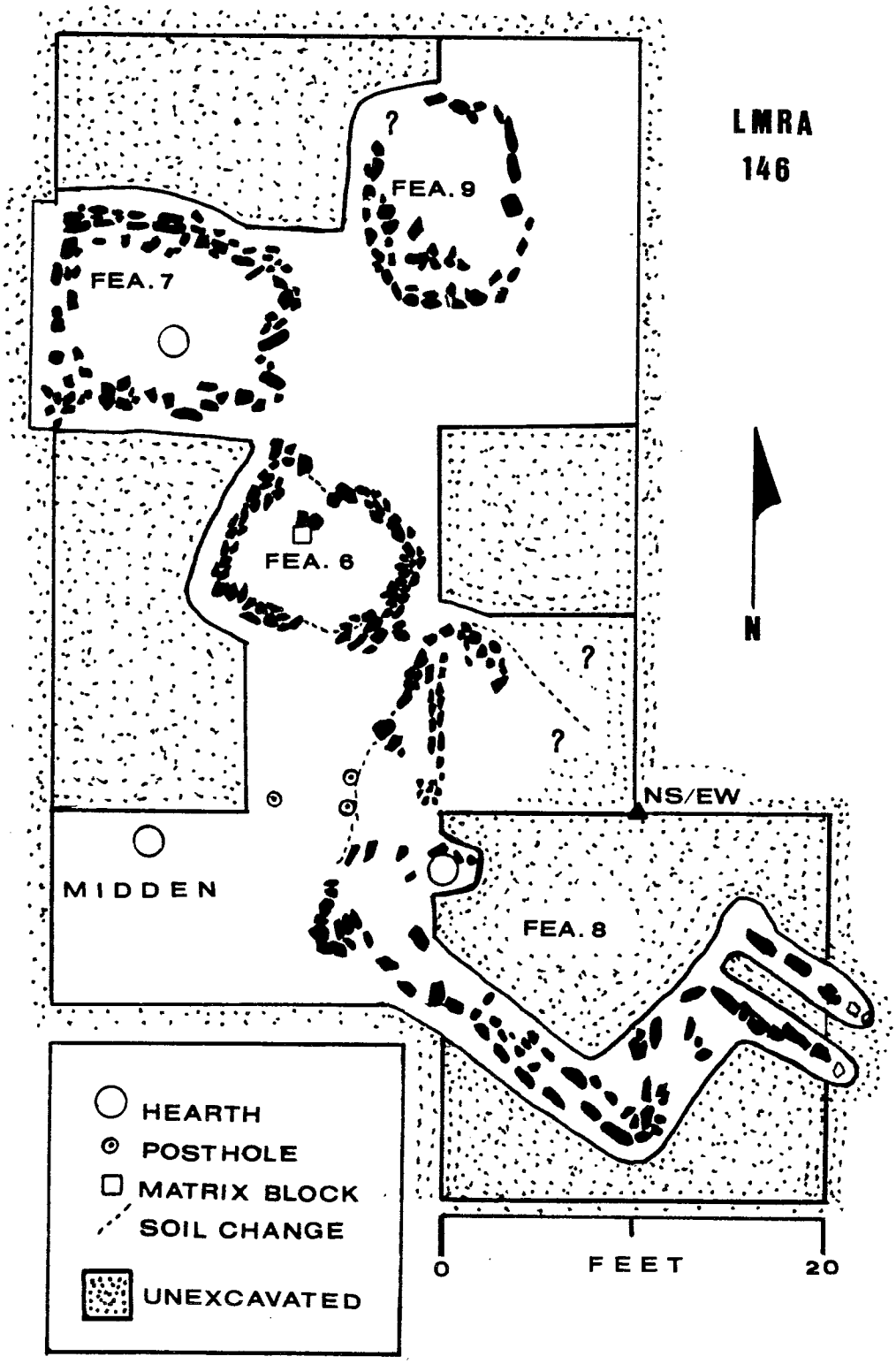


Figure 25. Site plan of 41MO36 structures excavated by TAS. Unexcavated and unmapped Features 3-5, and a possible (unnumbered) feature are not shown; they cluster to the east, southeast, and south near the central structure, extending as far south as perhaps E10/S40.

Features 11 and 12 refer to faunal remains found inside the wall of Feature 8, near its southwest corner. Feature 11 is a group of bison lower leg and foot bones, and Feature 12 is an intact tortoise carapace.

The individual architectural structures are Features 6, 7, 8, and 9. The discussions that follow begin in the northern part of the site (Feature 9), then move to the south with Feature 7, Feature 6, and Feature 8, respectively. From all available archeological data (including structure orientation), Features 6, 7, 9, and the latest construction of Feature 8, appear to be contemporaneous.

Figure 26. Tops of two large in-line vertical slabs in the southwestern corner of unit W10/ N30, marking the east wall of Feature 9.

FEATURE 9

The northernmost feature at 41MO36, this small slab-lined structure appears to have been a D-shaped house. Feature 9 as depicted in Figure 25 is based principally on two low-level, oblique-angled, long-distance photographs.

The east wall of Feature 9 is marked by two large (1.5 x 1.0 x 0.4 feet) vertical slabs in the southwestern quadrant of unit W10/N30 (Figure 26). Another large slab had collapsed inward into the northwestern quadrant of unit W10/N20.

The east wall was straight, comprised mainly of the three large slabs, with smaller slabs or chunks scattered (by vandals and erosion) nearby. The northernmost of the large slabs was apparently near the structure's northeast corner, with an adjacent hard-packed suspected "floor" that may have been an entryway.

The structure's north wall had few remaining slabs, probably from damage by pothunters or from the prehistoric robbing of slabs from the structure. The north wall may have had less substantial slab construction, consisting perhaps of a pit lined along its top with tiers of small slabs, possibly in mortar, with a framework of wattle superstructure.

The west wall ran essentially north-south for at least 5 feet (from about W25/N35 to W25/N30). The archeological documentation indicates it was built of tiers of small stacked slabs lining the upper margins of a pit. However, large slabs, equal in size to those opposite in the east wall, may have also been used in wall construction: several lay partly exposed on the structure "floor" just inside the west wall. Smaller slabs and some large quartzite cobbles are mixed in with these slabs.

Most of the south wall, marked by mainly small slabs, is in the northeastern quadrant of W20/N20. The south wall was curved, making the structure D-shaped, with a foundation about 1.0 foot wide, and capped by numerous small slabs, some still stacked. Inside the foundation, several large slabs, comparable in size to those in the east wall and on the house floor along the west wall in W20/N30, had collapsed inward and lay on the house "floor." The remainder of the south wall (in W20/N20 and the northwestern part of W10/N20) was not documented, but the southwestern and southeastern house corners apparently were rounded, and there may have been another opening in the south wall near the southeastern corner.

Feature 9 is quite similar to Features 6 and 7 (described below). The structure is a pithouse whose inner wall faces were lined/braced with large, thin dolomite slabs. The pit's upper wall, or "foundation," was lined with tiers of stacked smaller slabs, presumably encased in an adobe mortar, reaching at least 1.0 feet in height. A wattle or wattle-and-daub upper wall or superstructure was then

erected, and roofed over by an unknown method. No postholes were identified in or outside the structure. Possible slab-gap openings were present in the east (northeastern corner) and south (near the southeastern corner) walls.

Interior features and archeological deposits had been vandalized, although the disturbance was limited mainly to the structure center. A lens of bone and flint flakes (in W10/N30) was "inside" the wall at about -11.5 feet elevation. Immediately below it was a possible cache of "larger" flakes (oriented vertically) inside the wall, near one of the vertical slabs. A hard-packed clay surface (possible "floor" or heavily trampled entryway passage?) north of the vertical slabs was encountered below -11.6 feet.

The house interior near the south wall (in unit W20/N20) had lenses of charcoal and ash, patches of a hard red clay (flooring?), and scattered occupational debris. A probable floor may have been detected at about -11.5 feet, corresponding with the lens of bone scraps and debitage at the same depth in W10/N30. An antler billet, near the southwest corner and about 1.5 feet from the wall, lay on the floor.

Excavations in unit W10/N20 suggest two stratified occupations. The uppermost (level 1 and the uppermost portion of level 2) occupation (-10.8 to -11.6 feet in elevation) had a dense deposit of stone tools, debitage, and organic debris; the lower occupation lay in the lower part of level 4 and level 5 (-12.1 to -12.6 feet). The younger occupation may mark a living surface in the "patio" area (i.e., the relatively small, open area between the smaller structures and the west end of the large house, with abundant cultural materials and the hint of activity areas) that was about 0.5 feet above the last structure floor. The older occupation indicates a deeper floor in the structure, probably the original housepit floor.

FEATURE 7

This is a relatively small (about 12 feet east-west by 10 feet north-south) D-shaped structure found principally in units W30/N20 and W20/N20, but extending into W30/N30 and W40/N20. Feature 7's axis is slightly west-northwest to east-southeast, comparable to the house at 41MO37 and Feature 6 at 41MO36. The north wall is relatively straight, but curves at one end toward the south; a matching curve occurs at its southeast "corner." The west wall is straight, but the orientation of the south wall is unclear (either because of wall collapse or less substantial construction) (Figures 28-29).

The north wall has several large vertical (or on-edge) slabs. In places, vertical slabs were placed side by side; most of the slabs are dolomite, but there is an occasional sandstone slab fragment. There were also vertical slabs in the south wall. Two large vertical or on-edge slabs were centered perpendicular to the north-south orientation of the east wall. They may form a braced entryway two to three feet wide (see Figure 29).

Feature 7's walls appear to be a combination of large vertical or on-edge slabs and stacked tiers of smaller horizontally laid slabs. These were set into a trench whose bottom was about -12.8 feet. The trench fill is a dark reddish-brown, sterile, gravelly sand. The trench's base was apparently excavated about 0.5 feet below the initial house floor (at -12.1 to -12.3 feet). Tiers of stacked slabs *seem* to begin at about -10.8 feet, suggesting they were stacked on the original living surface alongside the vertical slabs erected in the housepit trench. The stacked slabs may have alternated with vertical slabs in a few places, or overlain the vertical slabs, probably in a mortar.

Figure 27. Features 6 (left), 7 (center), 9 (right), and northwest corner of Feature 8 (at lower left corner). The Feature 6 hearth left in matrix block is at the right of the excavator working on east wall. View to northwest from about N10/E10.

Figure 28. Feature 7, from south to north. Note the relatively insubstantial west wall; the south wall has not yet been excavated, but scattered slabs are visible. The ruler in the center is pointing directly at a bison tibia fragment.

The south wall was not fully excavated. The scattered character of the documented portion of the south wall suggests that the main south wall, probably comparable to the north wall in numbers of vertical slabs, lay in the northern unexcavated part of unit W30/N10. If this is accurate, the structure would have been roughly square in shape, with the bulged east wall D-configuration matching the east wall of Feature 6 as well as the south wall of Feature 9.

Feature 7 had an interior fireplace (-11.5 feet in elevation), apparently located slightly south and east of the center of the house. The fireplace is circular and about 1.5-2.0 feet in diameter. No postholes, cache pits, or

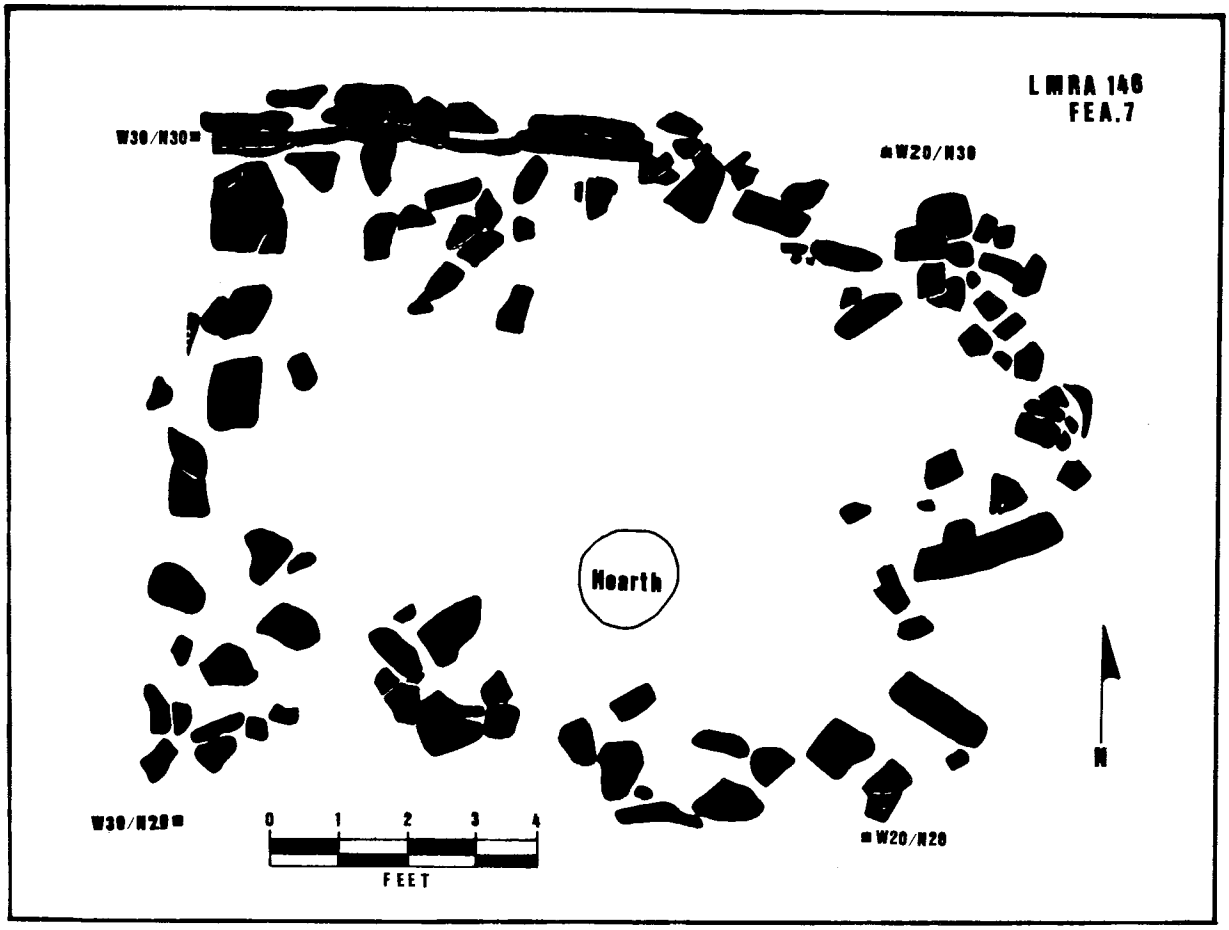


Figure 29. Plan view of Feature 7, depicting major vertical and horizontal slabs.

ash pits were found inside the structure. Most of the interior had been potted; vandals had penetrated much of the upper occupation floor in most of the house center. However, many artifacts and other cultural materials were found along the inside of the walls and in floor areas that had not been potted (Figure 30).

The latest occupation floor was at -11.3 to -11.4 feet elevation, 1.7-1.8 feet bs. Though largely destroyed by pothunters, it was marked by artifacts and debris around the wall interior and the upper face of a firepit, detected at -11.4 feet bs by charcoal and ash. The fill of the structure is a brown sand with concentrations of cultural materials in two zones: between -11.3 to -11.4 feet and -11.7 to -11.8 feet.

Immediately under the latter zone is a 0.5-1 inch floor made of a sterile tan, sandy clay. Below this floor lies a 0.4-0.5 foot thick occupation, also resting on a floor made from a sterile tan, sandy clay. This occupation's deposits are a dark brown sand with small gravels, bone, and lithic debitage. This floor ranges in top elevation from -12.0 to -12.1 feet; its thickness is variable, from 0.04 feet to as much as 0.25 feet near the north wall. This floor marks the original prepared floor of Feature 7.

The two floors and occupational zones of the house are essentially horizontal in aspect. However, beneath the earliest house floor is another occupation zone(s) that slopes toward the south or southeast following the general site surface. This zone, from about -12.1 to -12.7 feet, is a gray-brown coarse sand with abundant gravels. Cultural materials were present throughout the zone, with debitage particularly abundant at -12.6 to -12.7 feet. A darker and less compact zone below -12.7 feet also had cultural materials, although they were sparse.

A deeply buried occupational zone was also identified *outside* the house's northwest corner. There, a possible eroded hearth lay directly atop a conglomerate at -12.5 to -12.8 feet in elevation. The north-wall trench of Feature 7 was excavated into this occupational zone, reaching the conglomerate at -12.8 feet. This cultural deposit represents a buried occupation predating the house; the house pit was excavated from a living surface about a foot higher.

Artifacts from Feature 7, and the buried occupations beneath it, include Panhandle Aspect cultural materials and locally available lithics. The only trade items are three obsidian flakes found in an upper occupation inside the house.

Figure 30. North wall of Feature 7, about three feet east of the northwest corner. The bison tibia end fragment is on the latest floor, and against the wall interior. Note double slab construction and a smaller slab lying directly atop vertical slabs.

FEATURE 6

Feature 6 is a small (approximately 8.5 x 8.75 feet) D-shaped slab-lined structure, probably a dwelling. Its west wall is straight; its north and south walls are straight until near the eastern corners, where the walls arc to form the bulged D-shape outline. Like Feature 7, Feature 6 is oriented west-northwest to east-southeast (Figure 31).

As with Features 7 and 9, Feature 6 began as a pit or trench excavated from a living surface to form a base floor into which vertical or on-edge slabs were erected. The depth of the original pit excavation is unknown, but the lowest "floor" inside the house is at -11.9 feet in elevation, which corresponds relatively well with the lower floor in Feature 7. An upper floor (at -11.0 feet) is also suggested, even though the interior of this feature had been badly potted (Figure 32).

Feature 6's walls were constructed of vertical (or on-edge) slabs and stacks of horizontal slabs. The large slabs were apparently set vertically at more or less strategic structural intervals; more vertical slabs are evident in the north and east walls than in the others. Some large vertical slabs in the east wall have slumped inward, while tiers of stacked slabs atop or alongside them have slumped or washed outward. Occasionally, small "chink" slabs were used to fill in spaces between both vertical and stacked slabs. A few of the vertical slabs are actually boulders, more blocks than slabs (Figure 33).

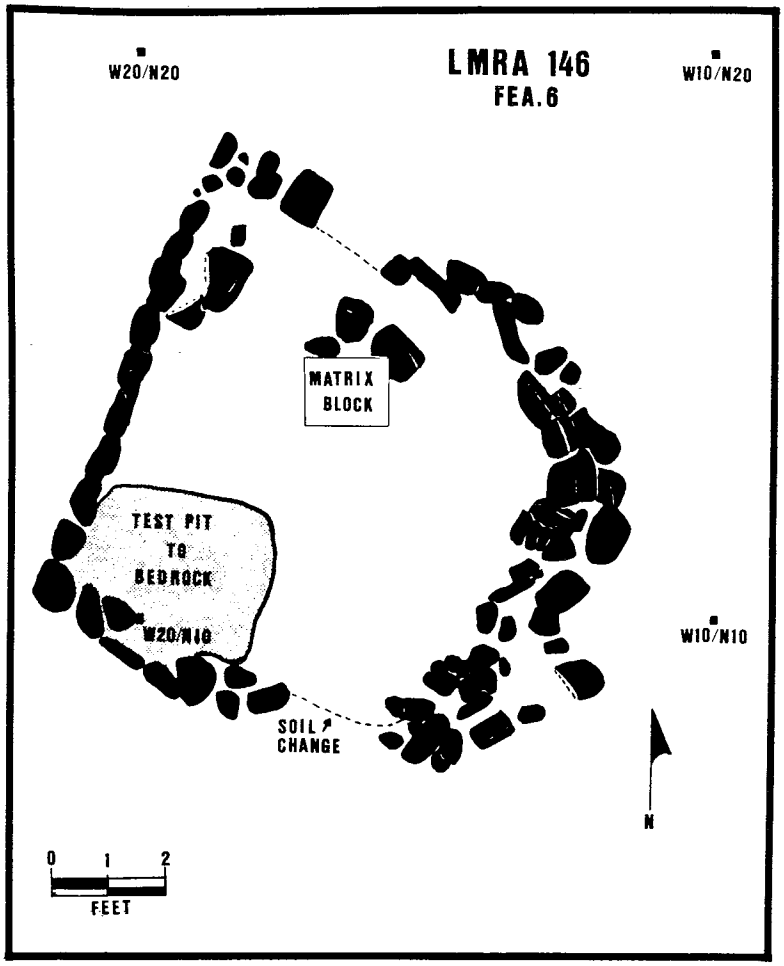


Figure 31. Plan of Feature 6, depicting major wall sections of vertical and stacked horizontal slabs. The gap in the north wall near the northwest corner is a probable entryway.

The large vertical slabs must have been placed in a prepared trench on the inside of the house pit, as at Feature 7. Smaller slabs or chunks may have been stacked and interspersed with, or substituted for, vertical slabs along the outline of the lower wall. Then, on the pit edge, stacks of smaller slabs were aligned, presumably with mortar, to form an upper wall. The upper wall may have supported a wattle or wattle-and-daub superstructure wall, or alternatively, the lower wall of larger slabs may have supported a wickiup-type brush/sapling wall.

There is a gap or opening in the north wall, near its northwest corner (Figure 34). A single large, vertically-placed block slab at the west edge of the gap is matched on the east side by another large slab, shimmed or braced by a smaller vertical slab; these slabs form a jamb, and the gap is interpreted as an entryway.

A circular firepit was located inside Feature 6 at an elevation of -11.5 feet, about two feet north of the house center; because

Figure 32. Feature 6 in unit W20/N10. There is a large pothole in the center, and a gap in the north wall near the northwest corner. The scattered slabs, and those on the balk, are from the upper fill and upper tiers of structure walls.

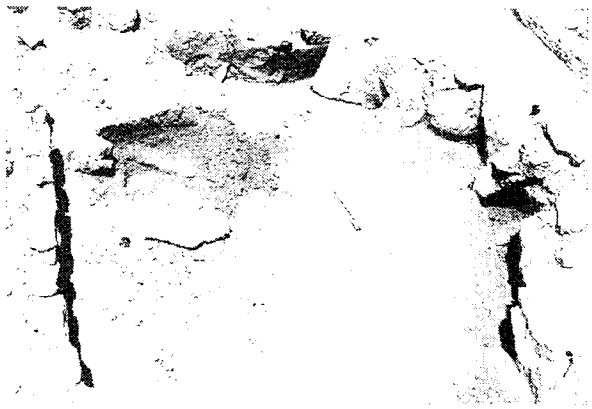


Figure 33. Feature 6, southwest to northeast. The slabs of the east wall collapsed inward, while smaller slabs of upper wall collapsed outward; a few remain stacked atop vertical slabs, but are probably not in their original positions. There are stacked small slabs (apparently lining the edge of the housepit) along the west wall, and the large slabs on the floor slumped inward along the interior face of the housepit.

of lack of time this feature was not excavated. It was 1.33-1.5 feet in diameter and was not clay-plastered. It had two thin slabs on its north edge that slanted downward into or beside the hearth. These may have served as deflectors, or the feature may have been slab-lined.

Depths of floors in Feature 6 are similar to those in Feature 7. The firepit is probably associated with the last occupation floor, as it occurred at a depth of -11.3 to -11.5 feet (the floor slopes slightly to the south or southeast). Below this floor there is an artifact-bearing brown sandy fill about 0.5 feet thick. The lower floor, marked by a more compact, lighter-colored sandy clay and increased amounts of cultural materials, is at -11.7 feet at the northwest corner, -11.9 feet in the center, and slightly below -12.0 feet in the southeast corner. Cultural materials were rare below -12.2 feet, and dolomite bedrock was struck at -12.6 feet.

Cultural materials were found primarily inside the west, south, and northeastern walls of Feature 6, and a group of metapodial awl blanks was deliberately cached at the base of the south wall and near the southwestern corner (Figure 35). The Feature 6 collections include: a cache of four grooved and split deer metapodial awl blanks (see Figure 35); a complete bison tibia digging tool (Figure 36); two bison scapula hoes; an almost complete right mandible from a pronghorn antelope; a bison rib "rasp" section; more than 12 bison ankle elements (one possibly polished) and fragmentary bison phalanges; an articulated bird wing; a large section of deer antler with two tines; and 20+ fragments of polished/worn bone. The cache of metapodials, one of the scapula hoe sections, two of the polished scapula fragments, and a few of the bison ankle elements were from immediately outside the structure walls. Conversely, most of the bone and other organic materials were found inside the structure (Table 3). Stone tools found inside the house include a two-handed mano, a reworked arrowpoint, a complete knife, and scraper fragments.

Figure 34. Gap in Feature 6 south wall at lower center, view to north from near the center of unit W20/S10; all four TAS-excavated structures are visible. At lower right is northwest corner of Feature 8; in center is Feature 6; at left-center is Feature 7; in distance, right center, is Feature 9. The tops of deeply buried vertical slabs are barely visible at lower right, at least 1.5 feet below Feature 10.

Figure 35. Cache of split deer metapodial awl blanks by the south wall of Feature 6, near its southwestern corner, -11.2 feet elevation.

The cultural materials from inside the house are indicative of household utensils and midden debris. The positioning of many artifacts around the walls implies that they were cached: the oval knife, the tibia tool, and the antelope mandible were in protected alcoves or interstices between major wall slabs. The positioning of the metapodial awl blanks suggests they were placed in a bundle cache, probably in a shallow pit, against the house wall.

FEATURE 8

"Walls within walls" and "Walls running to nowhere!": This is how Feature 8, a large

Figure 36. Bison tibia tool cached between wall slabs, east wall of Feature 6; elevation -11.9 feet.

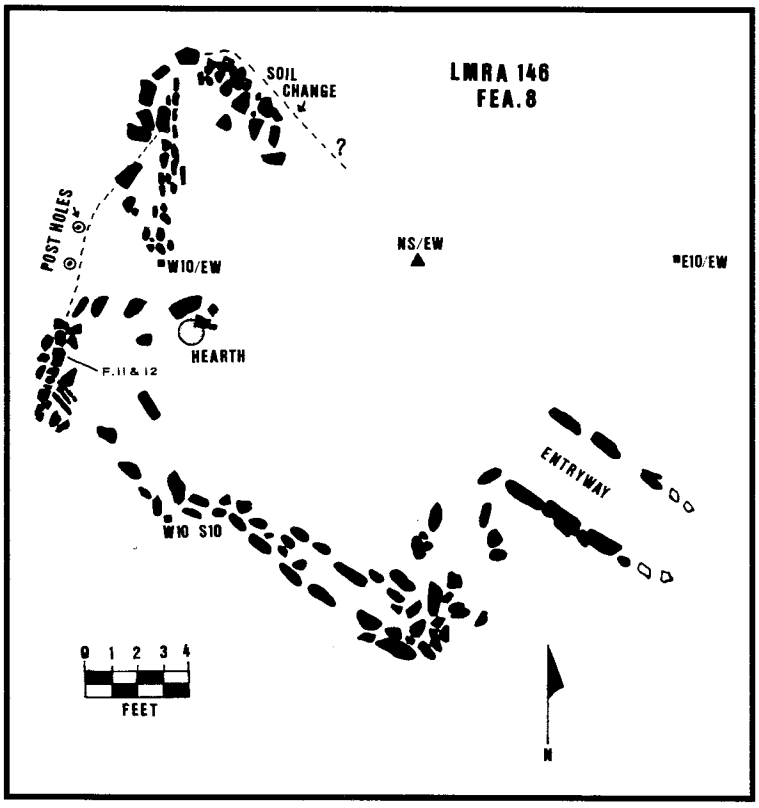


Figure 37. Feature 8 and an underlying older, north-south oriented wall.

rectangular structure, was often described by TAS Field School participants. Most of the structure's walls were uncovered in narrow trenches, while the northwestern portion, including the west wall and the northwest corner, were more fully excavated. Apparently multiple building episodes were exposed: collapsed walls overlying and intermingled with partly vertical and partly collapsed walls representing at least two building cycles, with different structure orientations (Figure 37), and an entryway associated with the upper structure.

The entryway was visible by the tops of two or three slabs on the surface, apparently at the east or southeast edge of a "depression," that may refer to the deflated central area of the house as outlined by slightly higher soils along the major walls. The entryway's walls are marked by single rows of sandstone slabs; some may be laterally overlapped, but the slabs were not aligned in double-row fashion. Small flat or angled dolomite slabs/fragments are in the alignment, lying atop the sandstone slabs. Quartzite cobbles also occur in the feature, possibly as chinking or bracing wedges.

The entryway is about 2.6 to 3.0 feet wide on the interior, and some 7 feet in length. It apparently was not tapered, and there is no clear evidence that it rises toward the surface or had flooring. No interior entryway features, such as a "sill" or cold trap where the entryway joins the house wall, were documented, but excavations did not reach floor level(s).

Only the southern segment of the house's east wall was exposed. This wall was a relatively massive pile of fallen slabs (at the southeastern corner), with an occasional vertical slab, that extended to the north-northeast. There apparently was a gap in slabs in the wall line near stake S10/NS and the southern wall of the entryway. The angles of slabs suggest that the wall collapsed inward, and the pattern of overlap of the collapsed slabs is indicative of a double row of slabs, with quartzite cobbles used as "fill" between the rows. The east wall segment is

Table 3. Cultural Materials from 41MO36

Description	W10/N30	W10/N20	W20/N20	W30/N20	W30/N10
Arrowpoint, Washita	-	1	-	2	-
Arrowpoint, Fresno	-	1	1	-	-
Arrowpoint, Unclassified	1	1	1	-	-
Preform/Blank	-	2	4	1	-
Knife, Ovate	1	2	1	4	-
Knife, Unclassified	1	-	-	1	-
Scraper, End-End/Side	-	1	-	1	-
Scraper, Side	-	-	-	2	-
Scraper, Unclassified	2	2	1	2	-
Graver	-	1	-	1	-
Spokeshave	-	-	-	1	-
Denticulate	-	-	-	-	-
Retouched Flake	3	3	5	6	-
Multifunctional Tool	-	2	-	-	-
Quarry Blank/Biface	-	1	-	-	-
Debitage, Alibates	320	319	477	948	20
Debitage, Tecovas	7	10	4	4	-
Debitage, Obsidian	-	1	-	3	-
Hammer/Anvil/Maul	-	-	1	-	-
Mano	-	1	1	-	-
Metate	-	-	-	-	-
Misc. Ground/Pecked Stone	1	2	-	2	-
Borger Cordmarked	5	13	10	3	2
Daub	-	-	-	-	-
Bone Tool, Digging	-	-	-	7	1
Bone Tool, Perforating	-	2	-	1	4
Bone Tool, Other	-	1	3	3	2
Bone, Large Mammal	-	4	7	4	6
Bone, Bird/Rodent	-	2	3	3	-
Bone Scrap, All	60	240	183	226	41
Antler Billets/Hafts	-	(2)*	(2)*	1	-
Turtle Carapaces	-	-	-	-	-
Turtle Carapace Segments	1	9	2	15	-
Mussel Shell, Utilized	1	1	4	4	-
Mussel Shell, Scrap	5	40	9	23	1
Plant, Other	1**	-	-	-	-
Totals	408	664	719	1268	77

* Includes flaker and tine
** Cane fragment

Table 3. *(Continued)*

Description	W20/N10	W10/EW	W20/EW	W30/S10	W20/S10
Arrowpoint, Washita	-	-	-	1	-
Arrowpoint, Fresno	-	-	-	2	-
Arrowpoint, Unclassified	2	-	-	-	-
Preform/Blank	-	-	-	1	2
Knife, Ovate	1	-	-	-	-
Knife, Unclassified	-	-	-	1	-
Scraper, End-End/Side	-	-	1	-	-
Scraper, Side	-	-	-	-	-
Scraper, Unclassified	3	-	-	-	-
Graver	1	1	1	-	3
Spokeshave	-	-	-	-	1
Denticulate	-	-	1	-	-
Retouched Flake	5	2	8	5	6
Multifunctional Tool	-	-	-	-	-
Quarry Blank/ Biface	-	-	1	1	-
Debitage, Alibates	509	69	450	1384	532
Debitage, Tecovas	18	2	10	-	5
Debitage, Obsidian	-	1	-	-	2
Hammer/Anvil/ Maul	-	-	-	3	-
Mano	1	-	1	-	1
Metate	-	-	-	-	-
Misc. Ground/ Pecked Stone	-	-	-	-	?
Ceramics, Borger Cordmarked	6	1	1	-	-
Daub	-	-	2	-	-
Bone Tool, Digging	16	-	2	-	-
Bone Tool, Perforating	1	-	-	1	-
Bone Tool, Other	11	-	6	2	5
Bone, Large Mammal	14	-	-	1	22
Bone, Bird/ Rodent	1+*	-	-	1	-
Bone, Scrap	315	65	254	63	52
Antler Billets/ Hafts	(1)*	-	+	-	-
Turtle Carapaces	-	-	-	-	1
Turtle Carapace Segments	4	-	-	-	1
Mussel Shell, Utilized	6	-	-	-	-
Mussel Shell, Scrap	42	1	4	1	2
Plant, Other	-	-	-	-	-
Totals	957+	142	742+	1467	635+

1+= 1 Scrap and bird wing
(1)* = Fragmented billet?
+ = Fragmented tine/billet
? = number uncertain

Table 3. *(Continued)*

Descriptions	S10/W10	Unknown	Excavation Totals	Surface	Site Totals
Arrowpoint, Washita	-	-	4	-	4
Arrowpoint, Fresno	-	-	4	-	4
Arrowpoint, Unclassified	-	-	5	1	6
Preform/Blank	-	1	11	3	14
Knife, Ovate	-	-	9	1	10
Knife, Unclassified	-	-	3	3	6
Scraper, End-End/Side	1	-	4	3	7
Scraper, Side	-	-	2	-	2
Scraper, Unclassified	-	-	10	15	25
Graver	-	-	8	10	18
Spokeshave	-	-	2	18	20
Denticulate	-	-	1	2	3
Retouched Flake	-	5	48	143	191
Multifunctional Tool	-	-	2	2	4
Quarry Blank/Biface	-	-	3	-	3
Debitage, Alibates	17	867	7892	4342	12234
Debitage, Tecovas	1	1	62	49	111
Debitage, Obsidian	-	-	7	-	7
Hammer/Anvil/Maul	1	-	5	7	12
Mano	-	-	5	-	5
Metate	-	-	-	1	1
Misc. Ground/Pecked Stone	-	-	5?	4	9?
Stone Pipe	-	-	-	-	-
Borger Cordmarked	-	1	42	4	46
Daub	-	-	2	-	2
Bone Tool, Digging	-	1	27	1	28
Bone Tool, Perforating	-	-	9	-	9
Bone Tool, Other	-	1	33	2	35
Bone, Large Mammal	2	1	58	-	58
Bone, Bird/Rodent	-	1	11+	-	11+
Bone Scrap	17	84	1600	8	1608
Antler Billets/Hafts	-	-	6+	-	6+
Turtle Carapaces	-	-	1	-	1
Turtle Carapace Segments	-	2	34	2	36
Mussel Shell, Utilized	-	3	19	3	22
Mussel Shell, Scrap	-	23	151	25	176
Plant, Other	-	-	1	-	1
Totals	39	991	10086+	4649+	14735+

+ Represents minimum number
? = number uncertain

about 6 feet long and 1.5 feet wide.

The character of the south wall was difficult to decipher from the field records and photographs. It appears to have been constructed with a continuous double row of slabs set into a prepared trench, and interstitially filled with cobbles and loose soil/rubble. This wall may have been 1.5-2.0 feet wide. Most of the slabs were originally vertically set (in a supporting trench), although a few may have been stacked.

One photograph (Figure 38) suggested that the southeasternmost 6-7 feet of the wall was composed of the upper 0.5 feet of vertical slabs in a single-row alignment, with a 90-degree turn in the wall. However, this row of visible vertical slabs was the inner row of slabs; another row, the outer, ran underneath the unexcavated balk at foreground left, and the small slabs or fragments that form the apparent 90 degree turn may be out of place.

The southwest corner of Feature 8 is substantial: it is formed by four closely set thin vertical or on-edge slabs. Other angled but collapsed slabs mark a southwestward wall line that extends about two feet from the corner. The corner was thus of double-slab construction, with reinforcing slabs placed (vertically?) at strategic spots.

The west wall is composed of a substantial number of fallen slabs that run about four feet north-northeast, and they angle inward, as if they had collapsed toward the interior of the house. The wall itself was a double row of slabs with a cobble and rubble fill. Also, cobbles were abundant in the soil outside the wall in W20/S10.

There was a 4-5 foot gap at the north end of the wall segment. A change in soil ran along the outer edges of fallen slabs, with sediments outside the wall line a culturally sterile yellow-orange sand; the soil inside (the room interior) is a reddish-brown sandy "fill." At about the center of the west wall gap were two postholes evenly spaced within the gap, but outside the wall line. A third posthole was about 3.5 feet west-northwest of the southern posthole in the gap, forming a right triangle with the other two. While the elevations at which the postholes were detected is different (-10.5 to -12.0 feet), we surmise that they supported an eave or roof, like a porch, covering the area west of the wall gap.

The west wall resumes in the southern part of unit W20/EW, and continues to the Feature 10 corner just south of W10/N10. The sediment change line described above continues around the corner, heading back to the southeast. Some of the slabs from the west wall collapsed inward from the soil change line, but nearing the northwest corner, slabs collapsed toward the exterior, while others are flat.

The northwest corner of the structure, or Feature 10, was visible on the surface as a semi-circular fan of collapsed slabs, suggesting initially that it was a slab-lined cist with an opening to the southeast. Excavations revealed a pile of slabs forming the east to southeast arc of the "cist," with slabs continuing toward the southeast. With further investigations, it became clear that the "cist" was actually the northwest corner of the large rectangular house. Only a three to four-foot segment of the north wall was eventually uncovered. The pile of collapsed slabs implies a double-slab wall set into a trench; most of the slabs had collapsed inward.

Figure 38. Feature 8 south wall. Southwest corner slabs are at the top left. The apparent 90-degree turn is in the center and the apparent single row of vertical slabs is in the foreground. This wall segment is the inner row of slabs; the outer row is still in the balk at lower left.

In summary, the walls form a single rectangular house oriented to the northwest-southeast. Its west wall measures about 14 feet; its south wall about 16 feet; and its entryway is about 6 feet long. It has a four to five-foot gap in the center of its west wall, and two posts were erected just outside the floor and/or wall trench, with another nearby posthole. The walls are mainly double rows of vertical slabs set in a trench; cobble and rubble fill was poured into the interstices between the slab files. The main walls are overwhelmingly dolomite, and the entryway is mainly of sandstone slabs.

An older and deeper wall was found under Feature 8. It had deeply buried vertical slabs with a red clay mortar on their interior faces. This mortar extended to the bottom of the slabs, then expanded horizontally to form a prepared floor. No red clay was found outside the buried wall. The wall apparently began near stake W10/N10, and ran due south at least 5 feet. It was composed of double or triple rows of closely set vertical slabs. The tops of the slabs in the northern area of the wall, near W10/N10, are just above -13.0 feet. They may slope gradually toward the south, extending to a depth of about -13.5 feet, and below the depths of much of the excavations in this area.

This older structure, with a west (?) wall running north-south, underlay Feature 8. This structure has substantial "foundation" walls constructed of closely set double and triple slabs held in a red clay mortar which also forms an interior floor. The tops of the older wall are in a culturally sterile yellow-orange sand or clayey sand, which separates the older structure's walls and floor from the bottom of Feature 8's floor (at about -12.5 feet in elevation). This older house gave rise to the crew's chant, "walls within walls!" Since it seems to disappear to the south, it may have also contributed to the "walls to nowhere!" lament, although that is more closely and logically associated with the entryway, which was not recognized as such in the field.

A hearth was found inside Feature 8, but it is not the house's primary central hearth. This feature was a 1.2-1.3 foot diameter circular basin located in the southwest quadrant of the house. Its upper elevation is at -12.3 feet, indicating it was in an accumulated fill deposit about 0.25 feet thick placed atop a prepared floor. Slabs at the north edge of the hearth may have served as pot supports.

Excavations beside the hearth identified a red clay underlying the floor and a yellow sand: the floor was at -12.5 to -12.6 feet elevation; the yellow sand at -13.0 feet; and the red clay was -13.5 feet in elevation. The lowest red clay zone may mark a floor for the structure known to underlie Feature 8 (see above). The Feature 8 floor (ca. 5-8 cm thick in places) was apparently a light reddish-brown clay packed down or applied wet as a plaster. Above this is a darker reddish-brown fill up to a foot thick, which is in turn covered by wind-blown sand, gravel, and a thin humus.

Features 11 and 12 were located just inside the west wall of Feature 8, in the southwest corner. They may have been cached in a protected area next to the wall, and slabs from the wall had collapsed atop the objects. They lay in reddish-brown fill soil at -12.4 feet, immediately above "the floor," a lighter reddish-brown sandy clay with fragments of sandstone in it.

Feature 11 was 20 bison bones/fragments, mainly from a left rear lower leg (Figure 39). The foot and ankle were articulated, as if still in hide when discarded. The metatarsal was shattered, but both ends were present, along with a large fragment of the calcaneus and the ankle elements. The distal end of the metatarsal articulates with the phalanges. There are two other bison joint elements in the feature, one from a right lower leg.

The metatarsal was presumably shattered for removal of the large, rich morsel of marrow it contained. From the bones' position inside the house lying against a wall at a corner, the whole lower leg unit was apparently taken into the house after the meat of the upper portion had been removed, the marrow extracted and processed/eaten, and the remains tossed into an out-of-the-way corner.

Feature 12 is a complete and unaltered turtle carapace (plastron missing, as is usually the case). It was less than 0.3 feet to the south of Feature 11, and at the same depth. The shell was recovered virtually intact and was filled with a dirt matrix. The matrix contained more than 100 small gravels, probably representing natural soil inclusions, but possibly evidence that the carapace was used as a rattle.

EXTERIOR LIVING SURFACE

Although excavations at 41MO36 concentrated on exposing structure walls and interiors, exterior living surfaces were also examined. Unit W20/S10 contains the southwest corner of Feature

8 and sections of its west and south walls. Excavations encountered large numbers of quartzite cobbles and pebbles outside the house walls, a concentrated "blanket" of stones extending westward from the house's southwestern sector. The same deposit was found in the eastern third of W30/S10, lensing out as it downsloped. The gravels were found mainly from about 0.5 feet bs to about 1.0-1.2 feet bs. They overlay a relatively rich midden zone. Similar gravel layers were found in W20/EW between Feature 6's south wall and Feature 8's west wall. The gravels extend some 10-15 feet west of the house's southwest corner, at least 6 feet to the northwest, and at least 6 feet to the southwest. These large gravel lenses may represent a form of support or external protection for the house wall; another possibility is that since the stones were not burned, they were a stockpile of boiling pebbles for future use.

As noted above, the gravels lay directly atop a large midden zone covered by sterile sod and windblown sand. When the gravels were brought in and stockpiled, all trash dumping activity in this midden area ceased, or had already ceased. This must have occurred late in the occupational history of the site, since the base of the gravel deposit lies just above the exterior living surface extant during the Feature 6-8 occupation.

The midden, a dark reddish-brown sand with charcoal and ash stains/lenses, is over a foot thick (in the northeastern corner of W30/S10) and covers more than 400 square feet. The midden rests primarily on bedrock, with depths ranging from -11.4 to -12.0 feet in elevation. Otherwise, a sterile yellow-orange coarse sand underlies the midden. The cobble layer caps the midden at depths ranging from -10.3 to -10.9 feet, typically at about -10.5 feet. The midden may be contemporaneous with the first occupation of the latest house at Feature 8. It is possible that the floor and wall trench fill and soil for adobe were "borrowed" here, with the resulting shallow, extensive pit used as a trash dump (as may have been the case for Feature 1 at 41MO37).

The midden contained a possible hearth or ash dump, described as a 2.0 foot diameter circle of ash, charcoal, and "many flakes" (see Figure 25). Such ash or hearth dumps are frequently found in Panhandle Aspect middens. Many of the flakes from the feature were soot-coated, though not necessarily burned.

Figure 39. Feature 11 Bison Lower Limb and Foot (LMRA 146-13-96.1ff), 41MO36, Feature 8 House.

There was much trash deposited outside the walls of Features 6 and 7. Feature 9, however, had more trash deposits in its interior than along the outside walls; this is consistent with the exterior area south of Feature 9 having been used as a "patio," in the sense of a gathering area for social and other activities.

As was the case at 41MO37, exterior living surfaces were used for several activities, not the least of which was trash disposal. Also present were ashy and charcoal-stained areas, probably representing small open fires (pits) and/or ash dumps. Many fire-cracked pebbles, or boiling pebbles, were noted in virtually every unit, and one small cluster of boiling pebbles was located in the northwestern quadrant of W10/N20, just east of the southern edge of Feature 9.

Artifacts and other cultural materials were highly scattered in exterior living surface contexts, with no clearly definable activity-specific areas. However, two broken oval knives, knife fragments, and flake cutting tools occur in unit W10/N20, along

with fragmented bison bones. Knives and knife fragments are comparatively rare in other exterior living surface areas, suggesting that the butchering of selected game portions, brought home from off-site kills, may have occurred in this locale.

One complete Fresno point, several preforms, and abundant chipping debris were found outside the entrance to Feature 7 (in unit W20/N20), along with a section of antler rack with two intact tines with polished tips. The polished tip of another antler tine apparently also came from this general location. Taken together, these finds imply a chipping station in the "patio" area near Feature 7's east wall and Feature 9's south wall.

Exterior surface artifactual materials occurred mainly at the bottom of level 1 and in level 2, clustering around -11.0 to -11.2 feet in elevation. This indicates that one living surface lay only 0.5 feet bs in some places. However, since efforts were concentrated on exposing structure walls and interiors, virtually no excavation in *exterior* areas reached below level 2. Deeply buried hearths under the walls of Features 7 and 8 (at elevations ranging from -12.3 to -12.5 feet) clearly suggest that the site was occupied by Panhandle Aspect people prior to the Feature 6-8 building episodes. The more deeply buried north-south wall underlying Feature 8 may even predate the buried hearth-bearing zone.

THE DISTRIBUTION OF CULTURAL MATERIALS

Except for the midden west of Feature 8, most cultural materials were found *inside* the structures. Pottery is scarce at 41MO36, being limited to Borger Cordmarked. Of the 41 sherds found during excavation (one sherd is from an unknown provenience), over 61 percent were from the "patio" area. Another three sherds from W30/N20 were in the deep Panhandle Aspect occupation beneath Feature 7. Not surprisingly, the midden in W30/S10 contained considerable debitage (see Table 3). Of the structures, Feature 7 produced the most, with a total of 948 flakes in W30/N20; of this total, about 500 are from the older deposits under the north wall.

Feature 6 deposits had at least 29 bone/antler tools and fragments, plus abundant bone debris. Indeed, Features 6, 7, and 9 each had more bone tools than Feature 8, which was almost devoid of worked bone/antler. This contextual relationship is similar to 41MO37, where the cist had antlers and bone implements/fragments, while virtually no bone tools or debris came from the house interior.

SUMMARY

Site 41MO36 consists of a group of at least six relatively small structures flanking a large rectangular house. This structure pattern is similar to that at 41MO37, where there was a large house with several smaller structures nearby. Both sites appear to be semi-permanent hamlets or small villages where horticulture was practiced on the terraces and valley of Blue Creek and tributaries, and large-scale hunting was done elsewhere.

Features 6, 7, and 9 (and probably the unexcavated Features 3-5) may be seasonally occupied dwellings that are less substantially constructed than the "big houses" at both sites. That the smaller structures were used as dwellings or occupied shelters is evident from interior hearths and domestic trash, plus ash dumps and possible caches. Similarly, Feature 8 was also a dwelling house, as evidenced by construction techniques and size. No cists were recorded at 41MO36, although one or more of the unexcavated structures may have been used for storage. Relatively rich middens were found outside the main rectangular house, as at 41MO37.

The large house at 41MO36 apparently did not burn; rather, it simply collapsed, with most of its wall slabs falling inward. Far less stone was used in its construction than at the large rectangular house at 41MO37, but the extent of 41MO36's walls were never fully established. Feature 9 may have burned and then been "robbed" of its larger slabs. Features 6 and 7 did not burn, but collapsed after their abandonment.

Construction techniques relied on both vertical and horizontally stacked slabs, especially in the smaller structures at 41MO36. Chink rocks and rubble-mortar fill were used to bolster foundation walls that were comprised of double rows of slabs.

Horticulture played an important role, as did hunting and meat/hide processing. Southwestern trade goods are virtually non-existent: a two-handed mano that resembles handstone tools used in the Puebloan Southwest, and seven obsidian flakes. The occupants of 41MO36 were Panhandle Aspect peoples who lived and worked in much the same

ways as did their peers at other sites in the region. They farmed, hunted, gathered, and built houses, all apparently during a peaceful time, with no evidence of violence or belligerence among themselves or fear of the same from other groups.

Drought may have been a causative factor in site abandonment since a wind-blown sand deposit appears to have accumulated immediately above the structure fill. However, these sands could be the product of modern droughts (the Dirty Thirties) that are well known for stripping soils and replacing them with wind-blown sands and dust.

All in all, 41MO36 is an impressive site, one worthy of further study. And an equally impressive job was done here by TAS crews working under far less than ideal conditions in a shorter time span than they counted on. But walls were sought, and walls were found, even if they were not understood at the time (and still may not be understood).

It is well to consider that Panhandle Aspect archeology in 1969 (and in other areas of Southwestern archeology where architecture was present) emphasized the study of houses, apartment complexes, and other structures, as well as their construction techniques. This followed from a school of thought that postulated a direct cultural link between the Panhandle Aspect and the Puebloan peoples, a link or bond that superseded the mere trade of flint, pottery, obsidian, and imported trinkets. Up to 1969, there had been relatively few formal, carefully controlled excavations of Panhandle Aspect sites with detailed examination of house/wall construction techniques; rather, work had consisted of 1930s-early 1940s WPA efforts with shovels rather than with trowels, and even earlier excavations with shovels and horse-drawn fresnos. Consequently, the TAS decision in 1969 to identify structure walls was justified by the emphases and field strategies of the times, and the removal of considerable fill dirt without screening was common.

The emphasis on excavating Panhandle Aspect walls and structure interiors has continued almost unabated to the present time. Few adventurous souls have excavated the living surfaces outside the houses. To our knowledge, only three Panhandle Aspect open camps, or non-architectural sites, have been tested (Jack Hughes' [1962] Lake Creek site component; Etchieson's [1979] South Ridge site at Lake Meredith; and Couzzourt's [1982] A1543 site at Boys Ranch), leaving an important cultural side of the Panhandle Aspect's character almost completely uninvestigated.

ARTIFACTS

The artifact assemblage from 41MO36 is characteristic of Panhandle Aspect habitation sites (see Table 3) in that it is dominated by the use of Alibates raw materials for stone tools, triangular arrowpoints, abundant scraping tools, horticultural bone tools, and Borger Cordmarked ceramics. It is noteworthy that Southwestern trade material is rare: only seven obsidian flakes were found, and no obsidian tools are in the collections. The only other possible Southwestern item is a two-handed mano recovered near Feature 6. While this type of grinding implement is commonly associated with Puebloan groups, the specimen also fits effectively within the basins of two large metates in the collections, one from 41MO37 and the other from 41MO35. A fragment of a very large metate was found at 41MO36, possibly the kind on which the two-handed mano was used.

All of the ceramics are Borger Cordmarked (n=46). One rim sherd was found, but as many as five different vessels may be represented by the sherd assemblage from the site.

Projectile points are uncommon (see Table 3). They include Washita (n=4) and Fresno (n=4) arrowpoints, along with four unfinished/broken arrowpoints and one reworked specimen. Fourteen arrowpoint preforms/blanks and "guitar-picks" were also present at 41MO36.

Knives (n=16) outnumber projectile points. Of these, 10 are oval-shaped; the other six fragments are probably from oval knives as well; none have obvious blade beveling.

As usual on Panhandle Aspect sites, scrapers are common (n=34). While 47 percent are unidentifiable scraper fragments, snub-nosed scrapers are infrequent in the assemblage, while end and end-side scrapers, conversely, are prevalent. Flake tools—gravers, spokeshaves, and combination tools—are common, and retouched flakes comprise the largest category of unifacial tools.

Stone grinding implements are scarce at this Panhandle Aspect site. Only five manos/fragments and one metate fragment were recovered in the TAS excavations.

A wide range of bone tools and fragments were present, particularly digging and perforating implements (see Table 3). Antler billet/haft tools (n=6) and unmodified racks/tines are present but poorly preserved (Figure 40), and utilized mussel shell "scrapers" occur in surface and excavated contexts.

Artifact Descriptions

The following descriptions pertain to specific tools and other cultural materials from the 41MO36 excavations.

LMRA 146-13-170.1 (W30/N20, L.3, Feature 7): Arrowpoint (Fresno, or unnotched [and therefore unfinished] Washita); long, narrow point, snapped near the tip. The arrowpoint is bifacially worked; base slightly concave; edges straight. Alibates. Size: 24.3 x 15 x 2.9 mm (Figure 41, middle row, second from left).

LMRA 146-13-142.1 (W20/N10, "12-inch level"): Reworked arrowpoint. This specimen is a well-made, thin, triangular unnotched point with a concave base; blade edges are straight but taper inward at a point above the base where Washita arrowpoints are usually notched. It is slightly asymmetrical since the tip is not centered on the midline. The piece has no edge-wear, but based on its morphology, it may have been intended for use as a bow-drill tip. Alibates. Size: 22 x 14 x 2.3 mm (see Figure 41, middle row, far left).

LMRA 146-13-144.1 (W20/N10, "approx. 2-foot level," on floor, inside wall; Feature 6): Complete thin, oval of leaf-shaped bipointed knife; no bevel, and edges worn, especially near the ends of the tool. Alibates. Size: 81 x 40 x 7 mm (Figure 42, top, center).

LMRA 146-13-128.2 (W10/N20, L.1, exterior living surface): Base of possibly hafted knife, ovate knife pattern. It has a biconvex profile with convex blade edges, tapering inward near the base, then tapering to a convex base, suggesting a tang or "handle" for hafting; the knife has been resharpened, but is not beveled. Alibates. Size: 59 x 52.5 x 9 mm (see Figure 42, bottom right).

LMRA 146-13-179.1 (W30/N20?, L.?, Feature 7): Very large side scraper on an ovate and curved flake. Its lateral edges expand outward from a small platform, with convex edges; distal end (unworked) convex and very thin; edges steeply retouched and resharpened. Alibates. Size: 87 x 48 x 7 mm (Figure 43, top center).

LMRA 146-13-145.9 (W20/N10, Interior fill, Feature 6): Two-handed mano. Very large, heavy, oblong water-worn quartzite cobble with one highly ground, slightly convex face. There are pecking scars around the grinding margins; the ends are convex and battered/crushed. Size: 245 x 87 x 60-66 mm.

LMRA 146-13-202.1 (Surface, in or associated with Feature 5 pothole): Edge fragment of large, heavy, basin-shaped grinding slab; one face is heavily ground and pecked. Dolomite. Size: 230 x 220 x 90-110 mm. Since this is an edge frgament, the 245 mm two-handed mano would probably fit this metate's trough.

LMRA 146-13-89.3 (W20/S10, L.3): Small, roughly circular waterworn pebble of fine-grained, well-cemented sandstone (?) with a natural hole in the center. Both faces are relatively flat and naturally smoothed, with rounded edges; one face damaged and split. Size: 28 x 27 x 10.5 mm.

LMRA 146-13-77.15 (W20/ES, L.2): Borger Cordmarked neck sherd; the rim has eroded away. The paste has a possible seed impression, and a small portion of husk remains embedded in the clay. The neck curvature indicates a small vessel or a vessel with a narrow, possibly constricted mouth. Thickness: 6-8 mm.

LMRA 146-13-152.14 (W20/N20, L.1): Borger Cordmarked bodysherd which may have a red wash applied to its exterior. Thickness: 5 mm.

LMRA 146-13-77.16 (W20/EW, L.2): Fired

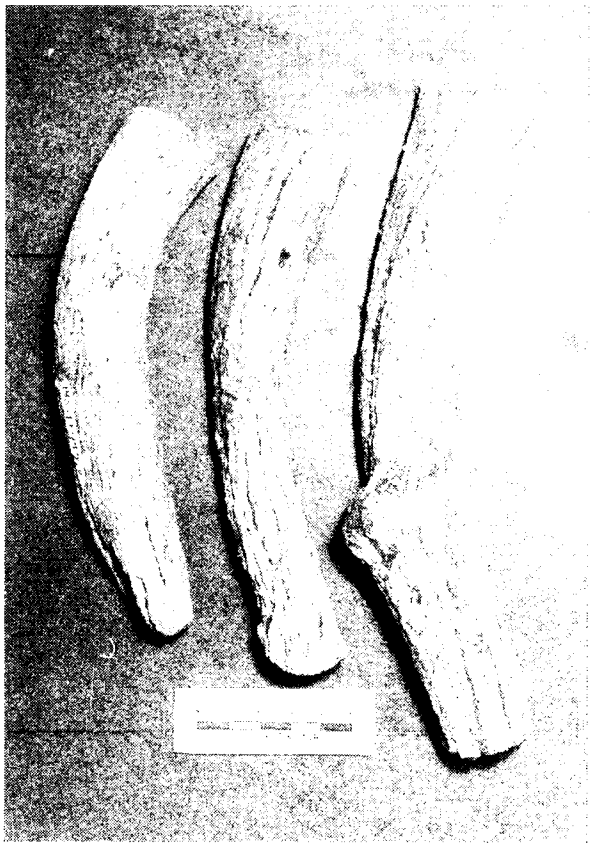


Figure 40. Antler Billets from 41MO36. The specimen on the left is from Feature 9 (LMRA 146-13-157.2), and the two others are from Feature 6 (-159.2 and -177.11).

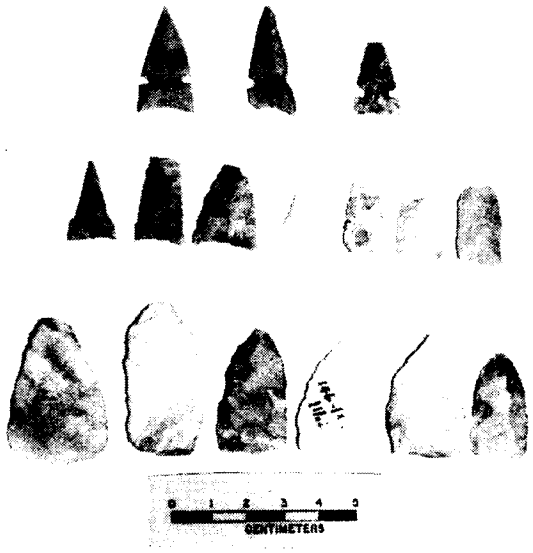


Figure 41. Arrowpoints and preforms, 41MO36: Washita points, top row; Fresno points and reworked arrowpoint, middle row; Preforms, bottom row.

Figure 42. Site 41MO36 Stone Knives.

clay disc. There are light cordmarking impressions on one face, while the other face is smoothed. It is sparsely tempered with fine-grained crushed quartzose rock or sandstone. It is roughly square in shape, but three sides are convex and the other is concave; all edges are worn and rounded. Size: 19 x 18 x 2.8-3.2 mm.

LMRA 146-13-81.5 (W10/EW, SE quad, "all levels," Feature 10): Two round lumps of crumbly, rather poor quality red clay. The clay contains some small dolomite fragments and tiny pebbles. The larger piece has three distinct limb/cane/sapling impressions with very smooth margins; the stick diameters are 7.2, 10.0, and 10.5 mm; two are spaced 59 mm apart. This is apparently the red clay wall plaster and flooring on the interior faces of slabs in the deep wall underlying Feature 8.

LMRA 146-13-137.19 (W10/N30, L.2, Feature 9): Very small fragment of a tubular fibrous material with a hollow center. It was preserved by charring. The piece appears to be cane/reed but could be wood from an arrowshaft fragment (?) or wall/roof construction material or thatching. Size: 6.5 x 6.5 x 3 mm.

LMRA 146-13-159.3 (W20/N20, NE quad., L.9, Feature 9 or directly underneath floor): Antler rack. The rack, probably a mule deer, was apparently naturally shed, inasmuch as there was no evidence of cut or removal marks.

LMRA 146-13-146.4 (W20/N10, Floor, Feature 6): Bison scapula hoe. The tool is a longitudinal fragment of the posterior border, and only a small portion of the blade remains; it is heavily weathered and rootlet-etched, and has a few cuts and striations. It may represent a tool discarded after use in the excavation of the structure. Size: 204 x 55 x 22 mm (Figure 44, top).

LMRA 146-13-163.2 (W30/N10, "16 inches below surface," Feature 6): Bison scapula hoe, distal end and blade portion. The distal end is sinuous with a shallow concavity in the blade center. The piece is weathered and leached, but longitudinal use-striations and end/edge polish and heavy wear are present. The tool may have been discarded after its usefulness in excavating the wall trench for Feature 6. Size: 213 x 58-103 x 30 mm (see Figure 44, bottom).

LMRA 146-13-140.1 (W20/N10, L.?, Feature 6): Scalloped bison rib. The interior half of the rib was split lengthwise, and the edges shaped by cutting/shaving and abrading to form a scalloped edge. The rounded edges of scalloping appear polished,

but heavy weathering, intensive rootlet etching, and rodent-gnawing has obscured most surface areas of the rib. Similar specimens have been found at 41MO35, Southern Group, and in P-PHM collections from the Panhandle Aspect ruin at Saddleback Mesa. Size: 170 x 20 x 12 mm.

LMRA 146-13-146.3 (W20/N10, Floor, Feature 6): Midsection of bison rib. It has one fractured end, while the other was cut, trimmed, and rounded to a tapered point. The rib also has two small holes drilled into its interior face, though they do not penetrate into the rib interior, and a smaller hole is centered on the rib face. Size: 240 x 23 x 9-10 mm.

LMRA 146-13-133.6 (W10/N20?, L.5?, patio): Antler rack with two tines (digging or flint knapping tool). The tips of both tines were dulled, rounded, and lightly polished.

LMRA 146-13-143.13 (W20/N10, L.2): Deer cranial fragment. The piece had not been burned or modified, but was shattered from the skull, probably at a kill site.

Figure 43. Scraping tools from 41MO36. Note possible thick reamer bit on specimen at the upper right of top row.

LMRA 146-13-141.10 (W20/N10, L.1, edge of pothole): This is a fragment of thick honeycombed bone, apparently a shattered bison cranial fragment. Size: 36 x 35 x 14 mm.

LMRA 146-13-146.1 (W20/N10, Feature 6 "floor"): Pronghorn antelope right mandible. The mandible lacks incisors and their sockets, the first premolar, and has a very small socket for the rearmost molar; there are no obvious butcher marks. The lateral edges of the teeth cusps appear to have been worn/polished, perhaps as a sickle. A highly worn and polished fragment of an antelope mandible was found at the Courson B site (41OC27) (Hughes 1991).

LMRA 146-13-162.1, -162.2 (W30/N10(?), "15 inches below surface," Feature 6): Cache, apparently in a bundle, of two deer meta-podials, each cut and split, presumably for awl manufacture. Both bones were cut lengthwise by sharp flakes, using the natural groove in the center of the shaft. One (-162.1) has a hole cut or drilled into the proximal articular face, along with many longitudinal and random butchering cuts (Figure 45).

LMRA 146-13-166.3 (W30/N20, "following wall," Feature 7): Proximal end of burned, split deer (?) meta-podial. The convex edge of the articular surface has two V-shaped grooves cut into it, one much longer than the other; the center of the articulating surface has holes drilled into it. The grooves were apparently not placed for splitting the

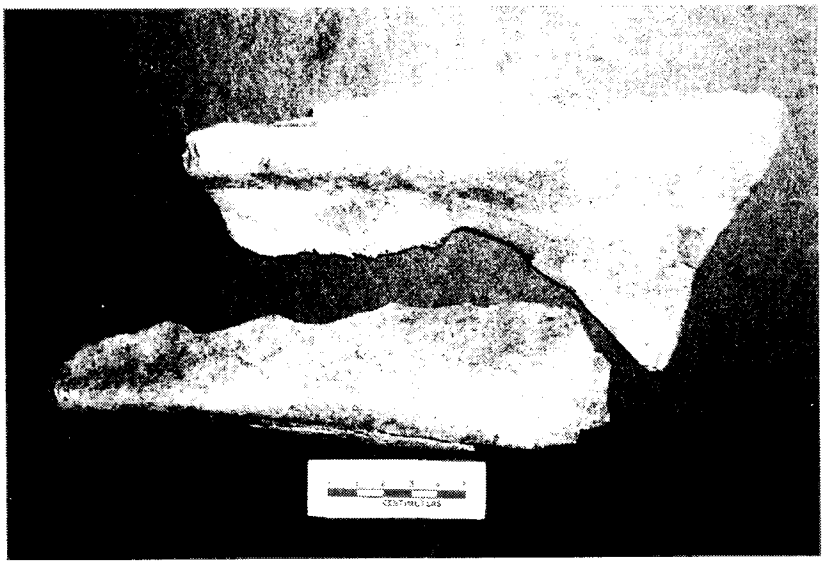


Figure 44. Bison Scapula Hoes, 41MO36.

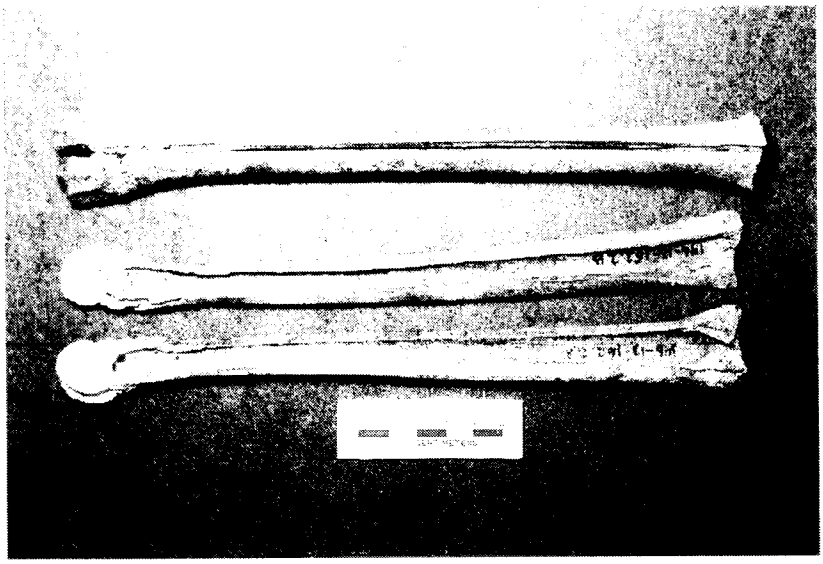


Figure 45. Deer Metapodial Cache from Feature 6, 41MO36. The metapodials are shown opened and closed to illustrate cutting.

bone to make awls, but instead as guides for sinew, hide, or vegetal cordage. Size: 59 x 16 x 11 mm (Figure 46, top right).

LMRA 146-13-144.4, -144.5 (W20/N10, "approx. 2-foot level," Feature 6, east wall recess or wall trench): Bison tibia digging tool. It was made by removing the proximal epiphysis and large portion of one face (posterior) of the shaft/body, and a hole (for the handle) was burned into the distal articulating surface, and the proximal end was tapered and spatulate-shaped (Figure 47, top). Polish covers the entire tool, except for the proximal end. A lateral malleolus (-144.5) was part of this digging tool (see Figure 47, bottom), and was apparently still attached to the green tibia when the hole was burned as the malleolus was also burned on its interior. Size: 309 x 51 to 75 x 48 mm; shaft walls 8 or 9 mm thick.

LMRA 146-13-129.5 (W10/N20, L.1, outside Feature 9): Unknown bone tool. This piece is a small fragment of tubular bone, probably deer limb. Where the bone is split on one end, there are four shallow regularly spaced (4.5-5 mm apart) notches and a single scratch; the notches (1 mm wide and 0.5 mm deep) were made by a sharp flake. Size: 31 x 7 x 3 mm.

LMRA 146-13-164.7 (W30/N10, "12-14 inches, exterior fill," Feature 6): Weathered fragment of an unidentified bison ankle element. The bone has an apparently deliberately drilled hole in the cancellous tissue, extending to the bone wall. Hole diameter 7.3 mm; depth 6 mm.

LMRA 146-13-164.5 (W30/N10, "12-14 inches, exterior fill," Feature 6): Unknown bone tool. The bone is the edge or end of a burned, fused 2nd and 3rd bison carpal. One articulating surface is naturally flat and smooth, but it has been abraded and polished to show longitudinal parallel striations indicating abrasion on (or by) a coarse surface. Size: 22 x 21 x 17.5 mm.

LMRA 146-13-146.6 (W20/N10, Floor, probable plaster matrix, Feature 6): Unidentified bird (size range for crow, small hawk, or small waterfowl) wing, incomplete but still articulated. The wing was in spread attitude, not folded, as usually occurs in death. Radius measures 83 mm in length; shaft diameter is 6.5 to 7 mm.

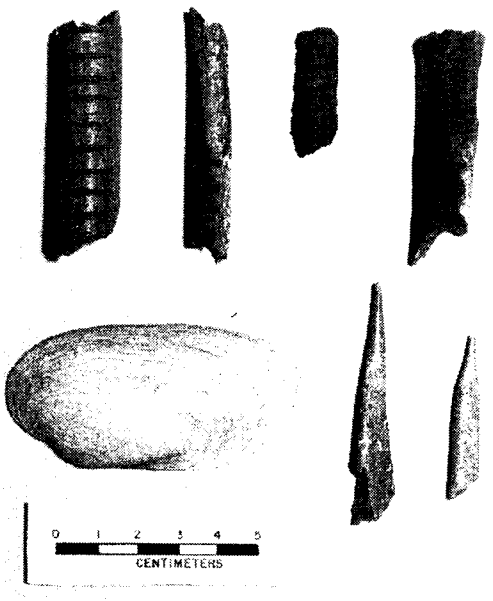


Figure 46. Bone and Shell Tools, 41MO36. Top row: three rasp fragments (LMRA 146-13-153.6, -172.9, -173.1) and "grooved" deer metapodial (-166.3). Bottom row: mussel shell scraper (-168.10) and bone awl tips (-172.10 and -104.5).

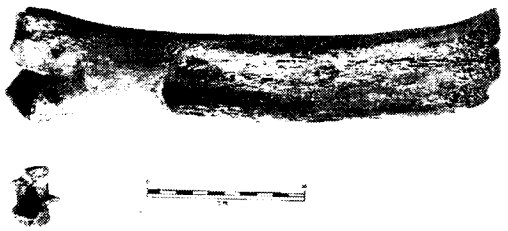


Figure 47. Bison digging tool and attached lateral malleous (LMRA 146-13-144.4 and -144.5), Feature 6, 41MO36.

41MO35 (LMRA 145) BLUFFTOP COMPLEX: THE "PUEBLOS"

Acting on advice from NPS personnel and area collectors, Jack Hughes visited the Blue Creek site complex and carried out limited testing at the locality termed the Northern Group of 41MO35. We integrate Hughes' testing with the subsequent TAS excavations.

After surveying the area and examining the architectural remains, Hughes thought that the 41MO35 ruins represented "multi-room pueblos," now reduced to a series of low slabby mounds extending ca. 55 m along a blufftop overlooking the Blue Creek valley. Here, the creek makes an eastward bend, creating an expansive and fertile floodplain below the bluff slopes. Hughes also explored extensive midden deposits on the slopes below the ruins, noting considerable vandalism there as well as in the ruins.

While this trip may have been Hughes' first visit to the area, 41MO35 was already known to him. With his help, Martha Lewis Crabb (1968), one of his students, had reported Southwestern ceramics at several Panhandle Aspect sites. Her "Big Blue I" site corresponds to 41MO35 and the midden slopes below it. Hughes had also been shown artifact collections from the site. After his visit and testing, Hughes decided to make this complex a major focus of TAS efforts during the field school.

When June 1969 rolled around, Dr. E. Mott Davis was assigned as Site Supervisor for 41MO35. Given time limits and the numbers of available crew members, Dr. Davis focused his crews' labors on the Northern Group, and on promising areas to the west. Two crews were assigned to units in another part of the complex, a series of rooms some 18-21 m to the south, a group labelled the Southern Group.

No detailed surface feature map was made of the complex, but a TAS sketch map indicates the Northern Group was a series of single in-line, connected, rectangular rooms outlined in part by vertical slabs. In the sketch, the southern half of the Northern Group was oriented north-south, while the northern half angles to the northeast onto a projecting spur of the bluff; both sectors comprise a single linear "pueblo."

There was a large break or gully immediately east of the point where the north-south room section "joins" with the angled northeast-oriented room section. For an unspecified distance (but at least 10 m) south of, and upslope from, the Northern Group room block, the sketch map shows a gap with no ruins; two very large potholes were in this gap area, however. It is not clear if there were any architectural remains in the gap between the two room blocks, but we assume there were not any that escaped Davis' experienced eyes.

The TAS map also shows a second long (pos-

sibly 75 feet) rectangular room block, its north wall beginning ca. 20-25 feet south of the potholes, and its long axis paralleling the blufftop rim. This room block is oriented north-south, with its eastern wall set back 30 feet from the rim. The room block was estimated to be 27 feet wide (this measurement in all likelihood reflects collapsed walls rather than the actual width of the architectural units). No obvious dividing walls were noted, and vertical slabs were infrequent. A large circular structure (bearing the notation "storage cist?") was apparently attached to the room block's southern end, and it was as wide as the room block itself. Given these measurements, the circular feature appears to be too large for a cist, and is possibly another room or dwelling.

To begin the TAS work, three 10-foot outlier tests were excavated on relatively level ground west of the Northern Group. Excavations in the Northern Group ruins proper consisted of four 10-foot units and one 5-foot unit. Only two contiguous 10-foot squares were completed in the Southern Group complex at 41MO35.

The 41MO35 Midden Area, lying below the Southern Group, was also investigated during the Field School. This work was carried out by the youngsters attending the Field School (dubbed the Beaver Patrol), who were supervised by experienced adults. Excavations in the Midden Area concentrated on the more promising areas on relatively level ground below the bluff.

OUTLIER TEST, W70/N10

This unit was placed between surface exposures of large dolomite boulders to determine if they were natural "walls" or corners for structures. No walls or other features were observed, and the excavation was culturally sterile.

OUTLIER TEST, W30/N10

Surface collections indicated a relatively flat area ca. 30 to 50 feet west of the nearest ruin that may have been used as a Panhandle Aspect lithic workshop. The southwest quadrant of Unit W30/N10 was excavated there in three 6-inch levels. Below a thin surface humus was a reddish sandy loam, a hard, red clayey sand, and a sterile gravelly sand reached at about 1.5 feet bs.

Archeological materials were abundant, particularly in levels 1 and 2. Found in level 1 were six knife fragments, two scraper fragments, one denticulate, one spokeshave, three retouched-flake tools, hammerstone fragments, over 3,100 flakes, and a few unidentified bone pieces. The flakes were apparently concentrated around a dolomite slab or chunk at the bottom of the level. Level 2 had an arrowpoint fragment, five preforms/fragments, one knife fragment, five scrapers/fragments, one denticulate, one spokeshave, one perforator, three retouched-flake tools, more than 3,000 flakes, one ground slab fragment, and about 50 small pieces of bone; core fragments were found in both level 1 and level 2. Level 3 contained only 52 flakes and a few unidentified organic remains, all located between 1.0-1.25 feet bs.

Large numbers of broken tools and considerable amounts of debitage in so small an area are indicative of a flintknapping workshop. No evidence of features or structures was identified, and midden deposits were minimal. Several kinds of tools were made in the workshop, including points, knives, and scrapers. Most of the flake tools—spokeshaves, denticulates, retouched flakes (some with graver beaks)—are to be expected in a tool-making and repairing workshop (including woodworking and perhaps bone/antler-working activities).

OUTLIER TEST, W30/N40

This unit investigated a large slab-like boulder protruding from the soil, with other slab fragments visible on the surface, that apparently resembled the larger slabs used in 41MO35 house construction about 40-50 feet to the east. Only the southeast quadrant of the unit was excavated, but was abandoned at about 0.8 feet bs when the boulder turned out to be a bedrock exposure.

Nevertheless, artifactual materials were abundant from 0-0.5 feet bs. This level contained one preform, two knife fragments, one retouched flake, four Borger Cordmarked sherds, more than 800 flakes, but less than 20 unidentified bone pieces. Level 2 had only 118 flakes, two small nodules of limonite, and four mussel shell fragments. Waterworn cobbles, pebbles, and small scattered dolomite slab fragments were numerous in both levels, possibly eroded from structures in the Northern Group.

Much of the archeological deposit appears to be midden trash, although lithics are quite abundant.

NORTHERN GROUP STRUCTURES

The Northern Group structures are apparently the "isolated" group of structures mentioned in 1968 field notes by Jack Hughes. They are located at the north end of the 185 foot-long complex he located along the blufftop rim, and are separated from the main body of ruins by a low saddle or gully. A small(er) cluster of Northern Group structures is situated partly on a spur extending to the northeast and partly on the blufftop. The Northern Group is about 10-12 feet lower in elevation than the Southern Group, and steep slopes border it on the southeast and the northwest. The northern part of the Midden Area lies below the southern end of the Northern Group.

Based on available information, the Northern Group had a minimum of four structures/rooms, but possibly as many as six to eight structures. The structural evidence indicates the structures/rooms were dwelling-size constructions, and no "cists" or storage rooms were documented.

On March 9, 1968, Jack Hughes, NPS archeologist Calvin Cummings, and two couples from Dumas visited and tested the site. Hughes' informal test, an L-shaped trench, was located in the area of units E30/N10 (unexcavated), E30/N20, and E20/N20 (Figure 48). His excavation followed walls of vertical slabs, which apparently ran east-west and north-south; the only intact wall excavated here by the TAS ran southwest-northeast.

Hughes' notes state that the east-west wall disappeared to the west, and the north-south wall became indistinct to the north, as both were damaged and at least partly erased by gullying action and other forms of erosion since the site was abandoned. Quoting from his field notes:

> . . . [W]e hauled our gear up to the long compound ruin and began a testpit in the NW part of the slabby mound just S of the slightly isolated N'ernmost structures, at a point where a few vertical slabs in an E-W and in a N-S alignment were visible, beginning our trenches to the N of the E-W group and to the W of the N-S group.
>
> The entire party took turns digging and screening, using shovels, picks, and trowels for digging, and saving all worked items showing on the 3/8-inch screen. The fill was soft brown sand in the upper foot or so, containing small loose slabs, large stream cobbles, waste bone and flint, and occasional artifacts. In most places this lay with a sharp contact on a compact reddish clayey sand containing whitish limey particles, relatively sterile. Trash was concentrated just above the contact. We were digging either over a floor, or a "yard" adjoining some rooms. The trench along the west wall revealed vertical slabs toward the N end, extending several inches into the red zone, evidently having been set into a shallow trench. At one point a big stream cobble at the base of a vertical slab looked as if it had been wedged against the bottom of the slab as a brace. Toward the S, the vertical slabs gave way to horizontal slabs in a relatively sterile red clay mortar (?). This kind of wall construction rounded into the S wall and W-ward along it. We were not sure at first that these were not just wall-fall rocks, and removed them, back to some vertical slabs in the E part of the S wall. Toward the W, the S wall tended to disappear. The W part of our trench revealed a kind of shallow basin area below the level of the S wall in the surface of the sterile red zone, the basin being filled with several inches of very rich trash, full of bone and flint, and producing corded sherds, triangular arrowpoints, beveled knife fragments, grooved abraders, a small piece of glaze polychrome ware, and various other artifacts. The floor in the narrow E trench slopes gently Nward, that in the wider S trench gently NW-ward, both slopes about the same as the general surface slope here .... One obsidian flake was found (Hughes, 3/9/1968).

The archeological deposits of the Northern Group are discussed by excavation unit, with references to Hughes' test excavations. We begin with unit E20/N20, where Hughes uncovered the "rich" trash-filled basin.

UNIT E20/N20

This unit was the southern and westernmost TAS excavations in the Northern Group. A relatively shallow and narrow gully ran through the unit from southwest to northeast, passing through unit E30/N30, before flowing down into the creek valley. Excavations here reached the bottom of level

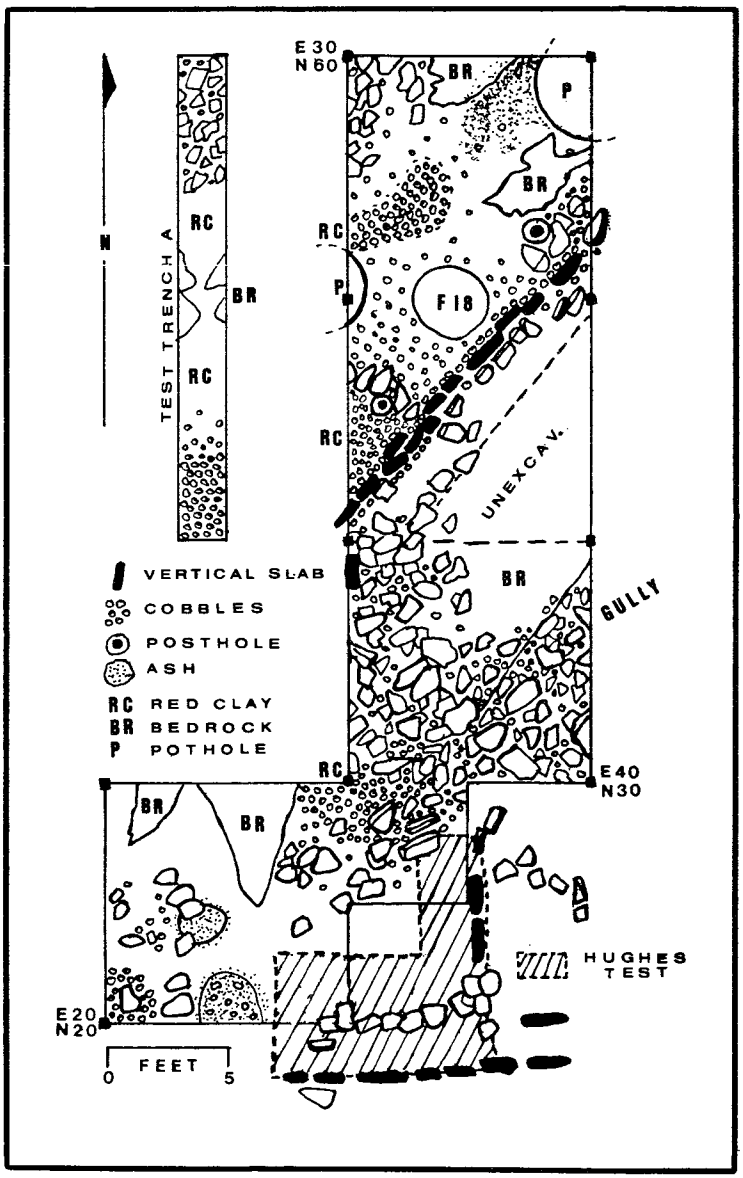


Figure 48. Composite map of Hughes test and TAS excavations, depicting architecture and features.

5, but bedrock was struck in level 4 at approximately -20.0 feet in elevation.

The unit had a considerable surface slope—a difference of two feet from the southwest (-18.3 feet in elevation) to the northeast (-20.3 feet); consequently, the top three levels were partial to compensate for the slope. Nevertheless, the upper 1.5 feet of deposit, a midden zone, contained a wider range of materials than many other parts of the site. Level 3 was the most productive single level, followed closely by level 2; level 5 was virtually devoid of cultural materials.

Dolomite slab fragments were scattered primarily in levels 1-3. The crew considered these fragments to be collapsed and disintegrated wall slabs, evidently from structure walls to the east and possibly northeast. However, no vertical or stacked horizontal slabs, indications of a wall, wall trenches, or foundations were identified in the unit.

Numerous waterworn pebbles and cobbles were also scattered through the deposit, particularly in level 3, and two concentrations of cobbles were documented. The first, in the southwest unit quadrant, was in levels 2 and 3; this coincides with Hughes' findings. The cobble con-centration was associated with an ashy, humic midden soil overlying a red sandy clay. The second concentration of pebbles/cobbles lies in level 4, in the south-central part of the unit, and included an abundance of bone and other artifacts. Both of these concen-trations appear to be boiling stone and/or hearth dumps.

There were many charcoal stains below level 2 in the unit, but no hearths. The E20/N20 deposits appear to represent a large midden associated with, and lying directly outside, one or more structures to the east and north of the unit. The red clay floor and walls in Hughes test excavations were structure walls that had collapsed and been heavily scattered by erosion and gullying. The area around the unit may have then been used as a midden, and the walls robbed of stone for subsequent construction.

Cultural materials from this unit are tabulated in Table 4. For many artifact/material culture classes, especially Alibates debitage, this was the single most productive Blue Creek complex excavation unit.

UNIT E30/N25

This five-foot unit lies immediately east of the north-south wall of vertical slabs explored by Hughes, and incorporates the north end of Hughes' test trench. A vertical slab stood adjacent to the unit's southeastern stake, and there were at least two other slanting slabs nearby.

Fallen slabs and fragments also littered the surface of the unexcavated area east of the north-south wall, while in levels 1 and 2, there were several slabs that had fallen to the north or northwest following the natural slope. Two other vertical slabs were located in the unit's center and northeastern quadrant; they leaned to the north. The northeastern quadrant of E20/N20 had larger slabs or fragments that may have marked part of a wall that ran roughly southwest-northeast, with a corner just outside the juncture of units E30/N25 and E30/N30.

There were quartzite pebbles and cobbles mixed with and underlying the slabs in E30/N25, and the cobbles continued in a red sandy clay beneath the dark "topsoil" in levels 2-3. This is again consistent with the results of Hughes' work, where a brown sand fill overlay a "floor" of compact reddish clayey sand intermingled with cobbles.

Cultural materials from E30/N25 were from midden deposits, although not as abundant as in E20/N20 (see Table 4). In E30/N25, most cultural materials were in level 2, above the red clay; the latter zone had few artifacts. The red clay zone appears to be a structure floor, and the walls have largely collapsed and disappeared.

UNIT E30/N30

A large exposure of dolomite bedrock occurs in the north half of the unit, along with the gully noted in other units. With increasing depth, the area taken up by the bedrock expanded, such that at the bottom of level 7, at -24 feet elevation, the unit consisted almost entirely of bedrock and red clay.

One possible vertical slab (but no stacked slabs) was recorded in the unit; however, the pattern of fallen slabs indicate two possible wall locations. These presumably relate to a juncture between the east-west structure walls investigated by Hughes and the angled walls found during the TAS excavations, suggesting the walls were part of a single block of rooms.

There were many fallen slabs/fragments in levels 1-3 in the eastern half of the unit, forming a rough, broad line running southeastward from the northwest corner. There was also a smaller concentration of slabs running roughly from west to east (Figure 49), and slabs, cobbles, and rubble concentrated in the gully. The slabs along the south wall of the unit sloped northward into the gully, presumably from the fallen east-west wall. Thus, a wall ran from one corner (just outside stake E30/N40) to another collapsed corner at or near stake E35/N30, where it joined (?) the north-south alignment recorded by Hughes. At the same corner, an east-west wall runs to the east, forming a north wall for the structure recorded by Hughes.

As noted in other Blue Creek architectural contexts, here slabs/fragments and a culturally rich brown fill overlay a red clay that was intermingled with cobbles. The remainder of the gully fill was a dark humic midden soil laden with artifacts and food trash; this deposit extended below level 7 in a small area of the eastern side of the gully.

UNIT E30/N40

A still-standing wall of dolomite slabs ran through this unit, angling from E30/N40 toward E40/N50. Most of the wall slabs were relatively large and thin, set with their long axes on edge; other smaller, more square slabs or chunks are "vertical," and one or two wall units may have been stacked horizontal slabs or chunks. A few small slabs/fragments lay in fill inside the wall, and up to two dozen larger slabs lay outside, sloping to the east and southeast. Near E30/N40, loose or fallen slabs increased in number and were scattered farther from the standing wall.

The upper-level fill of the room was a reddish-brown loamy sand, overlain by grass and a thin wind-blown sand. There had been some minor pothunting, along with rodent disturbance. Erosion was responsible for the wall collapse, but this evidently did not cause significant damage to more deeply buried features.

Cultural materials were found immediately below the thin cover, and were very abundant in level 2, apparently representing occupational debris. At the bottom of level 2, the fill became harder and darker (with more cultural materials), and structural features other than the wall slabs began to

Table 4. Site 41MO35 Artifacts and Cultural Materials

Description	E20/N20	E30/N25	E30/N30	E30/N40	E30/N50
Arrowpoint, Washita	8	-	-	3	2
Arrowpoint, Fresno	9	-	3	-	2
Arrowpoint, Unclassified	5	-	1	1	1
Preform/Blank	29	-	21	6	5
Knife, Ovate	4	-	7	2	3
Knife, Beveled	1	-	2	-	2
Knife, Unclassified	11	1	4	1	-
Scraper, End-End/Side	12	1	6	9	8
Scraper, Side	2	-	3	-	2
Scraper, Unclassified	6	-	12	5	2
Drill/Perforator	3	-	1	-	-
Graver	6	-	12	-	2
Spokeshave	4	1	8	1	1
Denticulate	1	1	-	-	2
Retouched Flake	24	6	20	8	11
Multifunction Tool	1	-	4	1	1
Quarry Blank/Biface	3	-	2	1	1
Debitage, Alibates	17,109	181	3998	781	1657
Debitage, Tecovas	100	1	25	9	18
Debitage, Obsidian	13	-	3	12	6
Chopping Tool	-	-	2	-	-
Hammer/Anvil/Maul	1	1	1	-	-
Mano	-	-	2	-	-
Metate	1	-	-	-	-
Misc. Ground/Pecked Stone	1	-	-	-	2
Ceramics, Borger Cordmarked	119	2	24	3	10
Ceramics, Southwestern	2	-	-	2	2*
Ceramics, Unclassified	1	-	-	1	1
Daub	-	-	-	-	1
Bone Tool, Digging	2	-	-	7	1
Bone Tool, Perforating	2	-	1	2	-
Bone Tool, Other	10	4	5	13	3
Bone, Large Mammal	69+	-	2	2	8
Bone, Bird/Rodent	6	-	-	7	3
Bone Scrap	2140	47	139	183	535
Antler Billets/Hafts	-	-	-	2	-
Turtle Carapaces	-	-	-	-	1
Turtle. Carapace Segments	33	-	3	36	47
Bead, Olivella	-	-	-	6	-
Mussel Shell, Utilized	8	-	-	2	3
Mussel Shell, Scrap	137	1	38	96	42
Totals	19,883+	247	4349	1202	2385

* 1 sherd in 18 pieces
+ totals uncertain

Table 4. *(Continued)*

Description	TRENCH A	W30/N40	W30/N10	E50/S50	E50/S60
Dartpoint	-	-	-	-	1
Arrowpoint, Washita	-	-	-	5	1*
Arrowpoint, Harrell	-	-	-	1	-
Arrowpoint, Fresno	-	-	-	2	1
Arrowpoint, Unclassified	-	-	1	-	1
Preform/Blank	-	1	9	13	20
Knife, Ovate	-	-	-	1	3
Knife, Beveled	1	-	-	-	2
Knife, Unclassified	-	2	8	2	3
Scraper, End-End/Side	-	-	2	1	5
Scraper, Side	1	-	1	-	-
Scraper, Unclassified	-	-	4	2	8
Drill/Perforator	-	-	1	1	2
Graver	-	1	1	1	3
Spokeshave	-	-	2	3	2
Denticulate	-	-	2	-	-
Retouched Flake	1	3	7	9	13
Multifunction Tool	-	-	1	1	1
Quarry Blank/Biface	-	-	2	2	1*
Debitage, Alibates	90	935	6855	3539	4731
Debitage, Tecovas	3	3	14	26	48
Debitage, Obsidian	1	-	2	5	16
Chopping Tool	-	-	-	1	-
Hammer/Anvil/Maul	-	-	-	-	1
Misc. Ground/Pecked Stone	-	2	-	3	1
Stone Pipe	-	-	-	-	1
Ceramics, Borger Cordmarked	2	4	-	39	58
Ceramics, Southwestern	-	-	-	2	2
Ceramics, Unclassified	-	-	-	-	3
Bone Tool, Digging	-	-	-	11	9
Bone Tool, Perforating	1	-	-	1	1
Bone Tool, Other	-	-	5	2	5
Bone, Large Mammal	1	-	1	5	31
Bone, Bird/Rodent	-	-	3	8	9
Bone, Fish	-	-	-	-	7
Bone Scrap	1	10	68	676	771
Antler Billets/Hafts	-	-	-	-	1
Turtle Carapaces	-	-	-	-	3
Turtle, Carapace Segments	-	-	11	12	121**
Bead, Shell (other)	-	-	-	-	1
Mussel Shell, Utilized	-	1	-	2	6
Mussel Shell, Scrap	2	12	6	80	124
Corn	-	-	-	1	-
Plant, Other	-	-	-	-	3
Totals	104	974	7006	4457	6020

* 2 (each) documented
** excludes 106 segments of a single carapace

Table 4. *(Continued)*

Description	Excavation Totals	Blufftop Surface	Site Totals
Dartpoint	1	-	1
Arrowpoint, WAshita	19	1	20
Arrowpoint, Harrell	1	-	1
Arrowpoint, Fresno	15	-	15
Arrowpoint, Unclassified	10	-	10
Preform/Blank	104	1	105
Knife, Ovate	20	-	20
Knife, Beveled	8	-	8
Knife, Unclassified	32	1	33
Scraper, End-End/Side	44	-	44
Scraper, Side	9	1	10
Scraper, Unclassified	39	-	39
Drill/Perforator	8	-	8
Graver	26	-	26
Spokeshave	22	1	23
Denticulate	6	-	6
Retouched Flake	102	7	109
Multifunction Tool	10	1	11
Ouarry Blank/Biface	12	-	12
Debitage, Alibates	39,876	203	40,079
Debitage, Tecovas	247	1	248
Debitage, Obsidian	58	2	60
Chopping Tool	3	-	3
Hammer/Anvil/Maul	4	-	4
Mano	2	-	2
Metate	1	-	1
Misc. Ground/Pecked Stone	9	-	9
Stone Pipe	1	-	1
Ceramics, Borger Cordmarked	261	2	263
Ceramics, Southwestern	10	-	10
Ceramics, Unclassified	6	-	6
Daub	1	-	1
Bone Tool, Digging	30	-	30
Bone Tool, Perforating	8	-	8
Bone Tool, Other	47	-	47
Bone, Large Mammal	119+	1	120+
Bone, Bird/Rodent	36	-	36
Bone, Fish	7	-	7
Bone Scrap	4570	1	4571
Antler Billets/Hafts	3	-	3
Turtle Carapaces	4	-	4
Turtle, Carapace Segments	263+	-	263+
Bead, Olivella	6	-	6
Bead, Shell (other)	1	-	1
Mussel Shell, Utilized	22	-	22
Mussel Shell, Scrap	538	1	539
Corn	1	-	1
Plant, Other	3	-	3
Totals	46,625+	224	46,849+

Figure 49. Looking from stake E30/N50 across unit E30/N40, with northeast-running wall on spur in center. The jumbled slabs at the top right are in unit E30/N30. The gully drops off at the top left.

take shape. Inside the room, a compact red clay ridge ran parallel with, and about 1 foot from, the vertical wall. A straight line of horizontal slabs, smaller than most wall members, lay atop the harder fill, extending to the northwest, perpendicular to the main wall; they lay in about the middle of the unit, and may represent a dividing wall. Cobbles occurred in quantity on the inside of the structure, and a line of them had been placed at the bases of the wall slabs, between the slabs' interior faces and the ridge of hard red clay (Figure 50).

In level 3, the entire room floor was lined with cobbles and pebbles, with a more densely packed area in the western and southwestern portion of the unit (Figure 51). The northern or northeastern edge of this cobble-packed zone is even with the straight line of slabs perpendicular to the structure wall. The cobble "carpet" was more than 0.5 foot thick and two or more cobbles deep. The compact red clay ridge paralleling the wall was the raised inner margin of a trench into which the vertical slabs were placed, then lined on the inside with cobbles, some still wedged in place at the bases of and in between wall slabs.

Excavations along the outside of the structure wall indicated that a 1.0-1.5 foot wide trench was lined and based with a compact red clay, with wall slabs placed upright (or on edge) in this trench, and cobbles were used to brace and "chink" both faces of the slabs. The same red clay was used as the original flooring for the structure, mixed with cobbles in and/or placed on top of the clay floor. Cultural materials lay atop the red clay and cobble floor but were not found in it or below it, and few artifacts were found in the excavations outside the wall. One probable posthole was inside the room, about 1.0-1.5 feet from the wall. It was 0.75 feet in diameter and was detected at -20.7 feet in elevation.

It is unclear what is represented by the straight line of horizontal slabs perpendicular to the wall. A profile of the unit's west wall indicates a low, flat-topped ridge of hard red clay—slightly more than a foot wide and 0.5 feet in height above the original floor—where the line of slabs exits the unit. In all likelihood, the slabs were a dividing wall that separated two rooms. Because of wall collapse, the manner in which the slabs of the dividing wall were erected or utilized is not known, though they may have been set vertically in a wet clay mortar, or stacked atop it. The quantity of fallen slabs does not suggest a high or very substantial wall; thus the slabs may have served as a foundation or footing for a jacal-type interior wall composed of poles or small sticks.

No hearths, pits, or other features were found within that portion of the structure in this unit. Feature 18, a large pit, does lie partly in the unit, but was only detected in a profile.

A complete turtle carapace lay about a foot inside the structure wall at 1.5 feet bs. There was also a cluster of large mammal bones, mostly bison, lying directly atop the clay/cobble floor and adjacent to but southwest of the possible dividing

Figure 50. Slab wall in E30/N40. Alternating sizes and shapes of slabs and cobbles line the wall bases and in the floor. A portion of a possible dividing wall is visible in the lower center to lower left.

Figure 51. The massive "carpet" of cobbles in the clay floor. The pile of cobbles on the balk was removed from previous excavation in the northwestern quadrant of the unit.

wall. Among these were an exhausted bison scapula hoe, a bison mandible, and two or more bison leg bones shattered for marrow extraction, but sufficiently intact to serve as tools. These bones lay below the dividing wall slabs; indeed, the scapula hoe was covered by one of the fallen slabs.

Unit E30/N40 had a wide range of Panhandle Aspect cultural materials; most suggest domestic activity, from flintknapping to cooking, although no cooking fires were recorded. Additionally, Southwestern trade goods are represented by two sherds, 13 obsidian flakes, and six Olivella shell beads.

UNIT E30/N50

This unit is the northernmost of the Northern Group excavation squares. It is at the end of the relatively flat portion of the spur crest, near where it begins to slope down toward the creek valley. The upper slopes are littered with slabs and fragments; dolomite bedrock is exposed along the upper spur flanks.

The unit had two relatively large vertical slabs in the southeastern corner; these are a continuation of the wall in unit E30/N40. Fallen slabs were also numerous, particularly outside the unit's northwestern quadrant and off its northern margin, and represent evidence of the structure's collapsed west wall. From its description, the structure was about 12-14 feet in width.

The house was constructed by first excavating an area through a shallow topsoil to an undulating dolomite bedrock and a shale-like red clay, apparently a Permian deposit. To level their excavation and prepare a floor, the builders brought in cobbles and pebbles to form a pavement or "carpet," mixed in and capped with a compact red clay. Then, a shallow trench was prepared, lined, and ridged with red clay. Dolomite slabs were placed on end or on edge, their bases resting on or in the red clay lying above bedrock. Cobbles were used to brace the slabs and to line the trench. A portion of the trench fill may have been preserved in unit E30/N50, where an orange-tan sandy clay, with small pebbles and charcoal specks, filled the trench above the red clay to just below the surface; this clay does not appear elsewhere in the unit (Figure 52).

Patches of charcoal and ash-stained earth were present above the red clay floor, and atop—and in direct contact with—massive bedrock outcrops in the unit's northern half. Above these stains was a thin compact layer of reddish clay (-20.5 feet in elevation) that may be a second floor. Possibly, the stains indicate that the first structure built here burned and collapsed onto the compact red clay-and-cobble floor. To rebuild, the occupants brought in fill and laid a new floor atop the burned areas, which may be the remains of consumed wall or roof timbers, wattles, and/or brush thatch.

A brown sandy fill was found above the second thin layer of red clay. This was similar to the fill encountered elsewhere in the Northern Group. Above this was a wind-blown sand layer of varying thickness, humus, and a sparse grass cover.

A posthole was present in the unit's southeastern quadrant. It lay about 1.5 feet inside from the nearest vertical slab and was surrounded by a layer of pebbles and cobbles. This posthole was associated with the original red clay floor, and reached to bedrock. The feature's diameter is 0.75 feet. A core of charcoal about 0.33 feet in diameter indicates that the post burned in situ. This, too, suggests at least one major fire.

Cultural materials are concentrated in level 2, above and on the second floor (-20.5 feet). Above -20.5 feet, a complete ovate knife (LMRA 145-90-48.3) was recovered at -20.21 feet, while another complete oval knife (in two pieces) and a complete Washita point (LMRA 145-90-48.1), were at about -20.3 feet. Also associated with the second floor were two groups of thin, well-made Southwestern Glaze-on-yellow sherds that fit together into a single large sherd (18 individual sherds, LMRA 145-90-48.12), and a bone flaking tool (LMRA 145-90-49.21).

Other materials were found in the fill between

Figure 52. Profile of wall trench, southeastern corner of E30/N50, with wedging cobbles. The light-colored soil in the center is probably the original trench clay fill, while the dark lower band is the red clay trench base and edging.

the second floor and the original red clay/cobble floor, as well as abandoned lying directly atop the original floor. These include a Washita point, an arrowpoint blank, a beveled knife fragment, eight scrapers, eight miscellaneous flake tools, 658 flakes (including three pieces of obsidian), five Borger Cordmarked sherds, three worked bone fragments, and about 320 faunal pieces.

At or slightly below -20.52 feet, in the fill immediately below the second floor, a blade-scraper cache was found near the wall. The cache was not in a definable pit. It consisted of two overlapping blades lying flat, ventral face up, atop four closely spaced specimens lying on edge (see LMRA 145-90-50.5A-F). A complete scraper (LMRA 145-90-50.3) lay nearby, but slightly deeper, and may have been part of the cache.

No clearly defined hearth was found in the unit, although some patches of charcoal and/or ash may represent simple scooped-out shallow hearths for warming fires (Figure 53). An ash/charcoal lens lay over the original floor, and may represent either burned wall/roof material, a hearth, or an ash dump; its location near the presumed location of the north wall suggests it was not a hearth.

FEATURE 18

Feature 18 is a relatively large bowl- or basin-shaped pit which lay centered in the 1 foot-wide balk left between units E30/N40 and E30/N50. The pit was 3-4 feet in diameter, with the opening near the present ground surface. Its bottom reaches below the original floor, and into the shale-like clay hardpan, with a bottom elevation of -21.58 feet. Feature fill is the same mottled reddish-brown sandy soil that comprised the general structure fill below the thin wind-blown sand. It contained at least 25 flakes, three identifiable bison bone fragments, 18 bone pieces, one bird bone, one turtle carapace fragment, and a single piece of mussel shell.

Feature 18 may be a cache or storage pit dug through the two floor fills. The pit's interior is smooth and suggestively cracked, as if it had been clay-lined (Figure 54). Its fill argues against it being a recent pothole, because it is the same soil observed as occupational fill throughout the Northern Group, not wind-blown sand or slope wash.

TEST TRENCH A

A 2-foot wide, 20-foot long trench was placed to the west of the main squares on the spur to seek the structure's west wall. The trench, designated Test Trench A (E23-25/N40-60), had a layer of cobbles at its southern end. These cobbles, in a "pavement" of red clay, apparently represent the same original floor found in both adjacent units. The compact red clay ran almost the entire length of the trench, terminating at about N56-N57. The bedrock sloped downhill to the north at about N50, and the clay is thick beyond that point, perhaps as much as two feet in some places. At the end of the red clay deposit, the upper surface dips, and a midden deposit lies atop the clay; it deepens toward the north end of the trench. In this area, a dolomite slab was found in a horizontal position about 1.67 feet bs. Atop this slab lay a large fragment of a beveled knife and a bone awl; nearby lay a scraper. Other slabs, fragments, and cobbles were uncovered about two feet south of the dolomite slab. This midden deposit contains fallen dolomite slabs less than 0.5 feet bs; these suggest the existence of a wall at the trench's northern end.

From Test Trench A archeological data, we surmise that the structure's west wall, now entirely collapsed and scattered by erosion, ran just outside the extreme northwest corner of unit E30/N50. It was parallel with the extant eastern wall (see Figure 53), and the buried midden deposit atop the red clay zone marks associated occupational debris. The structure would have been 12 to 14 feet wide, and at least 24 feet in length. It may have been divided

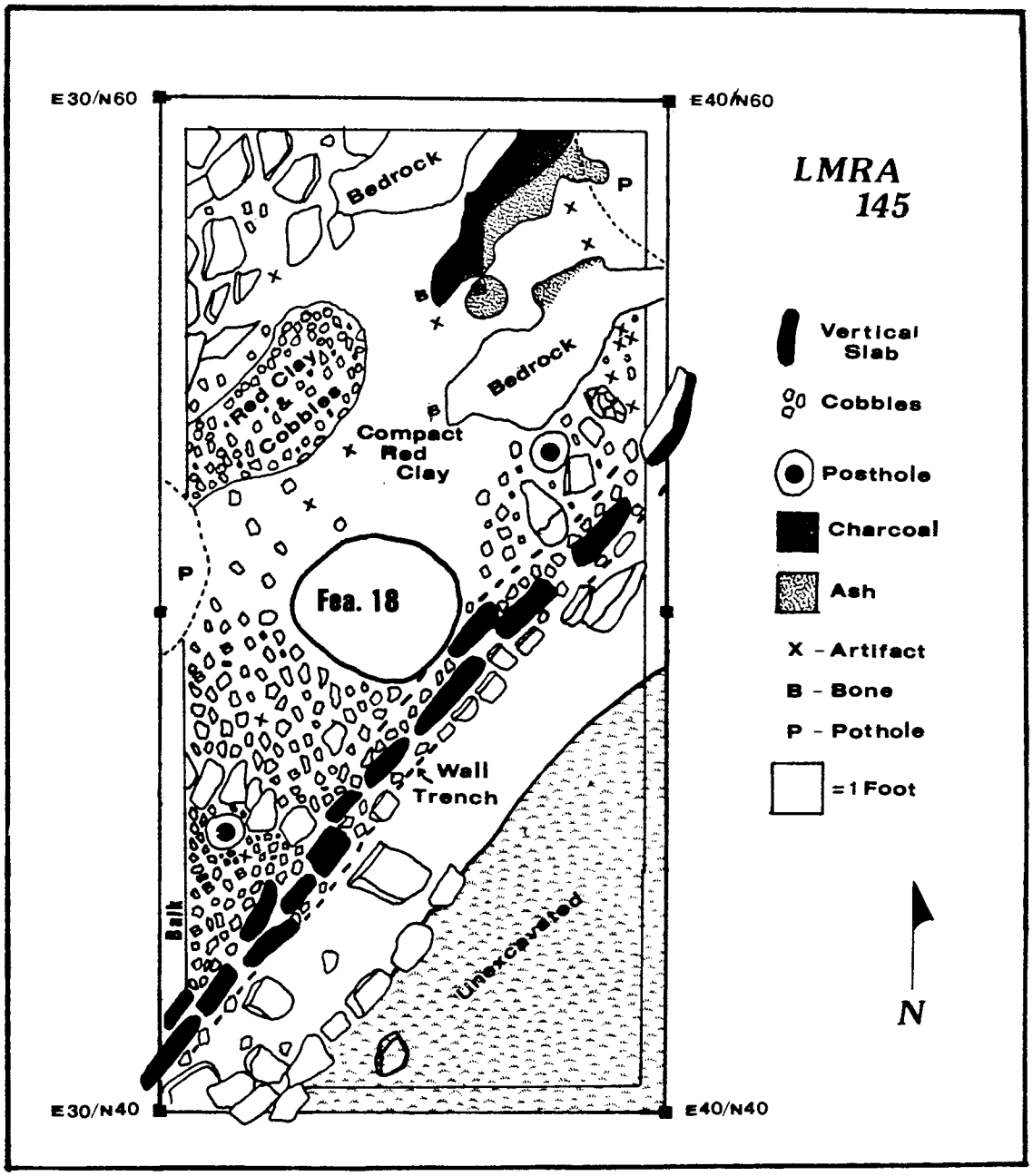


Figure 53. Units E30/N40 and E30/N50. The darkened slabs are vertical or stacked wall members.

into separable rooms by less substantial walls, perhaps of clay and slab foundations and vertical poles or wattles.

SUMMARY, NORTHERN GROUP

The architecture and material culture of the Northern Group at 41MO35 clearly bespeak construction and occupation by Panhandle Aspect peoples. Those who lived here apparently lived in peaceful times: the site is not especially defensible and the evidence of fire in one or two of the structures can be attributable to the use of readily combustible materials in house construction.

The Northern Group occupants relied on Alibates quarries for the overwhelming majority of stone tool production, as well as extensive use of

Figure 54. View to southeast of structure wall and Feature 18 (center) in E30/N40 (right) and E30/N50; arrow is at the feature's northern edge. The white mass at the lower left is a bedrock exposure.

other locally available lithic materials for tools and building materials. Hunting and on-site limited processing of game or selected "pre-butchered" portions of large game was prevalent, along with the hunting or trapping of small game and the utilization of a wide range of animal foods. Horticulture was practiced in nearby creek and tributary valleys, and seasonally or perennially available vegetal foodstuffs and domestic-use materials were gathered. Ceramics were manufactured and used on site for cooking and storage activities. Its architecture is similar to 41MO36 and 41MO37 in the following manner: the use of vertical and horizontal dolomite slabs for wall footings or foundations; the construction of a wall footing trench to help anchor and support wall slabs; the use of clay for flooring and wall mortar; the use of "chink" rocks for fill or other support; and the presumed use of primarily wooden superstructures and roofs. Its most salient difference, of course, is its linear arrangement and use of interior walls to create rooms.

SOUTHERN GROUP

From the Northern Group, the blufftop rim runs southeast, rising gently some 10 feet to the Southern Group of ruins. There appears to be a gap of 50 to 60 feet between the two complexes; this area contains midden deposits and has been heavily vandalized. Figure 55 shows the areal relationship between the two complexes.

The Southern Group excavations consisted of two contiguous ten-foot units, E50/S50 and E50/S60, placed within the slab remains of a cluster of rooms and/or slab features possibly larger in area than the Northern Group. One TAS sketch depicts a 75 x 27 foot room block with a large circular structure attached to its southern end. Etchieson (1981 and personal communication, 1985) could not determine the architectural arrangements in 1980 and 1982 visits. From the available evidence, the Southern Group consisted of one long block of contiguous rooms, probably similar in layout and construction to the neighboring Northern Group ruins.

UNIT E50/S60

Our discussion begins with this unit because its several features are critical to interpretations of E50/S50. The prehistoric remains in this unit represent a complicated intermingling of ruins, multiple building episodes, features, and deposits.

The crew removed the grass, exposing a unit literally full of slabs, cobbles, and rubble, with a noticeable north-south ridge running through its center, and continuing to the south where the surface was equally littered with slabs and rubble. This is a major structural wall that has collapsed. A still-standing wall segment of closely set large vertical slabs was 10 to 15 feet to the east; between E50/S60 and this wall are many scattered slabs and fragments.

Feature 3 is the major north-south slab wall (Figure 56). Its bottom elevation is about -11.5 feet. It was a continuous wall running across E50/S60 and E50/S50; there may be a gap in the wall in the southern half or third of unit E50/S60. Part of the Feature 3 wall in the unit's northern half was comprised of tiers of stacked horizontally laid slabs, along with some quite large cobbles. The wall base measures between 1.0-1.5 feet in width. Its height was probably at least four or five tiers of stacked slabs, judging by the amount of collapsed slabs. The wall slabs were apparently laid in a red clay mortar. Most of the wall slabs are small, about a foot in length but less in width.

At about the center of the unit, a section of Feature 3 turns to the west to join Feature 1 (described below). This join was equal in width and similar in construction to the main wall. From there, Feature 3 runs ca. 1.0 feet south, to a possible wall gap (see Figure 56).

There are abundant slabs and rubble in the three-foot "gap" area, along with a red clay mortar

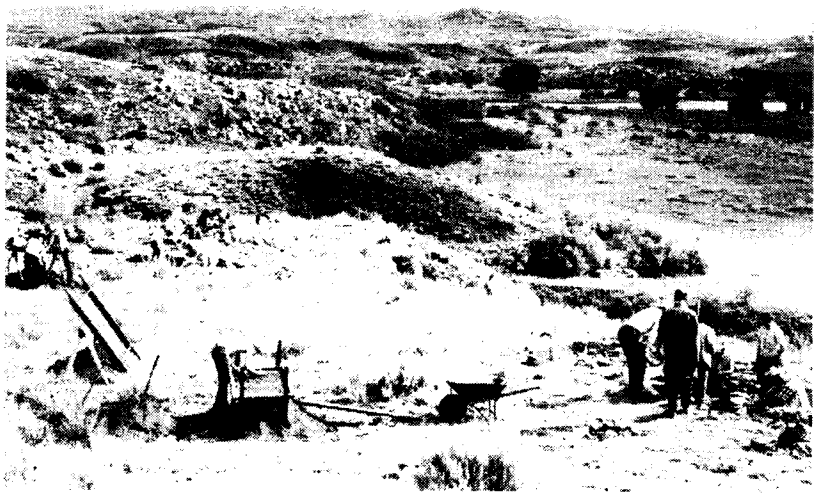


Figure 55. Site 41MO35 Blufftop complex, with the Northern Group downslope and the Southern Group at the lower right. Blue Creek is in the distance, with the floodplain below the bluffs.

underlying the slabs and overlying a possible "caliche" wall or "foundation." The red clay mortar wall in the "gap" suggests that the Feature 3 wall had been removed, rather than marking a west-facing entryway, which is virtually unknown in Panhandle Aspect house construction.

Feature 3B is a north-south wall segment or remnant in the northeastern quadrant of the unit. This wall is comprised of a narrow and unsubstantial stack of horizontal slabs. Feature 3B curves slightly (see Figure 56), and its southern end was evidently damaged by a large pothole. Here, the wall may either have joined or been obliterated by an eastern segment of the Feature 3 wall, but it is higher in elevation than Feature 3, and thus built later. Feature 3B also overlies Feature 3A (also truncated by the pothole). The Feature 3B slabs may have been set in a red mortar clay.

The north end of Feature 3B may be marked by a small cluster of small slabs lying along the southeastern face of the E50/S50 balk, where the slabs turn to the east along the unit's east wall. Although the function of Feature 3B is unclear, it resembles the possible dividing wall between large rooms in unit E30/N40 of the Northern Group.

Feature 3A is an east-west running "trench" filled with "caliche" clay or burned dolomite mixed with clay that underlies Feature 3 and 3B. Its base is apparently at -12.0 or -12.1 feet, and its top at -11.5, where an unknown upper portion of it may have been cut into by construction of Feature 3. The trench tapers in profile: its southern edge is almost perpendicular, while its northern edge has a 45 degree slope. The solid clay mass is about a foot wide at the base and perhaps 0.6-0.7 feet wide at the top.

There is no clear association of slabs with Feature 3A, and its function is unclear. However, the gray "caliche" clay runs south along the line of Feature 3 and/or underneath its red clay mortar fill. Near the southern end of the unit, the gray clay either disappears or becomes mixed with the red clay mortar and flooring.

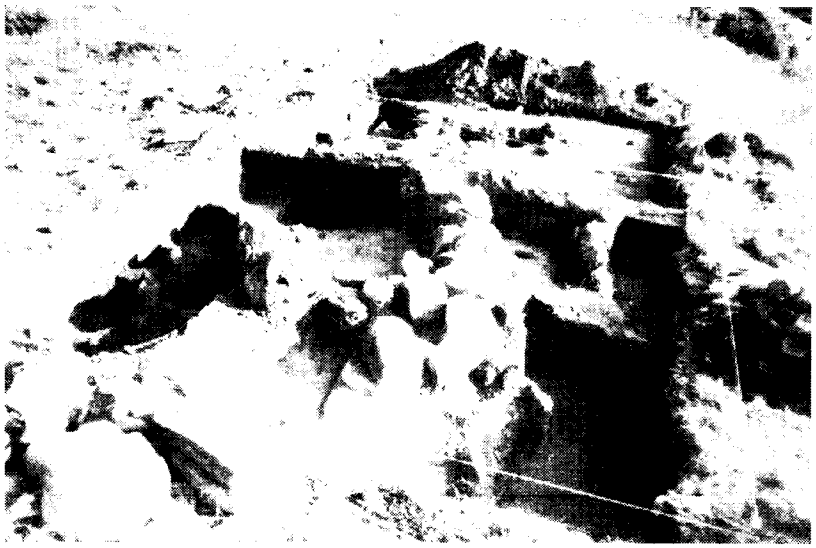


Figure 56. Units E50/S50 and E50/S60 at the end of the excavations. Feature 3 wall is in the center, curving slightly; note a possible gap in the wall at the bottom of the photograph. Feature 1 is at the left, and the deep wall, Feature 4, is at the lower right. The Feature 3B wall is at the right center, and Feature 2 lies just beyond Feature 1.

Feature 3A may join together with Feature 4A (see below), in the unit's southeastern quadrant balk. This feature is also composed of a gray clay with caliche inclusions; it is the same thickness; it runs east-west; and the bases of both are about -12.0 feet in elevation. If they did connect, they would form a squared C-shaped architectural feature of unknown function that was apparently older than Feature 3 or Feature 3B.

Feature 4A is, as mentioned, a "bench" of gray clay with "caliche" inclusions that runs east-west along the southern balk of E50/S60. Its western end is even with that of Feature 3A; its eastern end apparently disappears at a point about 1.5 feet west of stake E60/S60. At its west edge, the Feature 4A gray clay blends with the red clay base foundation of Feature 3.

Feature 4 is a relatively deeply buried wall of vertical slabs running north-south in the unit's southeastern quadrant. The tops of some of these slabs are at -11.8 feet; their bases lay at -12.4 or -12.5 feet. The top of the southernmost Feature 4 slab (Figure 57) is higher than the base of Feature 4A, but most of that feature overlies the wall. Also, the base of Feature 3A is level with, or slightly lower than, the tops of the northernmost Feature 4 slabs, although the wall apparently terminates about 1.5 feet before it reaches Feature 3A.

The southern half of Feature 4 is comprised of a single row of small, angled slabs. After a small gap, where a single slab leans eastward, the wall continues for another two feet. At that point the wall is composed of a single broad, thin slab braced or backed by three or more small slabs. At its northern end, Feature 4 is "capped" by a well-fitted "L-shaped" slab. Opposite this slab, extending from the eastern balk at the southern edge of the pothole, was another vertical slab, oriented east-west, extending into the balk.

The sediments west of the wall are reddish-brown sands until about -11.5 feet, where a hard-packed red clay "flooring" was found that extended to the tops of the wall slabs. There is no description of the soils above the area east of Feature 4. Nevertheless, the fill of the room enclosed by Feature 4 (assuming it is a west wall or wall segment) contained cultural materials to -12.4 feet, and no floor was encountered. It appears that Feature 4 underlies a room marked by the Feature 3 wall, and thus it predates Feature 3; it also presumably predates Features 3A and 4A.

Feature 1 was identified early in the excavations and, judging by the bleaching of the upper 0.2 feet of its largest slabs, it was exposed on the surface. It is a large block of closely set vertical slabs and an underlying curving line of on-edge slabs that apparently directly relate to the higher slabs.

As a structural element, it is composed of four or five vertical slabs firmly set in a mass of red clay mortar. The mortar curves away to the northwest from the northern end of the slabs, suggesting that Feature 1 is the eastern half of a circular structure.

Another curving wall or wall/mortar segment begins at the southern end of the massive, double-row block of slabs, and curves to the southwest. This wall (at about -11.0 feet) is comprised of a line of small, single-row, thin slabs set on edge, rather than having their long axes set vertically. The largest of these slabs measures from 0.75-1.0 feet in length, 0.5-0.7 feet in width, and no more than 0.17 feet in thickness; these slabs are smaller than those in Features 3 and 4. In contrast, the largest slab in the main Feature 1 element of Feature 1 is 1.2-1.3 feet wide, about two feet long, and 0.4-0.5 feet thick.

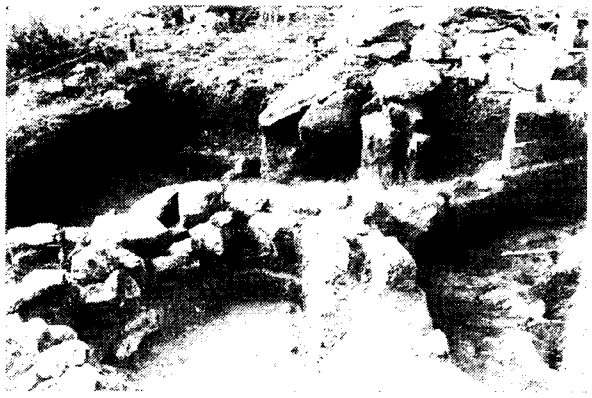


Figure 57. Feature 4 in Unit E50/S60.

The smaller slab wall begins at the south end of the larger double-slab row, along the west edge of the southwesternmost slab. The lesser wall arcs toward the southwest, with the final slab in the series having another slab stacked directly atop it. Both of these slabs are much larger than the others in this wall, and it appears that these larger slabs were originally lying directly atop the small, thin slabs of the wall, forming a continuous, relatively massive wall linking the double-row element with the larger, stacked slab at the southwestern end of the smaller slab wall (Figure 58).

Figure 59 is another view of Feature 1. It illustrates several slabs lying at the base of level 2 "inside" Feature 1 that may be related to Feature 1A (described below).

Feature 1 may be the eastern half of a large slab-lined circular room or "cist" about 8-10 feet in diameter. It seems to have been attached to the west wall of a room block. But, there are no obvious vertical slabs in the presumed northern arc of this wall, only a massive wall of red clay mortar completing the northwestward curving wall. This clay begins about 1.0 feet beyond the north end of the massive double-row element, and curves into the west unit balk. The clay wall measured about 0.75 feet wide and 1.0 foot in height. Only one small, rounded sandstone chunk and a small, apparently vertical slab seem associated with the clay wall, though there at least two large slabs (one possibly in vertical position) on the unexcavated surface that may be related to the clay wall.

Feature 1A is a small (2.5 feet in length and 0.7-0.8 feet in width) slab-lined construction found about a foot "inside" Feature 1, apparently protruding from the west balk. Initially marked by a vertical, though slanting, small dolomite slab, there were two other vertical or on-edge slabs, both sandstone, at its eastern end. There were no slabs for flooring. The matrix within Feature 1A was a brown, ashy soil. Its top elevation was about -11.2 or -11.3 feet, with its base extending to -11.6 or -11.8 feet.

Feature 1A may represent a slab-lined cist. Its relationship with Feature 1 is unknown, although it does occur within a major occupational deposit inside as well as outside Feature 1.

Feature 1B is a deeply buried "wall" and a probably associated "burned floor" "inside" but earlier than Feature 1. Found well below Feature 1A, a vertical slab protruded from the "wall" of Feature 1, almost directly below the west edge of the central cluster of vertical slabs. This deep slab angled toward the southwest, with a top elevation of -12.1 feet, and a bottom elevation below -13.0 feet. Arranged in a line to the north, and possibly to the north-northwest, of this slab are at least four other, apparently smaller, touching slabs. Another similarly placed small slab may be on the opposite, or south, side of the vertical slab, implying a continuation of a wall in that direction (Figure 60). Their tops were at -12.2 to -12.3 feet. These slabs certainly represent a deeply buried construction, possibly a house/room wall. But what is its orien-

Figure 58. Feature 1 in the left foreground. The tops of the two largest slabs in the massive double-row element are at left-center. The tops of the on-edge slabs of the smaller wall are visible in a curving line from the top of the corner stake; just above and to the right of the stake are two stacked larger slabs where the curving wall exits the unit. Between the stacked slabs and the two large vertical slabs are two massive slabs.

Figure 59. The supposed wall and "inside" area of Feature 1. At the lower left, encased in mortar, are the western vertical slabs of the massive "central" element. Above them are the tops of the smaller on-edge slab wall, at the end of which are two larger, stacked slabs. In between are massive slabs, once lying directly atop the small slab wall, forming a continuous curving wall.

tation? Does it curve, consistent with Feature 1, or is it straight? Interestingly, a 0.2 foot thick, hard-packed "burned clay floor" at -12.7 feet seems related to the deeply buried slab construction because its orientation conforms to the deeply buried vertical slabs.

Feature 2 is a pit north of Feature 1 and west of Feature 3. The pit is about 2.0 feet wide, and extends south into the unit about 1.5 feet; somewhat less than half the pit is in the one-foot balk separating the units. Its western edge is about 1.5-1.67 feet from the balk at the northwest unit corner. The pit had straight sides and a roughly flat bottom, extending from -12.0 to -13.0 feet in elevation.

It contained ash and burned rock fragments, but no appreciable charcoal; some of the pebbles and fragments were unburned. The pit also had a number of flakes, all of which were ash-coated, but few were burned. Two bison ribs were in the pit, both worked (LMRA 145-90-73.5 and -73.6). Another polished bone fragment was found, along with a fish bone, and either a small caudal vertebra or a damaged human carpal/tarsal.

If Feature 2 begins at or near -12.0 feet, then it predates Feature 3 and possibly Feature 1. It may be contemporaneous with Feature 4, but is almost certainly younger than the deep architectural remains (Feature 1B) "inside" Feature 1.

Occupation Zones

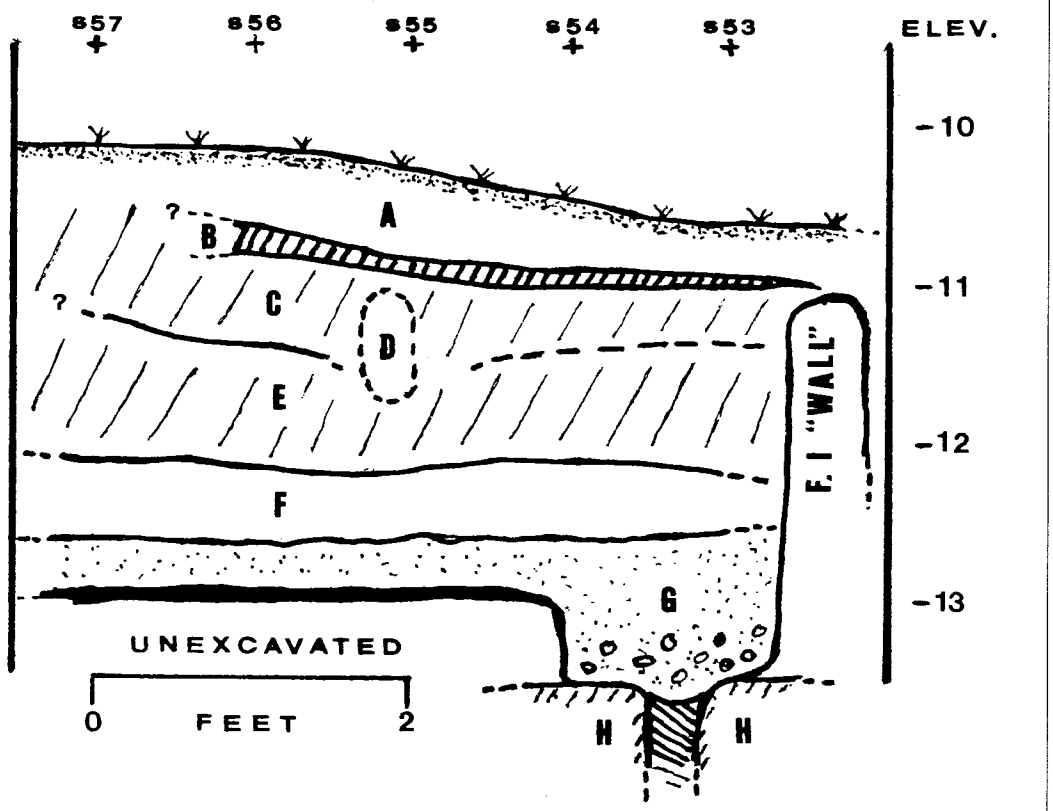
The west balk profile of excavations in E50/S60 illustrates the occupational zones within this part of the Southern Group at 41MO35. The profile extends from the surface (at -10.1 feet) to about -13.5 feet bs (Figure 61). Below 0.5 feet of windblown sand and humus was a "possible pale lens" that represents "melted wall plaster" or mortar from long-collapsed walls. Below this lens (B in Figure 61), was a darker zone (C) reaching almost to -11.5 feet, and within this zone were the "scars" where the angled east-west slab of Feature 1A was removed. Level 3 was an artifact-rich zone, implying major prehistoric occupation and activity, that seems contemporaneous with Feature 3 and the latest major occupation of the site.

Beneath this zone was Zone E, a thicker midden layer (from -11.5 to -12.2 feet) that overlay a relatively thin occupation zone (0.3 foot) extending to about -12.6 and possibly -12.7 feet bs. This zone lay almost horizontal, whereas the higher zones angled downslope following the present surface (see Figure 61). At the base of this zone (-12.7 feet) is the supposed deep "burned" Feature 1B floor in Feature 1 (Zone F).

Below this was a relatively thick zone of apparently sterile or nearly sterile sand with some gravels (Zone G). The upper surfaces of two masses of dolomite were found at -13.5 feet in the profile. Between these masses was a zone of "hard earth." These may represent another buried occupational/architectural zone below -13.0 feet (see also E50/S50 discussion, where a vertical slab and a bone protruded upward from a seemingly sterile pebbly sand zone below -13.0 feet).

In the artifact collections, specific occupational zones cannot be well defined, but cultural materials were abundant from ca. -11.0 to -12.1 feet bs. Artifacts were found in level 4 beneath the rocks comprising Feature 3's wall. Also, except for a few obsidian flakes deep in the Feature 4 room fill, most of the Southwestern materials came from higher in the room fill. A Washita point (with a nick or a second "token" notch on one side) and an oval knife base were recovered at -12.8 feet bs, in level 6, below the Feature 1B burned floor. The carapaces of three turtles were found in the southern half of Feature 1, apparently clustered together, one at the base of level 3 and two in the upper part of level 4. A dartpoint or hafted knife was located in level 4 just south of the carapaces.

Figure 60. The deeply buried architectural Feature 1B. A vertical slab is in the left foreground, and smaller slabs (or chunks) are to its left. The largest vertical slab of Feature 1 is at the left, while the relatively large stacked slabs at the right, and the on-edge slabs, are the small slab wall of Feature 1. An apparent "floor" line is visible at the base of these small slabs. The tops of slabs of Feature 4 are in the upper left.



A = Surface: Grass, thin humus wind-blown sand (indistinct)
B = Pale lens (Crew: "Melted Plaster/Adobe")
C = Dark occupation, vaguely defined (dark brown, sandy)
D = Scar, F.1A slab removed (base questionable)
E = Occupation ("Midden"; mottled gray-brown; charcoal)
F = Well-defined occupation (gray; charcoal)
G = Sparse occupation (pale gray; fine, loose sand with pebbles/gravel deep; F.1B "Burned Floor")
H = Dolomite "bedrock" or slabs ("hard earth" between rocks; no debitage or bone; extent unknown)
"Clay Wall" of Feature 1 at right.

Figure 61. The "Davis Profile" from the Southern Group, S53-S57 on the E50 line.

UNIT E50/S50

This unit had been vandalized, with two large potholes damaging much of its northern half. It was strewn with slabs and rubble, and slabs were lying downslope to the north and northeast of the unit. From the northeastern corner of the unit, the ground slopes steeply toward the bluff rim, while to the east are gentler slopes; the rim is 20 to 30 feet distant. The area is covered with slabs and rubble, and there were two or more closely set vertical slabs 10 to 15 feet away that probably represent a segment of Feature 3's eastern (unexcavated) wall.

In all, three levels were excavated in the unit. In addition, the larger pothole, probably an old trench, was cleaned out and profiled on its southern face, while a test trench was excavated along the unit's west balk.

Level 1 (-11.0 to -11.2 feet bs at the base of

the level) consisted mainly of a grass-covered humus overlying a thin deposit of wind-blown sand. The level had one Fresno and two Washita points, several other stone tools, over 650 flakes, five Borger Cordmarked sherds, and more than 50 organic remains. A wall was apparent in the southeastern quadrant of the unit at the base of this level. It ran east-west from roughly the middle of the southern half of the square to the eastern balk (Figure 62). None of the relatively small slabs in the alignment were vertically set, their edges did not touch, and most sloped slightly toward the north or were flat.

Level 2 (-11.5 to -11.7 feet) was even more productive, especially with respect to the frequency of debitage, ceramics, and organics. Three obsidian flakes, a glazeware body sherd (LMRA 145-90-55.18), and a very small body sherd of a plain utility ware (LMRA 145-90-55.19) represent Southwestern materials.

The rock alignment was unchanged, but there was a change in soil change at or near the bottom of level 2 to a dark and compact fill. A red clay (wall mortar/plaster) was exposed in the southern half of the unit, adjacent to the west edge of the slab alignment and close to the southern balk. The slabs and red clay represent part of Feature 3, with the east-west, smaller wall in the southeastern quadrant a dividing wall like that in E30/N40.

There is a distinct zone of light-colored soil in level 2 and the upper part of level 3 in the southern balk of the southeastern quadrant (Figure 63). An apparently matching light soil appears in the opposite face of the balk in E50/S60. This may relate to an occupation associated with the Feature 3 wall.

Level 3 (-12.0 to -12.2 feet bs) was the most productive level in unit E50/S50. It represents house occupation fill. Found in this fill was a Harrell point, two Washita points, one Fresno, and six arrowpoint preforms, of which four are "guitar-picks." Other stone tools and a quarry blank were recovered, along with more than 1,500 flakes, 20 Borger Cordmarked sherds, 12 worked bone fragments, and over 430 organics.

Soil changes in level 3 were bewildering: thin (less than 1/4-inch thick) layers of fill ("brown, sandy"), charcoal and ash, then "clean" tan sand, and more of the others, including red clay. These must represent different occupational layers, possibly with thin layers of clean sand brought in and spread around to create a new floor.

At the bottom of level 3, no sign of a wall trench or foundation lay beneath the aligned slabs first exposed in level 1. A band of "reddish, sandy" soil at about -12.0 feet sloped to the west, merging with the patch of red clay (mortar?) mentioned in level 2, about where the cluster of slabs in the southwestern quadrant is densest. These slabs slope mainly toward the northwest, having collapsed outward away from the buried soil zone and the red clay patch. Slabs in the northern part of the unit and on the slopes beyond, however, tend to slant toward the north. Based on the slab and soil evidence, the major north-south Feature 3 wall ran across E50/S50, and then turned toward the east. Another but more substantial wall heads west along the south wall of this unit.

The crew cleaned out and profiled the southern face of the pothole trench (see Figure 64). A small hearth or ash pit was found in the trench just west of E55/S45. The basin, about 1.0 foot wide

Figure 62. Slab alignment or wall in southeastern quadrant of E50/S50 as exposed at the bottom of level 2, looking east. The wall extends into E50/S60, and other slabs are exposed in the unit's southwestern quadrant.

Figure 63. Unit E50/S50 at the end of the excavations. There is a clustering of slabs in the southwestern quadrant, including some deeper than level 3, as exposed in the trench at the lower right. The curving trench in the foreground is a cleaned-out vandal trench.

and 0.2-0.25 feet thick, lay 0.25-0.33 feet below the bottom of level 3. The pit contained ash, charcoal, and a few burned rock fragments. To its west was a burned dolomite slab, angling shallowly down into unexcavated soil to the south. The profile shows an undulating black lens rippling away from the top of the basin, tending to dip slightly toward the east or northeast but extending about a foot in the direction of the burned slab on the west. At least 0.5 feet below this lens is another, very similar lens, and with the same general orientation as the higher one. These lenses probably represent occupational deposits of charcoal and ash, or possibly house fires.

About two feet west of the ash-filled basin, but 0.3-0.4 feet deeper, is a "dark gray floor" associated with thin ash deposits. Less than 0.3 feet below this "floor" is a zone of "coarse sand [and] rock," which represents a major sterile zone, possibly deliberate fill, or instead the sterile subsoil into which the exposed prehistoric constructions were built. However, at -13.0 or -13.2 feet bs, sticking up from this zone, or within it, the crew found a bison (?) bone. This bone could represent a more deeply buried occupation or midden, a stake of some sort, a naturally occurring object, or a noncultural fossil (the bone was not recovered or is absent from the collections).

Another test was excavated from the large pothole's southern edge to along the balk to E50/S45. The test was 0.8 feet wide and 3.0 feet in length. A relatively thick ash zone was encountered from ca. 0.67-0.75 feet (ca. -12.7 to -13.0 feet bs) to 1.0 foot below level 3. This ashy zone appears to be associated with the "dark gray floor" in the pothole trench profile, but the thicker ash in the balk suggests it was deposited as a basin-shaped lens extending westward from about E53/S45. Given its position, we believe the thick ash deposit is an exterior feature, possibly an outdoor hearth or ash dump set close to a structure wall (probably Feature 3).

Below the ash deposits, a vertical slab was found in the bottom of the small test trench; the top of this slab was at -13.1 feet. The trench apparently bottomed at about -13.5 feet, with the slab still buried at that depth. Is this slab part of a structure? Combined with the above-mentioned (bison) bone that protruded from a supposed sterile zone at about the same depth, the presence of the slab suggests the existence of deeply buried cultural and possibly architectural remains at the north end of E50/S50. These may correlate with the deeply buried slabs in Feature 1 and the possible slabs down at about -13.5 feet in the same area.

If the slab is an architectural element, there must be at least a 0.5 foot thick sterile zone separating its associated occupational floor(s) from the lowest definable occupational zone in unit E50/S50. This would correspond to features and fill zones "inside" Feature 1 in E50/S60, again suggesting that this zone was a deliberate fill or natural post-abandonment fill.

SUMMARY

There are at least three and possibly as many as five occupations within Southern Group units E50/S50 and E50/S60. This is not to say, however, that there may be five building/remodeling episodes represented, as not all occupational zones necessarily have evidence of architecture.

The earliest suspected occupation in the Southern Group is represented by the deep vertical slab in unit E50/S50, with its top at -13.1 feet and its base below -13.5 feet. Probably associated with this slab (which may or may not be architectural) is the bone at -13.1 feet some 4 feet away in the profile of the vandal trench. Both items are in a coarse, pebbly sand matrix. Also related are the possible slabs, with "hard earth" between them (see H in Figure 61), in a similar matrix at ca. -13.5 feet. Each of these finds may be natural, but information is lacking about their context, and nothing is known about what may be present at or near their bases

(ca. -14.0 feet). The matrix in which they occur may be a sterile hardpan, a deliberate fill, or a post-abandonment natural fill/cover.

The lowest well-defined cultural features are the lower "floor" at -12.8 to ca. -13.0 feet in the E50/S50 vandal trench profile, the ash deposit and cultural materials at -12.9 to -13.1 feet in the west balk trench, and the ash lens or "floor" at -12.9 feet in the vandal trench. Additionally, in E50/S60, the "burned floor" at -12.7 or -12.8 feet and the deep wall (Feature 1B) may be contemporaneous with the E50/S50 features. The tops of the Feature 1B wall range from -12.1 to about 12.3 feet in elevation, with basal depths below -13.0 feet.

The slabs exposed at the south end of the west balk trench in E50/S50, with top elevations at -12.1 to -12.2 feet (and bottom elevations below -12.5 feet), may be associated with Davis' Zone F (see Figure 61). The north-south wall of Feature 4, with slab tops at ca. -11.8 feet and bases at ca. -12.4 feet, seems to be contemporaneous. In E50/S50, a Zone F occupation is marked by artifact-rich occupational deposits, and an ash pit with associated "floor" at -12.4 to -12.6 feet. Zone F is a period of relatively intense activity in the Southern Group.

The next higher period, corresponding to Zone E, may be represented by Features 3A and 4A and the partial west-side connecting wall in E50/ S60, with basal elevations about -12.0 feet. This room (?), a possible slabless architectural feature, overlies Feature 4, which is probably in Zone F. The Feature 2 pit (with top elevations of about -12.0 feet) appears to also be contemporaneous with Features 3A and 4A.

Zone C deposits are associated with the most active architectural period, in that both Feature 3 and Feature 1 were built during this time. Feature 1A probably rested on the "floor" of Feature 1, and thus is also associated with Zone C.

Feature 3 was the last major wall construction at the site. Its average base elevation in E50/S60 is at -11.5 feet, slightly higher on the south, but lower on the north. It was a relatively massive slab and mortar wall more than 30 feet in length.

Feature 1 is thought to be generally contemporaneous with Feature 3, as its base of massive red clay mortar, holding together the central element of vertical slabs, is at about -11.5 feet; a short "branch" of stacked slabs connects this element with Feature 3. The curving wall of small on-edge slabs, "anchored" at the southwest corner by deeper, larger stacked slabs, seems to "bottom" at -11.5 to -11.6 feet and apparently served as a foundation of sorts for larger slabs stacked atop them. The overall appearance of Feature 1 is of a relatively massive curving wall of combined vertical and stacked slabs built at the same time as, or possibly a short time before, Feature 3, but definitely incorporated into Feature 3.

Feature 3B appears to represent the last construction at the site. Its base, at about -11.4 feet, is slightly higher than the base of Feature 3.

Figure 64 depicts recorded excavated/mapped features in unit E50/S60. Figure 65 depicts our reconstruction of Feature 3 and Feature 1, along with Feature 3B, and the "room" formed by Features 3A and 4A.

The Southern and Northern Group ruins at 41MO35 share an architectural tradition of linear room blocks with rooms sharing one or more walls. In the Northern Group, wall trenches were dug, with slabs placed in the trenches and secured by a red clay mortar. Some wall slabs were braced at or near their bases with cobble chinking rocks, while a few wall elements were built of stacked slabs. The room dividing walls were much less substantial than the primary room block walls. The one major floor was constructed with masses of compact red clay into which cobbles had been incorporated, possibly to create a level, solid floor atop an uneven dolomite bedrock. Upper wall construction is unknown, but clay daub, some with stick impressions, indicate a wattle-and-daub superstructure; roof shape and construction is unknown. Where defined, rooms were from 12 to 14 feet wide, oriented generally north-south.

The Southern Group had one or more large linear room blocks, with rooms sharing one or more walls with others. Major walls were constructed of stacked horizontal slabs placed in and bound together by a red clay mortar. Unaltered cobbles were found in the wall-slab concentrations, used as chinking rocks or rubble fill. One or more dividing walls were found, also less substantial than the main exterior walls; no vertical elements were recorded in the dividing walls. A clay-and-cobble flooring was not used in the Southern Group ruins, but since the soils of the Southern Group are considerably deeper than the Northern Group, a cobble flooring or bedrock fill may not have been necessary. Possible rooms in the Southern Group are about 6-8 feet wide, with Feature 1 about 10 feet in diameter. The length of rooms may be as much as 25 feet. The Southern Group room block(s)

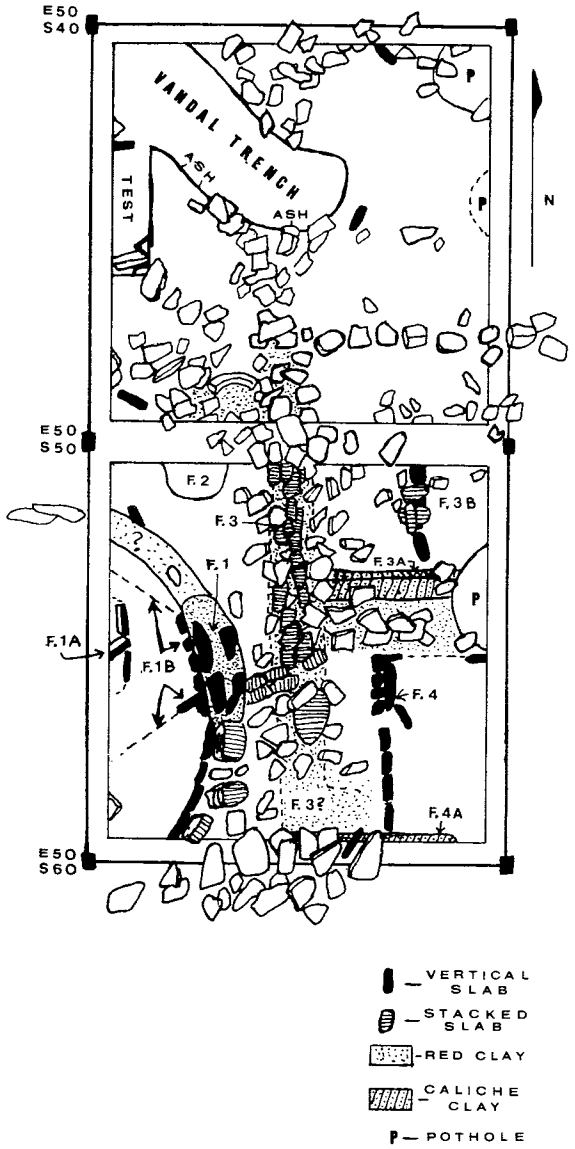


Figure 64. Sketch of units E50/S50 and E50/S60, including architectural and other features. Slab concentrations depicted are not comprehensive because many slabs were removed before being mapped or photographed.

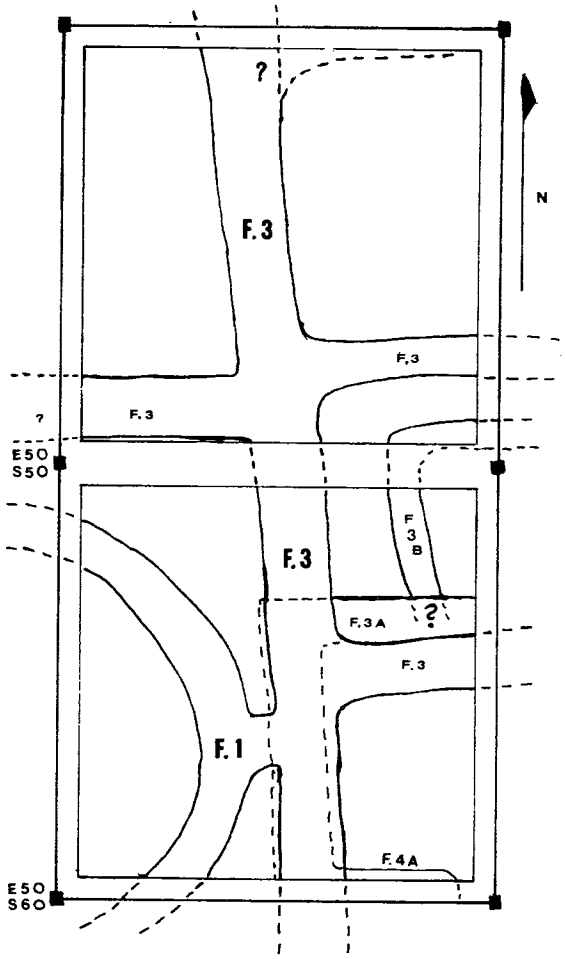


Figure 65. Reconstruction of Feature 3 and Feature 1, with Feature 3B included. Older, deeper Features 3A and 4A and their connecting wall are shown by dashed lines.

orientation is essentially north-south.

No clear evidence of entryways, "benches," or "altars" was found in either site area. Prepared pits occur at both areas, along with shallow, scooped-out warming fires within the rooms. Major cooking hearths/fires may have been outside the structures. In both areas, rooms were damaged and/or destroyed by house conflagrations, with subsequent repairs and housecleaning.

The architectural evidence in the lower levels at the Southern Group is intriguing. There, the architecture *seems* to have consisted of non-linear, non-contiguous walled structures.

Cultural materials in both areas are characteristic of the Panhandle Aspect (Table 5). At both areas, minor amounts of obsidian and Southwestern ceramics were found; Olivella beads were recovered only at the Northern Group. Some of the Southwestern trade ceramics belong to the same regional traditions, indicating temporal contemporaneity between the two areas (except for the deeply buried architectural zone in the Southern

Group). The Southwestern materials in the Midden Area corroborate the temporal association because most of the cultural materials originated from the 41MO35 blufftop sites.

There are differences between 41MO35, 41MO36, and 41MO37, particularly in architecture. No rooms at 41MO36 or 41MO37 were built to share walls with any other room, except for the large circular cist(s) attached to the 41MO37 house. This feature resembles Feature 1 at 41MO35, Southern Group in size and shape, which is also attached to a larger structure. But the sheer mass of slabs used at 41MO37, and its construction techniques, indicate only a superficial similarity. Moreover, the other larger circular feature attached to the southern end of the Southern Group room block(s) is perhaps 25 feet in diameter, over twice the size of the circular room/cist at 41MO37 and Feature 1.

Although only a relatively small amount of Southwestern trade materials was recovered from 41MO35, it is substantial in comparison with the other Blue Creek sites. No Southwestern ceramics were found at 41MO36 or 41MO37, and only seven obsidian flakes came from 41MO36. By contrast, at 41MO35 (including the Midden Area), there were 99 flakes of obsidian and 12 Southwestern sherds (including a single sherd composed of 18 that fit together). Another eight unclassified sherds could also be from Southwestern pottery vessels. Finally, the only Olivella beads found during the project came from 41MO35, Northern Group.

With respect to the Southwestern ceramics at 41MO35, Hughes found an unidentifed "glaze polychrome" sherd during his testing in the Northern Group in 1968. Also in 1968, one of his students, Martha Crabb, reported on Southwestern trade ceramics found at several Panhandle Aspect sites, including "Big Blue 1 Ruin," or 41MO35. These were from the midden deposits "immediately below one group of houses" (Crabb 1968:85). Crabb (1968:85) lists the wares as follows: "Three sherds of a Cieneguilla Glaze-on-yellow vessel dated A.D. 1375-1450 and one possible jar base sherd of Agua Fria Glaze-on-red, A.D. 1325-1425, were found in the midden. Dates of the pottery cover a period from A.D. 1325-1450 with a median date of around A.D. 1400."

As discussed below, a sherd identified as Agua Fria Glaze-on-red was found at the Southern Group in unit E50/S60. Several sherds of an unspecified glaze-on-yellow ware, possibly Cieneguilla Glaze-on-yellow, were also recovered in units E20/N20, E30/N40, and E30/N50 of the Northern Group, along with a single possible Cieneguilla Glaze-on-yellow sherd from unit E50/S50.

Two other probable Southwestern sherds were found in the Southern Group at 41MO35. Both are plain utility wares, one possibly from a gray glazeware vessel or part of an unslipped jar.

Lintz (1986:34), in part using Crabb's information, reports finds of Agua Fria Glaze-on-red at Big Blue 1, Alibates Ruin 28, Antelope Creek Ruin 22, and Saddleback Ruin. In addition, Schmidt-Couzzourt (1983:41) reports a sherd of this type at the Chicken Creek Site. Of the mentioned sites, only Chicken Creek (41PT45) is *not* a multi-roomed "pueblo." Lintz also lists Cieneguilla Glaze-on-yellow at Big Blue 1, Alibates Ruin 28, Antelope Creek Ruin 22, Saddleback Ruin, the "Ozier Ruin," and the Floyd Ranch Ruin, all multi-roomed "pueblos." (Lintz' reference for the Ozier Ruin is Crabb [1968], but Crabb does not list Cieneguilla Glaze-on-yellow at the Ozier Ruin; rather, she describes a find of Largo Glaze-on yellow there.) These Southwestern types are from the Northern Puebloan Rio Grande/Pecos area, as are most of the trade wares found at Panhandle Aspect sites (see Perttula et al. 1995:Table 3).

Considering the stone tool assemblages, one interesting difference between 41MO35 and the other two sites is the virtual absence of grinding implements (only two manos) at 41MO35. Both manos and metates were found on the slopes and benches of the Midden Area, however. It is possible that the 41MO35 occupants took their raw materials down onto those benches so they could do their grinding out of the wind. Are there bedrock mortars/metates near the site?

The majority of Southwestern materials (except those from the Midden Area) from 41MO35 are in upper excavation levels. These occur in association with an occupation involving multi-room, contiguous-walled "pueblos."

ARTIFACT DESCRIPTIONS, 41MO35 BLUFFTOP

The Panhandle Aspect artifact assemblage from this site is rich and varied. The overall character of the assemblage illustrates the "activities of daily living" and of their methods for coping with their environment. The interpretive value of this collection lies *not* in its comparison

Table 5. Artifacts from the Southern Group at 41MO35

Description	E50/S50 L.1	E50/S50 L.2	E50/S50 L.3	E50/S50 Vandal Trench	E50/S50 West-balk Trench
Arrowpoint, Washita	1	1	2	1	-
Arrowpoint, Harrell	-	-	1	-	-
Arrowpoint, Fresno	1	-	1	-	-
Preform/Blank	2	3	6	1	1
Knife, Oval	-	-	-	-	1
Knife, Unclassified	-	1	-	-	1
Scraper, End-End/Side	-	-	-	1	-
Scraper, Unclassified	-	2	1	-	-
Drill/Perforator	-	1	-	-	-
Graver	1	-	-	-	-
Spokeshave	1	1	-	-	1
Retouched Flake	6	1	-	-	2
Quarry Blank/Biface	1	-	1	-	-
Debitage, Alibates	656	950	1545	148	240
Debitage, Tecovas	3	7	14	2	-
Debitage, Obsidian	1	3	-	1	-
Chopping Tool	-	-	-	1	-
Misc. Ground/Pecked Stone	-	-	2	1	-
Stone Pipe	-	-	-	-	-
Ceramics, Borger Cordmarked	5	12	20	2	-
Ceramics, Southwestern	-	1	-	-	-
Ceramics, Unclassified	-	1	-	-	-
Bone Tool, Digging	-	-	11	-	-
Bone Tool, Perforating	-	-	1	-	-
Bone Tool, Other	-	-	-	2	-
Bone, Large Mammal	-	-	5	-	-
Bone, Bird/Rodent	-	3	3	1	1
Bone Scrap	35	176	386	63	17
Turtle, Carapace Segments	-	3	7	2	-
Mussel Shell, Utilized	2	-	-	-	-
Mussel Shell, Scrap	14	18	40	5	3
Corn	-	-	-	1	-
Totals	729	1184	2046	232	267

Table 5. *(Continued)*

Description	E50/S50 Total	E50/S60 L. 1	E50/S60 L. 2	E50/S60 L. 3	E50/S60 L. 4
Dartpoint	-	-	-	-	1
Arrowpoint, Washita	5	1	-	-	-
Arrowpoint, Harrell	1	-	-	-	-
Arrowpoint, Fresno	2	-	-	-	1
Arrowpoint, Unclassified	-	-	-	1	-
Preform/Blank	13	1	5	5	5
Knife, Ovate	1	-	-	-	1
Knife, Beveled	-	1	-	1	-
Knife, Unclassified	2	-	-	1	1
Scraper, End-End/Side	1	-	2	2	1
Scraper, Side	-	-	-	-	-
Scraper, Unclassified	3	4	-	1	2
Drill/Perforator	1	-	-	1	-
Graver	1	-	-	1	-
Spokeshave	3	-	-	1	-
Denticulate	-	-	-	-	-
Retouched Flake	9	3	3	2	2
Multifunction Tool	-	-	-	-	-
Quarry Blank/Biface	2	-	-	1	-
Debitage, Alibates	3539	520	1053	999	1417
Debitage, Tecovas	26	6	15	12	12
Debitage, Obsidian	5	4	1	5	1
Chopping Tool	1	-	-	-	-
Hammer/Anvil/Maul	-	1	-	1	-
Mano	-	-	-	-	-
Metate	-	-	-	-	-
Misc. Ground/Pecked Stone	3	-	-	1	-
Stone Pipe	-	-	-	1	-
Borger Cordmarked	39	2	12	21	16
Ceramics, Southwestern	1	-	1	-	-
Ceramics, Unclassified	1	-	-	-	3
Daub	-	-	-	-	-
Bone Tool, Digging	11	-	-	1	8
Bone Tool, Perforating	1	-	-	-	1
Bone Tool, Other	2	1	-	1	-
Bone, Large Mammal	5	-	1	8	15
Bone, Bird/Rodent	8	-	-	-	3
Bone, Fish	-	-	-	-	-
Bone Scrap	677	8	91	124	361
Antler Billets/Hafts	-	-	-	-	1
Turtle Carapaces	-	-	-	1	2
Turtle, Carapace Segments	12	-	2	?	27
Bead, Olivella	-	-	-	-	-
Bead, Shell (other)	-	-	-	-	-
Mussel Shell, Utilized	2	-	-	2	2
Mussel Shell, Scrap	80	3	10	21	57
Corn	1	-	-	-	-
Plant, Other	-	-	-	-	
Totals	4458	555	1196	1215+	1940

?=single fragmented carapace

Table 5. *(Continued)*

Description	E50/S60 L.5	E50/S60 L.6	E50/S60 L.7	E50/S60 "All"	E50/S60 Total
Dartpoint	-	-	-	-	1
Arrowpoint, Washita	-	-*	-	-	1
Arrowpoint, Harrell	-	-	-	-	
Arrowpoint, Fresno	-	-	-	-	1
Arrowpoint, Unclassified	-	-	-	-	1
Preform/Blank	1	-	1	2	20
Knife, Ovate	-	2	-	-	3
Knife, Beveled	-	-	-	-	2
Knife, Unclassified	-	-	1	-	3
Scraper, End-End/Side	-	-	-	-	5
Scraper, Side	-	-	-	-	-
Scraper, Unclassified	-	-	1	-	8
Drill/Perforator	-	-	-	1	2
Graver	1	1	-	-	3
Spokeshave	-	-	1	-	2
Denticul ate	-	-	-	-	-
Retouched Flake	2	1	-	-	13
Multifunction Tool	-	-	-	-	-
Quarry Blank/Biface	-	-	-	-	1
Debitage, Alibates	367	79	124	172	4731
Debitage, Tecovas	-	-	1	2	48
Debitage, Obsidian	1	3	-	1	16
Chopping Tool	-	-	-	-	-
Hammer/Anvil/Maul	-	-	-	-	2
Mano	-	-	-	-	-
Metate	-	-	-	-	-
Misc. Ground/Pecked Stone	-	-	-	-	1
Stone Pipe	-	-	-	-	1
Ceramics, Borger Cordmarked	3	-	1	3	58
Ceramics, Southwestern	-	-	-	1	2
Ceramics, Unclassified	-	-	-	-	3
Daub	-	-	-	-	-
Bone Tool, Digging	-	-	-	-	9
Bone Tool, Perforating	-	-	-	-	1
Bone Tool, Other	3	-	-	-	5
Bone, Large Mammal	1	-	-	6	31
Bone, Bird/Rodent	-	-	1	-	4
Bone, Fish	7	-	-	-	7
Bone Scrap, All	153	14	13	9	773
Antler Billets/Hafts	-	-	-	-	1
Turtle Carapaces	-	-	-	-	3
Turtle, Carapace Segments	4	-	-	1	34
Bead, Olivella	-	-	-	-	-
Bead, Shell (other)	-	-	-	1	1
Mussel Shell, Utilized	-	-	-	2	6
Mussel Shell, Scrap	15	4	-	14	124
Corn	-	-	-	-	-
Plant, Other	3	-	-	-	3
Totals	561	104	144	215	5930

* 2 recorded

with the Panhandle Aspect culture as a whole; rather, its significance derives mainly from differences and similarities with the assemblages from 41MO36 and 41MO37, neighbors in both space and cultural affinity.

LMRA 145-90-69.1 (E50/S60, L.4, "in room"): Long, narrow, thin biface of mediocre workmanship—apparently a large dart point that may have been used as a hafted knife. Its blade edges are symmetrical and convex, and the base is convex, with a slightly expanding stem. It is corner-notched with short barbs. The tip is dulled, as is 2.5 cm of the blade edges opposite the tip, and the lower quarter of the blade edges. Alibates. Size: 66 x 30 x 5 mm; neck width 15.5 mm; base width 18.2 mm (Figure 66, Top row, left).

LMRA 145-90-56.2 (E50/S50, L.3): Small, thin, well-made complete Harrell point, with side-notches and a basal notch or deep indentation. The base is slightly concave, the tang lateral edges are straight, and the blade edges are slightly convex. The notches are about one-third of the distance from the base to the tip and are perpendicular to the blade edges. Alibates (?). Size: 25 x 12.8 x 2.2 mm; neck width 7.3 mm (see Figure 66, top row, second from left).

LMRA 145-90-56.1 (E50/S50, L.3): Very well-made, complete, and symmetrical Washita point. Its base is concave with straight blade edges. The notches are perpendicular to the blade edges and are slightly rectangular in form; they are placed one-third of the distance from the base to the tip. Waxy, translucent (almost transparent) blue-white chalcedony or opaline. Size: 28 x 16 x 2.5 mm; neck width 6.5 mm (see Figure 66, top row, third from left).

LMRA 145-90-56.3 (E50/S50, L.3): Very small, thin, narrow triangular arrowpoint, completely worked. It has a slightly concave base; its blade edges are straight with a slight taper at the tip. It has a single side notch very near the base that resulted in the fracture of one basal tang/corner. Alibates. Size: 23 x 11 x 1.8 mm (see Figure 66, third row, far right).

LMRA 145-90-41.1 (E30/N40, L.1): The base and part of an arrowpoint blade. The tip was snapped and the remainder split laterally. One edge has a double side notch, and the base is concave but not fully worked. A similar arrowpoint was recovered in unit E30/N50, L.2. Alibates. Size: 20 x 10 x 3 mm (see Figure 66, bottom row, second from left).

LMRA 145-90-24.4 (E20/N20, L.3): Very small, thin, ovate to sub-triangular arrowpoint, delicately chipped but rather poorly made. Its base is convex and asymmetrical, with an asymmetrical blade; there is a small fracture at one tang edge. The point has one complete side notch, with a rudimentary notch on the other side. Alibates. Size: 15 x 13 x 2.2 mm. Blade length 5.3 mm; base-stem length 9.7 mm; neck width 6 mm (see Figure 66, Bottom row, second from right).

LMRA 145-90-36.1 (E30/N30, L.4): Very small, thin, triangular unnotched and bifacially worked arrowpoint. The blade edges are convex, as is the base; the latter trait is rare for unotched arrowpoints in the Panhandle. Alibates. Size: 22 x 12 x 2 mm (Figure 67, Top row, third from right).

LMRA 145-90-67.4 (E50/S60, L.3?): Small, thin, well-made drill (?), possibly made from an arrowpoint. Its base is concave, with straight tang edges; the blade has rudimentary side notches. The tang/base is not well worked, indicating that it is not a reworked point. The blade is very narrow and diamond-shaped in profile (needle sharp), with no use-dulling. Alibates. Size: 30 x 14 x 2.5 mm; neck width 6 mm (Figure 68, Middle row, far right).

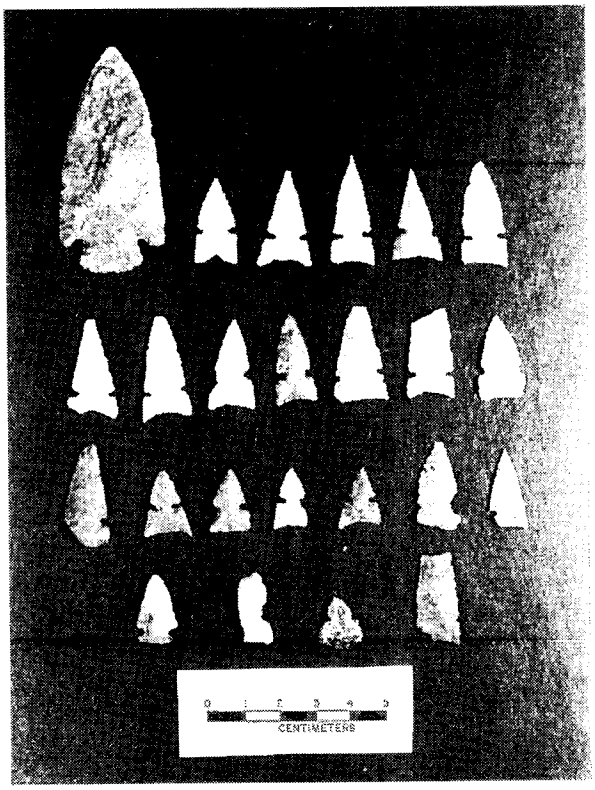


Figure 66. Projectile points, 41MO35 Blufftop and Midden areas.

LMRA 145-90-68.2A (E50/S60, L.4): Triangular-shaped preform (?) that morphologically suggests a drill/perforator or reamer. It has a concave base, with blade edges that are concave and sinuous; the tip is missing. The dorsal face is fully worked, but only the base and edges are worked on the ventral face, and the retouch is intermittent. The blade narrows toward the tip but there is no edge-dulling. Alibates. Size: 32 x 20 x 3.2 mm (see Figure 68, middle row, far left).

LMRA 145-90-88.2 (General Surface): Very small biface, with characteristics of both a drill and an arrowpoint. It is widest at the base, which is straight with a small snap at one corner, and the base's lateral edges taper slightly. The tool is notched like a Washita arrowpoint, and the blade edges are very narrow above the notches; the tip of the specimen is missing. The blade edges are finely retouched on alternating faces. Alibates. Size: 18 x 12 x 2 mm (see Figure 68, middle row, second from left).

LMRA 145-90-48.3 (E30/N50, L.2): Complete ovate knife, with convex base and tip. The base has been thinned, possibly for hafting, and the edges are slightly dulled, as are the base and tip. Excellent workmanship was employed in the manufacture of the knife, using a combination of soft-hammer percussion and pressure-flaking. Alibates. Size: 141 x 47 x 7 mm (Figure 69, bottom).

LMRA 145-90-24.38 (E20/N20, L.3): The distal end and most of the blade of a scraper-denticulate. One lateral edge is convex; the other is straight. Both edges are steeply worked (ca. 60 degrees) and use-dulled, and the straight edge is serrated, while the denticulate edges are worn. Alibates. Size: 59 x 35 x 9 mm (Figure 70, top, left).

LMRA 145-90-46.3 (E30/N50, L.1): Large spokeshave/denticulate/graver made from an almost complete flake, curved and twisted toward the distal end. One lateral edge is convex and uneven, and the denticulate edge was produced by retouch from the midpoint to the distal corner. The other lateral edge is straight, with a distal scraper-like retouched edge. The spokeshave bit is 9 mm wide and 2.5 mm deep. The denticulate spurs are broken at the tips and two or more may have been used as gravers.

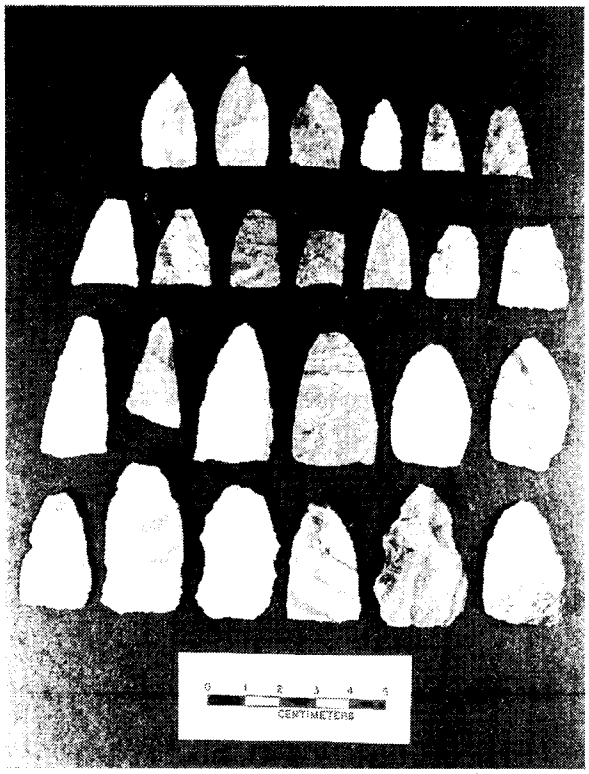


Figure 67. Arrowpoints and arrowpoint preforms from 41MO35 Blufftop and Midden areas. Top two rows: Fresno arrowpoints; third row: preforms and "guitar-picks;" bottom row: "guitar-picks."

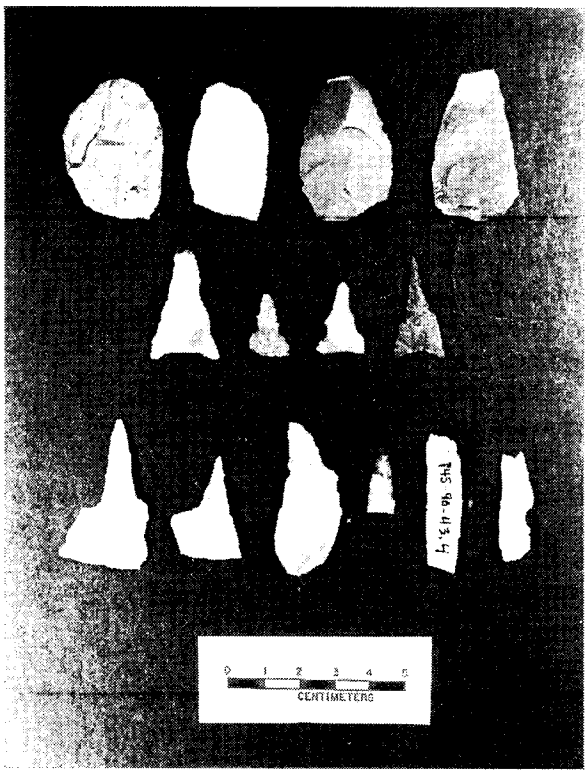


Figure 68. Blanks and Drills/Perforators from 41MO35. Top row: blanks, and specimen at top left has a graver spur; middle row: drills/perforators made from reworked arrowpoints or preforms; bottom row: flake drills/perforators.

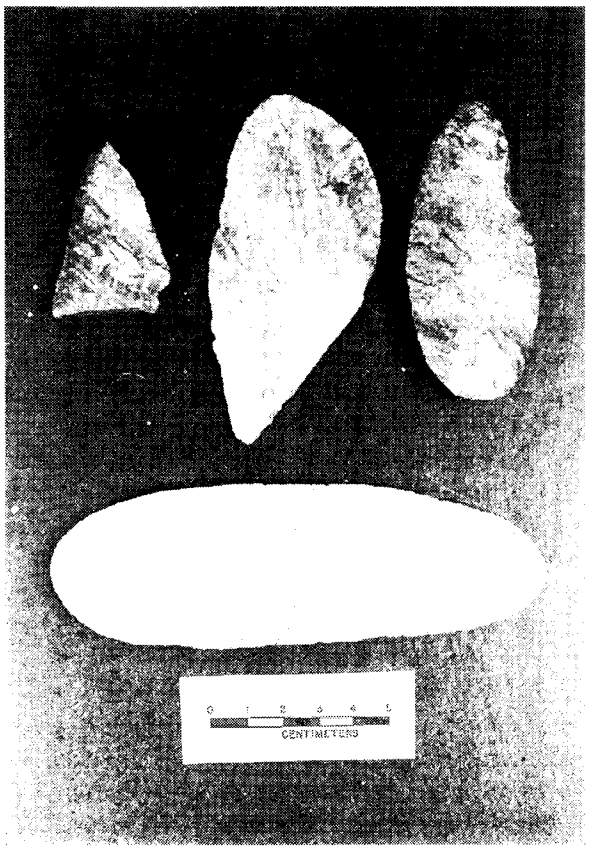


Figure 69. Site 41MO35 Knives.

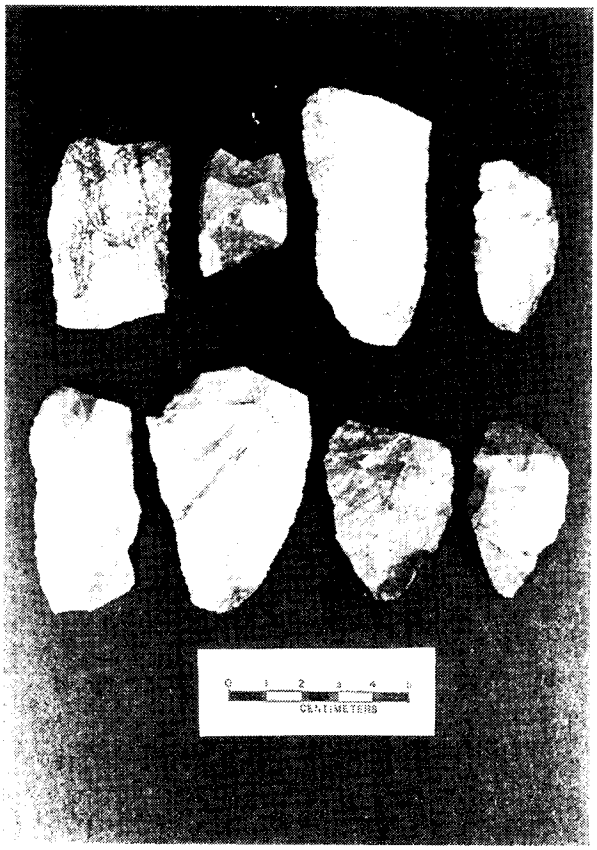


Figure 70. Flake Scrapers, Denticulates, and Scraper Blanks. Note that the ovate specimens in bottom row are scraper blanks.

Alibates. Size: 65 x 36 x 11 mm.

LMRA 145-90-45.5 (E30/N40, L.3, "outside wall"): Scraper-graver-spokeshave on a large, incomplete, concavo-convex flake or spall. The tool has unifacial retouch forming a scraping edge on one straight to convex edge; the shallow spokeshave bit was chipped into another convex edge. There were also three beaks chipped into another edge, with unifacial retouch on another edge. Alibates. Size: 70 x 58 x 12 mm.

LMRA 145-90-50.5A-F (E30/N50, L.3): Cache of six scrapers found inside a structure. All the tools were made from long, slender blades, with marginal retouch on the dorsal face. Specimens -50.5A and -50.5B are from the same core, while specimens -50.5C through -50.5F may well be from a (different) single core, but there are minor differences in color and banding patterns. Each scraper has minimal edge-wear and minimal edge-retouch. Specimen -50.5A is a side scraper; -50.5B is also a side scraper, but with retouch on the distal corners. Specimen -50.5C is an end scraper, while the others are end-side scrapers. Alibates. Size range: 74-87 x 26.5-31 x 5 mm (Figure 71).

LMRA 145-90-24.42 (E20/N20, L.3): Possible knife preform/blank, broken during manufacture. The tool is on a thick flake, with irregular but essentially convex edges, tapering to a sharp tip. It has been roughly retouched on the dorsal face, and is plano-convex in profile. One edge of the specimen shows use-scarring. The material is a pale yellow, opaque, grainy chert—called "Medicine Valley chert" in field records—but may be Niobrara chert from Nebraska, occasionally found in Texas Panhandle sites. It also resembles jaspers/cherts apparently from local Hemphillian gravels found at sites on the Courson Ranch. If the material is Niobrara, the tool may reflect a late Panhandle Aspect context (Jack Hughes, personal communication, 1987).

LMRA 145-90-43.4 (E30/N40, L.2, "outside wall"): Specialized cutting/trimming tool made on a long, very narrow, thin bifacial thinning flake, its edges trimmed and retouched on the ventral face.

One edge is straight, the other convex, while the distal end was snapped. The edges are dulled. Alibates. Size: 39 x 9 x 2.8 mm (see Figure 68, bottom row, second from right).

LMRA 145-90-67.19 (E50/S60, L.3?): About one-third of the bowl of a ground stone elbow pipe made from a fine-grained Permian siltstone. The bowl's body is gently convex, and the mouth has a rounded lip offset from the body by a ground shallow "waist;" the lip is smooth, both inside and outside. The interior of the bowl is hollowed, with shallow grooves in the walls from just below lip to the base; most grooves are longitudinal and parallel to the long axis of the bowl. Burning on the interior is concentrated in the bottom of the bowl and up one side. On the exterior are faint longitudinal striations. There is color variation within the siltstone. Size: 52 x 25 x 7 (bowl) to 1.2 (wall) mm. Lip thickness 3.1-3.3 mm; wall thickness averages 4 mm. The pipe is very similar to the specimen found at 41MO37, as well as to pipes from other Panhandle Aspect sites (Figure 72).

LMRA 145-90-24.64 (E20/N20, L.3): Pigment source (?) or small whetstone. The specimen is a small angular or tabular chunk of very fine-grained dark argillaceous stone with possible mica specks. Both faces are abraded and flattened; one is edge-beveled. The tool edges are also ground flat and faceted. One face has a series of deep intersecting cuts and many other striations, forming a double-barred cross pattern. One edge has a series of almost parallel cuts, much like those of a bone rasp. The stone material does not appear to be native to the region, although many local rock types have not been described, especially those in gravels. Size: 22 x 15 x 9 mm.

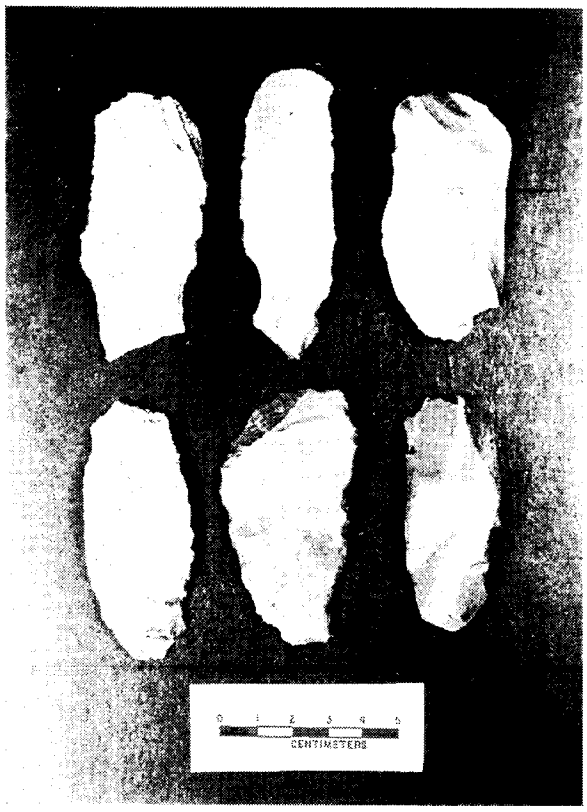


Figure 71. Scraper Blade Cache, 41MO35 Northern Group, E30/N50.

LMRA 145-90-56.19 (E50/S50, L.3): Abrader or possible pigment source on a small fragment of a thin slab of dense Permian siltstone. It has been ground on one face, producing a shallow basin with longitudinal striations. The other face is possibly lightly ground, and has no striations. Size: 75 x 90 x 28-33 mm.

LMRA 145-90-25.41 (E20/N20, L.4): Irregular flake or chunk of unidentified high-quality glossy, glassy, but opaque "flint" that resembles Tecovas, but is probably a jasper from the gravels. One edge has a hinge-fracture from a core; a small portion of the ventral face, near the hinge, has a series of fine parallel cuts or scratches which closely resemble bone butcher marks. The space where the cuts or scratches appear on the specimen does not lend itself to easy abrasion: the actual scratched surface is concave, with elevated ridges on either side. Scratches are in two groups: first a group of three, followed by a space, then a group of seven or eight.

LMRA 145-90-39.23 (E30/N30, L.7): Small, slightly damaged, but well-formed amethyst crystal. It is light blue-green, mainly blue, in color. Amethyst occurs in Alibates flint deposits, but this specimen was found in a cultural context, in deposits above and distant from the Alibates formations, and must have been brought to the site. The other amethyst crystal from the site, LMRA 145-9023.36, from E20/N20, L.2, is in poor condition, not well-shaped, and is light blue-white in color.

LMRA 145-90-55.19 (E50/S50, L.2): Very small bodysherd, plain utility ware. Its exterior is smoothed, with faint wiping or rubbing striations. It is light gray-tan in color. The interior is smoothed and lightly rubbed, with a dark gray color (soot-smudged?). The paste is hard and compact, with a temper of medium-grained sand or crushed light-colored quartzose rock, with some mica

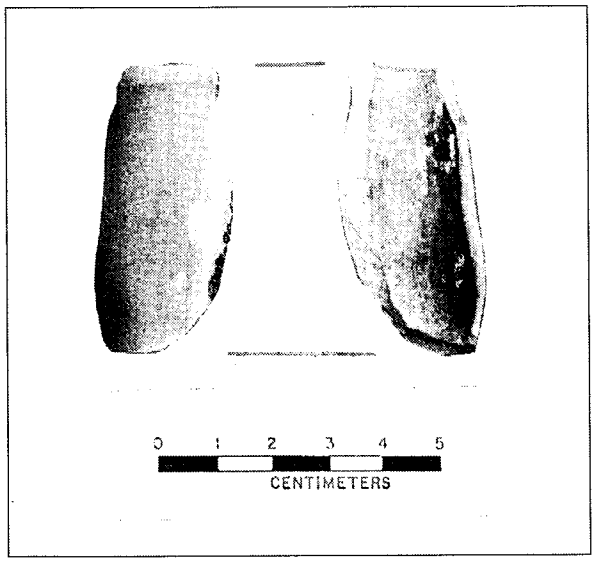


Figure 72. Exterior and Interior Views of Stone Pipe Bowl, 41MO35.

(possibly in the paste clay). It may be a "Faint Striated" utility ware (Larry Nordby, personal communication, 1986). Size: 13 x 13 x 4-4.8 mm.

LMRA 145-90-77.11 (E50/S60, all levels: from trimming "pillar," surface to floor, west wall of unit): Small body or basal sherd, unidentified or unspecified gray utility ware jar. Its exterior is unevenly polished; light gray-brown in color. The interior was wiped or rubbed, but still rough-textured; there are rubbing marks at one edge, where the curvature increases. It is also light gray in color. The sherd has a hard, compact, but friable paste, with a very fine sand temper. Size: 19 x 15 x 2-3 mm.

LMRA 145-90-66.15 (E50/S60, L.2): Small rimsherd of a Agua Fria Glaze-on-red bowl. Its exterior is thinly slipped with a red glaze and is quite smooth. The interior has been stone-smoothed, with a thin red glaze overlain by a glazed black band parallel to the rim. A vestige of another black band, perpendicular to the rim, is located at the edge of the sherd. The larger band is 3 to 4 mm wide and begins 9 mm below the lip. The rim is direct and flattened, but slightly thickened on the exterior face. Size: 18 x 17 x 4 mm.

LMRA 145-90-24.76 (E20/N20, L.3): Rimsherd of unspecified glaze-on-yellow ware, jar form. The exterior has a light beige or yellow faded glaze or slip over a highly polished surface; faint cracks or crazing are visible in the sherd surface, possibly in the glaze. The interior is not glazed; it is worn with scoring striations, suggesting it was worked or used as a scoop. It is also smoothed on the interior. The paste is hard and compact, but slightly friable, and the temper may be a fine-grained sand. The rim is direct, tapering from the interior to the exterior, and the lip is rounded. Unspecified glaze-on-yellow jar (Larry Nordby, personal communication, 1986), or possibly Cieneguilla Glaze-on-yellow. Size: 24 x 17 x 4 mm.

LMRA 145-90-22.15 (E20/N20, L.1): Bodysherd, unspecified glaze-on-yellow jar. The exterior and interior are smoothed but not polished; it has beige or light tan colors; and the temper is visible in the paste. The paste is hard, compact, and friable, and tempered with sand or finely crushed sandstone. Unspecified glaze-on-yellow ware, possibly Cieneguilla Glaze-on-yellow. Size: 28 x 28 x 5 mm.

LMRA 145-90-45.12 (E30/N40, L.3, outside wall): Two small bodysherds of an unspecified glaze-on-yellow jar, possibly Cieneguilla Glaze-on-yellow. Both sherds are either very thinly glazed or are slipped; one is cream or beige in color, the other is light reddish-tan. Both are very smooth, and stone-rubbing marks are evident. Interior faces are smoothed or rubbed but are not polished. The color and interior texture is comparable to the exterior, but it is not glazed. It has a compact paste, with a sparse fine sand temper. Sherds probably belong with the LMRA 145-90-48.12 group of sherds. Size: 34 x 22 x 3.3 and 23 x 18 x 3 mm.

LMRA 145-90-48.12 (E30/N50, L.2): Group of 18 body sherds that fit to form a single large sherd; unspecified glaze-on-yellow jar. The jar exterior has a thin, worn glaze covering part of the large sherd, but other areas are dull. The glaze is primarily an off-white to beige color, with some smudging from soot (?). The interior is smoothed, but there are obvious excoriations or deep striations from rubbing; no glaze or obvious slip; dull light brown to gray in color. The paste is hard and compact, with a temper of very fine sand or crushed sand. Much of the convex edge of the assembled large sherd is worn, as if the sherd was used as a scoop or expedient tool. Size of the assembled sherds: 113 x 113 x 3-4 mm.

LMRA 145-90-49.19 (E30/N50, L.2): Very small bodysherd of an unspecified glaze on-yellow ware vessel of unknown form. The sherd exterior and interior are smoothed but not polished, with a dull light brown color and no glaze or evident slip.

It has a hard and compact paste, with a very fine sand or crushed sandstone temper. This specimen resembles sherds from the large group LMRA 145-90-48.12, but there are no fitters. Size: 12 x 9 x 3.2 mm.

LMRA 145-90-55.18 (E50/S50, L.2): A small body sherd from a glaze-on-yellow jar, possibly Cieneguilla Glaze-on-yellow. The exterior has a thin, faded, weathered yellow-cream glaze or slip, over which a broad glaze/paint band has been placed. The band is thin (4 mm wide), varying in density, and is dark brown in color. The interior is unevenly smoothed, beige or cream in color; it is not glazed, but may have a worn or weathered slip. Its paste is compact, hard, and slightly friable, and the temper may be a fine sand or finely crushed sandstone. Size: 21 x 18 x 5 mm.

LMRA 145-90-23.38 (E20/N20, L.2): Unidentified rim sherd from a very small vessel, perhaps a miniature vessel. It has no detectable cordmarking, and the lip is everted and "rolled over" to the exterior and onto the neck, but is not pressed into the clay of the neck face. The vessel interior is smoothed but slightly uneven and soot-stained. It has a compact, friable paste. The temper appears to be sand and fine angular and subangular crushed (?) quartzose rocks. Size: 14 x 10 x 3.8-6 mm.

LMRA 145-90-70.3 (E50/S60, L.4, "in room under rocks"): Rim sherd, Borger Cordmarked or unidentified variant. The rim is slightly everted or flared, with a flattened lip and an interior bevel. There is a conical lug or node, apparently pinched out from clay matrix, then poorly smoothed over. There may be very faint cordmarks on the exterior below the node. The exterior surface is rough, weathered, and burned, with faint "brushmarks" or frayed stick impressions. The sherd interior is smoothed and wiped, although still uneven and rough; there is a clear wiping line running parallel to the lip just below the rim. The paste is soft, crumbly, and porous, with a temper of abundant fine to medium-grained crushed quartzose rock and sand (see also LMRA 145-90-70.4). Size: 32 x 23 x 4-6 mm (rim to neck); node thickness 10.5 mm.

LMRA 145-90-70.4 (E50-S60, L.4, "in room under rocks"): Two small non-cordmarked body sherds, probably from the same vessel as the noded rimsherd LMRA 145-90-70.3. They have a smooth exterior, with a coarse texture from temper protruding through the surface; dark gray-brown in color. The interior is poorly smoothed; black to brown-black (burned) in color; the temper is exposed on the sherd surface. The paste is soft, porous, and crumbly, and the temper is abundant crushed quartzose rock and sand, with possible traces of exceedingly fine mica. Size: 22.5/24 x 18/24 x 4/5 mm.

LMRA 145-90-70.5 (E50/S60, L.4, "in room under rocks"): Two Borger Cordmarked body sherds. One has a flint chip visible in its paste. Size: 40 x 29 x 5 mm.

LMRA 145-90-18.8 (Test Trench A, north end, unknown depth): Base or proximal end of a bone tool, probably an awl. Its end is thick, blunted, squared, with rounded edges, and the shaft tapers toward the missing distal end, becoming triangular in cross-section. The tool is made from a long shaft fragment of thick-walled solid bone, probably a bison limb. It is unburned. Size: 73 mm long; proximal end is 20 x 20 mm; distal end at fracture is 18 x 6.3 mm (Figure 73, second from top, right).

LMRA 145-90-45.13 (E30/N40, L.3, "outside wall"): Awl or perforator (?). Edge/end fragment of bison scapula condyle. The thick edge is broken to form a sharp point, which is strongly backed by an edge ridge. The tip is polished, probably from use as a perforator of soft materials, such as hides. Size: 48 x 38 x 26 mm (Figure 74, bottom right).

LMRA 145-90-56.22 (E50/S50, L.3): Awl or needle. The tool was made from a small highly polished sliver of bone, probably a deer/antelope limb. One end is evenly rounded; the other end tapers to a needle-sharp point. The tool is probably complete, but the larger, or proximal, end could have been broken and reworked. Size: 77 x 10 x 5 mm (see Figure 73, top right).

LMRA 145-90-49.21 (E30/N50, L.2): Small tip and medial fragment of a highly polished bone tool, probably a flaking tool. The tip is curved, like an antler tine flaker tip, and tapered to a convex point. The end of the tip has two small facets or scars. The tool is polished, with faint short and longitudinal striations. It has been burned black but not charred; polish is not "burn polish." The tool is a solid long bone, probably bison. Size: Tip: 22.3 x 7 x 5 mm; medial fragment is 21 x 9 x 5 mm.

LMRA 145-90-50.25 (E30/N50, L.3): Expedient tool with wear produced by unknown use. It is made from the medial shaft fragment of a thick-walled bison bone. One end is pointed, probably fortuitously; the *interior* surface at the point is highly polished, but the edges are not. The exterior surface at the point has little to no wear, but one edge, about halfway along the shaft, has four very

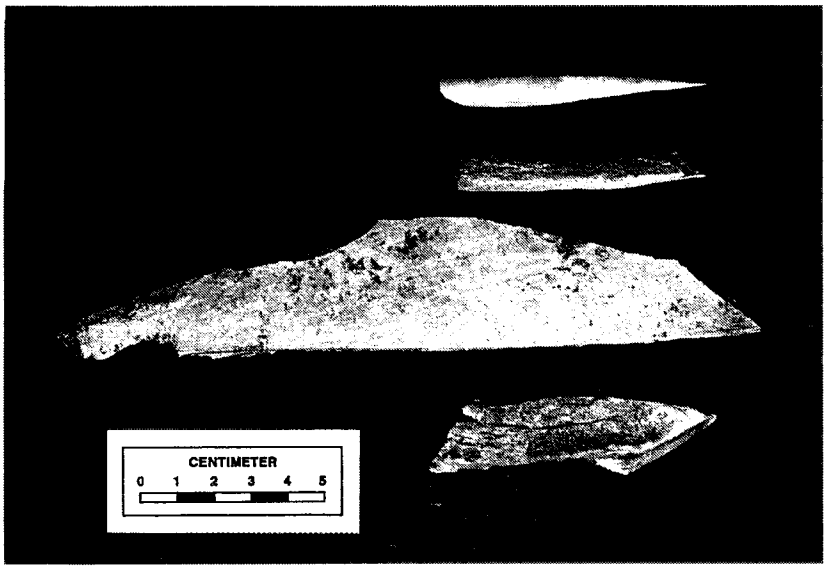


Figure 73. Bone Tools from 41MO35: from top to bottom, awls (LMRA 145-90-56.22, -18.8), scapula hoe or squash knife (-50.23), and digging tool (-50.25).

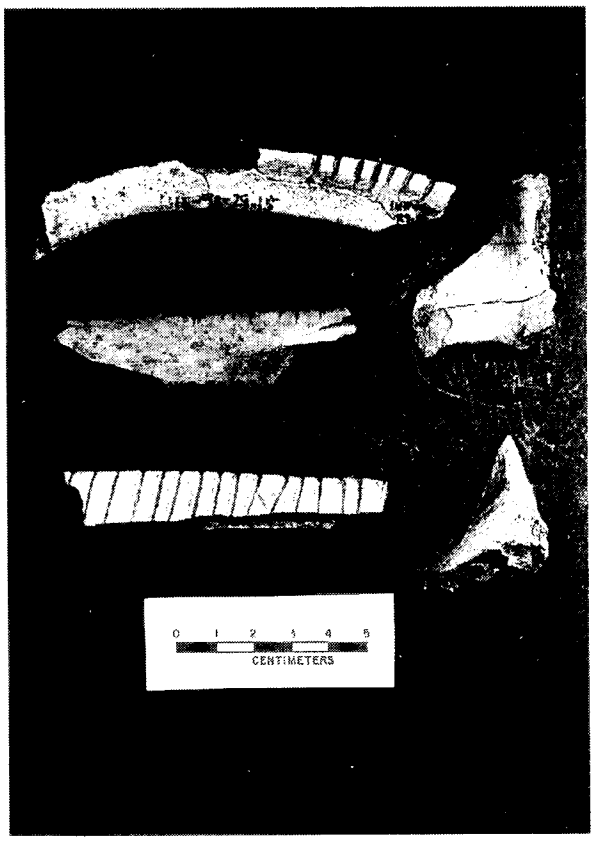


Figure 74. Site 41MO35 Bone Tools: Rasps, left vertical row; Cut vertebra, top right; polished and pointed perforator, lower right.

faint, shallow parallel grooves cut obliquely into the anterior/exterior face and fracture wall edge, angling away from the tip. The grooves were clearly cut after the bone was fractured. Size: 82 x 34 x 5 mm (see Figure 73, bottom right).

LMRA 145-90-79.23 (W30/N10, L.2, SW quadrant): Possible flesher or hand-held "pick" manufactured from a mandible, probably that of a small or juvenile bison. It has a few butcher marks on its exterior surface, but the fragment was not purposely cut from the mandible. The interior surface of the fracture at one end may be flaked and thinned from use, and it is worn but not polished; the tool "bit" is slightly convex. Size: 128 x 17 x 10 mm.

LMRA 145-90-73.5 and -73.6 (E50/S60, L.?, F. 2): Specimen -73.5 is a midsection of bison rib from near the distal end. One end has been cut and abraded to form a rounded edge; the cutmarks are virtually obliterated by abrasion. One lateral edge at the other end is polished from wear, while the opposite lateral edge is "scalloped" or unevenly grooved, with edges between the grooves being rounded; the very edges of the convex end of the "scallops" are worn and polished. The interior face may be polished, but the piece is warped and decayed. A specimen of the same kind has also been identified from the Saddleback Ruin (Site A139, catalogued G1-29D5/19). The -73.6 rib section is cut, abraded, and polished but not "scalloped." One end is especially heavily abraded, possibly from use as a digging implement. Both ribs may have been used in basketry or weaving activities. Neither has been burned. Specimen -73.5 measures 176 x 40 x 11 mm; -73.6 measures 151 x 27 x 10 mm. (Figure 75, left and center).

LMRA 145-90-68.19 (E50/S60, L.4?): A fragment of the end of an apparent fetal bison limb, almost entirely cancellous tissue. The end has natural "grooves" for fusion, but two others on the face suggest a deliberately grooved surface. These grooves were created by a sharp-edged tool but appear to be fresh, being much lighter in color along crushed indentations than the earth-stained

tissue. The object is reminiscent of a cancellous-tissue "paint applicator" (Figure 76, right).

LMRA 145-90-65.5 (E50/S60, L.1): Small tubular bird, rodent, or rabbit metatarsal, possibly a bone bead. One end had the epiphysis removed by cutting, then the cut end was evened to form a rounded edge. The shaft is split lengthwise and is not polished. Size: 21.5 x 3.8 x 0.7 mm.

LMRA 145-90-77.21 (E50/S60, L.?, "pillar, E-W wall, surface to floor"): Small complete land snail shell, possibly a bead or pendant; tentative species identification is *Bulimulus schiedeanus* or *B. dealbatus*. It has a hole perforated in the lip aperture (Figure 77, top).

LMRA 145-90-42.25 (E30/N40, L.2): Group of 36 unmodified and unburned turtle carapace segments, including 8 plastron segments. The carapace segments are from average-sized turtles, but one is from a very small individual.

LMRA 145-90-67.32 (E50/S60, F.1, L.3): Group of 100 segments and fragments of a single tortoise carapace ("Turtle No. 1"). This is one of a group of three carapaces in the southern portion of the circular room. (Note: Specimen LMRA 145-90-67.26 from the same provenience may be a turtle humerus.)

LMRA 145-90-69.17 and -69.18 (E50/S60, F.1, L.4): Two virtually complete and identical tortoise carapaces found together and immediately below "Turtle No. 1." The missing fragments show old breaks. Specimen -69.17 is "Turtle No. 2,"and Specimen -69.18 is "Turtle No. 3."

Unit E20/N20, L.4, in excavations of the Northern Group ruins had a series of fetal or juvenile bones, mostly bison:

LMRA 145-90-25.63: Fragment of very weathered and damaged fetal bison unfused distal ulna shaft.

LMRA 145-90-25.64: Distal end of unfused bison cannon shaft that is missing the condyles.

LMRA 145-90-25.65: Complete unfused bison first phalanx.

LMRA 145-90-25.66: Distal end of fetal (?) bison first phalanx.

LMRA 145-90-25.67: 3 fragments of fetal

Figure 75. Bison Rib Tools. Scalloped ribs are from Feature 2, Southern Group, E50/S60.

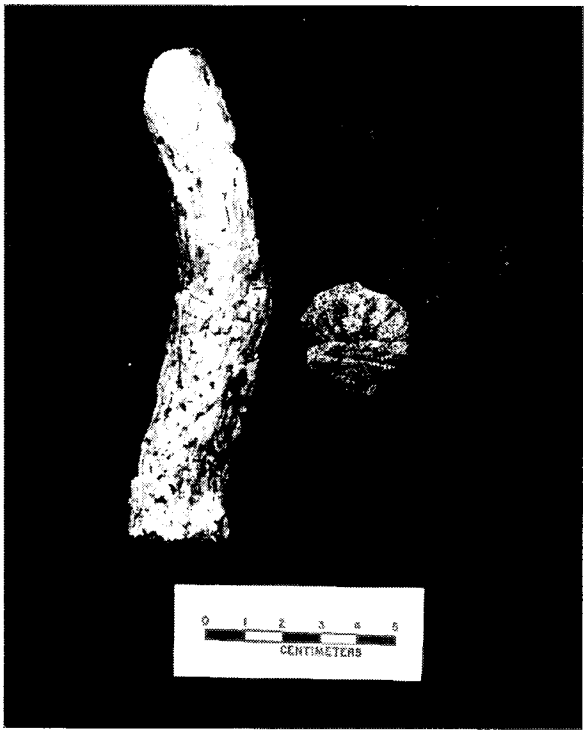


Figure 76. Antler Billet and Grooved Bone, 41MO35.

(?) bison vertebra transverse processes.

LMRA 145-90-25.68: Fetal (?) bison caudal vertebra.

LMRA 145-90-25.79: 3 fragments of fetal (?) bison (?) ribs.

LMRA 145-90-25.80: 3 fetal (?) bison cranial fragments.

LMRA 145-90-25.81: Fetal bison (?). Four fragments of sternal ribs.

LMRA 145-90-25.82: Fetal bison (?). Fragments of caudal vertebra and small group of apparent limb fragments.

41MO35 MIDDEN AREA

Strewn with dolomite boulders and rubble, the Midden Area at 41MO35 is on steep slump-block covered slopes that run from the blufftop ruin complex toward the creek floodplain some 27-30 m below (Figure 78). The area is sparsely covered by grasses and weeds, with a few hardy sumac bushes and small hackberry trees. In bare spots amid the dolomite, redbed clay, and gravel talus deposits, are abundant traces of cultural activity: flakes, fire-cracked rocks, and dolomite slabs/fragments, washed down and/or dumped from the ruin complex on the bluffs above.

These midden deposits have been heavily vandalized for years. In his March 9, 1968 field notes, Jack Hughes states that collectors told him that the Midden Area deposits reach a depth of 9 feet in some areas. According to Martha Crabb (1968:85), the midden yielded three sherds of a Cieneguilla Glaze-on-yellow vessel and a possible jar basal sherd of Agua Fria Glaze-on-red, while commenting that the "midden area [was] 6 feet deep ... on a shelf immediately below one group of houses."

When Etchieson (1981:52) visited 41MO35 in 1980, he observed that while the rim structures had not been significantly disturbed recently, "portions of the middens, both on the rim and steep slope east of the site, were thoroughly destroyed." The Bureau of Reclamation attempted to protect what remained of the Midden Area and the rim site areas by backfilling potholes and erecting official NPS signs warning potential vandals that the property is protected by various federal laws and sanctions.

The TAS felt that certain parts of the slopes would have been suitable for prehistoric activities,

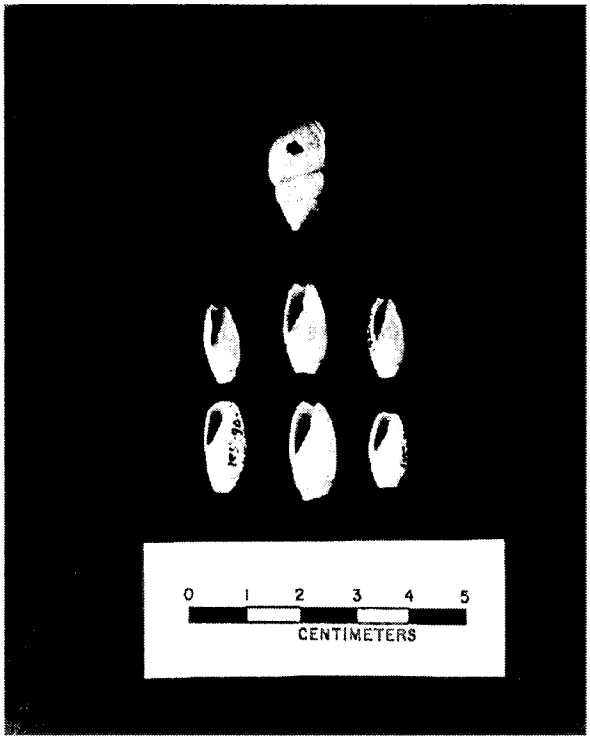


Figure 77. Shell Beads, 41MO35: Snail shell with holed lip opposite aperture, top row; the remainder are Olivella beads from Northern Group, E30/N40.

including the construction of structures or shelters that utilized the slumped boulders or outcrops (Figure 79) as partial walls or wall anchors. The possibility that old lower terrace remnants might produce features or other important archeological information added to the great promise of the Midden Area deposits. The slopes were consequently selected for test excavations by the TASFS, with the "Beaver Patrol" assigned to work here. Excavations were placed under the overall supervision of Dr. E. Mott Davis; Emmett Shedd directed their efforts (Figure 80).

The majority of the Midden area test pits were placed below the Southern Group of structures: in more level areas that may have been terrace remnants; in places where protection from the elements was possible and surficial evidence indicated buried cultural deposits; and in areas with possible shelter deposits beneath overhangs. Five five-foot squares and a five-foot unit with a five-foot extension were eventually excavated, and all deposits screened through 1/4-inch mesh using arbitrary levels. Level 1 was 12 inches thick, with subsequent levels of 6 inches.

While at least one test pit, Testpit 2, had buried

Figure 78. Midden Area slopes below Southern Group, with huge slumped or fractured dolomite boulders.

Figure 79. Boulder-strewn slopes of Midden Area.

Figure 80. Very steep slopes of Midden Area below the Southern Group at 41MO35. In a scene reminiscent of the prehistoric past, Emmett Shedd and a group of "Beaver Patrol" boys are bringing a captured large snapping turtle up to the blufftop architectural complex, much to the dismay of certain crew members. We're told that Emmett was threatened with vengeful violence when he dumped the turtle into an excavation unit with an all-female crew.

features, overall the Midden Area lacked undisturbed features. Nevertheless, considerable artifactual and other archeological data were recovered that adds to our knowledge of the Panhandle Aspect culture in general, and of those peoples who constructed and occupied the blufftop ruins above.

EXCAVATIONS

Testpit 1

Farthest downslope to the east, this pit was surrounded on the north, west, and south by very large dolomite boulders. The protected area was selected for testing to determine if occupational deposits or cultural features were present.

The upper few inches of soil were sandy riverine deposits intermingled with cultural materials, charcoal, and small gravels. Below this level, the sediments were "very loose and gravelly," having been disturbed by vandals. The test pit extended to 2.5 feet bs, reaching a sterile red clay.

Cultural materials were abundant in levels 2 and 3 (1.0-2.0 feet bs). They include a Washita and a Fresno arrowpoint, a "guitar-pick" preform, and Borger Cordmarked pottery, along with oval knife fragments, end-side scrapers, fragments of scapula hoes, a bone rasp fragment, and bison bones. The lithic debitage is overwhelmingly Alibates, with at least one quarry blank. Six flakes of obsidian were found, but no Southwestern ceramics (Table 6).

Testpit 2

This test pit was in a level area west of, upslope from, and on the opposite side of, the large boulders around Testpit 1. The level area was assumed to be a low terrace remnant, one likely to contain buried occupational deposits.

Level 1 was a loose, gravelly reddish-brown slopewash. Among the cultural materials were an arrowpoint, a chopper, lithic debitage, bone, and mussel shell (see Table 6). Level 2 had "slope-washed midden debris," with arrowpoints, sherds, Alibates and obsidian flakes, bone, and mussel shell fragments.

An ash lens was identified in midden deposits at 1.8 feet bs in level 3. A complete oval knife (LMRA 145-90-7.1) lay within the ash lens, which was underlain by a pit basin; a scraper lay near the knife. Other cultural materials from this level in-

clude arrowpoint preforms, perforators, gravers, scrapers, retouched flakes, Borger Cordmarked sherds, a Southwestern glazeware sherd, another unusual Southwestern sherd, Alibates debitage, and organic remains (see Table 6).

In level 4, the ash lens was clearly defined as extending out from a well-defined basin-shaped pit. The feature was in the unit's northwestern quadrant, and extended outside the test pit. This basin was apparently excavated into an original soil with a thin slopewash deposit lying atop a red clay (Figure 81).

Another well-defined ash lens, and a deeper basin-shaped ash pit, lay directly beneath the first pit (between 2.5-3.0 feet bs). This pit, excavated into the sterile red clay, apparently had no slopewash deposits around or above it. Cultural materials at this depth were scarce, particularly in the lower 0.2 feet. This ash pit, then, marks the first occupation of this part of the Midden Area.

The upper pit is circular to ovate, about 2.0 feet in diameter and 0.6 feet deep in the center. The basin has gradually sloping sides and a concave bottom. It is capped by a thin fan-like ash lens which extended more than 2.0 feet from the basin edge; a second, thinner lens was present on the western edge of the pit, separated from the higher lens by a very thin (one inch or less) and poorly defined deposit of red clay.

The lower basin is about 0.1 foot lower in the deposit, separated by a red clay. Ash lens fanned out in all directions from the pit. The lower basin, bowl-shaped, is about 1.5 feet in diameter and 0.4 feet deep.

Neither pit had fire-cracked rocks or was clay-lined. The lower pit did have an unburned dolomite slab fragment underneath it and a smaller unburned fragment atop it. Not much time is represented by the few inches of red clay and slopewash that separate the two features, perhaps no more than a few months given how rapidly wind-borne sediments are deposited in this type of setting. The red clay zone between the two basins is probably the result of both wind and slopewash, or perhaps even deliberate covering/smothering. The ash pits may have been cooking fires, or more doubtfully warming fires. Bison dung appears to have been the major fuel, as the fine light-gray ash indicates a slow and hot-burning fire, and the apparent absence of boiling pebbles may be indicative of direct cooking (i.e., roasting).

Testpit 3

This unit is at the base of a thick dolomite bedrock exposure, apparently the lower of two such exposures, south of, but upslope from Testpit 2. The unit was placed in an area of talus debris beneath a rim pour-off, suggesting this material was washed from the blufftop Southern Group ruin. Large slumped boulders lay to the east, which contributed to the accumulation of slopewash.

Excavations were taken to level 4 (2.5 feet bs). Soils were loose red sand and clay mixed with cultural materials, small gravels, and dolomite detritus. Most of the cultural materials came from 1.5-2.5 feet bs, with the collection comprised almost entirely of lithic artifacts; only two pieces of bone, two mussel fragments, and three pottery sherds were recovered in Testpit 3. Artifacts include two Washita and one Fresno arrowpoint, one "guitar-pick" preform, one oval knife fragment, two snub-nosed scrapers, a few flake tools, and lithic debitage, almost all of which is Alibates; there were nine obsidian flakes.

Testpit 4

Located north of Testpit 3 and west, or upslope, from Testpits 1 and 2, this unit was placed in a protected area between two very large boulders, with a smaller boulder along its western edge. The larger boulder created an overhang and small shelter.

Testpit 4 was excavated to 1.5 feet bs (the base of level 2). The deposits consisted of a "wet sandy brown" slopewash between 0-1 foot bs, and a "dry red clay" below that depth; the red clay was culturally sterile. No occupational features were found, although field records suggest that lying on the surface were collapsed wall slabs from the structures on the blufftop above.

The unit contained an abundance of cultural materials, albeit in shallow contexts. For example, the unit had 44 percent of the Washita points recovered from the test excavations in the Midden Area, 49 percent of the preforms, and considerable lithic debitage. Various other tools were found, including a mano fragment, along with a small amount of pottery and bone.

Testpit 5

The location of this unit, which was subsequently extended five feet to the north, was considered promising for identifying occupational deposits

Table 6. Site 41MO35 Midden Area Artifacts

Description	Testpit 1	Testpit 2	Testpit 3	Testpit 4
Arrowpoint, Washita	1	-	2	4
Arrowpoint, Fresno	1	1	1	1
Arrowpoint, Unclassified	2	-	-	4
Preform/Blank	12	11	1	22
Knife, Ovate	2	1	1	-
Knife, Unclassified	5	4	-	1
Scraper, End-End/Side	3	3	2	1
Scraper, Side	1	-	-	-
Scraper, Unclassified	5	2	4	7
Drill/Perforator	3	2	-	1
Graver	2	5	1	1
Spokeshave	1	-	-	1
Denticulate	-	2	1	1
Retouched Flake	20	9	6	9
Multifunctional Tool	2	-	1	1
Quarry Blank/Biface	1	-	-	-
Debitage, Alibates	1519	1094	370	1084
Debitage, Tecovas	10	10	4	20
Debitage, Obsidian	6	4	9	5
Hammer/Anvil/Maul	1	-	-	-
Mano	1	-	-	1
Ceramics, Borger Cordmarked	58+	26	3	8
Ceramics, Southwestern	-	2	-	-
Ceramics, Unclassified	-	1	-	-
Bone Tool, Digging	8	2	-	-
Bone Tool, Perforating	-	-	-	-
Bone Tool, Other	5	3	-	-
Bone, Large Mammal	38	1	-	-
Bone, Bird/Rodent	18	15	-	1
Bone, Fish	6	-	-	-
Bone Scrap, All	374	422	2	40
Antler Billets/Hafts	-	-	-	-
Turtle Carapace Segments	11	4	-	42
Mussel Shell, Utilized	3	3	-	-
Mussel Shell, Scrap	42	37	2	2
Corn	-	1	-	-
Totals	2161+	1665	410	1257

Table 6. *(Continued)*

Description	Testpit 5	Testpit 6	Surface	Site Totals
Arrowpoint, Washita	2	-	4	13
Arrowpoint, Fresno	1	-	-	5
Arrowpoint, Unclassified	-	-	1	7
Preform/Blank	2	3	3	54
Knife, Ovate	1	-	4	9
Knife, Beveled	-	-	2	2
Knife, Unclassified	1	-	3	14
Scraper, End-End/Side	1	-	4	14
Scraper, Side	-	-	1	2
Scraper, Unclassified	-	-	8	26
Drill/Perforator	-	-	1	7
Graver	-	-	2	11
Spokeshave	1	-	-	3
Denticulate	-	-	-	4
Retouched Flake	9	1	13	67
Multifunctional Tool	1	1	1	7
Quarry Blank/Biface	-	-	-	1
Debitage, Alibates	464	81	347	4959
Debitage, Tecovas	8	1	3	56
Debitage, Obsidian	4	4	7	39
Chopping Tool	-	-	4	4
Hammer/Anvil/Maul	-	-	6	7
Mano	1	-	3	6
Metate	-	1	1	2
Ceramics, Borger Cordmarked	24	6	19	144+
Ceramics, Southwestern	-	-	-	2
Ceramics, Unclassified	-	-	1	2
Daub	-	16	-	16
Bone Tool, Digging	1	-	-	11
Bone Tool, Other	6	1	-	15
Bone, Large Mammal	8	1	-	48
Bone, Bird/Rodent	4	4	-	42
Bone, Fish	-	-	-	6
Bone Scrap	174	45	29	1086
Turtle Carapace Segments	7	3	3	70
Mussel Shell, Utilized	5	8	1	20
Mussel Shell, Scrap	16	15	2	116
Corn	-	-	-	1
Totals	741	191	473	6898+

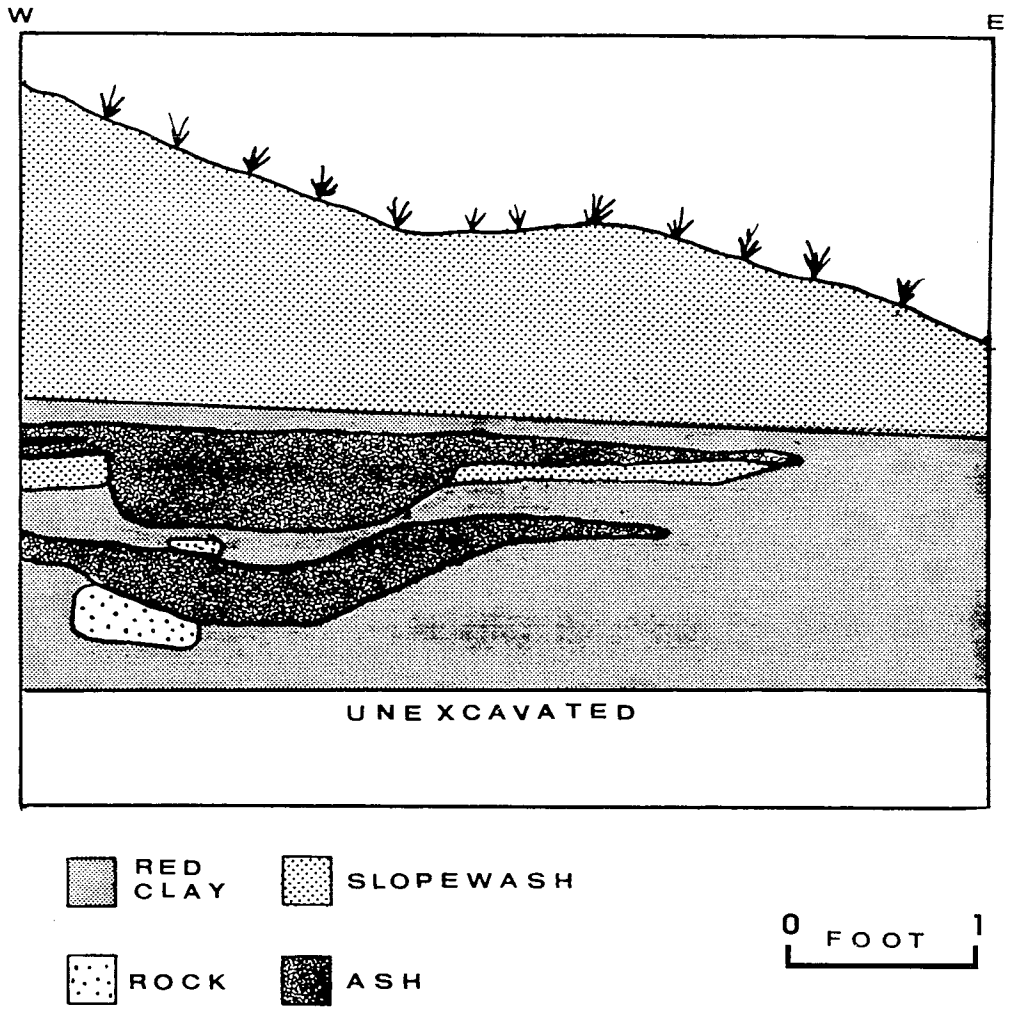


Figure 81. Superimposed ash pits, Testpit 2, 41MO35 Midden Area.

and cultural features. It was at the base of the dolomite bedrock exposure, in a secluded spot almost entirely ringed by large slumped boulders. The bedrock formed a small overhang ledge that protected a shelter within the "enclosure" below.

A "wall" of dolomite slabs apparently helped seal off one gap in the enclosure, extending from the base of the bedrock to a large slumped boulder. The wall was between 7-10 feet long, and composed of horizontal slabs that were "sometimes stacked." The wall appears to have been of prehistoric construction, perhaps as a retaining wall. What would it have retained? Since slopewashed soils are relatively rich in organic materials, corn or other plants may have been cultivated in protected areas on the slopes below the main site. With the addition of "retaining" walls at selected spots, watering could have been done entirely by nature and controlled to prevent over-watering and/or the washing away of seeds and plants.

Considerable midden debris was observed lying around the wall and within its stones, but unfortunately, the entire area within the enclosure had been disturbed by pothunters. There are no level records for the unit, but field notes suggest that it was shovel-skimmed to about 0.3 feet bs. The collections include one Fresno and two Washita arrowpoints, two preforms/blanks, two knife fragments, one snub-nosed scraper, several other flake tools, 24 Borger Cordmarked sherds, a few modified bone fragments, and moderate amounts of debitage (including four pieces of obsidian) and organic debris.

Testpit 6

This unit lies at the base of the uppermost dolomite bedrock exposure that forms the bluffs. Just to the north is a large pour-off cut that forms a natural separation between the blufftop ruin groups. The test pit was wedged between two large slumped boulders and the base of the bedrock outcrop, which formed a small overhang. Archeological materials on the surface suggested that midden deposits had been dumped here from the ruins above.

The unit was excavated in four levels to 2.5 feet bs. Levels 1 and 4 contained only a few flakes, with most of the cultural materials found between 1.0-2.0 feet bs. A large fragment (44.7 x 35.8 cm) of a "trough" metate was in the upper part of level 2 (Figure 82), and 16 fragments of daub were recovered in the lower portion of level 2 and the upper part of level 3, as were four obsidian flakes and six Borger Cordmarked sherds.

Artifact Descriptions, 41MO35 Midden Area

LMRA 145-90-4.2 (TP 1, L.3): Long, slender, well-made triangular and unnotched arrowpoint (Washita), missing the tip and one basal corner. Its base is concave, while the blade edges are slightly convex; probably discarded when the tip broke. Alibates. Size: 26 x 12 x 3 mm (see Figure 66, fourth row, far right).

LMRA 145-90-1.51 (General Surface): Small, thin, crudely-flaked arrowpoint, with one large side notch and one incipient side notch; the larger may be the result of a blade fracture. The concave base is missing one corner tang; the edges are convex. Non-Dakota quartzite. Size: 24.5 x 12.5 x 3 mm; neck width 8.5 mm (see Figure 66, third row, 2nd from right).

LMRA 145-90-1.52 (General Surface): Unfinished arrowpoint, missing the distal end, made from a "guitarpick" preform. It is plano-convex, with the convex face well chipped and thinned, with the other face only retouched along one edge and the base. There is an incipient notch that suggests this is a Washita arrowpoint. Alibates. Size: 23 x 15 x 3 mm (see Figure 67, 2nd row, 3rd from left).

LMRA 145-90-3.1 (TP 1, L.2): Very small drill/perforator, possibly made from a broken arrowpoint or a flake. The tip is missing, with a narrow bit (edges dulled) that expands toward the base; there are two opposing chipped shallow concavities that form a flange for the base. The base is concave and unretouched. Alibates. Size: 21 x 13 x 3 mm (see Figure 68, 2nd row, 3rd from left).

LMRA 145-90-4.17 (TP 1, L.3): Portion of a drill bit and base. The bit is bifacially worked, and expands at the unworked base/flange area. The drill bit has been split lengthwise down the middle, while the tip was snapped diagonally. Alibates. Size: 32 x 6 x 6 mm.

LMRA 145-90-3.16 (TP 1, L.2): Cutting/shaving tool? The tool is a thin and narrow prismatic flake that is missing the distal end and portions of one edge. Both edges are straight to slightly sinuous, with retouch on the dorsal face that produced steep but dulled edges. Alibates. Size: 30 x 10 x 1.5-4.8 mm (see Figure 68, bottom, far right).

LMRA 145-90-7.1 (TP 2, L.3): Complete bifacially thinned oval knife with a convex base; its lateral edges were dulled near the base, possibly for hafting. One edge of the tool has more resharpening than the other, creating a bevel. The knife tip is more pointed than the base. Alibates. Size: 88 x 39 x 10 mm (see Figure 69, top right).

LMRA 145-90-15.10 (TP 5, surface): Edge fragment of a large, broad, well-made non-beveled knife. The original knife edge is straight, and finely retouched on both faces, but additional post-fracture retouch produced a chisel-like bit with wear. Two notches flaked into opposite ends of the original knife edge emphasize the chisel edge. Alibates. Size: 31 x 43 x 12.2 mm.

LMRA 145-90-16.3 (TP 6, L.2): Complete snub-nosed end-side scraper with a spokeshave/graver spur. The scraper bit is convex, with a steep (almost 80 degrees) and well-worn working face. One lateral edge is convex, steeply flaked, and worn, while the other is uneven, convex, and has a retouched concavity near the bit. The tool also has a worn graver spur at the distal-right corner (dorsal face). Alibates. Size: 54 x 32 x 7 mm (Figure 83, Bottom row, 2nd from left).

LMRA 145-90-1.29 (General Surface): Chopper (?). Ovate, relatively thin pebble or concretion of dense, fine-grained Potter chert (?). Both faces are mainly cortex, smooth on one face and rough on the other, while both ends are battered and cortex has been flaked off. Its larger end is convex, resembling an axe bit, and could function well in that role. Size: 105 x 62 x 21 mm.

LMRA 145-90-1.79 (General Surface): Discoidal thick spall, with a trimmed platform; the distal end is broken. Its edges are continuously

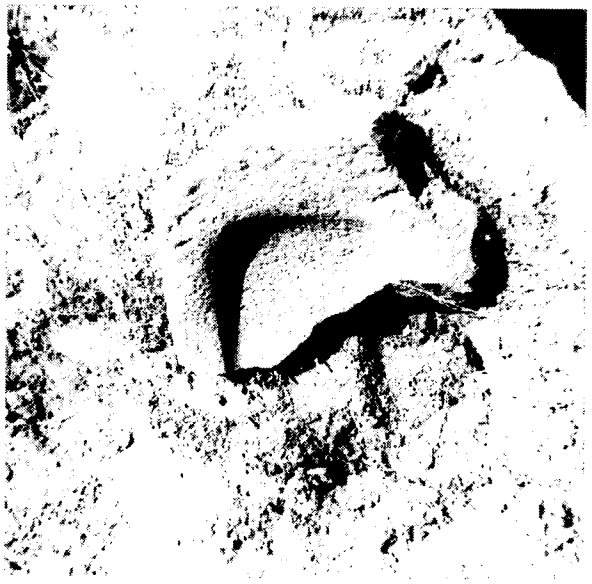


Figure 82. The "trough " metate in the 41MO35 midden (LMRA 145-90-16.19), possibly in situ.

convex, bifacially battered, crushed, dulled, and heavily percussion-flaked. The fractured end also has use-scars, suggesting it was used as a chopping tool after being fractured. Alibates. Size: 70 x 72 x 26 mm.

LMRA 145-90-16.19 (TP 6, L.2): Roughly 50 percent of a large, thick, heavy metate. The grinding area is a basin with sloping edges, and it is heavily pecked on the entire anterior surface. The grinding scars and striations indicate the metate was used with a back-and-forth grinding motion along a longitudinal axis. Panhandle Aspect metates generally have rotary grinding scars. Dolomite. Size: 447 x 358 x 30-80 mm (see Figure 82).

LMRA 145-90-2.11 (TP 1, L.1): Small bodysherd of Borger Cordmarked. The cordmarking was done with small-diameter (2 mm) cords on the exterior surface; the interior is unevenly smoothed and blackened. The sherd has a soft, crumbly, porous paste, and the temper is crushed quartzose rock, fine sand, and crushed bone fragments. Bone tempering is rare in the Panhandle Aspect, but apparently is more frequent in Plains Village sites in the eastern Texas Panhandle. Size: 29 x 20 x 4.8-6 mm.

LMRA 145-90-2.12 (TP 1, L.1): Small Borger Cordmarked bodysherd with two shallow scraped or incised lines on the vessel interior; the lines make a sharp-angled turn towards the edge of the sherd. The lines are 1.2 mm wide and 2.5 mm apart and less than 2 mm deep. A sherd with similar interior incising was recovered at 41OC27 during the 1987 TASFS at Wolf Creek. The temper is crushed quartzose rock and sand; many large grains. Size: 24 x 21 x 6.5-7.6 mm.

LMRA 145-90-13.17 (TP 4, L.2): Two Borger Cordmarked bodysherds with very small diameter (1.5 mm) cords applied with a tightly wrapped paddle. Both sherds have smoothed interiors, and one is also interior blackened/smudged. They have a relatively hard, friable paste, tempered with fine crushed quartzose rock, sand, and sparse fine mica. Sizes: 38/19 x 22.5/14 x 4.8/4.2 mm.

LMRA 145-90-1.73 (General Surface): Borger Cordmarked bodysherd with small conical (repair?) hole drilled partially into the exterior surface. The interior is smoothed but lumpy, with use marks. Micaceous temper. Size: 34 x 32 x 5 mm.

LMRA 145-90-1.86 (General Surface): Small, thin bodysherd (smoothed-over Borger Cordmarked [?] or Washita River phase tradeware). It has a smooth but lumpy exterior surface, while the interior was wiped and very smooth. The temper is a fine to medium-grained crushed quartzose rock and fine sand; hard, compact paste that is slightly po-

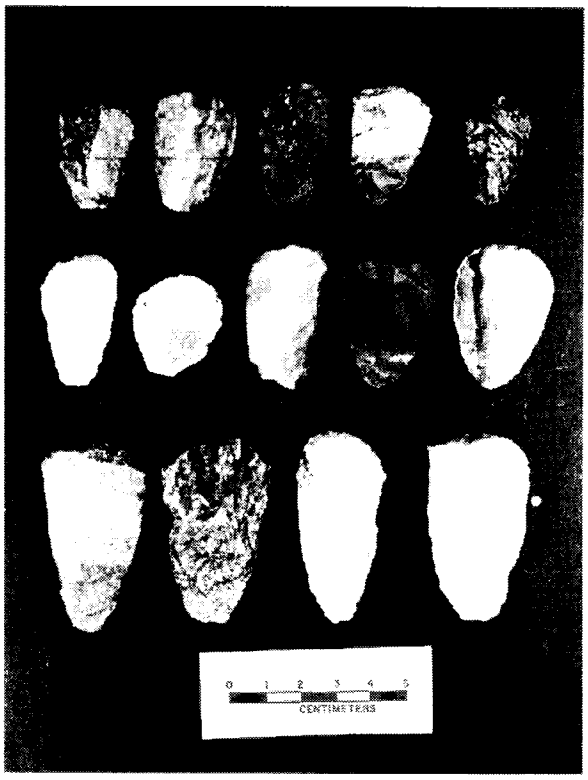


Figure 83. Scrapers, 41MO35 Midden Area.

rous. Size: 13.5 x 12 x 6 mm.

LMRA 145-90-8.18 (TP 2, L.4): Small, thin bodysherd of an unclassified ware (possibly smoothed-over Borger Cordmarked). The exterior is dark gray in color, smooth and lightly polished, but has faint indentations that may be from smoothed-over shallow cordmarking; the interior is smooth from wiping and is blackened. The sherd paste is hard, compact, and light brown in color, while the temper is a fine sand, with very fine (floated?) mica. The sherd curvature indicates it is from small vessel: a bowl/olla or jar. Larry Nordby, (personal communication, 1986), could not identify the sherd as a Southwestern ware. Size: 22 x 17 x 3.8 mm.

LMRA 145-90-7.20 (TP 2, L.3): Very small, strongly curved bodysherd, possibly from a small jar or miniature vessel (probably of Southwestern origin), or otherwise a ceramic pipe fragment. The exterior (a dull, ruddy brown color) is smoothed and lightly polished, and has wiping/rubbing striations. The sherd interior is unevenly smoothed from wiping/rubbing striations; it is a dull brown color with black mica or magnetite specks. It has a hard, compact paste, and is tempered with a fine-grained sand or fine crushed granitic rock with dark mica or magnetite. Size: 13 x 11.5 x 3.4 mm.

LMRA 145-90-7.21 (TP 2, L.3): Small bodysherd, Agua Fria Glaze A or Glaze-on-red. The exterior is very smooth, with a faded thin glaze over red or red-brown paint; faintly wiped/rubbed. The interior is also very smooth, and wiped/rubbed. It has a khaki color, with no glaze or paint. The sherd has a hard and compact paste, and the temper may be a fine crushed sand. Size: 16 x 12.5 x 4.2 mm.

LMRA 145-90-3.24 (TP 1, L.2): Fragment of unidentified large-mammal vertebra, probably deer or antelope. One end of the fragment has been partly sawed or cut through, with transverse cuts on the body of the bone. Size: 46 x 36 x 8 mm (see Figure 74, top right).

LMRA 145-90-4.54 (TP 1, L.3): Posterior edge fragment of the unburned medial section of a bison rib. Both edge facets at one end have deeply scored parallel lines—cutmarks or abrasions— that are the result of the bone being stuck into compact sand or sandy soil; minor polish on one face, above the abrasions. Size: 89 x 14 x 10 mm.

LMRA 145-90-16.11/17.7 (TP 6, L.2/L.3): Groups of two and five small mammal caudal vertebrae (unburned) from the same animal. They are possibly from fetal or new-born deer/antelope, or canid.

LMRA 145-90-1.47 (General Surface): Group of three turtle carapace segments. One is a large, thick specimen which is charred on the exterior but unaltered on the interior.

LMRA 145-90-9.15 (TP 2, L.5, lower ash pit): Very small and poorly preserved fragment of charred corn kernel; probably too small for identification of the maize type.

SUMMARY

The best way to summarize the results of the 1969 Blue Creek TAS Field School is to discuss its goals. There was no *primary* goal set for the Blue Creek Field School. The TAS had as its major goal the training of new and lesser experienced members in the crafts, skills, arts, and philosophies of field archeology, in addition to meeting the broader aims of the society itself to study man's past in Texas. Jack Hughes had two goals, both interrelated: (a) to study the Blue Creek ruin complex, with TAS help, to learn more about these Panhandle Aspect sites, and (b) to seek evidence to verify a then-current hypothesis regarding the development of the Panhandle Aspect. The TAS goal was admirably met by the Blue Creek Field School, as was Hughes' first goal, the one amply serving to accomplish the other. But Hughes' second goal may or may not have been successfully met, depending on one's viewpoint and sense of humor.

All the participants, including beginners, old hands, and professionals, learned about archeology at Blue Creek: from gridding and excavating sites; completing records and notes/logs/journals; preparing maps and sketches and learning why they are necessary; and to gaining knowledge concerning one group of prehistoric Americans. Old hands learned the complexities (and the basics) of Panhandle Aspect archeology, and how to manage large groups of diverse workers. Many professional archeological participants gained first-hand knowledge about the prehistoric Panhandle Aspect and its material culture. All three groups experienced the incomparable scenic beauty and the breathtakingly variable weather of the Texas Panhandle.

As an organization, the TAS learned more about itself and its capabilities, as well as some of

its limitations and weaknesses. This field school proved useful, if not instrumental, in bringing about helpful changes in later Field School programs and policies that have contributed to the growth of the society as a whole.

TAS members completed extensive excavations (more than 270 m^2) at four important Panhandle Aspect sites. This work has preserved archeological data for future study of the Panhandle Aspect. Valuable archeological information was added to the growing store of knowledge of the prehistory of the Panhandle, the Southwest, and the Southern Plains.

With respect to Hughes' second goal, a final answer remains to be agreed upon. At the time Hughes directed the field school, the current school of thought concerning the development of the Panhandle Aspect postulated a modified "Mogollon" or "Anasazi" development sequence: (a) circular (slab-lined in the Panhandle) pithouses were the oldest occupational ruins, followed in time by individual square/rectangular pithouses, ending with the development of surface-built multi-roomed, contiguous-walled "pueblos." It was also thought that there was a "more than mere trade" link between the Southwestern pueblos and the slab-lined ruins of the Texas Panhandle, and one of the most prevalent older names for the Panhandle Aspect was the "Panhandle Pueblo Culture."

However, with new excavations and site/assemblage analyses, along with a number of radiocarbon dates, archeologists have reevaluated the development of the Panhandle Aspect situation. The current school of thought, exemplified by Chris Lintz' (1986) research, suggests that the large, multi-roomed "pueblos" are the oldest Panhandle Aspect structures, while the individual-room small hamlets are the youngest occupied sites, a reversal of the former sequence interpretation.

Lintz (1986:258) also argues for a series of changes in the material culture of the Panhandle Aspect, especially in architecture and in evidence of Southwestern contacts:

> Some general changes in these main residential units are ... evident between the early (A.D. 1200-1350) and late (A.D. 1350-1500) subphases. These changes include an increase in room size ... with an [sic] concomitant increase in the number of roof supports, the use of less substantial wall footings (shift from predominantly double slab to mainly single slab foundations), a simplification of interior feature form, and an increased complexity of the entryways. The increase in the room size may signal an increase in the number of occupants using the structure, whereas the simplification of the wall foundations relates to changes in room aggregation.

There is likewise an increase in the occurrence of Southwestern materials in the "late subphase," indicating more frequent Canadian Valley-Southwest contacts and trade increases. Lintz' interpretations are supported by radiocarbon dates, but less directly by the relative dating of Southwestern trade wares.

Does Blue Creek complex archeology support either idea? The archeological evidence, as we interpret it, supports both ideas, or alternatively supports neither. For instance, if Lintz' (1986) arguments prevail, then the 41MO35 multi-roomed, contiguous-walled, relatively small (in room size) "pueblos" are the oldest Blue Creek complex occupation, and should not have much Southwestern trade materials in comparison with the other, apparently younger sites. Too, there is doubt that the 41MO35 structures were pithouses, and some of the walls were either stacked horizontal slabs or single rows of vertical slabs placed in a shallow trench and braced by cobbles. Site 41MO35's walls, especially in the Northern Group of structures, are less substantial than those at, say, 41MO37. But 41MO35 produced far more Southwestern materials than the other two architectural sites, and these date *late* in the Panhandle Aspect cultural-historical sequence. Conversely, if the "Old School" is correct, then 41MO36 and 41MO37 would be older than 41MO35, would have little or no Southwestern materials, and would have pithouses instead of surface-built structures. This seems to be the case. Moreover, in terms of site size and general layout, both 41MO36 and 41MO37 resemble "late subphase" sites in the Lintz developmental sequence, but they contain virtually no Southwestern materials, while the nearby site 41MO35 has relatively abundant Southwestern trade materials and architectural techniques and traits that are comparable with "early subphase" sites.

Lintz (1986:185) further states that:

> [A]n abundance of Southwestern ceramics and obsidian was found at Antelope Creek Ruin 24. The occurrence of sizable quantities of Southwestern trade goods at this contiguous

> room site is enigmatic. The pattern at other sites suggests that extensive trade developed after the general abandonment of hamlet sites with large room blocks. Perhaps the large contiguous room block at Antelope Creek Ruin 24 represents the continuation of a form which lasted longer than anticipated, or it may be that the trade ceramics and obsidian are associated with a later component than most of the architectural remains.

Lintz (1986:185-186) summarizes the Antelope Creek Ruin 24 case as follows: "In view of conflicting trends, the architectural remains from Ruin 24 will be excluded from subsequent analyses of temporal trends." What about 41MO35? The "abundant" Southwestern materials at Ruin 24 consist of 12 Southwestern sherds and one Olivella bead (the quantities of obsidian are not listed). Site 41MO35 and its Midden Area, then, also qualify as having "abundant" Southwestern trade goods, perhaps even more than Ruin 24.

We are not questioning Lintz' long-studied ideas here. They are probably correct, and much available archeological data supports them. *This* consideration of the development of the Panhandle Aspect points out the archeological importance of the Blue Creek project (it lies in the "core area" studied by Lintz), while at the same time it reflects some of the basic problems with Panhandle archeology in general. Nevertheless, this is TAS at its best: bringing to light new knowledge of Texas' past, while having a lot of fun doing it.

In closing, we offer *our* opinions concerning the Panhandle Aspect development/sequence problems. Sites 41MO36 and 41MO37 are the older of the Blue Creek sites and were probably contemporaneous, give or take a generation or two. Site 41MO35 is the younger habitation, probably by a considerable span of time (four or more generations). Of the two 41MO35 areas, the Southern Group is the older. Its latest constructions and occupations may be contemporaneous with the Northern Group.

We are curious as to why the Northern Group's rooms were extended out onto the relatively narrow spur, a rather precarious location for dwellings. It took an enormous amount of labor and effort to level the spur, then haul in probably more than a ton of cobbles and clay to form the original floors and wall footings. Even when completed, this spur section must have been a dangerous place to live and raise children, since the spur's flanks outside the house walls were very narrow, steep-sided, and always subject to erosion. The Southern Group had ample room for work and play between the room blocks and the bluff edge. Was the spur a late extension of the main bluff complex? Were the occupants of the spur part of a clan that needed more room, yet needed or preferred to stay close? As usual, the Blue Creek project raised more questions than it provided answers.

ACKNOWLEDGMENTS

This project has taken far longer than we expected when we so optimistically submitted our proposal to the TAS Field School Committee in 1983. Certain things (including parenthood) happened in our lives that drastically changed our priorities and curtailed/fragmented our available time. We did not fully understand all the problems inherent in examining and comprehending someone else's work; in viewing archeological features relatively familiar to us through so many sets of eyes with so many different levels of experience and perception; and in assembling thousands of bits of diverse, often conflicting, data into a coherent form suitable for TAS' high publication standards. In other words, we now have a much greater respect for the brave soul who takes on the challenge and responsibility of running and reporting a TAS Field School. And as so many others have done in the past, we underestimated the ability of the Panhandle Aspect people to confuse and confound modern students' efforts to unravel and decipher the clues they left that help us comprehend their "simple" lifeways.

But with the help of many people, individually and as members of organizations and institutions, we were able to produce this expanded but still inadequate report. It is, of course, impossible to thank everyone who supplied support and assistance, or to recognize their many services. We hope that those who are omitted here will understand that we deeply appreciate their help, their expertise, and their friendship.

Our sincerest and loudest applause (a standing ovation) must be for all those TAS members who labored long and hard in the mud or the hard-baked soil, the biting cold and the scorching heat, to examine the frustrating but exciting complexities of Blue Creek Panhandle Aspect archeology. That

same applause is directed to the officers and members involved in the planning and execution of the project and the fieldwork.

We are further grateful to the Field School Committee and the Board of Directors for allowing us to participate *ex post facto* in the project and for giving us the opportunity to work at what we love best. We thank them, too, for their patience and understanding with our delays. Then *Texas Archeology* Editor Beth Ogden Davis was a lifesaver in her role as technical adviser and writing coach. She and Mott have also been invaluable sources of encouragement during some of our periods of panic and frustration.

Without the assistance, cooperation, motivation, and expertise so generously provided by our friend and mentor Dr. Jack T. Hughes, none of our work could have been possible. Indeed, had it not been for Jack, we could never have even considered taking on such a project. We are especially grateful to him for securing ample lab space and equipment at the Killgore Research Center in Canyon.

Then Panhandle-Plains Historical Museum Curator of Archeology Billy R. Harrison gave us access to the collections and the documentation, as well as to his own personal storehouse of knowledge and expertise. He always found the time to listen and provide very sound practical advice. Bill left us in March 1996: mere words cannot possibly express the magnitude of that loss. We hope he has found his Great White Buffalo.

Mr. Ron Marlow, Chief Photographer for the *Amarillo Globe-News,* shared his photographic expertise with us. His son, Jim Marlow, processed our artifact photographs with an eye on our shoestring budget. Dr. Kenneth Crossland, DDS, Canyon, allowed us to use his X-ray and film processing equipment for examining the remains of one of the burials.

The TAS Donors Fund supplied much-needed financial assistance for our photography and other expenses. Mr. Larry Dippel, Head Coach at Amarillo High School, gave us access to his film room and viewing/repair equipment to study and help preserve the Martha Hughes movies of Blue Creek. Mr. Stephen K. Ireland, Bureau of Reclamation (Southwest Region), permitted us to select and process pertinent slides from the excellent Reclamation collection of Lake Meredith-area photographic resources. Mr. Meeks Etchieson, then with the Bureau, gave us his thorough field notes, along with other advice and assistance.

Mr. Ron Ice, Chief Archeologist, Southwest Region, National Park Service (Santa Fe), and his associate Mr. Larry Nordby, made time for us to discuss the project. Mr. Nordby examined the Blue Creek Southwestern pottery and other suspicious sherds, providing us with important identification data. And as always, Lake Meredith NPS Ranger Ed Day, "Mister Alibates," was available and helpful with his inexhaustable knowledge of Alibates flint, other area lithic resources, and the archeology of Lake Meredith.

Numerous other kind folks assisted us with access to copiers, paper and supplies, and various services; some of those do not wish to be identified. To these unsung heroes, and all those mentioned above, we express our deepest, sincerest thanks.

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Prehistoric Adaptation and Resource Exploitation in the Delaware Mountains, Culberson County, Texas

Boyd Dixon

ABSTRACT

Recent archeological survey in the northern Delaware Mountains of Culberson County, Texas, encountered the prehistoric remains of a settlement system focused on environmentally circumscribed natural resources such as workable stone, water sources, both desert and upland forest plants, and animals. On the western escarpment, the pattern of resource exploitation appears to have involved a series of small overnight camps located in sheltered saddles near seasonally watered canyons, each camp also serving as a base from which to extract cherts and quartzites from the surrounding hilltops for stone tool production. Settlement on the eastern slopes of the Delawares focused on major drainages which were the source of both water and lithic raw materials not generally available in the surrounding hillsides. Prehistoric inhabitants in the gypsum plains further east, however, appear to have adapted to an even different set of more dispersed resources, focusing on prominent topographical, geological, and mineralogical features where the processing of imported lithic raw materials was secondary to other activities. The observed differences in human settlement patterns between these three ecological zones appears to reflect optimal adaptations to local resource availability, a pattern which appears to have remained essentially unchanged from the Middle Archaic through Late Prehistoric times.

INTRODUCTION

Between October 1994 and February 1995, Espey, Huston & Associates, Inc. conducted an archeological survey of the West Texas Windpower facility in the Delaware Mountains of Culberson County, Texas (Figure 1). Over 200 windturbine locations, 15 miles of access road, and 28.5 miles of 138-kV transmission line were surveyed for cultural resources, under contract to KENETECH Inc. of Austin, Texas. Forty-six archeological sites were recorded during the project, and these were occupied from the Middle Archaic to Late Prehistoric periods, along with limited evidence of Historic period ranching activities. The pattern of prehistoric settlement in this area ranged from lithic procurement stations and small camps along the relatively lush western escarpment of the Delawares, to larger campsites and workshops on the major washes in the interior, and much smaller sites around isolated resources in the gypsum plains to the east. In this paper, I present an optimal foraging model that correlates the changes in human habitation remains with natural resource availability.

MODERN ENVIRONMENT

The Delaware Mountains lie in the Trans-Pecos Basin and Range physiographic region in Culberson County, West Texas (Bureau of Economic Geology [BEG] 1977). The region is characterized by mountains, mesas, plateaus and canyons, where wind and rain have stripped away the soils to expose bare rock surfaces; washes, draws, and intermittent creeks are common.

The Delaware Mountains are highly faulted upward on the west with cliffs rising from 250 to 300 m above the adjacent salt basin, dipping steeply eastward to the broad valleys and plateaus on the eastern edge of the study area (Hunt 1974). The elevation within the windpower development study area in the northern Delawares ranges from approximately 5300 feet amsl at the substation on the western escarpment to about 3700 feet amsl at the end of the transmission line in the gypsum plains to the east. The geologic formations of the study area are formed primarily by Permian age rocks, with scattered outcroppings of old Quaternary deposits (BEG 1968). Of particular interest to the

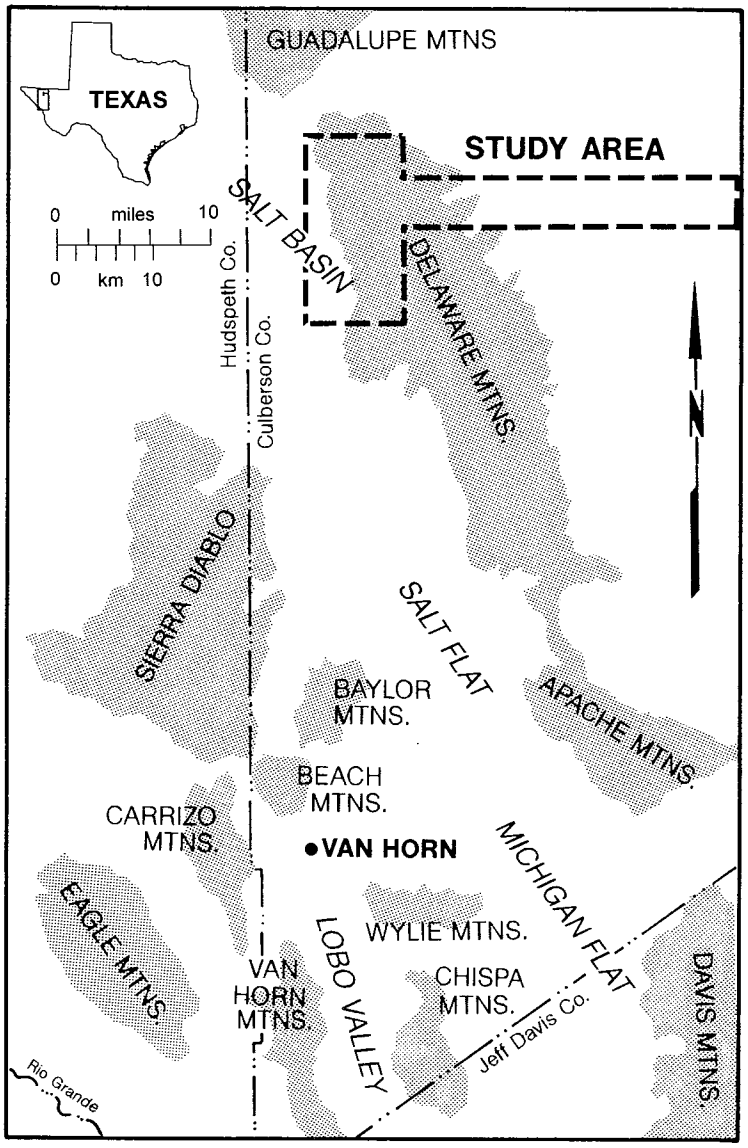

Figure 1. Project Study Area (after Hedrick 1988).

prehistoric inhabitants of this region were exposed outcrops of quartzites and cherts bedded in the limestone of the Brushy Canyon Formation along the western escarpment.

The study area has an average annual rainfall of approximately 25-30 cm and a high evaporation rate, with surface runoff draining by numerous draws and washes either north into the Pecos River via the Delaware River, or east into Salt Creek. Vegetation communities are those of the Chihuahuan Desert (Powell 1988), including desert shrubs and cacti, grama grasses, juniper, yucca, sotol, pinyon pine, creosote bush, and small stands of oaks and/or mesquite in the sheltered drainages (Gould 1975; Brown 1982; Wauer and Riskind 1974; McMahan et al. 1984). Animal species are very diverse (Davis 1974; Cornely 1991; Dixon 1987; Garrett and Barker 1987) and include: rabbits, mule deer, pronghorn antelope, a variety of reptiles, scavenging and raptorial birds, and migratory waterfowl overhead. The prehistoric presence of buffalo in the lower elevations on a seasonal or cyclical basis is debatable (Bamforth 1988).

PREVIOUS ARCHEOLOGICAL INVESTIGATIONS

Previous investigations in this region have been minimal compared to the southern Trans-Pecos archeological region (Kelly 1939, 1949, 1952, 1985, 1986; Kelly, Campbell and Lehmer 1940; Foster and Kelly 1987, 1989). Fieldwork in the vicinity of the project area first concentrated on deeply stratified caves and rock shelters (Howard 1932; Smith 1934, 1938; Sayles 1935; Schroeder 1983), rock art sites (Jackson 1938), and open campsites (Jackson 1937; Sayles 1941). Most archeological studies undertaken more recently have taken place within Guadalupe Mountains National Park to the north (Shafer 1970; Katz 1978; Katz and Katz 1974; Kenmotsu 1993; National Park Service 1976; Clifton 1991), while comparatively little work has been done within the Delaware Mountains (Anderson 1974; Mallouf 1989; Stephens et al. 1985). Some work has been conducted at the southern end of the Delawares around Van Horn (Hedrick 1988). All these archeological investigations have facilitated periodic prehistoric regional syntheses (Sayles 1935; Suhm et al. 1954; Lehmer 1948, 1958; Marmaduke 1978; Mallouf 1985).

REGIONAL CULTURE HISTORY

The study area lies within the northern sector of the eastern Trans-Pecos region as defined by

Mallouf (1985), a region which has been suggested to represent a transitional zone between eastern plains and Southwestern desert cultures (Mallouf 1985; Stuart and Gauthier 1981). During the Late Pleistocene period prior to 9000 B.C., the region was characterized by a relatively cool, mesic climate (Schroeder 1983; Van Devender 1986; Van Devender and Spaulding 1979). After approximately 6000-2000 B.C., the Chihuahuan Desert region became gradually warmer and drier, culminating in the xeric conditions recognized there today (Monger 1993). Paleoindian sites have been reported near Van Horn to the south (Mallouf 1989), and in some quantity along the eastern escarpment of the Guadalupe mountain chain in eastern New Mexico (Stuart and Gauthier 1981:262), although no such sites are recorded within the study area.

The Archaic stage (after approximately 6000 B.C.) is characterized by diverse prehistoric subsistence strategies: the hunting of modern species of game as well as the gathering of edible fruits, nuts, and roots. This diversification reflects the adaptation of native peoples to the environmental variability found within the basic xeric conditions of the Chihuahuan Desert, at times responding to small scale periods of drought (Wimberly and Rogers 1977). Most populations within the Trans-Pecos continued to maintain a hunting and gathering existence well into the historic period (Mallouf 1985; Marmaduke 1978), and the present survey results indicate that groups within the Delaware Mountains are no exception to this trend.

The Late Prehistoric era (A.D. 800 to 1500) is marked by aboriginal hunting-gathering groups with a band-level social organization. During this period, xeric conditions predominating in the Chihuahuan Desert (Bryant and Holloway 1985; Schroeder 1983; Van Devender and Spaulding 1979) were interspersed with short-term periods of drought between A.D. 750-1350 (Jorde 1977), with similar trends seen in northwestern New Mexico (Schoenwetter and Eddy 1964) between A.D. 700-1100 and A.D. 1275-1300 (Cordell 1979). The sociopolitical ramifications of these conditions to the west of the Delawares (Whalen 1977; Foster and Kelly 1989), were severe enough by A.D. 1400 to cause the virtual abandonment of most of the sedentary villages found in the Rio Grande valley (Lehmer 1948; Beckes and Adovasio 1982; Wheat 1955; Marmaduke 1978; Stuart and Gauthier 1981) and the Hueco Basin (Foster 1993; Kaufman 1984; Kegley 1980; Mauldin 1994; Miller 1987). These changes apparently necessitated a return there to a range of more mobile Archaic lifestyles (Beckett and Corbett 1992; Carmichael 1984, 1990), while subsistence practices in the Delawares remained essentially unchanged. Historic period aboriginal remains found in the Trans-Pecos are thought to be associated with aboriginal groups such as the Comanche and Apache (Hester et al. 1989; Lehman 1993; Mallouf 1985, 1987, 1992; Turpin 1985) who moved into the area in the 17th and 18th centuries.

SUBSISTENCE AND SETTLEMENT MODEL

Based upon the results of the initial archeological survey along the western escarpment of the Delaware Mountains (Dixon 1995a), I felt that the use of optimal foraging theory (Winterhalder and Smith 1981) to explain the character of the archeological data would most fully address the ecological adaptations which people practiced within this portion of the Chihuahuan desert. In this model, the pattern of small campsite/workshops used during the exploitation of a number of plant, animal, and lithic resources within a roughly circular "catchment area" (Figure 2) would be largely determined by patchy resource availability (Winterhalder 1981:31; Smith 1981:42). On the western escarpment, these resources included workable stone (cherts and quartzites on the hilltops), water sources (seeps and *tinajas* in the canyons), and both desert and upland plants (pinyon pine, sotol, yucca, and prickly pear) and animals (rabbits, deer, and antelope). The most optimal area for temporary settlement would, therefore, be in close proximity to the widest variety of these resources (pinyon pine nuts, desert succulents, deer and antelope, and water), perhaps the people moving from one camp location to another as the balance between collecting and foraging shifted (e.g., Binford 1980). As lithic raw materials were the only non-renewable resource on the escarpment, an overlapping catchment pattern such as that observed in Figure 2 might well result over time, although the wealth of unexploited raw materials in the study area suggests that lithic resource depletion was never a problem.

Both phases of the archeological survey of the Delaware Mountains (Dixon 1995a, 1995b) encountered a total of 46 sites (Tables 1 and 2). Site boundaries were sometimes problematical due to the existence of extremely sparse flaking debris

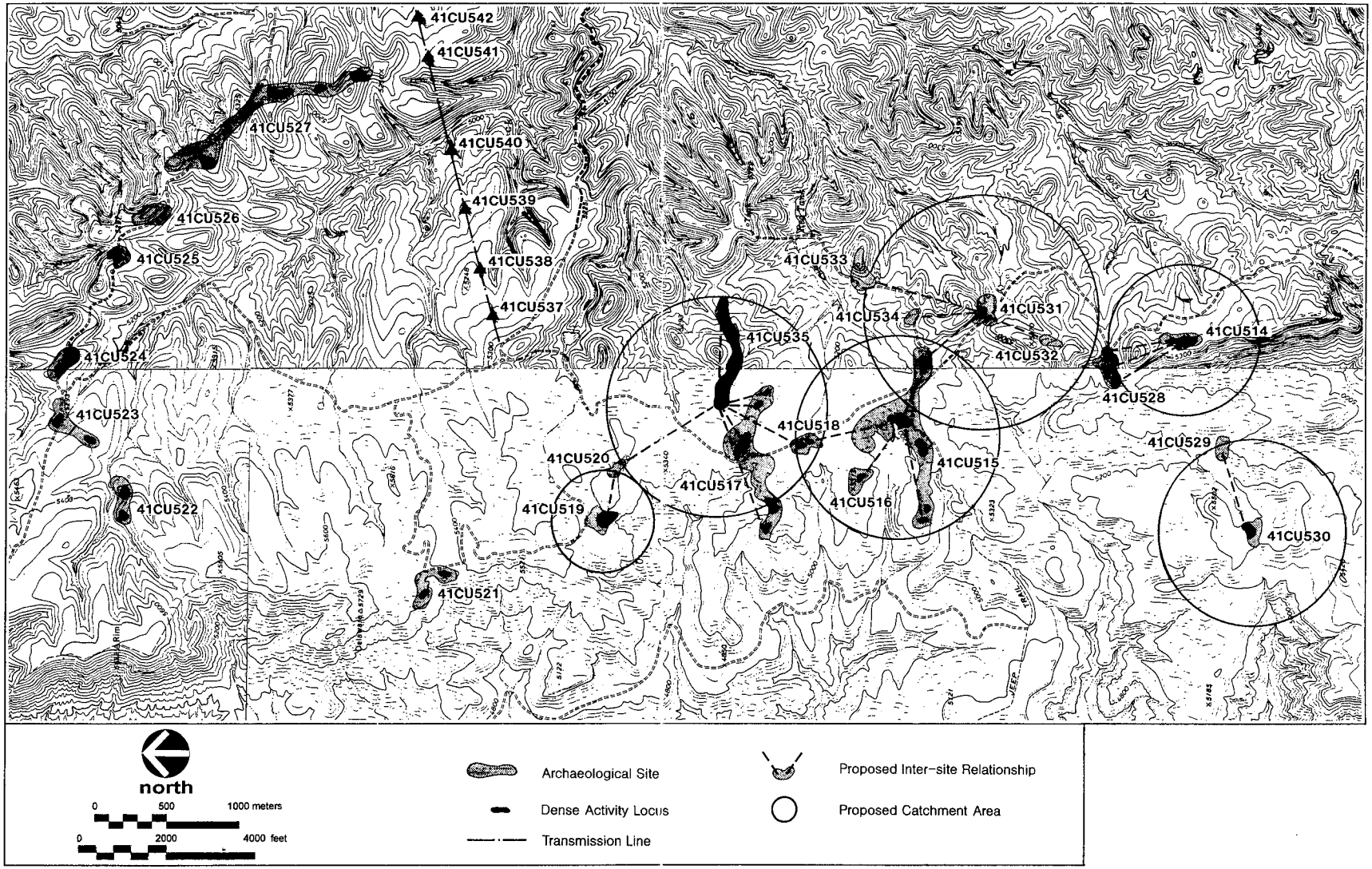

Figure 2. Previous Hypothetical Settlement Pattern Model.

from probable cobble testing, located across long bedrock outcrops in between many small but dense activity areas. Topographical features and a sterile space of over 100 meters in width were therefore used to define site limits. In the northern periphery of the windturbine construction area (see Figure 2), no campsite/workshop sites were encountered, although the pattern of dense activity areas and more sparse flaking debris was still present. Along the transmission line corridor to the east, sites were much more easily defined due to the absence of broad expanses of bedrock with exposed cherts and quartzites.

Archeological evidence on the western escarpment consisted of a series of small overnight camps (41CU514, 515, 519, 530, 531, 535) located in sheltered saddles near seasonally watered canyons (Figure 3), with smaller lithic procurement areas in the surrounding hilltops containing locally outcropping cherts and quartzites, plus occasional finished tools (Figure 4a). At these camps, frequently located in pinyon pine groves, lithic tool production and utilization seem to have been primary activities, often centered around the remains of small campfires and/or earth ovens, occasionally containing El Paso Brownware and Chupadero Black-on-White Jornada Mogollon ceramics (Kidder and Shepard 1936) as well (Figure 4b-d).

Upon survey of the 28.5 mile long transmission line corridor to the east (Dixon 1995b), only three campsite/workshops were found which contained features or "activity loci" (cf. Binford 1972:146) similar to those on the western escarpment, and these sites were located not in sheltered saddles but

Table 1. Archeological Site Descriptions from Windturbine Area (Dixon 1995a)

Site Number	Site Type	Features	Buried Deposit	Site Size	Estimated Age
41CU514	Campsite/Workshop	yes	yes (30 cmbs)	75 m E/W by 305 m N/S	Middle Archaic (Langtry point)
41CU515	Campsite/Workshop	yes	yes (40 cmbs)	1220 m E/W by 460 m N/S	Middle Archaic (Langtry point) to early 20th century
41CU516	Lithic resource procurement	no	no	155m E/W by 75 m N/S	Prehistoric
41CU517	Lithic resource procurement	no	no	1065 m E/W by 230 m N/S	Prehistoric
41CU518	Lithic resource procurement	no	no	150 m E/W by 230 m N/S	Prehistoric
41CU519	Campsite/Workshop	yes	yes (20 cmbs)	230 m E/W by 250 m N/S	Late Prehistoric (Jornada/El Paso Brownware ceramic)
41CU520	Lithic resource procurement	no	no	150 m E/W by 75 m N/S	Prehistoric
41CU521	Lithic resource procurement	no	no	75 m E/W by 380 m N/S	Prehistoric
41CU522	Lithic resource procurement	no	no	300 m E/W by 150 m N/S	Prehistoric
41CU523	Lithic resource procurement	no	no	380 m E/W by 150 m N/S	Prehistoric

Table 1. *(Continued)*

Site Number	Site Type	Features	Buried Deposit	Site Size	Estimated Age
41CU524	Lithic resource procurement	no	no	230 m E/W by 150 m N/S	Middle Archaic (Clear Fork Gouge)
41CU525	Lithic resource procurement	no	no	150 m E/W by 150 m N/S	Prehistoric
41CU526	Lithic resource procurement	no	no	300 m E/W by 150 m N/S	Prehistoric
41CU527	Lithic resource procurement	no	no	1500 m E/W by 150 m N/S	Late Prehistoric (Scallorn Point)
41CU528	Lithic resource procurement procurement	no	no	300 m E/W by 150 m N/S	Prehistoric
41CU529	Lithic resource procurement	no	no	100 m E/W by 50 m N/S	Prehistoric
41CU530	Campsite/Workshop	yes	yes	150 m E/W by 75 m N/S	Late Prehistoric (Chupadero B/W ceramics)
41CU531	Campsite/Workshop	yes	yes	150 m E/W by 100 m N/S	Prehistoric
41CU532	Lithic resource procurement	no	no	50 m E/W by 150 m N/S	Prehistoric
41CU533	Lithic resource procurement	no	no	300 m E/W by 100 m N/S	Prehistoric
41CU534	Lithic resource procurement	no	no	75 m E/W by 50 m N/S	Prehistoric
41CU535	Campsite/Workshop	yes	yes	915 m E/W by 100 m N/S	Prehistoric

along major drainages (Figure 5). This setting, particular to the eastern Delaware slopes, nevertheless appears to conform to the optimal subsistence/settlement model in that prehistoric inhabitants still focused on areas of densest resource availability, although they were arrayed in a more linear pattern on the landscape.

Settlement on the eastern slopes of the Delawares was apparently focused on terraces overlooking major drainages, which were the source of both seasonal water (and hence game) and lithic raw materials. Pinyon pine forests were not present at these lower elevations and desert plants and animals appear to have been less densely distributed on the landscape, with lower variability in the kinds of species available as well. Bedrock outcrops of exposed cherts and quartzites were present in diminishing quantities within the foothills of the Brushy Canyon Formation (41CU537-550), but were rarely available in the hillsides surrounding Chico Draw to the east (41CU551-556), making the few major drainages the only attractive alternative to the ecotone on the escarpment to the west. Prehistoric campsites in this region were somewhat larger in size than those to the east or west (41CU544, 551, 557), and they contained greater numbers of campfires and/or earth ovens, plus evidence for the temporary utilization of small rockshelters (Figure 6). As with campsites to the west, abundant evidence was present on the surface

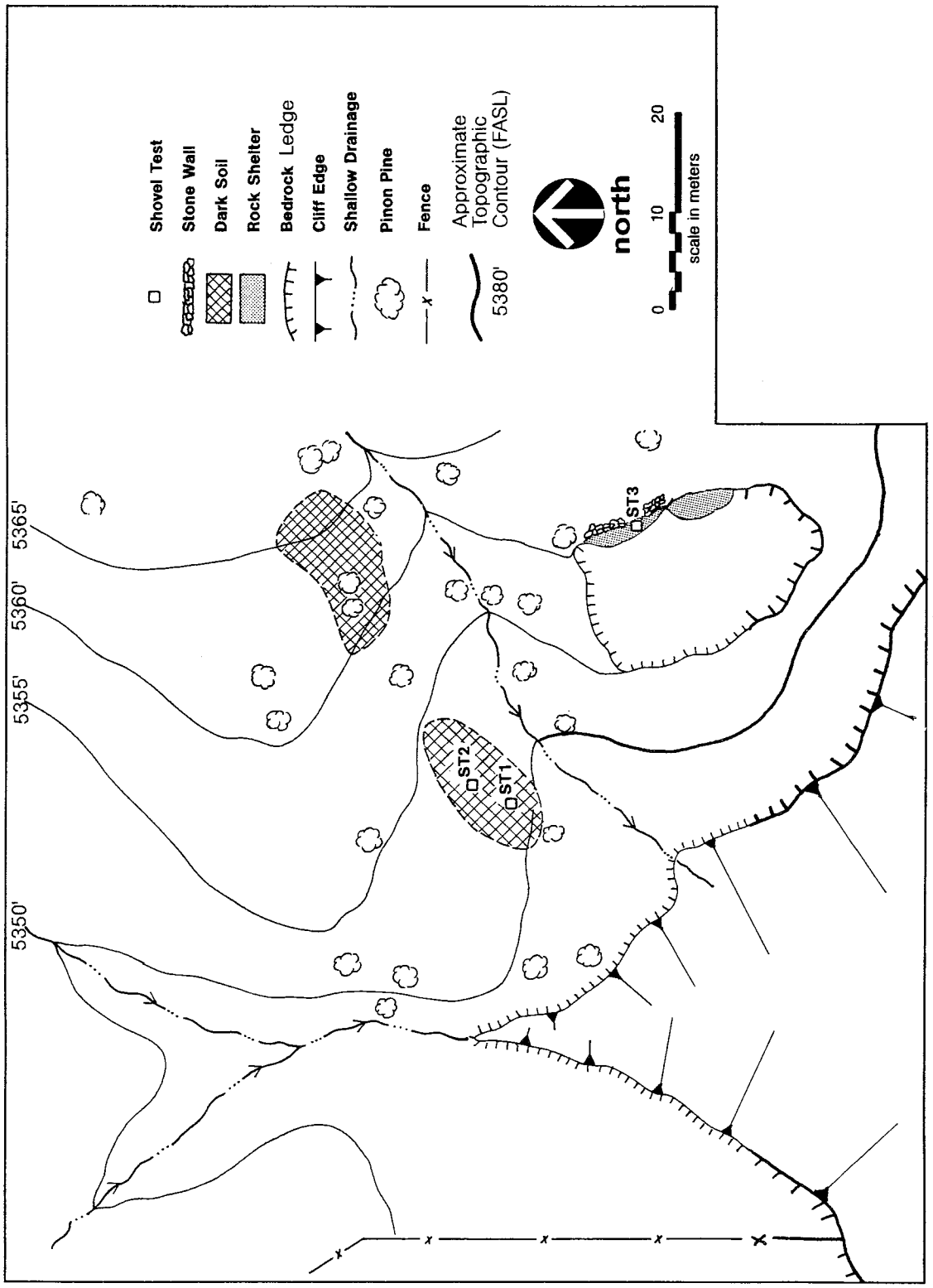

Figure 3. Sketch Map of 41CU519.

Table 2. Archeological Site Descriptions from Transmission Line (Dixon 1995b)

Site Number	Site Type	Features	Buried Deposit	Site Size	Estimated Age
41CU537	Lithic resource procurement	no	no	182 m E/W; N/S undetermined	Prehistoric
41CU538	Lithic resource procurement	no	no	182 m E/W; N/S undetermined	Prehistoric
41CU539	Lithic resource procurement	no	no	61 m E/W; N/S undetermined	Prehistoric
41CU540	Lithic resource procurement	no	no	91 m E/W; N/S undetermined	Prehistoric
41CU541	Lithic resource procurement	no	no	61 m E/W; N/S undetermined	Prehistoric
41CU542	Lithic resource procurement	no	no	122 m E/W; N/S undetermined	Prehistoric
41CU543	Lithic resource procurement	no	no	20 m E/W; 30 m N/S on ROW	Prehistoric
41CU544	Campsite/Workshop	no	yes (30 cmbs)	40 m E/W by 130 m N/S	Archaic (possible dart point)
41CU545	Lithic resource procurement	no	no	3 m E/W by 3 m N/S	Prehistoric
41CU546	Lithic resource procurement	no	no	3 m E/W by 3 m N/S (off ROW)	Prehistoric
41CU547	Lithic resource procurement	no	no	3 m E/W by 3 m N/S	Prehistoric
41CU548	Water source, lithic resource procurement	no	no	50 m E/W by 50 m N/S (off ROW)	Archaic (possible dart point)
41CU549	Lithic resource procurement	no	no	5 m E/W by 5 m N/S	Prehistoric
41CU550	Lithic resource procurement	no	no	5 m NE/SW by 5 m NW/SE	Prehistoric
41CU551	Campsite/Workshop	yes	yes (15 cmbs)	60 m E/W by 25 m N/S	Prehistoric
41CU552	Lithic resource procurement	no	no	60 m E/W; N/S undetermined	Prehistoric
41CU553	Lithic resource procurement	no	no	40 m E/W by 10 m N/S	Prehistoric
41CU554	Lithic resource procurement	no	no	10 m E/W by 10 m N/S	Prehistoric
41CU555	Lithic resource procurement	no	no	100 m E/W; N/S undetermined	Prehistoric

Table 2. *(Continued)*

Site Number	Site Type	Features	Buried Deposit	Site Size	Estimated Age
41CU556	Lithic resource procurement	no	no	3 m E/W by 3 m N/S	Prehistoric
41CU557	Campsite/Workshop	yes	yes (15 cmbs)	20 m E/W; N/S undetermined	Prehistoric
41CU558	Lookout, lithic resource processing	no	no	10 m E/W by 10 m N/S (off ROW)	Prehistoric
41CU559	Water source, lithic resource processing	no	no	20 m E/W by 20 m N/S	Prehistoric
41CU560	Sulfur seep, lithic resource processing	no	no	30 m E/W by 15 m N/S (off ROW)	Late Archaic (Figueroa point)

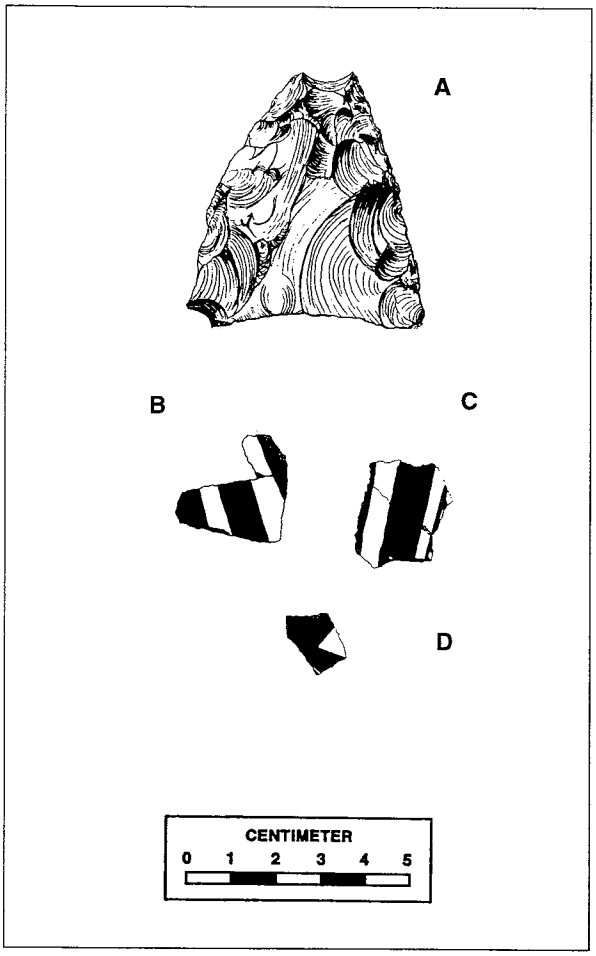

Figure 4. Artifacts from Selected sites: a: Clear Fork Bifacial Gouge from 41CU524; b-d, Chupadero Black-on-White Ceramics from 41CU530.

for the production, finishing, and utilization of a range of flaked (Figure 7) and ground stone tools (Figure 8) from locally available raw materials.

The third pattern found in the gypsum plains further east was again a modification of this model, as site distributions suggest inhabitants had to adapt to even more patchy resource availability (Dixon 1995b) with no real catchment area outside the site limits. There is an almost total absence of watered canyons, major drainages, and lithic raw material outcrops. And as scheduling access to these more limited resource "oases" with water and game was even more unpredictable, no long-term campsites were observed, nor did local lithic raw materials encourage the creation of workshops such as those found in sites to the west.

Here, isolated archeological sites were found around prominent topographic (high hills), geologic (bedrock outcrops), and mineral (sulfur springs) features. The few prominent hilltops in the area probably served as hunting lookouts (41CU558), while the occasional bedrock outcrops trapped rainfall in small basins (41CU559) and the sulfur seeps probably attracted game to the salty soils (41CU560). At the small sites adjacent to these resources, the lithic raw materials were quite distinct from those to the west. These cherts and quartzites do not appear to be locally available since no such raw materials or procurement sites were found in the vicinity during the survey. Little evidence of actual stone tool production (i.e. cores and large primary flakes) was present at these sites

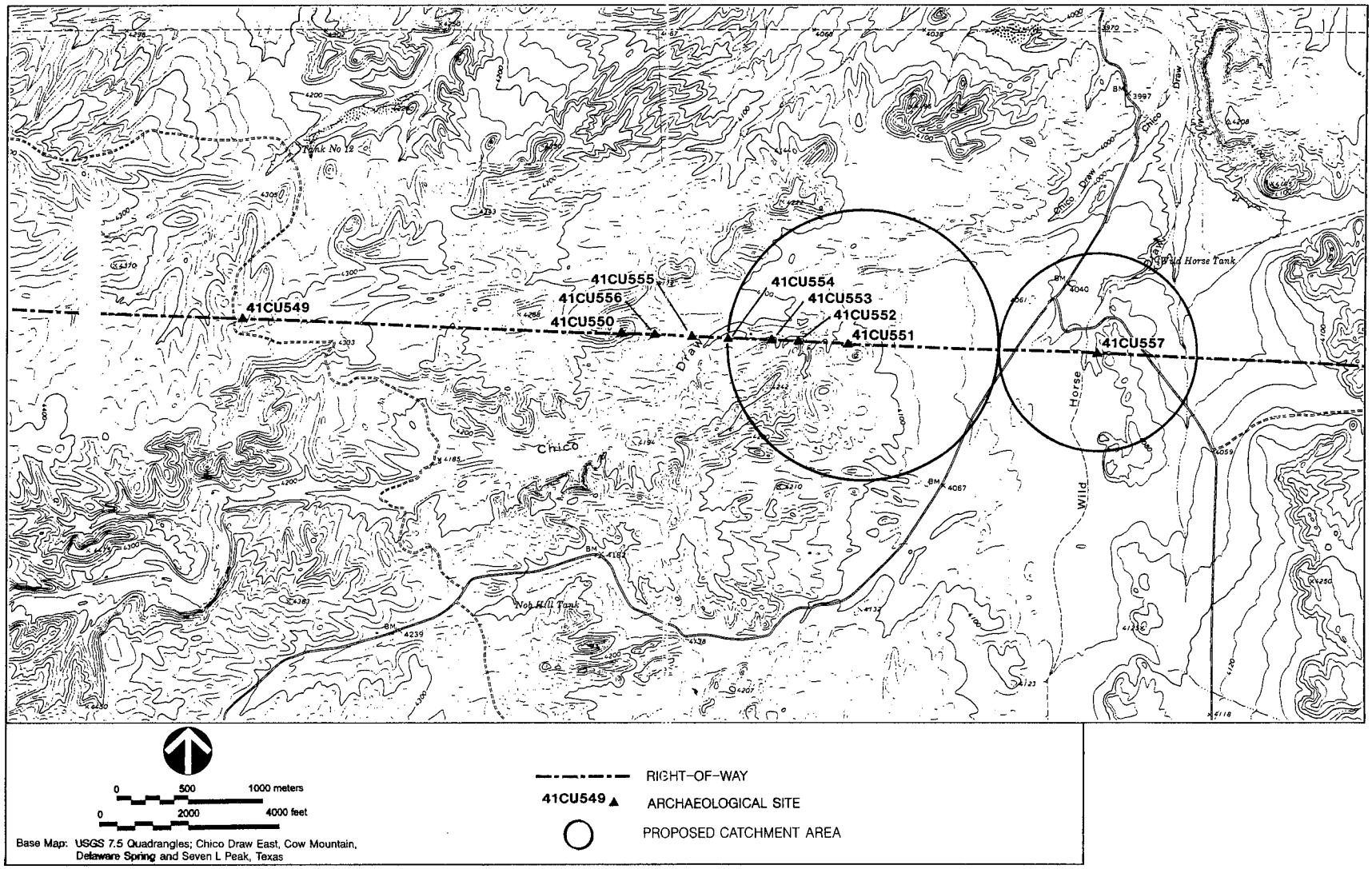

Figure 5. Sites 41CU549 through 41CU557.

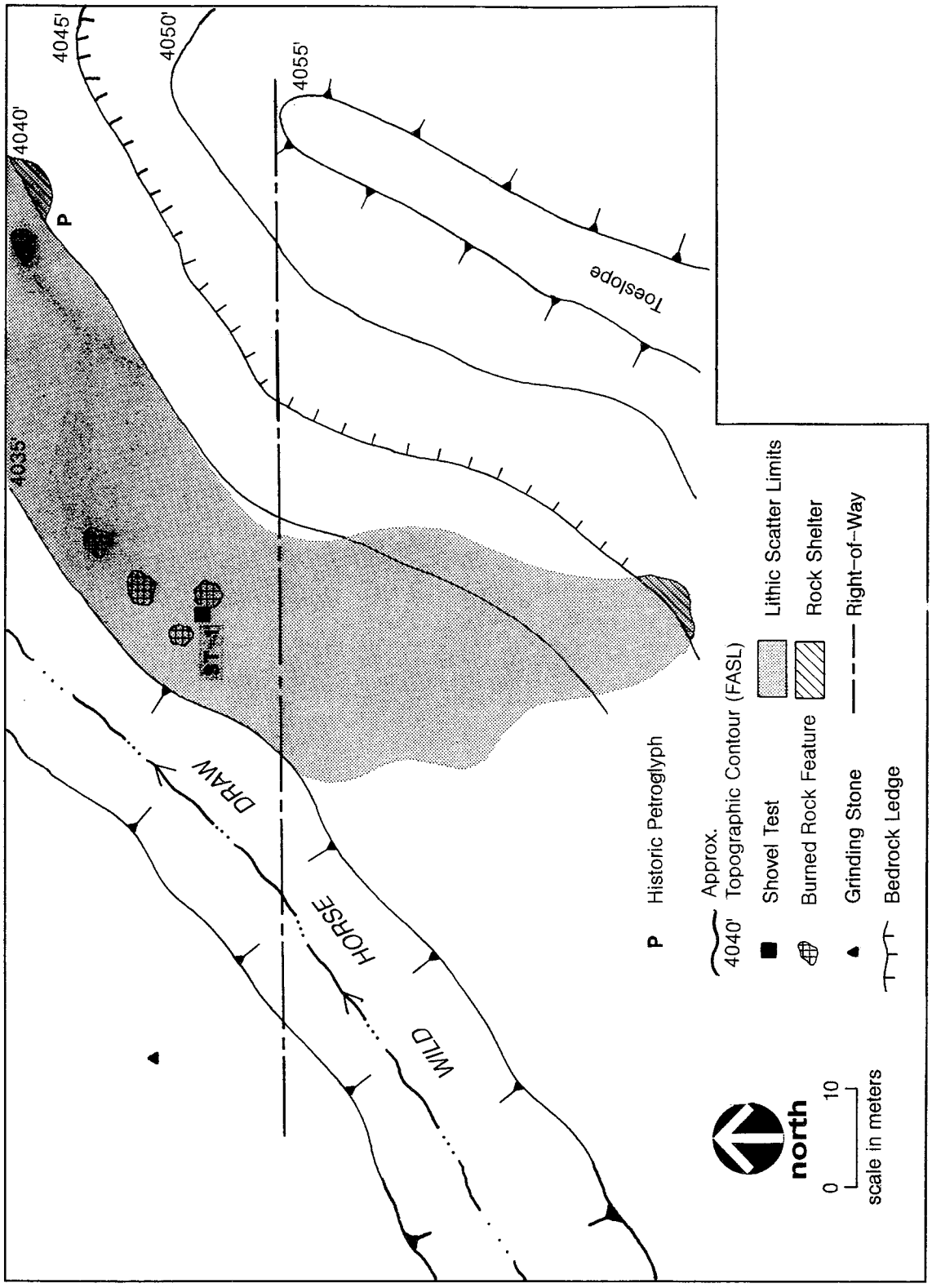

Figure 6. Campsite/Workshop Site 41CU557.

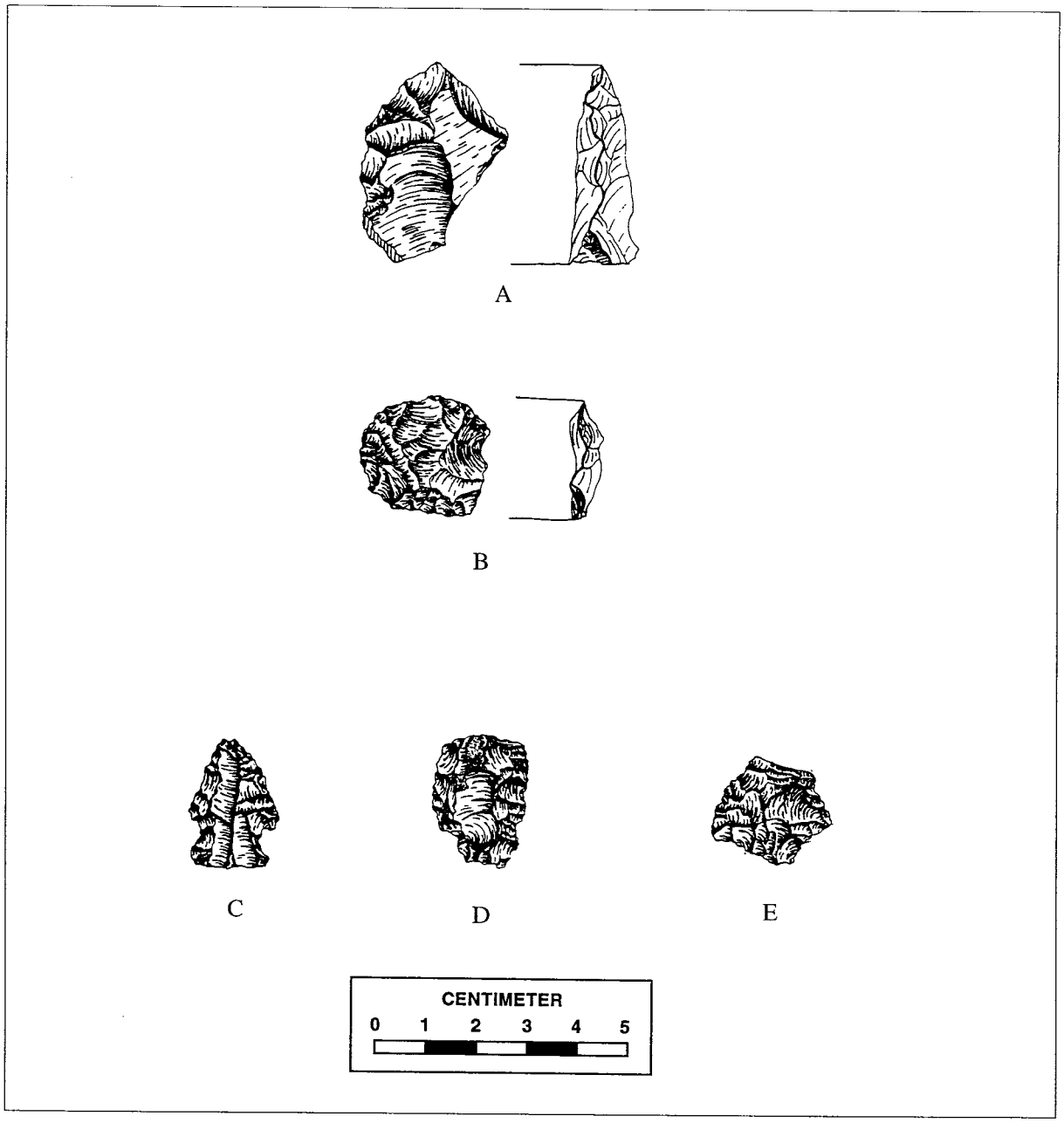

Figure 7. Flaked Stone Artifacts from Transmission Line Corridor: a, bifacial tool fragment, 41CU547; b, biface, isolated find; c, dart point, 41CU560; d, dart point, 41CU548; e, dart point, 41CU544.

which, instead, contained smaller thinning flakes and discarded tools (see Figure 7c). Lithic tool finishing and maintenance at these sites would appear to have been secondary to other activities such as hunting and water collection, unlike campsites to the west which also served as primary lithic workshops. The absence of fire hearths, earth ovens, and utilized rockshelters also suggests very limited occupation of the sites within the gypsum plains.

CONCLUSION

The relationship between prehistoric human settlement and critical natural resources in the

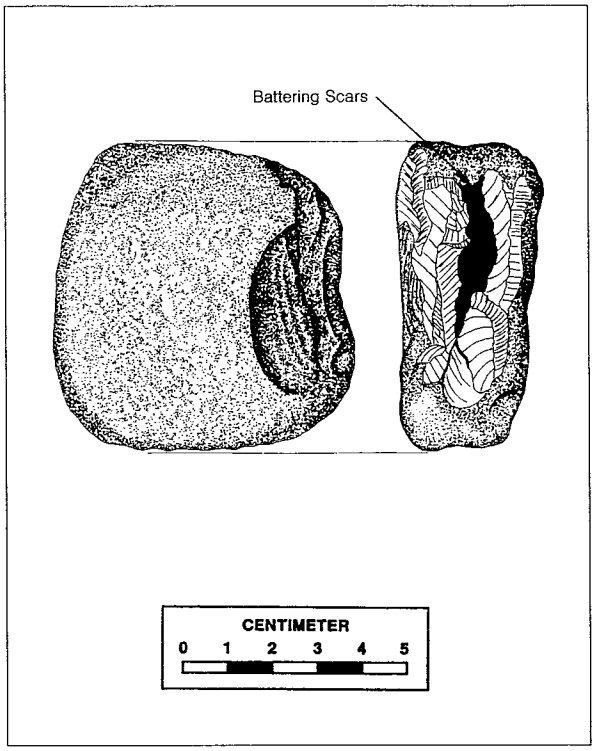

Figure 8. Battered and Flaked Grinding Stone from 41CU557.

northern Delaware Mountains was found to vary more by environmental zone than by individual site or time period, judging from the results of the archeological survey in the windpower study area. It also appears that the size of the possible catchment areas surrounding these sites, and by association the group size exploiting them, was determined to some extent by the density and availability of resources available locally. In this case, the most optimal strategy to deal with such small-scale stone outcrops and patchy desert food resources would be to disperse across the landscape into small groups on a seasonal basis. Alternative strategies involving larger groups on collecting forays for shorter periods of time would have entailed greater risk for the society as a whole, given the unpredictability of all but lithic resources in the three environmental zones.

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A Prehistoric Reservoir in Far West Texas

Jeff D. Leach, Federico A. Almarez, and Brenda J. Buck

ABSTRACT

The prehistoric management of water in the desert lowlands of far West Texas is not well documented. We discuss preliminary data from a recently discovered water storage basin in the Hueco Bolson, an intermontane basin located east of El Paso, Texas. Ceramic artifacts from the site suggest a construction date of A.D. 1000-1250. Low annual rainfall, high evaporation rates, and the limited size of the feature, suggest that it did not hold water year-round. Based on the surface evidence alone, similar features may be difficult to distinguish in eolian environments, when potentially rapid infilling occurs following disuse.

INTRODUCTION

As early as the late 1800s, Adolph Bandelier (1892) wrote about prehistoric water storage features during his Southwest journeys. Since then, a variety of water control features have been documented and excavated (e.g., McGimsey 1951; Wheat 1952; Haury 1956; Rohn 1963; Di Peso et al. 1974; Raab 1975; Wilcox 1979; Hayes et al. 1981; Herrington 1982; Doolittle 1985; Scarborough 1988, 1991; Schmidt and Gerald 1988; Sandor et al. 1990). Of these, perhaps the best known water control systems are those among the Hohokam in the Gila and Salt Rivers in south central Arizona. In this portion of the arid Sonoran Desert, a complex system of major canals was used to divert water for domestic and irrigation purposes (Masse 1981; Nicholas and Neitzel 1984). Also documented are wells, walled springs, catchment and retention basins, reservoirs, and check dams (e.g., Crown 1987; Doolittle et al. 1993).

While a large number and variety of water control features are known for the Sonoran Desert, few of these features have been recorded to the east in the Chihuahuan Desert. We discuss data from the limited excavation of a water storage basin recently discovered east of El Paso, Texas, along the western slopes of the Hueco Mountains (Figure 1). This water control feature is similar to another water storage basin described by Scarborough (1988) along the Texas-New Mexico state line. These are, however, the only documented water storage features for this portion of the Chihuahuan desert.

Similar to Scarborough's (1988) view, the surface area and depth of the water basin, the relative lack and spatial variability of annual rainfall, and high evaporation rates in the region suggest that the feature may not have held water year-round. Without a reliable and storable water source in a non-riverine setting, such as the basin lowlands of the Chihuahuan Desert, year-round occupation would have been precluded at any site(s) that depended on a reservoir as a primary domestic water source.

THE SETTING

The site lies in a desert valley known as the Hueco Bolson, located in southern New Mexico and far West Texas (see Figure 1) within the Mexican Highlands portion of the basin-range physiographic province (Hawley 1975). As in other arid regions, warm to hot days, cool nights, and low humidity characterize the area. Temperatures range from a high monthly average of 35.2 degrees C in June to a low of 13.5 degrees C in January, with an annual frost-free period of approximately 230 days (Mauldin 1994, 1995). Most of the rainfall occurs as intensively localized thunderstorms during the summer (July-September), with an annual average rainfall of approximately 20 cm a year; the estimated annual mean evaporation is approximately 200 cm (Marston 1986:277). Current paleoenvironmental data suggest little environmental change during the time period (Late Holocene) that the

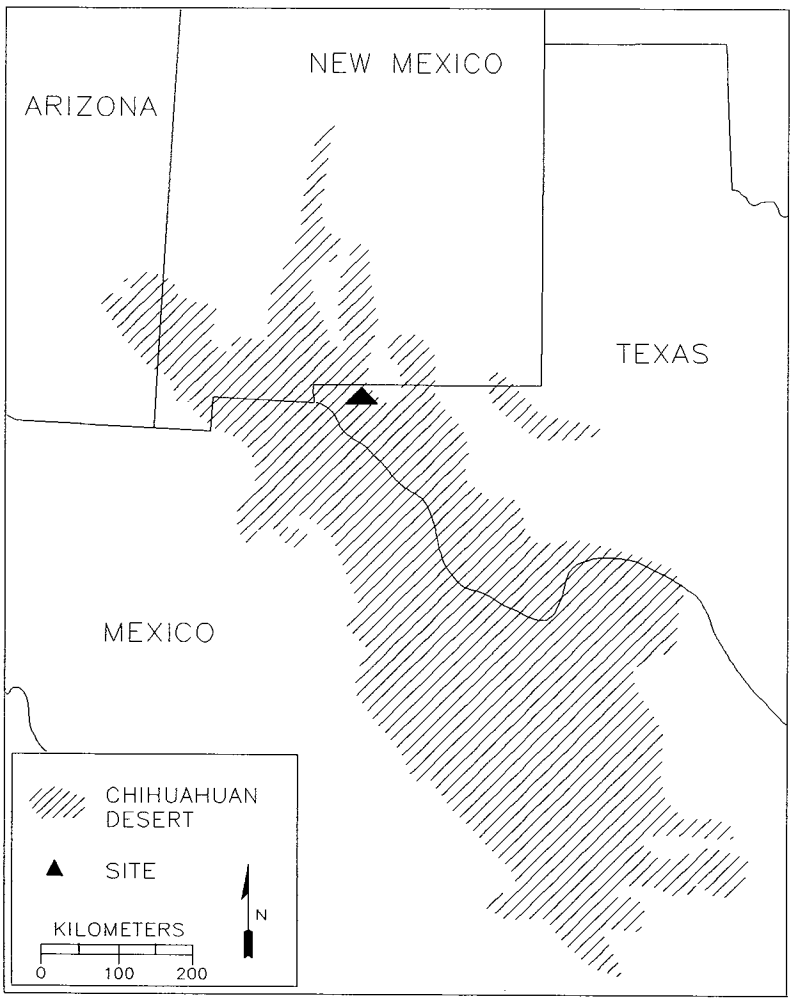

Figure 1. Chihuahuan Desert and study area.

water storage basin would have been in use (see Monger 1993).

Overgrazing in the late 19th century (Gardner 1951; Buffington and Herbel 1965; York and Dick-Peddie 1969), and extensive military activity over the last 50 years (Marston 1986), have resulted in the replacement of stable grassland with a mesquite dominated landscape (Figure 2). This vegetational change, possibly enhanced by climate change (Neilson 1986), has resulted in significant erosion. Consequently, the Hueco Bolson is characterized by mesquite-stabilized sand dunes, sheet sands, sand ridges, and eroded interdune blowouts (Monger 1993).

The region has a long history of archeological research. The area was visited by numerous archeologists during the first half of this century (e.g., Fewkes 1902; Roberts 1929; Cosgrove 1947), but the first cultural-historical synthesis of the archeology of the region did not appear until the late 1940s (Lehmer 1948). Using data from excavations at the pithouse village of Los Tules, the cave site of La Cueva, and the small pueblo at the Bradfield site, Lehmer defined the Jornada, or desert branch, of the greater Mogollon culture area. From his early work, Lehmer (1948) provided a developmental sequence for interpreting the archeology of the desert lowlands. Specifically, using changes in ceramics and architecture, Lehmer proposed the preceramic Hueco phase (pre-A.D. 900), the Mesilla phase (A.D. 900-1100), the Doña Ana phase (A.D. 1100-1200), and finally the El Paso phase (A.D. 1200-1450).

During the 1970s and early 1980s, our understanding of the regional archeological record increased tremendously as the result of several large-scale surveys in the Hueco (Whalen 1977, 1978) and Tularosa basins (Beckes et al. 1977; Wimberly and Rogers 1977; Skelton et al. 1981; Carmichael 1986). These surveys, in conjunction with a limited number of excavations (e.g., O'Laughlin 1977, 1979, 1980; Whalen 1980, 1981a, 1981b, 1986), revealed that thousands of archeological sites dating from Paleoindian through Late Formative periods lie scattered throughout the basin lowlands. While a limited number of pithouse villages and pueblo sites were also present, the majority of the sites consist of low density scatters of chipped and ground stone, ceramics, fire-cracked rock, and occasional hearth and structural features.

Building on the work of Whalen (1980, 1981a, 1981b, 1986, 1994a, 1994b), recent investigations have demonstrated that many of the archeological sites in the region date from the Late Archaic to early Formative periods (500-100 B.C. to A.D. 600-800) (e.g., Mauldin et al. 1994; Mauldin 1994, 1995, 1996; Leach in press; Leach et al. in press). In

Figure 2. Desert lowlands (Hueco Bolson).

addition, synthesis of hundreds of radiocarbon-dated features (Mauldin 1994, 1995, 1996; Leach in press) suggest a significant change in settlement—namely a decreased use of the basins—around A.D. 600 to 800. This correlates with an increase, or a sustained use, of the Piedmont areas at the same time (see Miller 1989).

THE WATER STORAGE BASIN

The recently discovered water storage basin (41EP3504) is located in the nearly flat distal portion of the Piedmont zone of the Hueco Mountains. Dominated by creosote bush (*Larrea tridentata*) and a low density of forbs and grasses, the distal Piedmont area marks a transition between the rocky limestone bedrock and sediments of the upper proximal Piedmont from the hummocky, mesquite-stabilized dunes and sheetsands of the central basin (Figure 3). The distal Piedmont is characterized by low rates of sedimentation and/or high rates of eolian erosion, as evidenced by highly calcareous soils and archeological hearths over 1,000 years old exposed at the surface (Leach et al. 1993). Soils of the lower Piedmont are predominately fine-textured clays and silts derived up slope from the Paleozoic limestone of the Hueco Mountains which rise several hundred meters above the basin floor.

Discovered during a survey and testing project (Leach et al. 1993; Leach 1994, Leach et al. in press), the water storage basin appeared on the surface as a circular distribution of artifacts covering approximately 600 m^2 (Figure 4). No depressions indicating either a subsurface basin or channel leading into the site area were visible on the surface. While archeological sites in the area are usually low-density surface scatters of chipped and ground stone, fire-cracked rock, ceramics, and occasional hearth and structural features, with the largest number of these sites being dominated only by chipped and ground stone and fire-cracked rock, site 41EP3504, however, is unique in that the surface assemblage was dominated by a relative large number and variety of ceramic artifacts (e.g., El Paso Polychrome, Chupadero Black-on-white, and El Paso Brown) over a relatively small area (see Figure 4). Other non-ceramic artifacts (fire-cracked rock and lithics) were present, but accounted for less than 10 percent of the site assemblage. The ceramics assemblage was dominated by jar fragments (see also Scarborough 1988).

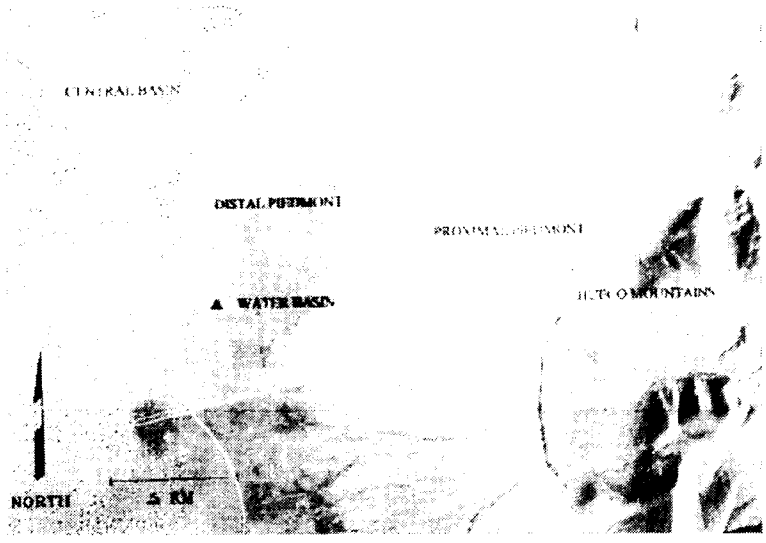

Figure 3. Western slopes of the Hueco Mountains showing the Proximal and Distal Piedmont, the Central Basin, and the location of the reservoir.

As mentioned, the site surface was covered with a circular distribution of ceramic sherds and other artifacts. Interestingly, intermixed with the circular distribution of artifacts was a large number of caliche fragments. Caliche occurs naturally as part of the underlying La Mesa geomorphic surface, situated locally some 0.70-1 m below the alluvial sediments, as evidenced by mechanical trenching in the Piedmont zone of the Hueco Mountains. This

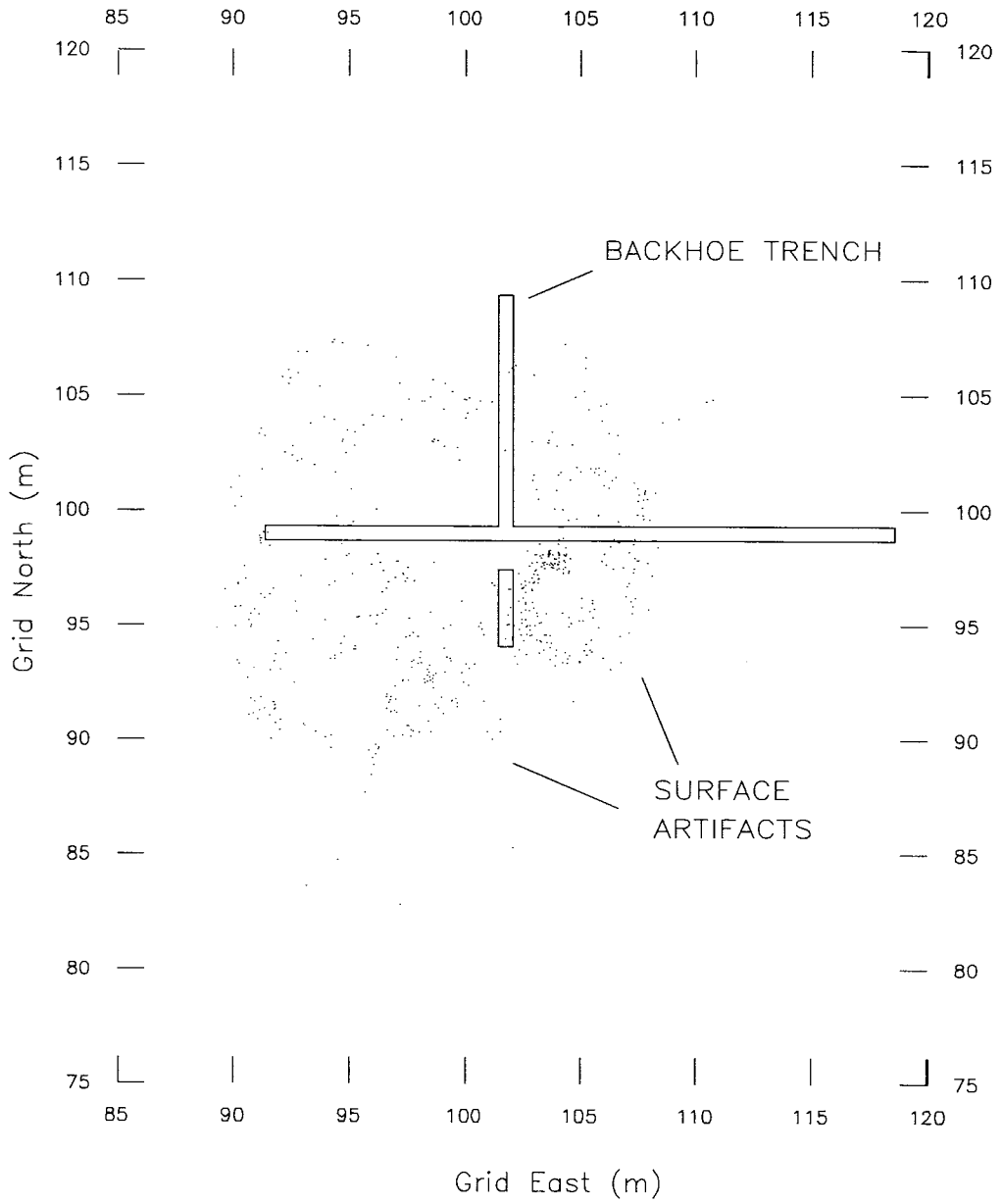

Figure 4. Distribution of surface artifacts and the backhoe trenches

underlying indurated (Bkm) calcium carbonate horizon (Gile et al. 1966), when exposed at or near the surface, will fragment, and a limited number of pieces can often end up on the surface through a range of natural processes (Monger 1993; Mauldin and Leach 1996). As a result, pieces of the La Mesa surface are often visible on the surface in the region as smooth, weathered fragments which are generally less than 0.1 m in diameter. Considering that the relatively high surface density of caliche fragments at the site corresponds spatially with the ceramic distribution, and the relative absence of caliche fragments outside of the circular artifact/caliche distribution, the angular and irregularly shaped fragments of caliche at this location suggested a cultural rather than a natural origin.

Following the point-provenienced collection of all surface artifacts and the excavation of a limited number of shallow 1 m^2 units, backhoe trenches were excavated through the center of the artifact/caliche distribution, that exposed the water storage basin in profile. The basin, as identified in profile (Figure 5), measured approximately 8-10 m in diameter and 2.2-2.5 m in depth. The feature has an

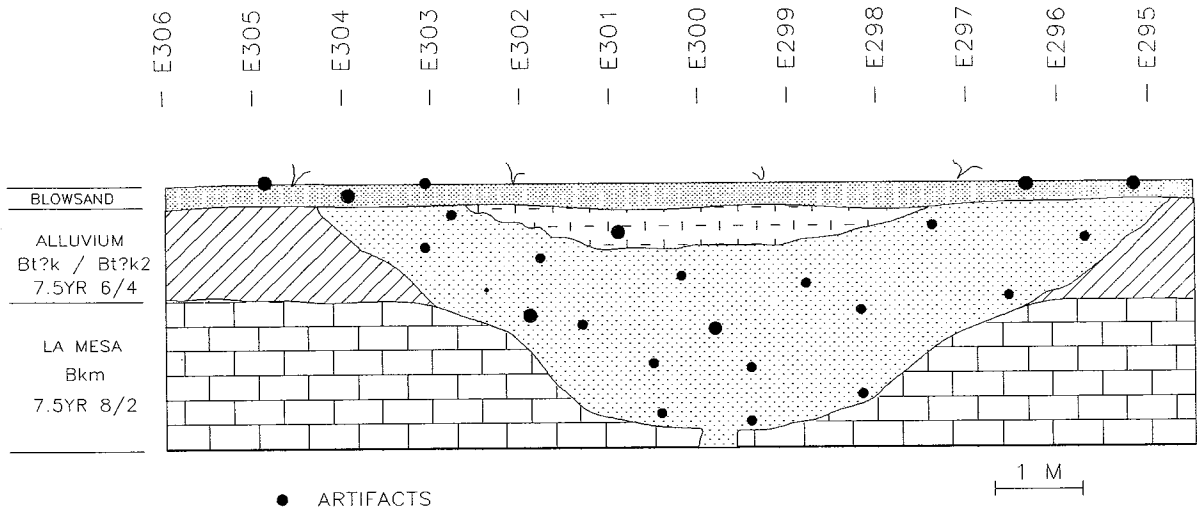

Figure 5. South wall profile of the reservoir.

estimated maximum water capacity of 100-125 m^3 and a surface area of 65-75 m^2. The basin is filled with fine, horizontal laminated clays and occasional cross-bedding of sand lenses, indicating ponding of runoff, vertical settling of suspended sediments, and rapid infilling. The basin appears to have been fed by direct rainfall and runoff from a limited area of the alluvial fans immediately east of the site. No evidence suggests that the feature was excavated as a well to tap subsurface water (see Wheat 1952:187).

Located at the bottom of the basin is a small "plug" of sand approximately 0.20 m wide, which extends beyond the bottom of the backhoe trench to an unknown depth (see Figure 5). The "plug" of sand appears to be of some antiquity, and unrelated to the infilling of the basin given the presence of strong pedogenic calcium carbonate filaments and incipient Stage II nodules (Monger 1993), which are overlain by a dense layer (ca. 3 cm thick) of fine clay. The clay lining appears to have functioned as a sealer to retard water from draining through the bottom of the basin. It is unknown whether the clay at the bottom of the feature was intentionally applied as a sealer against seepage (see Scarborough 1988:27), or is a result of the settling of suspended load during the last infilling of the feature by water. Located in the profile of the backhoe trench extending north from the center of the basin (see Figure 4) are two, possibly three, steps or treads carved into the caliche substrate. These steps appear to have been deliberately cut into the caliche, and would have facilitated easier access to the lowest portions of the basin. Scarborough (1988:26) reports similar steps or treads at the Hot Wells Reservoir.

The feature was excavated through 0.9 m of eolian and alluvial sediments into approximately 1.4 m of the dense, underlying La Mesa surface, no easy task using only wood and stone tools. The amount of caliche fragments observed on the surface suggests the feature was not excavated into one of the many natural occurring caliche cavities or pipes (see Gile et al. 1966; Monger 1993) that are buried throughout the region. Scarborough (1988:30-33) has suggested that the Hot Wells Reservoir may have been a natural caliche cavity or pipe (see Monger 1993) that was expanded for use as a water reservoir. Furthermore, Scarborough (1988:32) points to the naturally occurring pipes at the Meyers Pithouse Village (located within 1 km of Hot Wells Reservoir) as possibly being used as natural sinks for the catchment of water, and evidence that the prehistoric inhabitants knew of and utilized these pipes. Scarborough (1988:32) also comments that, unlike the extensive modifications seen at the Hot Wells Reservoir, no modification of the sides of the natural cavities was noted for the natural sinks at Meyers Pithouse Village. While Scarborough suggests that additional work will be necessary to confirm that the naturally occurring sinks at the Meyers Pithouse Village were used to impound water, the possibility is intriguing.

The use or expansion of natural cavities for water basins assumes that prehistoric inhabitants had knowledge of where these cavities were. It has been suggested that natural cavities would hold

more moisture than the surrounding sediments and, therefore, vegetation would grow in "patches" in these areas. These patches would stand in contrast to the surrounding, more sparse, vegetation. After viewing dozens of natural sinks and pipes exposed in backhoe trenches throughout the basin lowlands, we know of no evidence that confirms that vegetation grows in greater density in natural cavities. While this relationship between natural sinks and surface vegetation may hold in other areas, the latter is an unlikely surface indicator for subsurface sinks or caliche cavities within our study area.

CHRONOLOGICAL PLACEMENT OF THE RESERVOIR

Prehistoric artifacts are vertically distributed throughout the profile, with a limited amount of historic artifacts (e.g., wire, glass) noted in the top 0.20 to 0.30 m of the south wall profile in a shallow depression (see Figure 5). The presence of historic artifacts in the shallow depression suggest the basin was not completely in-filled at the turn of the 20th century. A 1980s aerial photograph shows that a road (see Figure 3), probably associated with early ranching or military activities in the area, is located immediately south of the site.

The prehistoric ceramics recovered from the limited investigations (surface collection and a limited number of shallow 1 x 1 m excavation units) is presented in Table 1. The assemblage is dominated by undifferentiated brownwares, accounting for 81 percent of the ceramics. Many of the undifferentiated brownwares are examples of El Paso Brown, an unpainted brownware that is characterized by a coarse-grained temper of igneous rock. A suggested date range for El Paso Brown is A.D. 200/500 to A.D. 1100 (Whalen 1994b; Perttula et al. 1995:Table 4), with early and late variants distinguished by subtle variations in rim form (Whalen 1993). All 11 El Paso Brown rims recovered were early varieties that are distinguished by a pinched rim rather than the later rounded or flattened rims (see Whalen 1993, 1994b). Many of the brownwares lack the coarse-grained temper and due to the absence of any paint, it is unclear whether some of these sherds belong to the bottom half of unpainted El Paso Polychrome or Bichrome vessels (Whalen 1977, 1978; Miller 1989).

A total of 59 body and rim sherds of El Paso Polychrome were recovered, followed in quantity by El Paso Bichrome, Chupadero Black-on-white, unpainted textured, Mimbres Black-on-white, and Playas Red Incised sherds (see Table 1). All of the El Paso Bichrome sherds were less than 1 cm in length. Because of their small size, identification as fragments of true bichrome vessels is problematic as the small number of bichrome sherds could have easily been fragments of El Paso Polychrome sherds; no bichrome rims were recovered. Suggested dating of the bichrome ceramics is roughly A.D. 1000-1250 (Perttula et al. 1995:213). The El Paso Polychrome ceramics include both early variants (A.D. 1000-1250), distinguished by vertical necks and rims, and later variants (A.D. 1250-1450), characterized by thickened, everted rims (see Whalen 1977, 1978, 1981c, 1994b). With the exception of one rim sherd, all of the El Paso Polychrome rims were of the early variety. The remaining chronologically sensitive ceramics include Chupadero Black-on-white (A.D. 1100-1500/1600), Mimbres Black-on-white (A.D. 750-1130), and Playas Red Incised (post-A.D. 1100/1150) (Wiseman 1982; Hard et al. 1994; Shafer and Brewington 1995).

The range of ceramics at 41EP3504 poses a problem in dating the reservoir. The presence of true El Paso Brown in the assemblage indicates that the feature should date no later than A.D. 1000/1100, and A.D. 1200/1250 at the latest. The end-

Table 1. Ceramic artifacts recovered from site 41EP3504

Type	N
Undifferentiated Brownware	472
El Paso Brown Rim	11
El Paso Polychrome	41
El Paso Polychrome Rim	18
El Paso Bichrome	21
Chupadero Black-on-white	10
Unpainted Textured	3
Mimbres Black-on-white	2
Playas Red Incised	2
Total	580

ing date for the Mimbres sherds of A.D. 1130 is consistent with that range, as is the Chupadero Black-on-white and the Playas Red Incised sherds. The El Paso Polychrome sherds suggest a broader date range (A.D. 1000-1450), but the majority of the rim sherds indicate a date between A.D. 1000-1250.

To obtain absolute dates from the reservoir (Leach et al. 1993), five bulk soil samples from various elevations throughout the south wall profile (see Figure 5) were submitted for radiocarbon analysis. This resulted in four humate and one pedogenic carbonate date (Table 2). While trace amounts of wood charcoal were noted in the fill of the reservoir, the context of the charcoal was in question given that unrelated wood charcoal could have washed-in from anywhere on the surrounding landscape.

Of interest are the two soil humate dates from the lowest portions of the reservoir (Beta-65373 and 65374). The lowest dates should document the last use of the feature. While the soil humate dates from the bottom of the reservoir are slightly different, they suggest a last use date between approximately A.D. 60-650. Also recovered is a single pedogenic carbonate date from carbonate filaments isolated from a bulk soil sample from the lowest portion of the reservoir. The pedogenic carbonate sample dates to the Late Archaic period (see Table 2).

The soil humate and pedogenic carbonate dates obtained from the feature proved of little use in chronologically placing the reservoir, as the dates are much older than documented by the ceramic assemblage. However, they do reveal that caution should be applied when using sediments in alluvial settings for radiocarbon dating of deposits. The results of the dates from the reservoir demonstrate that older sediments and carbonates from the landscape are contaminating the samples. In the case of the carbonate date, old carbonates exposed along the freshly cut edges of the reservoir may have contributed older contaminants to the sample.

The sum of the ceramic data implies a best-fit date range between A.D. 1000-1450 for the last use of the reservoir. This time period cuts across widely used cultural-historical phases in the region: the Late Mesilla (pithouses) and El Paso (adobe pueblos) phases. Which phase does it belong to: people who built pithouses or people who built adobe pueblos? Ceramic data and its proximity to the Hot Wells Pueblo, suggested to Scarborough (1988; see also Bentley 1993), that the Hot Wells reservoir clearly dated to the El Paso phase (i.e., A.D. 1250-1450). No clear site association for the 41EP3504 reservoir is evident. The closest known pueblo or pithouse site is several km away (Whalen 1977; Mayberry 1992).

The authors previously suggested that the construction and maintenance of such a water catchment system could only have been accomplished by a group residing in a site(s) for extended amounts of time, namely during the El Paso phase (Leach et al. 1993:42). El Paso phase populations are seen as more sedentary than the earlier Mesilla phase populations, where a high degree of residential mobility in response to the spatial variability in water and food characterized the pithouse period (Whalen

Table 2. Radiocarbon dates

Beta #	C-13 Adjusted Age BP/ ^{13}C values	Calibrated Two Sigma Date Range	Dated Material	Depth bs
65371	1000 ± 70 / -18.8 o/oo	AD 895-1212	Soil	1.1 m
65372	1490 ± 60 / -19.6 o/oo	AD 426-662	Soil	1.5 m
65373	1820 ± 60 / -19.9 o/oo	AD 66-384	Soil	1.9 m
65374	1630 ± 80 / -20.8 o/oo	AD 243-636	Soil	2.3 m
65375	3340 ± 70 / -6.2 o/oo (^{18}O=-1.6)	BC 1720-1507	Pedogenic Carbonates	2.3 m

Note: Calibrations follow Stuiver and Reimer (1986, 1993).

1981a; Hard 1983a, 1983b). Our initial settlement analysis and dating of the reservoir (Leach et al. 1993) did not consider that groups, even ones that had invested significantly in architecture (e.g., adobe pueblos), could move frequently (Nelson and LeBlanc 1986), nor did it consider the substantial pithouse period settlements in the region (e.g., Hard 1983a, 1983b, 1986; Scarborough 1988, 1991; Miller 1989; Hard et al. 1994; Whalen 1994a, 1994b). We revise our original dating of the reservoir, suggesting that a date range of A.D. 1000-1250 may be most appropriate.

DISCUSSION AND CONCLUSION

The 41EP3504 water storage basin documents one adaptation to the water-poor lowlands of the northern Chihuahuan Desert. The number of Late Formative sites located in non-riverine locations throughout the desert basin suggest that many water storage features may lie buried beneath the sands. Unlike the Hot Wells reservoir, which is located within 400 m of the Hot Wells Pueblo (Scarborough 1988), no substantial Late Formative period sites are located anywhere near the current feature. Did the reservoir function as a catchment for water for human consumption or for ponding water to irrigate agricultural fields in the immediate area? Locating a residence near the water reservoir would have been advantageous, but not a necessity. However, if the reservoir functioned to hold water for irrigation of fields in the distal Piedmont area (see Hack 1942), the feature could be maintained from a great distance. Currently, either scenario, or combination of scenarios, is plausible.

Rapid infilling following disuse has meant that all but a few of these features have gone undetected. The unique surface characteristics of 41EP3504 underscores the importance of understanding the local geomorphology to locate such features in eolian environments where eolian and/or alluvial sedimentation has masked the underlying basins. Surface artifact assemblage distribution patterns dominated by ceramic jar fragments located in areas of optimal surface runoff may be important variables to consider when surveying such areas.

There is no doubt that the knowledge to successfully engineer and maintain water storage systems allowed populations to invest in the construction of architectural sites away from permanent water sources (Haury 1956), and to inhabit "somewhat less-than-ideal environmental settings" (Neely 1974:41). However, the paucity of rainfall and its erratic nature, coupled with the high evaporation rates characteristic of the region, suggest that these features may not have held water year-round.

A similar water adaptation is noted for the G/wi bushman of the arid central Kalahari Desert in Africa (Silberbauer 1981). Like the northern Chihuahuan Desert, a low mean annual rainfall (25-35 cm) and a high annual evaporation rate (280 cm) characterize the central Kalahari Desert (Silberbauer 1981:33, 220). In this arid region, the G/wi bushman take full advantage of the sparse rainfall by increasing the water holding capacity of existing, natural, calcrete depressions in the valley floor through excavation and redirection of runoff into the newly enhanced sinks (Silberbauer 1981:221). Through this water management system, the G/wi bushman are able to extend the pool life of a given source to six to 24 days, depending on the size of the pool and available shade around the pool area. However, the availability of this resource to the G/wi is seasonal and precarious, given temporal and spatial variability of the local rainfall. Clearly, water control has to be an important subsistence strategy for populations in the dry desert lowlands. While the ability to capture seasonal runoff in water basins in marginal environments may have allowed for the expansion of some settlement systems, any models concerning non-riverine adaptive strategies must also consider the limitations (e.g., unpredictable rainfall and the low winter precipitation) of those features as well as the population's response to such limitations in the northern Chihuahuan Desert. The presence of water storage reservoirs in the lowlands between A.D. 1000-1250 may also mark the increased importance of cultivated crops in the diet.

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Head of the Concho Stage Station (41IR95)

Larry Riemenschneider

ABSTRACT

Prior to and after the Civil War, many wilderness roads crossed Texas. Among these roads were the overland stage routes that provided transportation for travelers, as well as mail service. As the routes were established, numerous stage stations were strategically located to provide a place to exchange tired teams of horses and mules and supply drivers and passengers with water, food, and lodgings. This paper provides information on one of these stage stations, Head of the Concho (41IR95), which provided service for both the Butterfield Overland Mail and the San Antonio-El Paso Mail.

HISTORICAL SETTING

Stagecoach lines came into existence at different times, but all of them were established for the same reason: communication. When gold was discovered in California in 1848, people flocked to the West Coast. Upon their arrival, they demanded that the federal government establish trails, forts, and mail services. Various routes between the settled East and California were surveyed, and by the time California was admitted to the Union as a state in 1850, the most favorable routes for mail service were known. This opened the way for the establishment of the stagecoach mail lines. The lines provided mail and passenger service in a vast area, and did their part to settle and hold together a young, expanding nation (Scannell 1970-1972).

The first mail contract from San Antonio to Santa Fe was issued to Henry Skillman by the Postmaster General in 1851 (Austerman 1985). The route stretched from Santa Fe to El Paso, and then ran east to San Antonio by the lower road (Figure 1). In 1854, the contract with Skillman expired and the contract was then awarded to the low bidder, David Wasson, who later sold the contract to George Giddings in March 1855. Giddings continued to operate the San Antonio-Santa Fe line until 1862; however, by 1858, the Santa Fe portion of this line was only a branch of a much larger endeavor, a line from San Antonio to San Diego (Austerman 1985).

By the summer of 1858, the El Paso Mail had proven that time and distance could be mastered across these arid reaches if men were willing to accept the challenge. This challenge moved Giddings to invest even more of his dwindling resources in improving the mail line. At great expense he set out rebuilding his ruined stations and ordered the construction of a string of new ones. During this time, a new company emerged. Giddings saw John Butterfield sign a mail contract in 1857 and prepare to launch his operations with the backing of $2 million in capital stock. No expenses were spared to have the coaches rolling by the deadline in 1858.

The newly organized Butterfield company had purchased over 1500 horses and mules, 250 coaches, a fleet of freight and water wagons, and all the other items of equipment needed to run a stage line in the wilderness. Approximately 800 employees were already at work surveying the route, digging wells, and building the 141 stations that marked the 2800 miles between St. Louis and San Francisco. The Butterfield route from St. Louis to San Francisco joined the Giddings route near El Paso (Austerman 1985).

Butterfield's mail line through Texas intersected the Middle Concho River, and continued along the north bank until it crossed the headwaters of the Middle Concho. This was referred to at the time as the source of the Middle Concho (see Figure 1). This was the last dependable water source on the route west until the Pecos River 75 miles away.

The need for a station at the head of the Concho was met by the construction of the first of a chain of 25 stone and adobe, fortified, stations built by the company at other strategic points on the route between this station and mission camp in Arizona

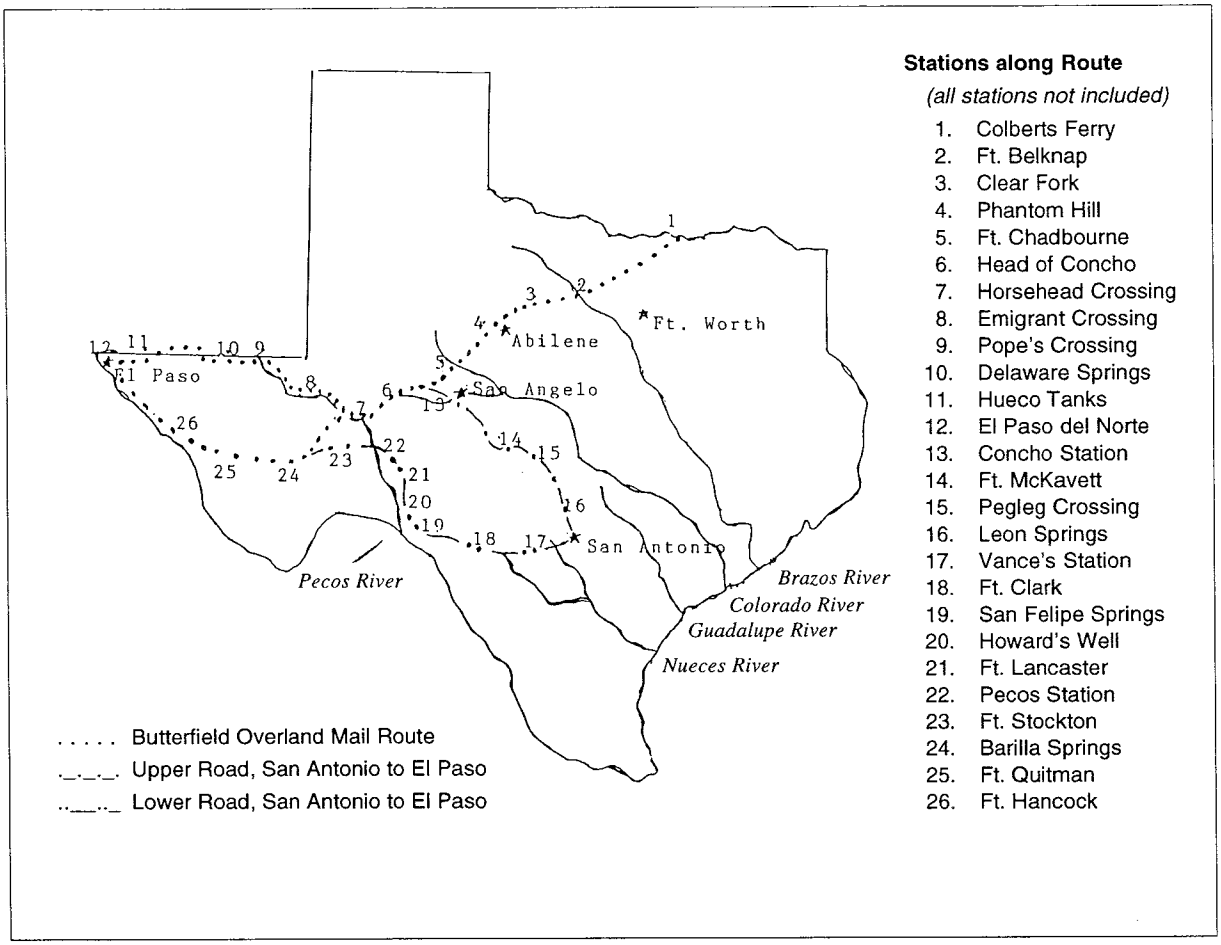

Figure 1. Overland Mail Routes across Texas (after Ormsby 1942 and Austerman 1985).

(Conkling and Conkling 1947). These stations were built on a modified plan of the old *posada* or inn that was introduced into Mexico by the Spaniards. These stations were high-walled (usually 3.4 meters high), square or rectangular, enclosures or corrals with a number of small rooms attached to the inside walls. The one entrance was wide enough to admit a coach and team, if necessary. There was ample room within the enclosure for a herd of stock, a supply of water, fodder, provisions, arms, and ammunition. These little fortresses provided a secure stronghold for its inmates against attacks (Conkling and Conkling 1947).

Waterman Ormsby, the only through passenger on the first west-bound Butterfield stage, described stopping at the head of the Concha (Concho) River early on the morning of Saturday, the 25th of September 1858, and found a most comfortable camp. The men had not yet had time to build houses and were living in tents. Ormsby stated that they had built corrals of bushes and had a large stock of mules. The stage's arrival was unexpected, and all haste was made to prepare a meal for them and start them on their journey. A good-natured Dutchman, who served as cook, quickly arranged the tin cups and plates, prepared broiled bacon, shortcakes, and coffee, which Ormsby considered to be quite an aristocratic meal for such an early settlement. Ormsby (1942) watched for nearly an hour as "greasy Mexicans" wielded their "larriettos" (*las reatas*) trying to catch and harness wild mules for the teams. The mules, so frightened and nearly choked to death, were tired out before their 75 mile trip across the staked plains to the Pecos River.

The main station building at the Head of the Concho was not finished when Ormsby traveled on the first west-bound stage; however, it was finished before the cold weather in December 1858. Sometime later, a number of small stone huts were erected to accomodate the guard of foot soldiers that were detailed there (Conkling and Conkling 1947).

Accounts of Indians (probably Comanches) in the vicinity of the station in 1860 culminated in an attack on the station in which the station agent was slain. A 12-year-old boy, who was herding the station mules, was cut off from the station by the Indians. After a lengthy detour, the boy circled back to the station, and he credited his survival to his well-shod horse, which outdistanced the Indians over the rocky ridges (Haley 1952).

Despite the skirmishes encountered along the Butterfield overland mail route, the stages kept running and never in its history on the southern route was the mail lost or destroyed. All of the employees kept in mind Butterfield's first instructions: "Remember boys, nothing on God's earth must stop the United States Mail" (Scannell 1970-1972:25). Butterfield stepped down from the presidency of the company in 1860, and his loss was reflected in the decline of morale and discipline, but still the coaches ran until 1861. With the election of Abraham Lincoln, and secession of the Southern States, the southern route became impossible. On March 16, 1861, the Post Master General ordered the Overland Mail to suspend its Southern Operations. Gidding's route from San Antonio to El Paso continued operations until the Civil War stopped it as well (Scannell 1970-1972).

After the closing of the Gidding route in 1862, Bethel Coopwood reopened the route from San Antonio to El Paso in 1866, again using the lower road (see Figure 1). Coopwood's attempt at operating the mail route ended in the fall of 1865, when he yielded control of the company to Federick Sawyer. In September 1867, Benjamin Ficklin joined Sawyer as a partner in the company and soon took on the complete operation. After a short time, Ficklin's company was ordered by the U.S. government to make a series of major alterations in the company's service. On March 1, 1868, Ficklin's company shifted its route from the old lower road to a new upper road (see Figure 1). Some of the old Butterfield stations between the Concho and Pecos rivers could be rebuilt and utilized by Ficklin's Company; thus, the Head of the Concho station was again placed into service as a mail station (Austerman 1985).

As the station now provided service for Ficklin's El Paso line, the Comanche Indians continued to present problems. The wet winter had brought good pastures to the plains that spring and gave strength to the Comanche's ponies. By June, they had swept down from the Llano Estacado and were in full force along the mail route. On the 17th of June 1868, nearly 30 Comanche attacked the Head of the Concho station, stampeding both mail company and army stock in the face of heavy fire from the picket guards. The trouble continued as groups of up to 150 Comanches were seen roaming the country beyond the Head of the Concho (Austerman 1985).

Indian raids continued on the mail station into the summer. The pickets remained to help guard the station. In the fall, orders were issued by Captain George H. Gamble, the commandant at Fort Concho, to erect a fortification, a stone building, at the head of the river (and 200 m north of the station) to protect the mail station. The stone structure was completed, and Gamble again gave orders to detach 25 well-mounted men to maintain this outpost (Haley 1952).

The building of the military outpost and the large detachment of soldiers stationed at the post did not deter the Comanche. During the summer of 1870, a war party chased the El Paso stage into the Head of the Concho station. The stage had its baggage boot shot full of arrows. Less than two weeks later, the Comanche attacked the station and captured some of its stock before the herders drove them away (Austerman 1985).

Ficklin's mail route continued serving the Southwest during the post-Civil War reconstruction period. With the unexpected death of Ficklin in March 1871, the company operated under Francis Taylor, who had joined the company in 1869, and Sawyer, Ficklin's partner. The company still felt the effects of the Comanche, as they repeatedly attacked the Head of the Concho station in June 1871. No records of further attacks on the station were recorded until 1875, when the Head of the Concho station was attacked twice in one week. During the same week, Sawyer died in the East, and the company was again reorganized, with Taylor retaining control of the route west of Fort Concho to El Paso. After Taylor's death in 1879, Charles Bain operated the El Paso route until its closure. The last recorded skirmish at the Head of the Concho was in August 1876, when a herd that was stolen by rustlers from Lipan Springs was captured there (Austerman 1985).

During the decades of service the mail lines had provided in the region, they had endured much turmoil. The intrigues and economics of the Post Office Department, and the ceaseless depredations of the Indians and Comancheros, among other fac-

tors, had failed to destroy the company. However, the closing of the El Paso Mail came when the Texas and Pacific Railroad reached El Paso from the east in January 1882 (Austerman 1985).

SITE LOCATION

Head of the Concho Station (41IR95) is located in West Central Texas in the northwestern corner of Irion County, near the boundary line of Irion and Reagan counties, on the Rocker B Ranch. The station ruins are on the first terrace, approximately 150 m east of the Middle Concho River, and approximately 400 m upstream from the confluence of the Middle Concho River and Centralia Draw.

ARCHEOLOGICAL INVESTIGATIONS

The investigations at the Head of the Concho Station are tied to the Rocker B project. The project began when The University of Texas, Texas Archeological Research Laboratory's (TARL) All-American Pipeline project brought a survey crew to Reagan and Irion counties. Various collectors in the area talked of large numbers of unrecorded prehistoric and historic sites on the Rocker B Ranch. Subsequently, Dr. Solveig Turpin (then with TARL) contacted the Texas Scottish Rite Hospital for Children, current owner of the Rocker B, and worked out an agreement with the Board of Trustees permitting access to the ranch for systematic site recording. The University and the Hospital were both parties to this agreement, with the proviso that the majority of the work would be conducted by the Concho Valley Archeological Society (CVAS), with oversight by Dr. Turpin and the author.

Investigations on the ranch began in the spring of 1993 when the author met with Rusty Culp, ranch manager, to develop a plan for surveying the large ranch (over 300 square miles). Surveying a ranch of this size with a small group of volunteers seemed almost impossible, but after studying the USGS 7.5' maps, a decision was made to begin at the Middle Concho River where it enters the ranch on its northern boundary. One of the first sites recorded by the CVAS was the ruins (Figure 2) of the Head of the Concho Station.

The ruins include a limestone structure divided into three sections (Figure 3). Area A measures 15.9 x 10.7 m with a small 3.7 x 5.4 m extension on

A

B

Figure 2. Ruins of the Head of Concho Station: a, corral, looking northwest; b, ruins of rooms to the left and the corral ruins to the right.

the north wall. The eastern entrance to Area A is wide enough to admit a stage coach and team. The enclosure, containing 170 m^2, provides ample space to house a herd of livestock as well as turn around a team and coach. This large area was presumably a corral for the station, with the small extension on the north wall serving as a storage area for water, fodder, and supplies. On the north wall of the storage area, a small 1.5 x 0.5 m offset in the main wall is discolored, and the limestone rocks have been thermally altered, suggesting it was a fireplace that served as a blacksmith forge for repairing equipment, and a cooking area to provide food for the inhabitants of the station.

In the northwest corner of the storage area, near the fireplace, a doorway opens into a room (Area B) measuring 4.1 x 6.95 m. This room, with a doorway and located near the fireplace, is likely a

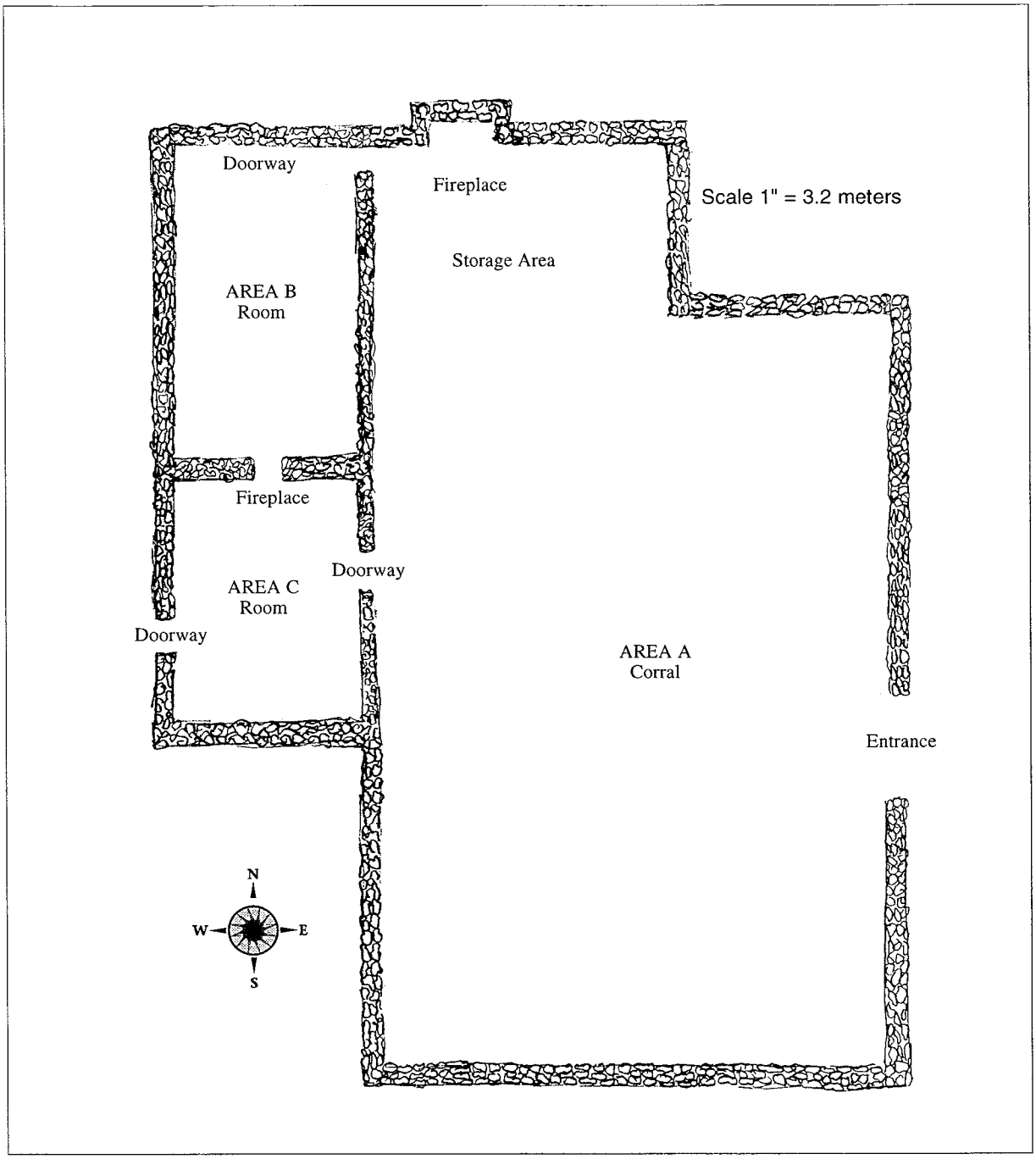

Figure 3. Plan Map of the Head of Concho Station.

living area, possibly a kitchen and dining area for the station.

The remaining area of the structure (Area C) measures 4.1 x 5.45 m. It has two doorways, one which enters the corral and one which leads to the outside of the structure (see Figure 3). This room may have served as a living and sleeping area. The limestone rock wall between areas B and C had been thermally altered by heat, suggesting a fireplace was present between the two rooms. A fireplace in this location would serve to heat both rooms as well as provide another cooking area for the kitchen.

Four features were observed outside of the structure (Figure 4). Two features south of the station contained 4 x 5 m scatters of limestone rocks

that were 50 x 75 cm in size. These were the same type of rocks used in the construction of the station, and are the probable ruins of the picket guardhouses constructed to house the foot soldiers guarding the station.

One feature northwest of the station had a heavy concentration of metal and glass on the surface (see Figure 4). Broken bottle glass, pieces of ceramic dishes, rusted tin cans, and rusted metal represent a trash dump of the station.

South of the station, the old roadbed cut by wagons and stagecoaches as they traveled the mail route is now 20-50 cm deep and 3 m wide (Figure 5). The depression enters from the south, crosses the entire site, and exits to the west as it crosses the Middle Concho River (see Figure 4).

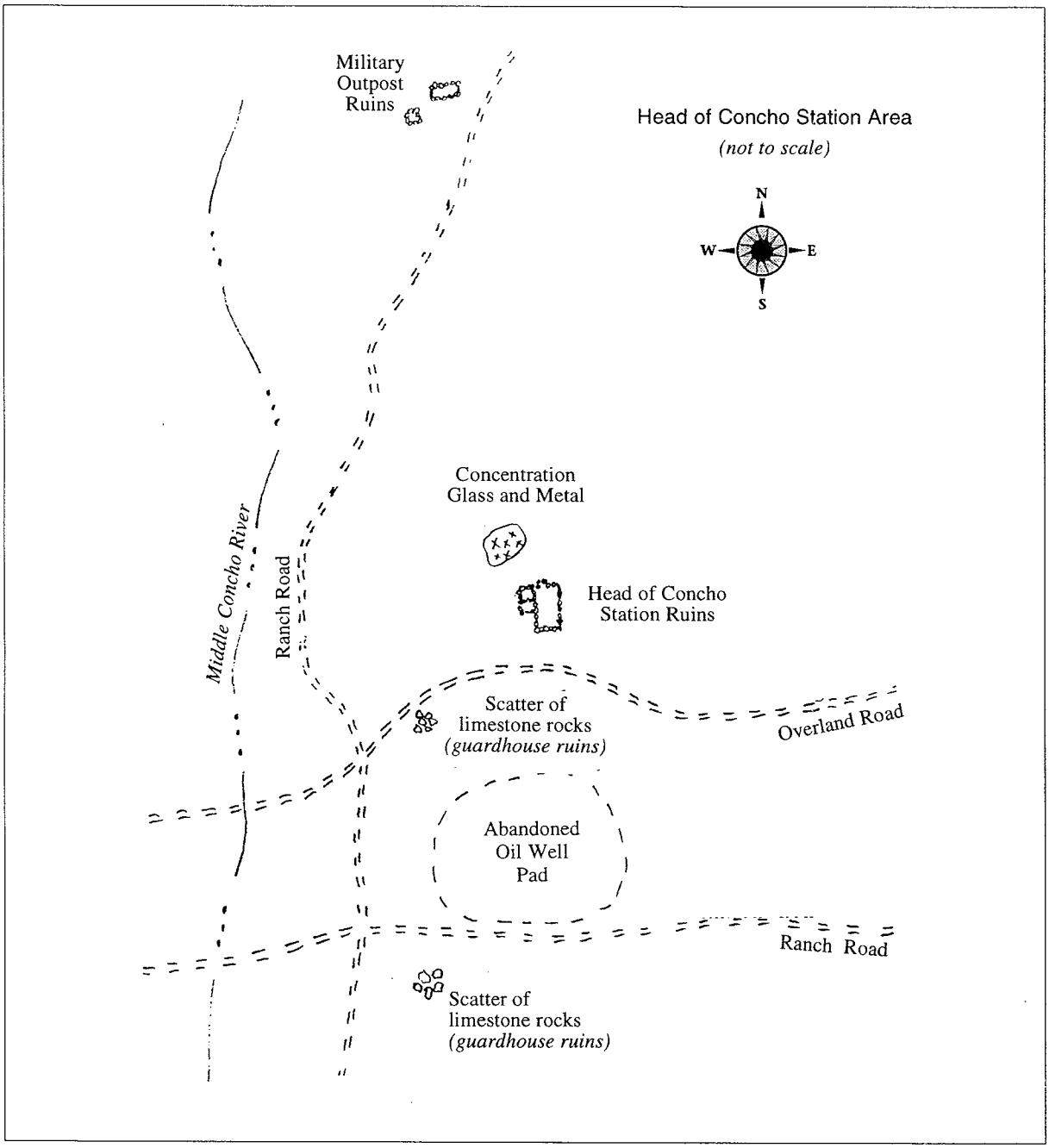

Figure 4. Plan Map of Head of Concho Station ruins, military outpost ruins, the guardhouse ruins, and the overland wagon road.

Figure 5. Old stagecoach and wagon roadbed south of the station.

ARTIFACTS

An extensive surface survey was conducted in the area surrounding the station. Artifacts from the Head of the Concho Station consisted of mid-to-late 19th century broken glass, including purple and green bottle sherds, square nails, cartridges, lead bullets, unidentified fragments of rusted metal, a rivet, and a buckle. This section presents descriptive data on a few select artifacts from the Head of the Concho Station.

A number of lead balls, bullets, and cartridges from revolvers, carbines, and rifles are present that were discarded at the station during its use as a mail stop. Table 1 provides specific data on these artifacts (Figure 6a-h).

Other artifacts from Head of the Concho Station are illustrated in Figure 7. They include large and small square nails, horseshoe nails, a small rivet, a small metal buckle, and the applied lip of a blue-green liquor bottle (see Figure 7g).

CONCLUSIONS

The Head of the Concho Station (41IR95), though in ruins, has suffered little destruction. Many stations along the mail routes in Texas have been destroyed. For example, the Smith Station on the Butterfield route near Albany, Texas, was destroyed as the limestone rocks which were used to build the station were removed in the 1930s from the site to build a roadbed (Riemenschneider 1993).

The walls of the Head of the Concho Station structure have fallen, leaving the foundation intact. The foundation is from a *posada*-like structure (Conkling and Conkling 1947) that housed a corral

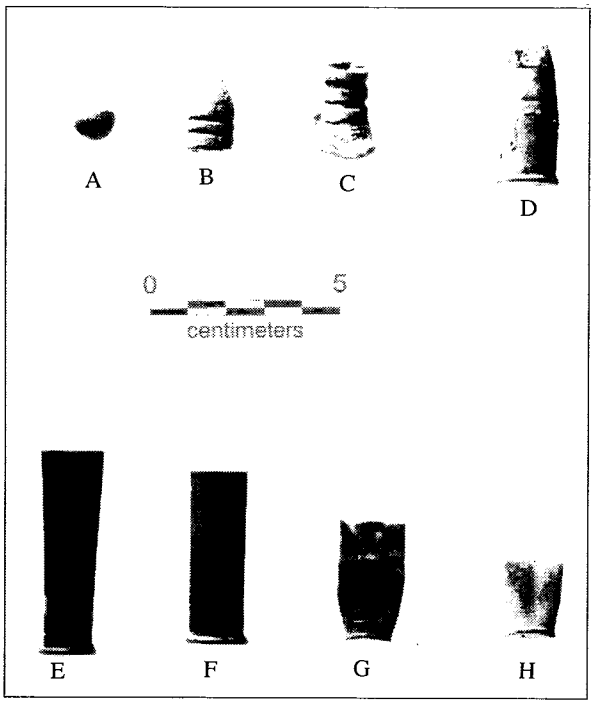

Figure 6. Artifacts from Head of the Concho Station: a, cast lead ball; b, .50 caliber lead bullet; c, .45 caliber lead bullet; d, 56-.56 Spencer cartridge; e, .45-70 U.S. government cartridge; f, .50-70 U.S. government cartridge; g, .45 Colt revolver cartridge; h, .44 Henry cartridge.

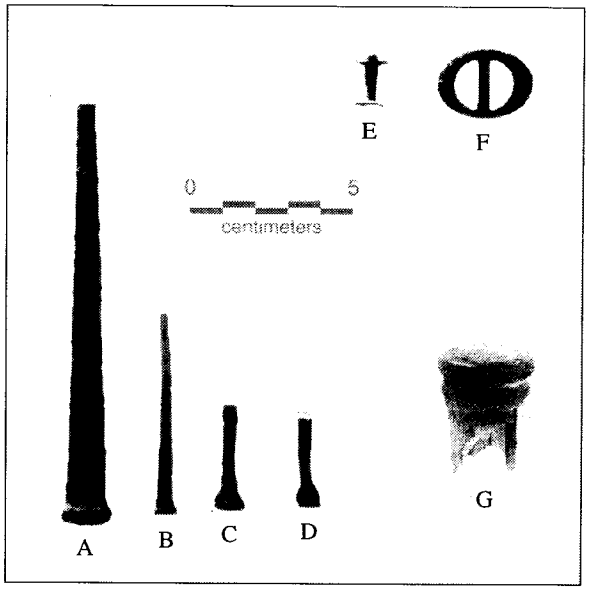

Figure 7. Other artifacts from Head of the Concho Station: a-b, square nails; c-d, horseshoe nails; e, rivet; f, buckle; g, bottle lip.

Table 1. Lead Balls, Bullets, and Cartridges

Artifact	Diameter	Wt.	Caliber	Fired	Type	Figure
Cast lead ball with cut sprue	.456 mm	-	-	No	Colt or Remington cap and ball revolver	6a
Swaged lead bullet	-	350 grains	.50	No	56-.50 Spencer	6b
Swaged lead bullet	-	383 grains	.45	Yes	.45-70 U.S government carbine load	6c
Rim fire cartridge	-	-	.56	Misfired	56-.56 Spencer rim fire	6d
Inside primed center fire cartridge (Benet)	-	-	.45	Yes	.45-70 U.S government (1870s)	6e
Inside primed center fire cartridge (Benet)	-	-	.50	Yes	.50-70 U.S government (late 1860s-early 1870s)	6f
Inside primed center fire cartridge (Benet)	-	-	.45	Yes	Colt revolver, U.S. government (1873-1874)	6g
Henry rim fire cartridge	-	-	.44	Yes	.44 Henry manufactured by Winchester[1]	6h

[1]Fired in either a Henry rifle or a Winchester Model 1866 rifle, as indicated by the dual, opposing, firing pin indentations.

with a small storage shed and fireplace, and two rooms with a central fireplace for both rooms. Also present are the picket guardhouses and a station trash dump.

Head of the Concho Station, appropriately named because of its location on the head waters of the Middle Concho River, played a very important role in providing the necessities that were needed to survive the hostile environment of West Texas. Without this strategically-located station, the mail and transportation lines it serviced in Texas may have been very short-lived, thus hindering settlement during a very important era in our history.

ACKNOWLEDGMENTS

A very special thanks to Dr. Solveig Turpin for volunteering her time, professional advice, and guidance to the project. Thanks to the Board of Trustees of the Texas Scottish Rite Hospital for Children for the opportunity to survey the Rocker B ranch, and also to Rusty Culp, manager of the Rocker B, for his assistance and hospitality during our visits to the ranch. Thanks to Carole Medlar for taking the photographs and to Ron Ruiz for researching and identifying the artifacts. Thanks to Don Franks for drawing the preliminary plan view

of the stage station. Thanks also to the CVAS volunteers who contributed many hours to make this project a success. Finally, thanks to my family, Jo, Angela, Jimmy, and my dad, Adolph, for the many ways they supported this study.

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REVIEWS

The Archaeology of Spanish and Mexican Colonialism in the American Southwest, compiled by James E. Ayres, with contributions by Leo R. Barker, Rebecca Allen, Julian G. Costello, Frances Levine, and Kathleen Gilmore. Guides to the Archaeological Literature of the Immigrant Experience in America, Number 3, The Society for Historical Archaeology. 1995. 133 pp.

Reviewed by Nancy Adele Kenmotsu, Texas Department of Transportation

This slim, important publication by the Society for Historical Archaeology offers researchers bibliographies of the literature dealing with "the Spanish experience" (p. 1) in California, New Mexico, and Texas. The volume, third in the Society's Columbian Quincentenary Series, is divided alphabetically by state. Leo R. Barker, Rebecca Allen, and Julia G. Costello combined to complete the section on California, and Frances Levine and Kathleen Gilmore completed similar segments for New Mexico and Texas, respectively.

Each bibliography is prefaced by a discussion of the context of the archeological research of Spanish and Mexican Colonialism in that state, as well as an appraisal of the current status of Colonial archeology, and brief overviews of significant contributions. Thus, in California where tourism was a driving force for the interest in preservation of the Hispanic heritage as early as 1893, archeology at Spanish missions, presidios, and ranchos has been, and is "often still tied to restoration projects, and the types of questions asked still reflect interest in what the building, structure, or site looked like" (p. 13). In contrast, while restoration and stabilization of Colonial period sites has contributed to the Colonial archeological data base in New Mexico, Levine points out that the focus has been tied to "identifying the pueblos occupied at the time of Spanish contact, [and] tracing the routes traveled by the conquerors" (p. 53). In both California and New Mexico, however, the compilers are quick to point out that while these questions were the foundations of archeology related to the Spanish experience, today researchers—familiar with Wallerstein's world systems theory—are interested in how these far-flung colonies related to, or were affected by, world events.

Gilmore, grappling with the fact that Texas was colonized by two disparate processes—as a way station to Nuevo Mexico in the west and as a means to keep the French at bay in the east—places the archeology of the Spanish and Mexican colonial period in a context by first offering an historical sketch of the years 1519-1836. She then summarizes the archeological study of colonial sites, organizing the summary both by time and geographic area. The summaries illustrate how those studies have changed over time. Thus, in an effort to employ people during the Depression, early excavations in Texas were often completed by untrained personnel of the WPA and CCC, while analyses and reporting were minimal. Today, both personnel and methodologies are more sophisticated and concerted research efforts are being made to place the Spanish experience in a broader context. Nonetheless, the focus in Texas clearly continues to be the identification of missions and presidios. Identification and interest in domestic Spanish or Mexican sites is sporadic and generally driven by individual cultural resource management projects. As well, Gilmore points out that "few archaeological studies have been concerned with the colonists and their relationship to their material culture" (p. 115), suggesting that improvements are not only needed, but would be welcome.

The core of the volume is, of course, the bibliographic material. The references are extensive and provide a beginning point for researchers

working in or interested in the Colonial period. All compilers note that references have been missed; the literature is too voluminous to capture it all in one publication. It is also, as Ayres notes, unfortunate that Arizona is not included. Nonetheless, efforts were made to include as many references as possible for the three states, and researchers will find the volume is an important contribution to their source materials. While Texans will be particularly interested in Gilmore's section, they should not ignore the references for California or New Mexico. Both contain entries for specific material culture studies (e.g., beads, weaponry, majolica, etc.) as well as theoretical studies of the frontier experience that offer fine comparative frameworks for the investigation of the Colonial frontier experience in Texas.

The Pueblo Revolt of 1680, Conquest and Resistance in Seventeenth-Century New Mexico, by Andrew L. Knaut. University of Oklahoma Press, Norman. 1995. 248 pp., 8 illustrations, 2 maps.

Reviewed by Nancy Adele Kenmotsu, Texas Department of Transportation

The Pueblo Revolt of 1680 had major repercussions throughout northern New Spain. Among other things, it shattered any Spanish notion that native peoples would quietly acquiesce to demands by European colonizers. Knaut seeks to outline the causative factors of this revolt—both from the perspective of the natives and from the perspective of their Spanish overlords. His data base consists of a number of Spanish documents, most of which were translated into English in the early part of this century.

Knaut's scrutiny of the documents leads him to argue that the natives were not passive recipients of the hand that fate dealt them, and that the seeds of the rebellion were sown in the very earliest colonizing efforts of Oñate in 1601. For the next eight decades, the Spanish presence in Nuevo Mexico was marked by divisiveness. At the same time, their "numerically small [numbers]...made possible the preservation and continued following of the old ways" (p. 53). Knaut demonstrates fairly convincingly that the ability of the Pueblo peoples to retain the integrity of their lifeways while accommodating the Spanish newcomers was a primary cause of the revolt itself. The Pueblo peoples partially maintained their cultural values through their anger over the malnutrition and other indignities that they had suffered as a result of Spanish colonization. As Knaut (p. 170) ably points out, their feelings erupted when "more than eighty years of Pueblo fury fell upon New Mexico's Hispanic community."

While there is much to commend in this book for readers with an interest in the early contact period, two words of caution are advised. First, Knaut uses very little primary source material. To be sure, what he uses is of high quality. However, I anticipated that he would have combed a much larger sample of original documents in his search for the causative factors of the revolt, particularly those untranslated documents relating to the early interaction of Spaniards and Puebloan Indians. In the end, I could not help but wonder if more documents would not have led to somewhat different conclusions that he reached. Second, archeological data are neither considered nor acknowledged. Given the quantity of archeological investigations in New Mexico and the destruction of innumerable documents that took place as the Spanish fled to El Paso, I was frustrated to find such a rich potential data source ignored here. Knaut's failure to consider the available archeological data results in a depiction of the pueblos as occupied by bland, sedentary peoples who developed agriculture around 1500 B.C. (p. 59), an errant depiction that fails to capture the unique and rich lifeways of the diverse Puebloan societies encountered by the Spanish in New Mexico.

Nonetheless, the book is well written, providing a much needed re-evaluation of the Puebloan peoples' supposed passive acceptance of Spanish settlement along the Rio Grande, and the interaction between the colonists and natives. It is chronologically organized into three parts that Knaut prefaces with theoretical conclusions, followed by individual chapters that reveal the underpinnings of those conclusions. The book is recommended reading for individuals interested in either the Revolt or in the nature of the Spanish/Indian interaction in Northern New Spain.

Flags along the Coast: Charting the Gulf of Mexico, 1519-1759: A Reappraisal, by Jack Jackson. The Book Club of Texas, Austin. 1995. xii + 225 pp., plates.

Reviewed by Timothy K. Perttula, Texas Historical Commission

Jack Jackson's latest book on the colonial-era cartography of the Gulf of Mexico and the Texas Gulf Coast is published in a lavish and well-illustrated edition by The Book Club of Texas. The book's main purpose is to place European mapping and map-making within its late seventeenth and early eighteenth imperial and colonial context, the struggle for control of the Gulf Coast, and "to follow the far-reaching influence that [the Barroto/ Bisente maps] had on French and English cartography at a very critical juncture for the colonial aspirations of all three nations" (p. 3). In so doing, Jackson effectively counters the notion that Spain contributed little to advancing European geographic and cartographic knowledge of their New World possessions.

The book is divided into two parts. Part I focuses on Spanish exploration of the Gulf Coast, concentrating foremost on the breakthrough 1687 map (and diary) by Juan Enriquez Barroto, a senior Spanish pilot of the Armada de Barlovento, who played a key role in the search of the Texas Gulf Coast for the French explorer LaSalle (see Weddle 1987:129-205, 1991). Spain's heretofore static views and understanding of the Gulf Coast changed dramatically following Rene-Robert Cavelier, Sieur de LaSalle's ill-fated 1684 colonization attempt of the Texas Gulf Coast, as it led to a number of Spanish expeditions by sea and land that searched for LaSalle's colony. Barroto's December 1686-July 1687 diary and map was "the most complete description of record [of the Gulf coastal rim] since Alvarez de Pineda's sketchy beginnings in 1519" (p. 14).

Then Jackson turns to consider the cartographic history of Juan Bisente's 1696 map of the Gulf Coast, which he demonstrates from a comparison of toponyms and details of coastal bays, channels, islands and other topographic details must have been copied by Bisente, a fellow pilot of Barroto, from Barroto's now-lost map. It was Bisente's Gulf Coast chart that was taken by French pirates in 1697, who realized "its superiority over any chart the French possessed of these waters" (p. 24). The implications that this map had was considerable, once it was in French and English hands, because the map reshaped French and English knowledge of the Gulf Coast (as seen principally in maps by the Delisles), and they were then able to promptly profit from this knowledge in directing and hastening their own exploration and colonization efforts of the Gulf Coast in the early eighteenth century.

In Part II, Jackson considers the cartographic work of Valentin Devin, a French engineer who worked in colonial Louisiana, New Orleans and Mobile, between 1719-1735. Devin's maps, little known or appreciated in his own time, are representative of the improvements that French map makers made to the "pioneering efforts" of Barroto and Bisente (p. xi) some 20 to 30 years earlier. His map-making efforts bore fruit particularly in his 1726 map *Carte de la Coste de la Louisiane*, based on his more detailed and accurate surveys and soundings along the Texas Gulf Coast as far south as Aransas Bay, as well as in the mapping of the Mississippi River to above Natchez, the Red River to the French post of Natchitoches, and the river drainages east of the Mississippi. In Jackson's words, this map "was another milestone in the mapping of France's Gulf colony" (p. 73).

Jackson employs in *Flags Along the Coast* a wide variety of plates of sixteenth through eighteenth century European maps to illustrate the changing colonial perceptions of the Texas Gulf Coast and the struggle for imperial ambitions in the "Spanish Sea." These maps alone are worth the price of the book. As European knowledge of Texas and Louisiana advanced, lands away from the coast of these territories became better understood, such that beginning in the late 1710s many period maps had relatively accurate locations of Native American groups (such as Guillaume Delisle's 1718 *Carte de la Louisiane et du cours du Mississipi*, Jean-Baptiste Bourguignon d'Anville's 1731 *Carte des Isles de l'Amerique*, and Philippe Buache's 1740 *Carte d'une partie de l'Amerique pour la navigation du Golfe de Mexique*) The study of such maps is well-worth the effort because they illustrate group

boundaries and the territorial relationships of different Native American groups in Texas, changes in territories and group movements over time, and in certain cases they provide very specific locations for Native American villages (which is a great boon for the archeologist). As an example of the latter, Jackson includes the 1721 *Plan du Port francois* map by Valentin Devin that depicts a Native American village ("Pays de Natrones Errantes et Antropophages") about 0.5 leagues southeast of the mouth of the Trinity River where it enters Trinity Bay. The course of the drainages, and the shape of the bay, were accurately drawn by Devin, closely corresponding to modern topographic conditions on this part of the Texas Gulf Coast.

Jack Jackson's book will not fail to hold the interest of all of us captivated by the colonial and Native American history of the Gulf of Mexico, Texas, and Louisiana, and it is sure to be a pure joy to map readers, map makers, people interested in exploration, and cartographic historians alike. I heartily recommend this book, and its closely-related companion *Mapping Texas and the Gulf Coast* (Jackson et al. 1990), to the reader's attention.

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The Rediscovery of Santa Cruz de San Sabá, a Mission for the Apache in Spanish Texas, by V. Kay Hindes, Mark R. Wolf, Grant D. Hall, and Kathleen Kirk Gilmore, with Spanish document translations by Philip A. Dennis. San Saba Regional Survey Report 1, Archaeology Laboratory, Texas Tech University. Texas Historical Foundation and Texas Tech University, Austin, 1995. viii + 94 pp., figures and plates.

Reviewed by Robert S. Weddle, Bonham, Texas

The "rediscovery" of Mission Santa Cruz de San Sabá is precisely what this reviewer hoped for when writing a history of the mission and its protecting presidio in the early 1960s. The subject evokes a personal story that does not belong in a book review. But spare me a few lines.

In 1956, my family and I moved to Menard as the new owners of the local newspaper. As we familiarized ourselves with our new surroundings, my curiosity was aroused by the highway sign just west of town: "Mission San Saba." The sign, I was to learn, actually indicated the Presidio de San Luis de las Amarillas. A marker on the far side of town hypothesized the location of Mission Santa Cruz de San Sabá, which was burned in a deadly Indian attack in 1758; the actual site was not known. A spate of local legend, I soon realized, stood in the place of historical fact. Like a good reporter, I sought the truth. Eight years later, I published my findings in a book (Weddle 1964).

The mission site, however, remained unknown, as it had been since P. H. Hockensmith ran his plow through it in the 1880s or 1890s and turned up a human skull and pieces of ancient weaponry. Then had come the record flood of 1899, sweeping over the site and driving the Hockensmith family from their home (Hockensmith 1965). Half a century later, Hockensmith and the land he had tilled were all but forgotten. It became apparent that seeking the mission site was not a job for an individual with no particular qualifications and a business to run. Enter Dessamae Lorrain and Kathleen Gilmore, to conduct a study for Southern Methodist University, under contract to the Texas State Building Commission (Gilmore 1967). It was they who initiated the search that was to span almost three decades.

Never an undertaking to be accomplished at a single stroke, the quest was to involve several institutions, as well as individuals of diverse talents, methods, and perspectives. The most comprehensive effort—and the one that came closest to success—was conducted in 1990 by the Center for Historic Resources of Texas A&M University (Carlson 1991). It identified the Hockensmith place, now owned by Otis and Dionitia Lyckman.

Kay Hindes and Mark Wolf were to take the search one step farther. By means of aerial remote sensing, they located several promising anomalies, then enlisted the aid of Texas Tech archeologist Grant Hall and his Archaeological Field School. Field testing during the summer of 1993 failed to locate the mission site. In early September, however, Hall, Hindes, and Mark and Kim Wolf returned to test another anomaly on the Lyckman property. Finding it freshly plowed, they were able to collect Spanish colonial pottery sherds consistent with the 18th century Spanish mission, as well as pieces of fired daub suggesting the chinking of log *jacales*, remnants of a fire.

Two grants supported a ground-penetrating radar survey and (in January 1994) further site investigations for unequivocal proof of the mission site. Another excavation the following May disclosed additional posthole molds. Although the site is within a field that has been cultivated for more than a century, traces of shallow features such as wall trenches remained. Artifacts recovered—a religious medallion, glass and stone beads, nails, and fired musket balls—are consistent with other Spanish sites, as well as with proven aspects of the mission's history.

Further work at the site, needed to find the deeper features and determine the full extent of the mission complex, now awaits additional funding. Indeed, a lack of funding to maintain a continuity of effort appears to have been a problem all along. Kathleen Gilmore, having initiated the San Sabá quest, went on to investigate other Spanish colonial sites after funding ran out. The study directed by Shawn Carlson (1991) for Texas A&M University seemingly was terminated at a crucial point, thus frustrating its complete success. These examples

suggest a need for a sustained program that would enable a more efficient use of public and private resources than is evident in the on-again-off-again approach to the San Sabá quest.

Historical archeologists will find much valuable information in this report, presented clearly and concisely, yet with adequate detail. A historical introduction, however, might have given it a slightly broader appeal.

Only a few minor matters beg correction. The idea that "suppression of the raids made by the Northern tribes (particularly the Comanche) upon the mission settlements in San Antonio" (p. 5) was a reason for founding the San Sabá mission is slightly askew. In truth, it was a long-standing conflict with the Apache that the enterprise sought to end through the natives' Christian conversion. The Comanche at this point had not yet made war on Spanish settlements in Texas.

The description of Harris Hollow, which courses past the mission site, as "an abandoned channel of the river" (p. 19), also is incorrect. Rising in the hills south of Menard, the hollow follows its own channel to a juncture with the San Saba River near the mission site.

Yet, as the authors conclude (p. 65), their accomplishment demonstrates that "the multidisciplinary approach utilizing synthesis of archival, archeological, and architectural data can be employed to pinpoint 'hard-to-find' locations." Thus, hopes are raised that significant sites that have, like this one, been ravaged by the plow, floods, or other destructive forces may yet be found. The rediscovery of Mission Santa Cruz de San Sabá represents a triumph for all who seek.

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Aboriginal Life and Culture on the Upper Texas Coast: Archaeology at the Mitchell Ridge Site, 41GV66, Galveston Island, by Robert A. Ricklis, with contributions by Joseph F. Powell, Barry W. Baker, Meredith L. Dreiss, and Jeffery A. Huebner. 1994. Coastal Archaeological Research, Inc., Corpus Christi, Texas, xv + 559 pp.

Reviewed by G. Lain Ellis, Texas Historical Commission

Leland Patterson (1996:2) recently claimed in a study of Southeast Texas archeology that "most hunter-gatherer theory is not useful or significant." It would be a shame if Patterson is correct because Robert A. Ricklis' *Aboriginal Life and Culture on the Upper Texas Coast* is a sterling example of using hunter-gatherer (and other) theory to reconstruct and understand the past. Since Patterson dominates the archeology of the Upper Texas coast in terms of raw numbers of publications, it is worth reviewing this report in light of his claim.

Most cultural resources management reports start with dull background sections, probably a result of the obligatory fulfillment of tradition and Council of Texas Archeologists guidelines. Unlike many authors, however, Ricklis approaches these sections as an opportunity to provide relevant information. As a result, for example, the details of local geology become evidence in interpretations of features and settlement history, and comparative patterns of French and Spanish colonizing behavior become evidence for interpreting what happened to Galveston Island's aboriginal residents. Furthermore, this report focuses its summary of culture history on problems of interest to the Late Prehistoric to early Historic period archeology that emerges in later chapters. In these respects, the report reflects sound historical method by setting up a study of problems rather than periods (cf. Collingwood 1939:125).

The problem focus is maintained not only in the form of data presentations, but also in the form of substantive arguments ranging in scope from identifying feature functions to explaining the composition of various artifact classes and the history of aboriginal settlement. Ricklis tells us why he believes what he asserts and grounds his assertions in arguments for the best explanation. Thus, the reader has an opportunity to evaluate Ricklis' choices among competing claims and, whether or not one accepts his choices, to extend the discussion to matters Ricklis may not have entertained. Examples of this occur in his discussions of subsistence and lithic material use.

The faunal analysis is preceded by a discussion of alternative methods for determining the dietary contributions of various fauna. Ricklis infers, with appropriate methodological and theoretical hedges, that the faunal diet at Mitchell Ridge was based primarily on fish and mammals, with shellfish playing a minor role. A few fish species are preponderant in the assemblage. Nearby micro-environmental characteristics are congruent with easy procurement of large numbers of bone fish, but not shellfish. Hispid cotton rats (6.3-13.9 percent of the meat) are the most common mammals on the island, but deer (15-36.2 percent of the meat) and at least one bison (not calculated in an appropriate hedge) provided most of the mammalian meat. However, since the island is unlikely to have supported any bison or many deer, Ricklis concludes that these were obtained on trips to the mainland.

The emerging picture is one of people camping where fish, rats, and (Ricklis argues on theoretical grounds) plants could be obtained nearby, but also ranging across the bay for large mammals. If Ricklis' conclusions are correct (they are well argued within plausible limits of method, evidence, and theory), then fish, small mammal, and plant procurement technologies were forager-organized systems, whereas procurement of larger mammals was a logistically-organized technological system. The small amount of shell implies that shellfish procurement was either a forager-organized system in an environment with sparse nearby resources (Ricklis' preferred option), or a logistically-organized, bulk-reduction system with only small amounts of shell coming back to camp, perhaps for use as tools (such as the shell hearths). Hence, although Ricklis does not explicitly use his subsistence discussion as an account of the spatial organization of Late Prehistoric and early Historic subsistence technologies, his arguments and attention to evidence nonetheless lend themselves nicely to this consideration.

Ricklis' model of lithic material use is itself a model of using evidence to argue for the best causal explanation within a theoretical framework (cf. Miller 1987). Drawing on a general theory of how hunter-gatherers use stone at varying distances from the nearest source, and a well-substantiated macro-level model of material use in the central Texas coast area, Ricklis proposes several expectations that should characterize lithics at Mitchell Ridge, more than 70 km from the nearest apparent source. Consistent with expectations, the average length of Perdiz arrowpoints is quite short, reflecting an emphasis on resharpening and, perhaps, a production system that often starts off with small flakes. A low flake:tool ratio also meets expectations. Although the very high percentage of tertiary flakes deviates from expectations, it deviates in a direction consistent with the underlying theory (i.e., cores and bifaces may have been largely exhausted before getting to Mitchell Ridge, thereby inflating the percentage of tertiary flakes by reducing opportunities to produce primary, secondary, and thinning flakes).

However, a very low percentage of utilized flakes (5.9 percent) deviates wildly from expectations. Ricklis notes that the poorly preserved shell does not provide evidence for confidently inferring whether shell substituted for stone, and that the scarcity of cutting and scraping tools is counterintuitive at a site where vertebrate faunal exploitation was a major activity. His preferred explanation is that the low ratio follows from the small size and thinness of flakes. However, given that large-game hunting was a mainland activity, he underplays the possibility that larger and/or utilized flakes are scarce because they were used in activities that took place elsewhere. It would be natural to infer that butchering tools (including larger flakes) would be selectively carried to the mainland where they could be systematically lost or broken in use. Thus, although small average flake size undoubtedly is a major causal influence on the low percentage of utilized flakes within the macro-level model, the *extremeness* of the low percentage may follow in part from the meso-level spatial organization of work involving large game. Site-level spatial organization of ritual and work also selectively removed usable flake tools because about 12 percent of the total blade and utilized flake assemblage occurs in two human burials that are contemporaneous with the analyzed assemblage.

Joseph Powell's analysis of human burials maintains the pattern of mustering evidence and theory. Although the present reviewer is unqualified to comment on the appropriateness of Powell's bioarcheological methods, he recognizes good arguments when he sees them, and he sees them here. Like Ricklis, Powell tells the reader why he believes his methods are appropriate, and in laying them out, he gives us what we need to evaluate his choices (if we are competent) or to learn something (if, like the reviewer, one is not competent). Given his choices, what follows is a robust data interpretation backed up by explicit arguments for his conclusions. Powell's argument against cannibalism for burials 92-1a and 92-1b is an outstanding example of drawing evidence-based conclusions. His lack of commitment to a paleodemographic interpretation is an outstanding example of restraint when faced with causal comparison among alternatives that each find substantial support in the available evidence.

Although Powell acknowledges that very specific explanations of biological change at Mitchell Ridge are difficult to derive, he nonetheless provides us with a picture that is simultaneously remarkable for its apparent technical virtuosity and its humanity. If one accepts his methods, his arguments for declining health, changing work loads, changing diet, and genetic Europeanization of the mortuary population are compelling despite the fact that we cannot tell whether or not the population represents individuals from a single, historically continuous social group. And very close to the surface in the technical analyses are individual persons who were committed to the hereafter in a variety of rituals that retained striking continuity amidst changing conditions of life. That these people maintained a rich and vital sense of ritual and art as they went about their lives is amply illustrated by Meredith Dreiss' and Ricklis' descriptions and interpretations of the objects, made and found, that were buried with the dead.

The Mitchell Ridge report is a fascinating document, especially in light of Patterson's normative claims about doing archeology. To be sure, the authors could have reduced the report's bulk by eliminating or drastically curtailing argument, method, and theory, but what would they have given us if they had? Any individual section of the volume clearly shows the high interpretive value of careful, relevant deliberations over causal alter-

natives emerging from theory, evidence, and method. Reducing the theoretical bulk would have avoided extra thickness at the expense of transforming an important volume into a catalog of neat stuff strung together in otherwise empty spatial and formal relationships. As Quine (1960:22) notes, we do not and cannot see through atheoretical lenses. As Ricklis and colleagues vividly–if unintentionally–demonstrate, making artifacts speak about hunter-gatherers involves theory, and to abandon theory is to transform archeology into antiquarianism or metaphysics.

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Exploring Ancient Native America: An Archaeological Guide, by David Hurst Thomas. MacMillan, New York, 1994. xxii + 314 pp., figures, maps, and plates.

Reviewed by Pennie M. Lowetz, Weatherford, Texas

The first thing I did when reading this book was look at the pictures. I was impressed. But what did the rest of the book have to offer? It had the potential of being a very interesting archeological adventure through North America. The author promised "a personally guided tour through the first 1000 generations of American history," and he delivered!

The book is written in everyday, non-technical language (as Thomas puts it, no "archaeological tech-talk"). This makes it appealing to both the professional and avocational archeologist and those with a new found interest in America's past. The author's knowledge, experience, and sense of humor comes through, making the book an enjoyable reading and learning experience.

There are eight chapters in the book, each focusing on a different grouping of Native American cultures and sites. They are presented in chronological order, from Paleoindian through historic contact, including "Global Prologue," "The First Americans," "Spreading Out Across America," "Agricultural Imperatives in the American Southwest," "Harvesting the Eastern Woodlands," "Mississippian Transformations," "Colliding Worlds: Old and New?," and "Epilogue: An Enduring Encounter." Do not read it expecting an encyclopedic listing of archeological sites and museums. Instead, Thomas discusses only sites that are readily accessible to the public, that encourage visitation, and protect visitors and the archeological record. Throughout the book, he stresses "preserving the past for others to follow" (p. xxii).

Each chapter contains many excellent drawings, photographs (with two sections of color photographs), maps, and charts. Sites discussed in the chapters are in bold print, with directions, phone numbers, and brief descriptions. There are many sidebars, with information ranging from linguistic discussions of Native American migrations into North America, radiocarbon dating, Native American perspectives on the past, to protecting/preserving sites. At the end of each chapter, Thomas lists additional relevant sites/museums worth visiting.

Of particular interest to this reviewer in the book were the Native American perspectives on human origins (Chapter 1), and Thomas' discussion in Chapter 2 of the research by George Frison (University of Wyoming) with the Zimbabwe Division of Wildlife to conduct studies in elephant (mammoth) hunting using Clovis hunting methods and techniques. Also noteworthy was Thomas' examination of the different circumstances in which Native Americans and Europeans came into contact, beginning with Norsemen around A.D. 1000 (Chapter 7), which highlights religious missions, commercial colonies, military establishments, and battlefields, as well as the "reality" of mission life for Indians, the battle of the Little Bighorn, and how infectious diseases took their toll on native populations. To conclude the book, Thomas follows this discussion with an intriguing look at Native American traditions and religions today. Respect for the Native American heritage is appropriately stressed.

The book contains an impressive Appendix that lists major museums/sites throughout North America that feature Native American history and archeology. It is arranged alphabetically by state/province for easy reference; directions, phone numbers, and brief descriptions are also provided. The section "For Further Reading" lists archeological and historical books for each chapter, being divided into those for the general reader and sources for the specialized student.

I highly recommend *Exploring Ancient North America: An Archaeological Guide*. It is a well written, comprehensive, guide to North American archeological sites, and it would be an excellent addition to a personal library as well as a great gift for anyone interested in America's native history.

AUTHORS

Federico A. Almarez, Las Cruces, New Mexico

Brenda J. Buck, Department of Horticulture & Agronomy, New Mexico State University, Las Cruces

Beverly A Schmidt-Couzzourt, Canyon

Jim Couzzourt, Canyon

Boyd Dixon, Department of Land and Natural Resources, State Historic Preservation Divison, Wailuku, Hawai'i

G. Lain Ellis, Texas Historical Commission, Austin

Nancy Adele Kenmotsu, Texas Department of Transportation, Austin

Jeff D. Leach, Centro de Investigaciones Arqueologicas, El Paso

Pennie M. Lowetz, Weatherford

Timothy K. Perttula, Texas Historical Commission, Austin

Larry Riemenschneider, Miles

Robert S. Weddle, Bonham