Bulletin of the TEXAS ARCHEOLOGICAL SOCIETY

Volume 60/1989

Published by the Society at Austin
1991 (for 1989)

TEXAS ARCHEOLOGICAL SOCIETY

The Society was organized and chartered in pursuit of a literary and scientific undertaking: the study of man's past in Texas and contiguous areas. The *Bulletin* offers an outlet for the publication of serious research on history, prehistory, and archeological theory. In line with the goals of the Society, it encourages scientific collection, study, and publication of archeological data.

The *Bulletin* is published annually for distribution to the members of the Society. Opinions expressed herein are those of the writers and do not necessarily represent the views of the Society or editorial staff.

Officers of the Society 1988–1989

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Jimmy L. Mitchell, Editor
Beth Ogden Davis, Associate Editor

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FOREWORD:

CELEBRATING SIXTY YEARS

With the publication of this bulletin (BTAS), Volume 60, we celebrate 60 years of TAS publication and more than 60 years of TAS as a viable, active organization. It is entirely appropriate for the focus of most of this volume to be the Texas Panhandle and South Plains, where formal archeology in Texas began. To celebrate these years, this volume includes a long-awaited summary of the archeology of the region, reports of two TAS field schools in the two subregions, and a variety of related and relevant papers. The publication of a summary review of the Panhandle Plains and the South Plains substantially fulfills the promise made in the foreward to *A Review of Texas Archeology* (*BTAS* Volume 28, 1960, for 1958); a later volume will present papers on the Panhandle, the South Plains, North Central Texas, Southwest Texas, and the southeastern Coastal Plain (Foreword by Editors Edward B. Jelks, E. Mott Davis, and Henry F. Sturgis). A summary of Southwest Texas (the Lower Pecos and Trans-Pecos) was included in the most recent bulletin (Volume 59), and one on the southeastern Coastal Plain was included in Volume 50 (1979).

Such regional summaries and syntheses are difficult to accomplish; they require a tremendous amount of research and years of understanding on the part of the authors. Likewise, it is awkward and time-consuming to put together such a focused, coordinated volume. Furthermore, reports of past field schools are extremely difficult to write, particularly when the materials and information have been scattered in the intervening years among several individuals. The TAS Board of Directors and the Field School Committee are determined to recoup this information and publish summary reports of past field schools as soon as possible. The reports of two field schools (1975 and 1987–1988) in this volume are an indication that substantial progress is being made. Additional field school reports will be included in future *BTAS* volumes or will be published separately as Special Publications.

This, then, is the long-awaited 1989 issue of the *Bulletin*, and the beginning of tangible results of efforts of the Board of Directors and the Field School Committee in recent years. As was the case in 1960, it is our hope and belief that the members of the Society will find the papers of general interest and that members who are engaged in active research will find them of particular value.

Jimmy L. Mitchell, Editor

July 1991

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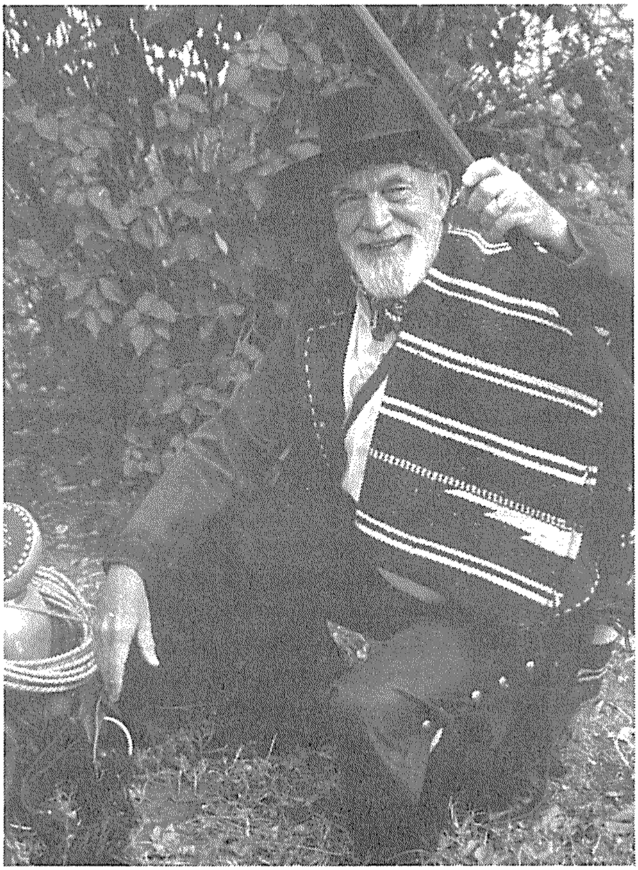

DEDICATION

This volume is dedicated to Jack T. Hughes (pictured here in *comanchero* dress), who is regarded by many as the Dean of Panhandle Archeology. He is undoubtedly the most knowledgeable individual about the Panhandle Plains and South Plains areas of Texas. Jack graduated *summa cum laude* from the University of Texas at Austin in 1937, with a double major in anthropology and geology. He completed his doctorate at Columbia University in 1968 with a dissertation entitled "Prehistory of the Caddoan-Speaking Tribes," which was later published as a book. He was for many years a teacher of geology at West Texas State University (WTSU) and also served as curator of paleontology at the Panhandle Plains Historical Museum in Canyon. Until his retirement in 1985 he was Professor of Anthropology at WTSU, where he impacted the thinking of literally thousands of interested students. Dr. Hughes has been a member of the TAS for more than 39 years and was named a Fellow of the TAS in 1980. In 1989, at the annual meeting of the TAS in Amarillo, Jack was honored with the publication of Panhandle Archeological Society Publication No. 5, *In the Light of Past Experience: Papers in Honor of Jack T. Hughes* (Beryl C. Roper, Ed.). A more detailed accounting of his accomplishments can be found in the introduction to that volume.

Prehistoric Cultural Developments on the Texas High Plains[1]

Jack T. Hughes

ABSTRACT

This paper accomplishes two aims: 1) it presents a brief synthesis of the main cultural developments on the High Plains of northwestern Texas from the end of the Paleoindian stage to the beginning of the Historic period, and, simultaneously, 2) it examines the possible effects of changes in the regional environment on these cultural developments and on the surrounding cultures. Both climatic changes and contact with other cultural groups appear to have been important in shaping the prehistoric developments on the Texas High Plains.

INTRODUCTION

This necessarily brief synthesis is based upon nearly eight decades of work by scores of dedicated prehistorians, both professional and avocational. It is obviously impossible in a short paper to provide a detailed review of all their findings or a complete bibliography of their publications. For the benefit of the reader who would like to pursue the subject further, however, some of the more useful reviews and bibliographies that have been published are mentioned, some other sources of data are indicated, and the history of archeological research on the Texas High Plains is summarized very succinctly.

PREVIOUS RESEARCH

Since few of the reviews and bibliographies published to date deal with the entire region and all of its cultures, the coverage provided by each of the sources mentioned is indicated. Readers are reminded that in addition to the sources listed below, most of the hundreds of survey and excavation reports pertaining to the region contain summaries of cultural developments and lists of references cited.

In chronological order, some of the major reviews are by Sayles (1935), on the whole sequence of the region as part of his survey of Texas archeology; Krieger (1946) on the Antelope Creek focus in the Texas Panhandle, as part of his study of

[1] Author's note: Photocopies of an earlier unpublished version of this paper, finished in 1981 except for the summary, figures, and list of references cited, have been provided to several people and have been cited in several reports as Hughes n.d. Obviously, any future citations should favor the present version over the unpublished, outdated, and incomplete version.

Puebloan-Caddoan ties; Suhm, Krieger, and Jelks (1954), on the sequence of the region as part of their introduction to Texas archeology; Kelley (1964) and Collins (1971), on the sequence in the Llano Estacado part of the region; Hughes (1976) and Bandy (1977), on the Panhandle Archaic; Campbell and Judd (1977), on the sequence in a large area of the South Plains as part of a survey report on the area; Hughes and Willey (1978), on the sequence in the Llano Estacado and its borders as part of an excavation report on Mackenzie Reservoir, and Hughes (1978), on the sequence in the Palo Duro Canyon area. By far the best studied and reported sequence on the Texas High Plains is at the Lubbock Lake site (Johnson 1987).

Bibliographies include a classified bibliography by Campbell (1960), as part of his bibliography of Texas archeology, a chronological bibliography by Hughes (1977) for the Texas Panhandle, a list of holdings of the Lower Plains Archeological Library by Riggs (1977), an Antelope Creek focus bibliography by Lintz (1982), and most recently, a northern Panhandle bibliography by the Office of the State Archeologist (Simons 1988).

The main regional research centers for the archeology of the Texas High Plains are at the museums and anthropology departments at West Texas State University at Canyon in the Panhandle and at Texas Tech University in Lubbock in the South Plains. A great deal of information, however, is in the collections, files, and libraries of some other institutions, several local archeological societies, and many avocational archeologists. Most of the documents that pertain to the archeology of the region have been microfilmed recently by the Texas Historical Commission in Austin.

Archeology in the United States may have begun with the beginning of history in the Texas High Plains. It is possible that a bison bone bed at Silver Lake in Hockley County was the first archeological site to be recorded in the region and perhaps in the whole United States. This site is probably the bone bed described by Castañeda with the Coronado expedition in 1541 (Kiser 1978).

Although the archeological priority of the Silver Lake site may never be proven, there is no doubt that the best known site in the Texas High Plains was recorded as early as 1845, when Lt. J. W. Abert described the Alibates flint quarries as "Agate bluffs" (Carroll 1941:64). The quarries may therefore be one of the first archeological sites recorded in Texas as well as the only national monument in the state.

Another well-known site in the region was also recorded at an early date, when Lt. A. W. Whipple (1856) camped an extra day at Rocky Dell in order to copy the Indian paintings and carvings on the cliffs. The giant rattlesnake depicted at this site has served as a "feathered serpent" to introduce the Hall of the Northern Frontier at the National Museum of Anthropology in Mexico City.

Until native American domination of the Texas High Plains was ended with the defeat of the Comanches and their allies in the Red River Wars of 1874, no real progress could be made in the study of native American archeology in the region. By the early 1900s, however, T. L. Eyerly (1907), a teacher at the former Canadian Academy in Canadian, Texas, conducted and reported systematic excavations at the

Old Buried City ruins on Wolf Creek in Ochiltree County. This is one of the earliest excavation reports in the state.

One of Eyerly's students was Floyd V. Studer, who commenced a survey of Panhandle archeology, including excavations in slab-house ruins (Studer 1931,1934), which continued throughout his life. Eyerly's report of Pueblo-like ruins on the High Plains also aroused the interest of W. K. Moorehead of the Phillips Academy in Andover, Massachusetts. With Studer's collaboration, from 1919 to 1920 Moorehead conducted surveys and excavations of the Panhandle ruins as part of a study of the archeology of the Arkansas River valley (Moorehead 1921, 1931). In 1929 Studer helped in the founding of one of the first archeological societies in the nation, the Texas Archeological Society, at Abilene. In 1932 he helped found one of the first major museums in Texas, the Panhandle-Plains Historical Museum on the campus of West Texas State University in Canyon.

Reports of the Moorehead expedition attracted further attention to the Panhandle ruins during the late 1920s and early 1930s by J. Alden Mason, of the University of Pennsylvania Museum (1929); Ronald Olson, of the American Museum of Natural History in the same year; W. C. Holden, of Texas Tech University (1929, 1930, 1931, 1932, 1933); and E. B. Sayles, of Gila Pueblo (1935). Some of Holden's work was also reported in theses by Haynes (1932), Lowery (1932), and T. Holden (1934).

During the rest of the 1930s, in spite of the Great Depression but partly because of depression-spawned projects of the Works Progress Administration (WPA), archeological activities continued to accelerate on the High Plains as elsewhere in the state. In addition to the reports mentioned above, work included a survey in Palo Duro Canyon by Erik K. Reed (1936) for the National Park Service, a survey in Lamb and Bailey counties by W. M. Pearce (1936), of Texas Tech, a survey of rock art sites in the region as part of a statewide study by A. T. Jackson (1938), excavation of the Miami mammoth kill by E. H. Sellards (1938), excavation of the Blue Mountain rockshelter by Holden (1938), a survey of lake sites in the South Plains by W. C. Watts (1939), and excavations at the Antelope Creek and Alibates ruins by Ele and Jewel Baker (1939, 1941; see also Johnston 1939).

During the 1940s, the High Plains suffered in the nationwide abatement of archeological work caused by World War II, and growth did not really resume until the 1950s. Several important investigations, however, were reported during the 1940s: the Lipscomb bison kill (Barbour and Schultz 1941; see also Hofman et al. 1991, this volume), Panhandle rock art (Kirkland 1942), the Quaternary of the Texas High Plains (Evans and Meade 1945), the Antelope Creek focus (Krieger 1946), and the Plainview bison kill (Sellards et al. 1947).

Since the 1950s, archeology in the High Plains has experienced the same accelerating growth as has archeology nationwide. The two principal trends involved in this growth have been the impressive increases in organized avocational archeology and in subsidized public archeology. These two developments have often interacted to their mutual benefit. Most of the scores of writers and hundreds of their helpers who have contributed so greatly to the archeology of the region during the last four decades are still actively pursuing their interests. It is obviously impossible in this context to recognize all of them for their contributions.

Although it has been more than 80 years since Eyerly's pioneering excavations in the Wolf Creek ruins, the fundamental task of descriptive archeology, of chronology-building by answering the basic questions of who, what, where, and when, is still far from finished on the Texas High Plains. Work is far enough along, however, so that in recent years some tentative efforts toward explanatory archeology (to answer the ultimate questions of how and why) have become possible.

ENVIRONMENTAL SETTING

Since the cultural system consists of interactive subsystems, as does the environmental system, and the two systems are themselves interactive (Wedel 1986), any attempt at tracing native cultural changes on the Texas High Plains, as elsewhere, must consider both the modern environment of the region and the environmental changes that have taken place during human habitation of the region.

The Modern Environment

The Texas High Plains includes all of the Southern High Plains except for relatively small areas to the north and west of the state (see Figure 1). The Southern High Plains is the part of the High Plains that stretches southward from the Arkansas River valley in Colorado and Kansas to the Edwards Plateau in Texas. The High Plains is a vast elevated piedmont plateau, an outwash plain that runs like a gigantic ramp along the eastern base of the Rocky Mountains. It is an exceptionally well defined physiographic province, blanketed as it is throughout its great expanse by the Ogallala Formation (Miocene-Pliocene, Tertiary) (Holliday 1988), which is a thick layer of sediments derived from the Rockies as they were uplifted during tens of millions of years of late Tertiary time.

The Texas part of the Southern High Plains is more than 240 km (150 miles) wide and 480 km (300 miles) long, and has an area of more than 64,000 km^2(40,000 square miles) covering more than 40 counties. Although the upland surface everywhere appears to be almost as level as the Gulf Coastal Plain, it actually has a gradual slope from an elevation of more than 1370 meters (4500 feet) at the northwestern corner near Texline to less than 760 meters (2500 feet) at the southeastern edge near Big Spring.

Except for the Rio Grande, all of the major rivers of Texas have their headwaters on or around the Southern High Plains. The northern part of the region is drained by the headwaters of the Arkansas and Red rivers going eastward toward the Mississippi River; the southern part is drained by the headwaters of the Brazos and Colorado rivers going southeastward toward the Gulf of Mexico. The plains have been separated from the mountains to the west by the headward erosion of the South Canadian River in northeastern New Mexico and by the headward erosion of the Pecos River in eastern New Mexico.

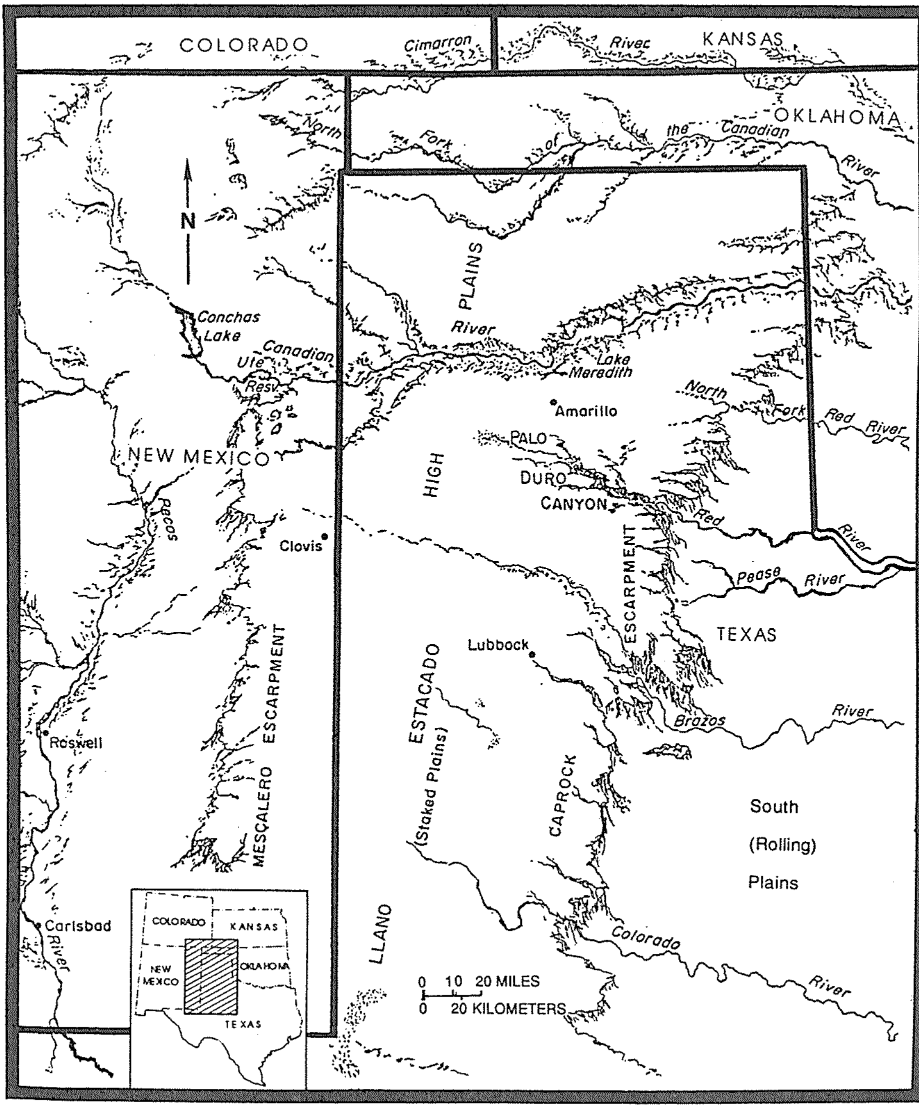

Figure 1 Physiographic map of the Texas High Plains and the Llano Estacado. From Erwin Raisz, 1939, Physiographic Map of the United States.

In northwestern Texas, the South Canadian River is known simply as the Canadian. The plains to the north of the river are called the North Plains, and those to the south of the river are called the Staked Plains or Llano Estacado. Alternatively, the plains in the Panhandle are called the Panhandle Plains, and those to the south of the Panhandle are called the South Plains.

The Canadian is the only river that cuts entirely across the Southern High Plains. It crosses the middle of the Panhandle Plains, where it has cut a swath 30 km (20 miles) wide and several hundred feet deep. The broad, deep valley is dissected along both sides by scores of small tributary creeks that constitute the Canadian breaks. These breaks form the northern edge of the Llano Estacado; the Pecos valley forms the western edge, and the eastern edge, overlooking the Rolling Plains, is a great escarpment formed by the headward erosion of the Red, Brazos, and Colorado rivers. This scarp is especially rugged to the north, where the Palo Duro Canyon on the Prairie Dog Town Fork of the Red River is 300 meters (a thousand feet) deep; to the south, the scarp gradually diminishes in height until it merges, with a barely perceptible break, into the Edwards Plateau. Throughout its length the scarp is rimmed by vertical cliffs of massive Ogallala caliche forming what is appropriately called the Caprock.

The uplands of the Texas High Plains are a vast expanse of level ground relieved only by thousands of playa lake basins and, at rare intervals, a long shallow valley tributary to one of the rivers that drain the great plateau. In the old days, the region was essentially a gigantic buffalo pasture with countless waterholes.

The surface geology of the Southern High Plains has layer-cake simplicity. The plateau is perched on top of Permian marine redbeds, which are the oldest rocks exposed all around its margins. These rocks are overlain by Triassic continental redbeds and Cretaceous marine sediments, except in the northeastern part of the Panhandle Plains and northward, where the Triassic and Cretaceous formations are missing. Capping the entire plateau is the Ogallala Formation, which has a thin mantle of Quaternary cover sands.

Climatically, the plateau is a semiarid temperate-zone steppe with summer heat and winter cold relieved somewhat by the low humidity. Precipitation comes mainly from summer rainstorms and partly from winter snowstorms. The region is one of the windiest of the continent, with prevailing winds usually from the southwest but subject to sudden reversals by winter *northers*. The region is also one of the sunniest in the nation. With so much wind and sun and so little moisture, the evaporation rate exceeds the precipitation rate by almost three to one. Periods of drought are characterized by blinding duststorms. During wet spells, the uplands become a series of shallow lakes separated by broad expanses of lush green grass.

The weather year-round is so pleasant that people tend to take the good days for granted and to comment only on the rare bad days. However, the usual mild conditions are subject to abrupt and violent changes. For people caught without shelter on the open plains, the awesome lightning and hail of summer thunderstorms and the biting cold of winter blizzards can be "hazardous to their health."

The Southern High Plains are part of the Kansan biotic province. The uplands are dominated by short grasses, the edge-breaks by junipers, and the stream banks by cottonwoods and other deciduous trees. Sandy areas have oaks, sagebrush, yucca, and prickly pear. The flora of the valleys and canyons is a rich mixture of woodland, plains, and mountains species that provides a sharp contrast to the monotony of the open grasslands. The chief game animals on the uplands were bison and pronghorn, in the valleys, deer and bear, but the region had a wide variety of smaller game and is a major flyway for migratory waterfowl.

In Texas, although there is only a gradual transition from the South Plains northward into the Panhandle Plains, there are some contrasts between the two regions. The South Plains are drained to the southeast by the headwaters of the Colorado and Brazos, whereas the Panhandle Plains are drained to the east by the headwaters of the Red River and by the Canadian River and other tributaries of the Arkansas River. The playa basins in the South Plains are fewer, larger, deeper, and more saline than those in the Panhandle Plains. The South Plains soils tend to be loose reddish sands in contrast to the tight brownish loams of the Panhandle Plains, and the vegetation has somewhat more desertlike character, although mesquite extends as far northward as the Canadian breaks. In recent decades, with irrigation from the Ogallala aquifer, the uplands have become almost entirely cultivated, with cotton the principal crop on the South Plains and wheat, on the Panhandle Plains.

On the uplands, the chief environmental zones are the grasslands, the frequent playa basins (often with lee dunes to the south and east), and the occasional stream valleys (sometimes bordered by sand hills). Environmental zones in the marginal scarps and Canadian breaks are much more varied—canyon rims, cliffs, slopes, benches, terraces, floodplains, and stream channels.

From the standpoint of early man, although the uplands at most places were short of everything (water, shelter, wood, foodplants, and mineral resources) except bison and some smaller game, the edge-breaks had all of these necessities in great abundance. Springs from the vast Ogallala aquifer are found in most of the canyons. The bedrock seldom forms good overhangs, but sheltering cliffs are common. Much of the varied plant life has parts that are edible during one season or another. Stones of various kinds for hearths, structures, and tools are always available. Some kind of flint for chipped stone tools is seldom far away: Permian Alibates agate in the Canadian breaks north of Amarillo, Triassic Tecovas jasper upstream from the same area and in the Palo Duro Canyon, Cretaceous Edwards chert along the southern part of the Eastern Caprock Escarpment, Cretaceous Dakota quartzite along the northwestern edge of the Llano Estacado, Tertiary Ogallala chalcedony at many outcrops in the Panhandle Plains, and an assortment of siliceous materials in the widespread Ogallala and Quaternary gravels.

The Llano Estacado in many ways is like a great sea of grass surrounded by a rugged shoreline of upside-down hills. Just as fish are the principal resource of a sea, bison were the principal resource of the Llano Estacado, and, like many seas, the Llano appears, for the people who lived on opposite shores, to have served more as a bridge than a barrier. As with sea travel, although storms were a hazard, crossings were relatively easy and swift, either along the upland valleys or from one valley to the next.

Environmental Changes

In recent years there have been increasing numbers of studies of various kinds dealing with late Pleistocene and Holocene environmental changes on and around the Texas High Plains. Comparisons among these studies indicate that most are in general agreement, but reveal some differences from one kind of study to another and from one region to another. Most studies at most places seem to be fairly well in accord with the Antevs (1955) model of climatic changes for Arizona and other parts of the western United States. This model proposes three main climatic periods: a cool moist Anathermal from 8000 to 5500 B.C., a warm dry Altithermal (Long Drought) from 5500 to 2000 B.C., and a moderate Medithermal from 2000 B.C. to the present. Some of the implications of this model for the Texas High Plains are suggested below.

During the cool, moist Anathermal, stream valleys and lake basins had ample water, alluvial sediments were accumulating, soils were forming, dune fields were stabilizing, uplands were covered with grass, and there were many bison herds. With gradually increasing temperatures and decreasing precipitation during the period, however, vegetation was deteriorating, the giant bison were disappearing, and the modern bison were declining.

During the Altithermal—the Long Drought—frequent spells of warm dry weather, with heightened evaporation and lowered precipitation, diminished the grass cover and exposed the ground to erosion by soil-scouring dust storms and gully-washing cloudbursts. Streams and ponds were generally dry. Along the drainages, channel sands were blowing, floodplains were accumulating dust layers, and dune fields were expanding. At the playa basins, floor deposits were deflating and lee dunes were growing. With water scarce and grazing poor, bison herds and other game animals virtually disappeared from the Texas High Plains.

During the cooler and moister Medithermal, water returned to the streams and ponds. Fluviatile and lucastrine deposition resumed, as did soil development and dune stabilization. As water supplies and grazing conditions improved, bison and other game returned to the region. Throughout the Medithermal, however, the climate may have been gradually warming and drying (Antevs 1955:330).

The Antevs model is partly supported by Dillehay's (1974) study of bison population changes in the Southern Plains. His Bison Absence Period I from 6000 or 5000 to 2500 B.C. corresponds well with the Altithermal. His Bison Absence Period II from A.D. 500 to 1200 or 1300 seems to have ended with an increase in bison population during the 1200s on the middle Pecos (Jelinek 1967), on the southern Llano Estacado (Collins 1968), and in the Panhandle Plains (Duffield 1970), although Duffield suggests a decrease in bison remains in Panhandle aspect sites after A.D. 1300 or 1350. It should be noted, however, that the applicability of Dillehay's model to North Central Texas has been questioned by Lynott (1979), although he does see an increase in bison population in that region from A.D. 1200 to 1600.

Henderson's (1976) study of pollen changes in the middle Pecos supports the Altithermal concept but differs from the Antevs model in other respects. Equating arboreal pollen with mesic conditions and nonarboreal pollen with xeric conditions, he infers a xeric period from 4500 to 2500 B.C., a mesic peak at 500 B.C. (instead of Antev's Fairbank Drought), a xeric period from 100 B.C. to A.D. 700, a mesic period from A.D. 700 to 1400, a xeric peak at about A.D. 1400, expanding grassland until about 1880, and scrub desert during the last century.

A model of late Quaternary environmental changes in Texas proposed by Bryant and Shafer (1977) differs in some ways from the Antevs model. Although both models postulate gradually increasing aridity since the end of the Pleistocene about 10,000 years ago, the Antevs model sees the overall drying trend as interrupted by a series of droughts (the Long Drought from 5500 to 2000 B.C., the Fairbank Drought at 500 B.C., the Whitewater Drought at A.D. 330, and the Great Drought from A.D. 1276 to 1299), whereas the Bryant and Shafer model sees the general xeric trend as punctuated by brief mesic intervals (especially one at about 500 B.C. in the Texas High Plains and lower Pecos regions). The latter corresponds with Henderson's mesic peak at 500 B.C. on the middle Pecos.

Although Bryant and Shafer cite Patton's (1977) evidence of much flooding on the lower Pecos from 5000 to 2000 B.C., they fail to note the coincidence of this episode with Antev's Long Drought. Shafer (1989) also notes a northward expansion of grasslands in the lower Pecos from 5000 to 2000 B.C.

Further support for the Altithermal concept is provided by Stafford's (1981) study of alluvial geology on the Southern High Plains in Texas. Stafford infers increasing aridity between about 11,000 and 2000 B.C., with maximum aridity occurring between 3000 and 2000 B.C. He sees a scarcity of archeological and paleontological remains between 6000 to 4000 B.C. and A.D. 1 as implying "decreased use, if not selective abandonment, of the valleys during that interval," and notes a significant increase in occupation of the valleys between A.D. 1000 and 1400 (1981:563). At the Lubbock Lake site, Johnson and Holliday (1986) and Holliday (1988) have been able to refine the Antevs model with a more detailed and better-dated record of paleoenvironmental events, including evidence of a "two drought" Altithermal.

To the east of the Texas High Plains, the Antevs model is generally supported in geoarcheological studies by Gustavson (1986) for the Rolling Plains near Quitaque, by Abbott (1990) for the Lower (Rolling) Plains near Justiceburg, and by Hall (1982, 1988) for the Osage (Rolling) Plains in Oklahoma. In western Oklahoma, paleoenvironmental evidence for a moist first millennium A.D. has been reported at Delaware Canyon (Ferring 1982, 1986) and at Carnegie Canyon (Lintz and Hall 1983). As will be explained later, several sites in the Palo Duro Canyon area have produced good evidence of mesic conditions during much of the first millennium A.D. (Hughes 1978:43–44).

Baerreis and Bryson (1965) have suggested that the Texas and Oklahoma panhandles were receiving more precipitation from A.D. 1250 to 1450 than were other regions in the Central and Southern Plains. However, studies by Duffield (1970) in the Texas Panhandle and by Wilson (1972) and Lintz (1978a) in the Oklahoma Panhandle fail to support this idea.

CULTURAL CONTEXT

Since archeology on the Texas High Plains shows that the region was used throughout prehistory by groups from all of the neighboring regions, one cannot deal with the cultural developments in the region without some background on the sequences found in the surrounding regions, in other states as well as in Texas.

On and around the Texas High Plains, there has been general usage of four main temporal units for tracing native cultural developments, but much diversity in naming, defining, and dating the units. In essence the four main units are 1) an early prehistoric time of late Pleistocene big-game hunters with lance points, 2) a middle prehistoric time of foragers with dart points, 3) a late prehistoric time of gardeners (usually) with arrowpoints and/or pottery, and 4) historic time.

Although these units are generally thought of and frequently referred to as periods, in Texas they have usually been called stages, as recommended by Suhm, Kreiger, and Jelks (1954), who pointed out that they actually are stages of cultural development that differ somewhat in time from one place to another. There is now a tendency among Texas writers to call them periods, but in this paper they will continue to be called stages.

Except for the Historic era, which has seldom been called anything else, each of the four stages has been variously labeled, especially the third, which still has no generally accepted label. In Texas the first three stages have usually been called Paleo-American, Archaic, and Neo-American, as proposed by Suhm, Krieger, and Jelks, but many writers have continued to use Paleoindian for the first stage, and in recent years, some have preferred Late Prehistoric for the third stage. For the Texas High Plains, this paper will call the four stages Paleoindian, Archaic (although Mesoindian is preferred), Neoindian, and Historic, and both the Archaic and Neoindian stages will be subdivided into Early and Late substages.

The terms Paleoindian, Mesoindian, and Neoindian are barbarous neologisms, but they have the virtue of inviting valid comparisons with the Paleolithic, Mesolithic, and Neolithic stages in the Old World. We seem to be stuck with the term Archaic, but the author cannot accept Late Prehistoric for a stage that begins as early as the time of Christ. In the Justiceburg area (Boyd and Tomka 1990), we already have Late Prehistoric I and Late Prehistoric II, in order to avoid the ridiculous alternatives of Early Late Prehistoric and Late Late Prehistoric. If the term Neoindian must be discarded, a Ceramic stage would be better than a Late Prehistoric stage.

In reviewing the archeological literature pertaining to the Texas High Plains and surrounding regions, it has become painfully obvious that there is little agreement on how to define the boundaries of the stages and substages of the native cultural development, and therefore on the dates for these boundaries. The Late Paleoindian/Early Archaic boundary is placed by some at the last lanceolate points and by some at the first stemmed points, whereas others recognize a transitional period for the assemblages with both kinds of points, and others prefer a definition based on changing subsistence patterns. One of the worst boundary problems concerns the beginning and ending of a Middle Archaic substage, where the differences are acute and the issue is seldom explicitly addressed. The Late Archaic/Early Neoindian boundary is also variously and vaguely defined, beset not only by regional differences in the time of appearance of pottery and the bow, but also by a gradual size reduction of dart point forms into arrowpoint forms, as well as by a lingering use of the atlatl long after the bow was known, differentially in different regions. The Early Neoindian/Late Neoindian boundary problem is similarly unsettled, the boundary being variously defined on the basis of arrowpoint changes, pottery changes, or lifestyle changes. And finally, the Late Neoindian/Early Historic boundary is notoriously variable from place to place, depending on how early or late the first significant European influences appear in a particular region.

With regard to culture units, the position of the Texas High Plains between the Great Plains and the Southwest has left the region influenced by various taxonomic systems from both directions. To the north, east, and south, the aspects and foci of McKern are giving way in some regions to the phases of Willey and Phillips. To the southwest, the Gladwin system of branches and phases for the Mogollon tradition still prevails, but to the northwest, the Kidder system of Basketmaker I–III and Pueblo I–IV periods for the Anasazi tradition seem to be giving way to phases. In this paper the terminology appropriate to each region and/or writer will be used, and *complexes* will be used for ill-defined units and as a general term.

In summarizing the culture sequences on and around the Texas High Plains, it is convenient to examine the Panhandle Plains and its surroundings separately from the South Plains and its surroundings, since the sequences in both regions generally resemble the surrounding sequences more than they resemble each other and have been investigated more in conjunction with their surroundings than with each other.

The Panhandle Plains

On the Panhandle Plains and in the surrounding regions to the north, east, and west, much similarity is recognizable in native cultural developments through the Archaic and Neoindian stages, although a great deal is yet to be learned, especially for the Archaic. In the High Plains of southeastern Colorado, southwestern Kansas, and the Oklahoma and Texas panhandles, in the Rolling Plains of Oklahoma, and in the headwaters of the Canadian River in northeastern New Mexico, the Archaic stage has generally been seen as having vague Early and Late subdivisions, the Early starting at about 5000 B.C. (with the start of the Altithermal) and the Late at about 2000 B.C. (with the start of the Medithermal). The start of the Early Archaic is perhaps best marked by a few kinds of stemmed dart points replacing stemless lance points. No culture complexes have been identified for the Early Archaic in these regions, although one candidate may be the complex represented by the Gore Pit site in western Oklahoma.

The start of the Late Archaic is perhaps best marked by the appearance of several kinds of barbed dart points in large numbers. Only a few ill-defined complexes have been proposed: the Little Sunday complex (J. Hughes 1955) in the Panhandle Plains, and a Summers complex and Lawton aspect in western Oklahoma (D. Hughes 1984).

The Neoindian stage in these regions is much better known, and is generally seen as consisting of Plains Woodland (Early) and Plains Village (Late) subdivisions, the Early substage starting at about A.D. 200 (with the first arrowpoints and/or pottery) and the Late substage at about A.D. 1100 (with side-notched triangular arrowpoints replacing barbed arrowpoints). Several Early Neoindian complexes have been recognized in these regions. In southeastern Colorado is the Graneros focus with the usual Plains Woodland corner-notched arrowpoints and conical cordmarked vessels from about A.D. 200 to 1000. In southwestern Kansas are components possibly representing the Keith focus with typical Woodland points and pots at about A.D. 700. In the Oklahoma Panhandle are unassigned Woodland components. In the Panhandle Plains of Texas, from the Canadian breaks northward, is the Lake Creek focus with Woodland points and pots, of uncertain temporal span. Also in the Panhandle Plains, from the Canadian breaks southward, is the Palo Duro complex with long-barbed (Deadman) arrowpoints and plain (Mogollon) brownware pottery, from about A.D. 200 to 1000. In western Oklahoma is the Pruitt complex, with Woodland points and pots at about A.D. 700 to 800. In northeastern New Mexico, in the plains to the east, are unassigned Woodland components; also in northeastern New Mexico, in the foothills to the west, are two named Basketmaker II and III phases, from about A.D. 400 to 900.

In western Oklahoma, although the Custer focus has generally been regarded as a Village complex, it has been seen recently as transitional out of Woodland, and to this observer it seems to be much more a late Woodland than an early Village complex in both cultural character and temporal position. There is some evidence of houses, but the complex has barbed arrowpoints and conical cordmarked vessels and has few bison remains and bison-bone tools. It is dated from about A.D. 800 to 1100.

Some Late Neoindian complexes have been recognized on and around the Panhandle Plains. In southeastern Colorado is the Apishapa focus with slab houses, side-notched triangular arrowpoints, and globular cordmarked vessels, from about A.D. 1000 to 1300. In southwestern Kansas are possible components of the Upper Republican culture, with points and pots like the Apishapa focus, but semisubterranean houses, from about A.D. 1100 to 1250. In the Oklahoma Panhandle is the Optima focus, with diagnostics like the Apishapa focus, from about A.D. 1100 to 1450. In the Panhandle Plains is the Antelope Creek focus with diagnostics and span like the Optima focus. In western Oklahoma is the Washita River focus with surface houses, side-notched triangular arrowpoints, and plain pottery, from about A.D. 1100 to 1450. In northeastern New Mexico, in the eastern plains, are unassigned Village components. Also in northeastern New Mexico, in the western foothills, are three named Pueblo I–III phases from about A.D. 900 to 1300.

Throughout the Panhandle Plains and adjoining regions to the north, east, and west, it seems likely that there was ethnic continuity from Early Neoindian time, and possibly from Late Archaic time, leading into historic Plains Caddoan groups—except for the foothill phases in northeastern New Mexico—of probable Tanoan affiliation.

The South Plains

The South Plains and surrounding regions are perhaps more diverse both naturally and culturally than the Panhandle Plains and its surroundings. This diversity is reflected in a plethora of systems for designating and subdividing the four main stages of native cultural development and in dating the stages and their subdivisions.

During the Archaic stage, the strongest cultural influences on the South Plains seem to have been coming from the Edwards Plateau to the southeast, from the lower Pecos to the south, and Rolling Plains to the east. During the Neoindian stage, the strongest influences seem to have come from the middle Pecos to the west.

The Archaic stage is best known in Central Texas, fairly well known in southwestern Texas, and poorly known in North Central Texas, on the South Plains, and in southeastern New Mexico. The Archaic in these regions is usually regarded as starting at about 5000 B.C., except in Central and southwestern Texas, where the start is usually placed at about 6000 B.C. The difference, however, appears to be a matter of definition. Prewitt's (1981) initial Archaic Circleville phase in Central Texas from 6500 to 5000 B.C. is characterized solely by lance points elsewhere regarded as terminal Paleoindian rather than as initial Archaic.

The Central Texas Archaic has been subdivided into early, middle, and late foci (Clear Fork, Round Rock, and Uvalde) by Kelley (1947); into a sequence of five named phases by Weir (1976); and recently into a sequence of 11 named phases (four early, four middle, and three late) by Prewitt (1981, 1985). The southwestern Texas Archaic has been subdivided into an early Pecos River focus and a late Chisos focus by Kelley, Campbell, and Lehmer (1940); into Periods 1, 2, and 3 by Epstein (1963); now, for the lower Pecos, into early, middle, and late periods by Shafer (1989), and for the eastern trans-Pecos, into the same periods, except that they are preceded and followed by transitional periods, by Mallouf (1985, 1987). In the Rolling Plains of North Central Texas, a five-fold subdivision of the Archaic into Initial, Early, Middle, Late, and Terminal substages, analogous to Weir's five named phases in Central Texas, has been proposed by Etchieson, Speer, and Hughes (1978). An Early Archaic Bitter Creek complex and a Late Archaic Twilla complex have also been proposed for this region by Hughes (1978). In the South Plains, a three-fold subdivision of the Archaic into early, middle, and late has been proposed by Campbell and Judd (1977). In southeastern New Mexico, a two-fold subdivision of the Archaic into early and late is implicit in the general use of a Late Archaic Hueco phase as the start of the Jornada branch of the Mogollon tradition.

All of the proposed subdivisions of the Archaic in all of the above regions are marked chiefly by changes in dart point types, and there is some disagreement over which types mark which subdivisions, and on time spans involved. The Neoindian stage on the South Plains and in surrounding regions is relatively brief, unevenly known, and variously subdivided and dated. Although the strongest influences on the South Plains during the Neoindian stage may have come from southeastern New Mexico, elements from Central, southwestern, and North Central Texas are also discernible. The starting date of the Neoindian stage in these regions, with the first arrowpoints and/or pottery, is variously estimated at before A.D. 900 for the South Plains, about A.D. 700 in Central Texas, about A.D. 1000 in southwestern Texas, an unknown date in North Central Texas, and before A.D. 900 in southeastern New Mexico.

In much of the South Plains the Neoindian stage has not been subdivided, and no complexes have been recognized, but in the southwestern part there has been proposed an eastern extension of the Jornada branch, with three named phases marked by changes from pit to surface houses, corner-notched-to-triangular arrowpoints, and plain-to-polychrome pottery, from about A.D. 900 to 1500. In Central Texas, an Austin phase with Scallorn arrowpoints from about A.D. 700 to 1300. is followed by a Toyah phase with Perdiz and Cliffton arrowpoints and Leon Plain and Doss Redware pottery from about A.D. 1300 to 1700. In southwestern Texas, directly south of the South Plains, is the Toyah focus; further south in the Trans-Pecos is the Livermore focus with Livermore points from about A.D. 900 to 1300; still further south in the Presidio area is the Bravo Valley aspect with both pit and surface houses, triangular arrowpoints, and polychrome pottery from about A.D. 1300 to 1600. In North Central Texas is the Henrietta focus, with triangular arrowpoints and Nocona Plain pottery, from before A.D. 1400 to about 1600. In southeastern New Mexico is a Southern Jornada sequence (also in the northern part of the eastern trans-Pecos and in the El Paso area), a Northern Jornada sequence, an Eastern Jornada sequence, and a Middle Pecos sequence, each with its own set of three named phases and all dated from before A.D. 900 to about A.D. 1300 or 1400 or 1500. All are characterized by changes from pit to surface houses, corner-notched to triangular arrowpoints, and plain to painted pottery.

From the above summary of Neoindian sequences on and around the South Plains, it becomes apparent that a good marker for an early-late subdivision of the stage would be the shift from corner-notched (Scallorn-like) arrowpoints into various triangular types (and Perdiz). This shift seems to have occurred at about A.D. 1200 in the southwestern part of the South Plains, about A.D. 1300 in Central and southwestern Texas, an undetermined date in North Central Texas, and about A.D. 1200 in southeastern New Mexico. In each region the arrowpoint change seems to be about contemporaneous with other changes of more importance but with less utility as boundary markers.

Ethnic continuities on and around the South Plains seem to have been quite diverse. Ethnic affiliations on the South Plains may have been mainly those of various adjoining regions. Ethnic continuity has been suggested throughout the Archaic and Neoindian stages into historic Tonkawans for Central Texas and into historic Coahuiltecans for southwestern Texas, except that the Toyah focus of both regions may have been ancestral to the mysterious Jumanos. In North Central Texas the Henrietta focus is probably ancestral to some historic Plains Caddoan group such as the Kichai. In southeastern New Mexico the Jornada branch may have been ancestral to historic Tanoans.

Throughout the Texas High Plains and in most surrounding regions, the immigrant Apache groups constitute a strong cultural unit that requires special treatment. To the north and west of the Panhandle Plains and in the Panhandle Plains, the resident Late Neoindian complexes apparently were being replaced by these Apache groups during the 1300s and 1400s. In southwestern Kansas, these groups are represented by the Dismal River aspect from about A.D. 1650 to 1750; in southeastern Colorado, the Oklahoma Panhandle, northeastern New Mexico, and the middle Pecos by as yet unassigned components after about A.D. 1300; in the Texas Panhandle by a proposed Tierra Blanca complex after about A.D. 1400; and in the South Plains by a proposed Garza complex after about A.D. 1500. By the start of the 1700s the various Apache groups on and around the Texas High Plains were being forced out by Comanches.

THE EARLY ARCHAIC SUBSTAGE

(About 5000 to 2000 B.C.)

For the Texas High Plains and bordering regions, the Early Archaic substage is here defined as coinciding essentially with the Altithermal Long Drought and characterized by a pattern of localized foraging for wild plant food and small game replacing a pattern of unrestricted bison hunting, as evidenced by the disappearance of bison kills, replacement of stemless lance points with stemmed dart points, decreasing use of end scrapers, and increasing use of gouges, grinding implements, hearth stones, and boiling pebbles. It should be noted that the Early Archaic thus defined also corresponds essentially with Dillehay's (1974) first period of bison absence on the Southern Plains.

The Altithermal interval on the Texas High Plains, when not represented by a wind- or water-scoured erosional unconformity, seems to be represented by geological deposits (fluviatile, lacustrine, and eolian) that are remarkably devoid of organic remains, including cultural materials. Any evidence of the above-mentioned cultural developments—and indeed of any human presence at all—on the Texas High Plains during the 3000-year span of the Long Drought is so scarce as to suggest the possibility that the level uplands were largely abandoned in favor of the broken country to the west, east, and south, where conditions may have been better suited to a foraging existence. It should be pointed out, however, that although surface evidence of early Archaic occupation appears to be much better in the breaks to the west, and especially in the breaks to the east, than on the intervening uplands, except for the Gore Pit site in the Rolling Plains of southwestern Oklahoma, it is only in the Edwards Plateau to the southeast and in the lower Pecos to the south that any artifact assemblages of this substage have been encountered in stratified deposits and dated by radiocarbon.

The Gore Pit site is puzzling, however, in that a deeply buried assemblage of features and artifacts dated at 5150, 4190, and 4066 B.C. includes a Meserve point and Clear Fork gouges together with dart points identified elsewhere as Late Archaic types. This seeming anachronism leads Hammatt (1976) to question the utility of dart point styles for dating Archaic sites, but his illustrations suggest that some of his typological identifications are questionable.

Only three kinds of evidence for human presence on the Texas High Plains during the early Archaic substage appear to be available: 1) cultural remains that have been radiocarbon dated between 5000 and 2000 B.C.; 2) dart points of types that have been assigned to that time span in Central and southwestern Texas; and 3) Clear Fork gouges, which flourished during the Early Archaic, although they started during Late Paleoindian times and may have lingered in some regions into Late Archaic time.

It appears that the only cultural material on the Texas part of the Southern High Plains to have been radiocarbon-dated for this interval so far is at the Lubbock Lake site, where a date of 3010 B.C. has been reported for a large ash concentration covered with caliche cobbles in Stafford's (1981) Stratum 4. Just outside of Texas, at the Clovis site, the Portales complex above the diatomite has been dated (on bone) at 6230 and 6300 B.P., and stemmed and notched Archaic points in the upper jointed sand have been dated (also on bone) at 4950 B.P. (Wendorf and Krieger 1959).

The only other radiocarbon dating of cultural remains to this interval that the author has been able to find for the Southern High Plains is at the Pigeon Cliff site, which is in New Mexico near the northwestern corner of the Texas Panhandle. At this site a buried living surface labeled the Clayton Horizon yielded a Williams dart point, a knife (retouched blade-flake), two end scrapers, a shallow firepit, and bones of an extinct bison like those at the Plainview site (Steen 1976). Soil samples impregnated with barely enough charcoal for dating produced a date of 8280 B.P. for the firepit in 1955 and, in 1966, a date of 5420 B.P. for the firepit and a date of 6070 B.P. for the bone area.

The Pigeon Cliff findings constitute a puzzle that is not likely to be resolved. Inadequate charcoal may explain the wide difference between the dates for the firepit and bone area and the considerable difference between the dates for the firepit and bone area in 1966—differences that suggest that all of the dates may be unreliable. There is no ready explanation for the association of a supposedly Late Archaic type of dart point with a supposedly late Pleistocene species of bison.

Dart point types (other than Paleoindian lanceolate types) that appear to be older than 2000 B.C. in Central and southwestern Texas include Andice, Baird, Baker, Bandy, Bell, Bulverde, "early barbed," Gower, Hoxie, Martindale, Nolan, Pandale, Taylor, Tortugas, Travis, Uvalde, and Wells (Weir 1976; Prewitt 1981; Mallouf 1985; Shafer 1989). In these two regions, some of these types have been found associated with lanceolate points generally identified as Late Paleoindian in deposits antedating 5000 B.C.; they have been regarded as "pre-Archaic" or "early Archaic" by some writers, but are considered in this paper to be a notched form that was developing during Late Paleoindian time. The difference has to do with defining the Late Paleoindian/Early Archaic boundary: they place it at the first of the notched points, whereas the author places it at the last of the lanceolate points. Others solve the problem with a *transitional* period for the time of overlap between lanceolate and notched forms.

These terminological differences have not helped to simplify the complicated problem of cross-dating between Central Texas, southwestern Texas, and the Texas

High Plains. It seems likely that Late Paleoindian/Early Archaic typological developments on the Texas High Plains resembled some of the developments not only in Central and southwestern Texas but also in other bordering regions; it seems unlikely, however, that developments were identical in any of these regions. In other words, the typology and chronology of one region cannot be transferred blindly to another region. Although some of these point types that are known to be early in Central and southwestern Texas have been reported occasionally as surface finds on the Texas High Plains, only two specimens appear to have been found in controlled excavations in the region.

At the Lubbock Lake site, Wheat (1974) found a Bulverde point in the upper part of Stratum IVb or in the top of Stratum IVc. Stratum IV, which "forms the upper limit of aboriginal occupation" (Wheat 1974:21), yielded three additional points, however, that do not appear to be early: a Desmuke, an Ellis, and a Trinity. Holliday (1977) and Stafford (1981) place Wheat's finds near the top of their Stratum 4, deposition of which ended at about 1000 B.P.

At the Marks Beach site, Honea (1980) found an "anomalous Frio-Uvalde like" point (p. 267 and Figure 14c on p. 262) in his Zone IIIA. The overlying Zone IIIB yielded two Marcos points with a variety of other cultural remains, and a well had been dug from the base of the zone. Honea regards the entire Zone III as Archaic and dating from the onset of the Altithermal, but the fact that the bones in Zone IIIA were mineralized suggests the possibility that this zone is Late Paleoindian, that its upper surface with the well may be an erosional unconformity representing the Altithermal, and that the overlying Zone IIIB with the Marcos points is Late Archaic.

The possibility that Honea's "Frio-Uvalde like" point is Paleoindian rather than Archaic is strengthened by finds at the Clovis site, where a point that Honea regards as similar was found under similar but much-better-dated conditions (Haynes and Agogino 1966). Here a "notched Archaic" point (p. 817 and Figure 7 on p. 819) was found on an erosional surface at the top of Unit E, 1.5 meters (5 feet) from a hearth with charred bone that gave a date of 6520 B.C. This surface also produced Eden and Scottsbluff points and showed many wells that had been dug into Unit E, the upper part of which gave a date of 7940 B.C. The wells were filled with sand that was regarded as dating to the Altithermal.

Excavations at the Rattlesnake Draw site on the Llano Estacado in southeastern New Mexico produced one or two *transitional* points (Smith et al. 1966) that resemble the Uvalde-like specimens at the Marks Beach and Clovis sites, as well as one or two Paleoindian points, and also revealed a well that is interpreted as filled with Altithermal sand, but the associations among these findings are not described. The surface of the site yielded several of the *transitional* points together with a variety of Paleoindian points. Meltzer and Collins (1987) have recently reviewed the above-mentioned water wells on the Southern High Plains as clues to Altithermal climate.

It should be added that the Uvalde-like points excavated at the Marks Beach, Clovis, and Rattlesnake Draw sites are at least vaguely reminiscent of the three notched points found together with two lanceolate points (all with quasi-fluted concave bases) among the skeletons of six extinct bison at the Rex Rodgers site in the Mackenzie Reservoir (Willey et al. 1978). The bones gave a date of 7441 B.C.

A few reports of surface finds on the Texas High Plains have explicitly identified some of the dart point types regarded as early in Central and southwestern Texas: a Bulverde and a Uvalde point at a sand dune site (LY-4) near Tahoka (Riggs 1965); some Bulverde, Martindale, Travis, Tortugas, Uvalde, and Wells points in a survey in the east central part of the Llano Estacado (Campbell and Judd 1977); and a Martindale point at the Marks Beach site (Honea 1980).

Elsewhere on the Southern High Plains, Bulverde points have been identified at two sites in east Central New Mexico (Warnica 1965); Nolan points at the Nall site in the Oklahoma Panhandle (Baker et al. 1957); and Pandale and Travis points at sites in southeastern Colorado (Campbell 1976). At the Johnson-Cline site in the Oklahoma Panhandle, Lintz (1978a) regards four dart points (one Palmillas, one Type D, and two Type E) as indicative of Early Archaic occupation, between 5000 and 1500 B.C. A great many published reports of surface finds on the Southern High Plains describe and illustrate dart points that appear to represent some of the early types, but, without access to the actual specimens, few of these points could be assigned with any confidence to one type or another, especially considering the primitive state of our typological understandings at present.

Although Clear Fork gouges are scarce on the Southern High Plains of northwestern Texas and eastern New Mexico, they are common to the west in the breaks of the upper Canadian and upper and middle Pecos, especially to the east in the Rolling Plains drained by the Canadian, Red, and Brazos rivers (Hughes 1980), to the southeast in the Edwards Plateau drained by the Brazos and Colorado rivers, and to the south in the canyons of the lower Pecos River. It appears, however, that these tools have been reported in excavated and dated deposits only in Central and southwestern Texas, except for three exceptions noted below.

In Central Texas, Prewitt (1981) attributes gouges to all five of his 11 Archaic phases that antedate 2000 B.C., including the oldest, his Circleville phase, dated at 6500 to 5000 B.C., the markers of which (Angostura, Golondrina, Meserve, and Scottsbluff points) are generally regarded as Late Paleoindian. He also attributes gouges, however, to one of his Late Archaic phases, the Twin Sisters, dated at A.D. 200 to 550, and to one of his "Neo-Archaic" phases, the Austin, dated at A.D. 700 to 1300. Are the late gouges truly gouges?

In southwestern Texas, on the lower Pecos, Shafer (1989) mentions gouges with lanceolate and early stemmed points at about 9000 B.P., and in the eastern trans-Pecos, Mallouf (1985) records them in his Early Transitional period at about 6000 to 4500 B.C. Outside Central and southwestern Texas, three reports of excavated and dated gouges have been found. In the Rolling Plains of the southeastern Panhandle, Cruse (1989) recovered a gouge in Stratum 2b at the Kent Creek site, with dates of A.D. 690 to 1010. In northeastern New Mexico, at the Old Coyote rockshelter in Los Esteros Reservoir on the upper Pecos, Mobley (1978) has reported five gouges from Stratum III, dated at A.D. 60 to 1096. As mentioned earlier, an assemblage including gouges at the Gore Pit site in southwestern

Oklahoma was dated at 5150, 4190, and 4066 B.C. Farther afield, Hughes (1980) has called attention to the occurrence of gouges at two Late Paleoindian sites on the northern fringes of the High Plains; the Allen site in Nebraska, and the Long site in South Dakota.

It seems that gouges are indicative mainly of the Early Archaic, from about 5000 to 2000 B.C., but appeared somewhat earlier, in Late Paleoindian time, and in some regions, may have lingered into Late Archaic and even into Neoindian times. What is puzzling about the late occurrences reported for Central Texas and northeastern New Mexico, however, is that scores of excavations in late components in the regions where gouges occur have failed to produce any of these tools. One wonders if the few seemingly late occurrences are intrusions from earlier cultures, like the occasional occurrences of Paleoindian points in more recent sites.

The only reported excavation of gouges from a site on the Southern High Plains that the author has been able to find is at the Blue Clay site in Mackenzie Reservoir in Tule Canyon (Willey et al. 1978). This was a small, open campsite with projectile points, indicating multiple occupations during Late Archaic and Neoindian times. Two gouges were found in the top 15 cm (6 inches) of the deposits.

Surface finds of the gouges have been reported at a few other place on the Texas High Plains. These finds include two gouges at the Little Sunday site on the rim of Palo Duro Canyon, where dart point types indicate a mainly Late Archaic occupation, although a Folsom point was also found (Hughes 1955); one gouge in the lower Tule Canyon (Katz and Katz 1976); two gouges in the South Plains Archeological Reconaissance area in the east Central part of the Llano Estacado (Campbell and Judd 1977); one gouge in the Red Deer Creek valley in the northeastern part of the Panhandle (Hughes et al. 1978); and one gouge in the Palo Duro Creek valley in the North Central part of the Panhandle (Hughes 1979).

Gouges are also seldom reported on the Southern High Plains outside of Texas. In southeastern New Mexico, one of the tools illustrated in a report on the Rattlesnake Draw site resembles a gouge (Smith et al. 1966:Plate VI, No. 18). In the Oklahoma Panhandle, in a survey of Black Mesa State Park (Saunders 1978), four gouges were found: one with Archaic, two with Woodland, and one with Village associations. In addition to the reported finds of gouges on the Texas High Plains, the author recalls a few rare findings of gouges in the Palo Duro Canyon part of the eastern Caprock Escarpment, in the Canadian breaks across the Panhandle, and one in a playa basin in Amarillo's Southeast Park (Hughes 1980).

From the foregoing review of what little evidence has been produced for cultural developments on the Texas High Plains during Early Archaic time, after several decades of archeological search it can be inferred that the region was generally so unattractive during the 3000-year span of the Altithermal Long Drought as to minimize human utilization. Geographic distribution of the scanty evidence available, in the form of dated remains, early dart points, and Clear Fork gouges, suggests that the playa basins and stream valleys on the uplands were seldom visited, and that even the sheltered, spring-fed canyons along the Caprock escarpment and in the Canadian breaks across the Panhandle Plains were only lightly occupied. It may also be predicted that information on the Early Archaic lifestyles on the Southern High Plains in general will come much more slowly and be harder to acquire than in some of the bordering regions, and that as the evidence accumulates, cultural differences from north to south and from east to west on the High Plains will be found to reflect the differences among the Early Archaic cultures in the bordering regions.

The Middle Archaic of Central Texas, characterized by Pedernales dart points and associated artifacts, is almost absent from the Llano Estacado. Interestingly, in Central Texas there appears to be a general increase in population in this same time period (Prewitt 1981; Brown 1989).

THE LATE ARCHAIC

(About 2000 B.C. to A.D. 200.)

The Late Archaic substage on the Texas High Plains is defined as starting at about 2000 B.C. with the beginning of Medithermal (modern) climatic conditions in the region. This substage is marked primarily by the use of various kinds of barbed dart points for hunting bison and other large game. The terminal date of about A.D. 200 is an arbitrary figure that splits the difference between about A.D. 1 and A.D. 400 or 500. Barbed arrowpoints and Woodland cord-marked and Mogollon brownware pottery may have appeared on the Texas High Plains as early as the time of Christ, whereas barbed dart points seem to have continued in use alongside of these innovations and to have been used in bison kills, until about A.D. 400 or 500 (see Lintz et al. 1991, this volume). Archeological remains that are dated within or near the 2000 B.C. to A.D. 200 span, or that include dart points of types supposedly used during this span, are assigned to the Late Archaic substage.

In contrast to the Early Archaic on the Texas High Plains, the Late Archaic is represented by thousands of sites of various kinds, many with quantities of features and artifacts that demonstrate the presence of many groups of foragers who had achieved a high degree of effectiveness at making a living by hunting and gathering. Late Archaic components are not only far more numerous than Early Archaic (and Paleoindian) components, but also appear to be about as numerous as Neoindian components.

Despite this wealth of evidence, however, Late Archaic manifestations have received much less attention than have the more intriguing Paleoindian sites and the more prolific Neoindian sites. Although hundreds of Late Archaic components have been recorded (but not reported) in ongoing survey programs and reported in special survey projects on the Texas and adjoining parts of the Southern High Plains, only a few dozen of these components have been encountered in excavations, and no more than two or three dozen of these tested components have been reported. Many, if not most, of the reported surface manifestations have an admixture of later materials (the Little Sunday site (Hughes 1955) appears to be one of the rare exceptions); and very few of the reported subsurface findings provide data on a discrete, ample, and dated assemblage (the lower midden at the Chalk Hollow site (Wedel 1975) is one of the best of these).

Pitifully few of the Late Archaic components on the Southern High Plains have been radiocarbon dated. Three of these are in the Palo Duro Canyon area. At the Canyon City Club Cave, the lowermost Level 5 produced no diagnostic items but was dated at 880 and 150 B.C.; the overlying Level 4 contained transitional Late Archaic-Early Neoindian remains, including dart points like Ellis and Lange, and was dated at A.D. 300 and 680 (Hughes 1969; Duffield 1970). At the Chalk Hollow site, the lower midden produced dart points like Castroville, Marcos, Palmillas, and Williams and was dated at 1650 to 400 B.C. (Wedel 1975). At the Deadman's shelter, the lowermost Stratum D contained transitional Late Archaic-Early Neoindian remains, including dart points like Edgewood, Elam or Kent, Ellis, and Lange, and was dated at A.D. 120 and 210 (Willey and Hughes 1978). Several Late Archaic dates have been reported for the Lubbock Lake site (Johnson and Holliday 1986; Johnson 1987; Lintz et al. 1991, this volume). In southeastern Colorado at the Medina rockshelter a Late Archaic component was dated at 20 B.C. (Campbell 1976),

In the eastern part of the Texas Panhandle, a series of Late Archaic bison kills located on the High Plains and the Rolling Plains below have yielded dart points like Ellis, Marcos, Palmillas, and Williams, and radiocarbon dates falling mainly in the A.D. 1 to 500 range (D. Hughes 1977). No cultural complexes have been identified for the Late Archaic on the Southern High Plains and defined as to cultural content and affiliations, spatial range, and temporal span. The author (1955) has suggested that a Little Sunday complex be postulated to account for the remains at that site, but the complex cannot be defined until the site has been explored and compared with others in the Panhandle Plains. Late Archaic components in the southwestern part of the South Plains have been assigned by Corley (1965) and others to the Hueco phase that Lehmer (1948) proposed for preceramic remains in the Jornada area of the Mogollon culture. However, whether all of the Late Archaic remains throughout the widespread eastern, northern, and southern districts of the Jornada Mogollon are similar enough to constitute a single complex is a question that does not yet seem to have been fully addressed. Although dart points in Late Archaic components on the South Plains have sometimes been attributed to the Edwards Plateau aspect of Central Texas and the Pecos River and Chisos foci of southwestern Texas, no one seems to have assigned an entire component to any of these complexes.

Late Archaic sites on the Southern High Plains represent a wide variety of functions and are found in a wide variety of locations. Most of the sites are open camps that were briefly occupied by small groups. Some of the sites appear to have been occupied repeatedly or protractedly by sizeable groups and were probably base camps. The open camps are usually near a water supply, around the playa basins and along the stream valleys on the uplands, and in the canyons that cut the margins of the High Plains and drain the Canadian breaks. The base camps tend to be near permanent sources of good water, and some of the best are in sheltered places in the canyons, around headsprings and pouroff pools. High places were used as lookouts, and wherever rock overhangs afforded any protection from the weather, they were used as shelters. Quarries and workshops are located at outcrops of Alibates agate, Tecovas jasper, Dakota quartzite, Edwards chert, and Ogallala chalcedony, and gravel beds of all ages were prospected for lithic materials. Bison kills were made in arroyo traps, especially in the Red River drainage along the eastern fringes of the Panhandle Plains. Some of the rock carvings in the shelters and on the cliffs around the High Plains probably date to Late Archaic time.

Various kinds of features characterize Late Archaic camps. Little or no evidence of dwellings or other structures has been found, but fires are usually evidenced by clusters and scatters of pieces of burned caliche, quartzite pebbles, sandstone slabs, and sometimes by patches of baked earth, charred wood or bone, soot, and ash. Slab-lined pit, basin, and level hearths are sometimes preserved. The various kinds of hearths and other evidence of heating and cooking doubtless have important chronological as well as functional implications that await exploration. Layers of burned rocks are found at some of the sites, but burned rock middens like those of Central Texas and ring middens like those of southwestern Texas seem to be absent. In addition to hearth areas, features at some of the sites include supplies and dumps of boiling pebbles, chipping stations, caches of raw materials, pockets of waste flakes, refuse deposits, caches of grinding slabs, bedrock mortars, and burials.

The mortar holes, usually deep and tapered cylindrical or elliptical (Forrester 1991, this issue) are sometimes clustered in large numbers on talus boulders or on bedrock ledges. The burials tend to be in the foetal position under a few slabs at the bottoms of small, shallow, oval graves, usually devoid of diagnostic artifacts but sometimes with a few personal possessions. Although few of these burials have been reported, a great many have been found both in and away from camps. The skulls tend to be long and low, with low foreheads and strong brow ridges; the teeth are much worn from eating stone-ground food, and are sometimes grooved or notched (Willey 1978; Willey and Ubelaker 1976).

Late Archaic assemblages on the Southern High Plains include many different kinds of dart points and a considerable variety of other artifacts. The dart points are potentially among the most useful of the artifact classes, and as their typology becomes better understood, they should prove to be very helpful, not only for dating High Plains sites, but also for tracing connections with adjoining regions. Most writers who have attempted to fit High Plains dart points into the Texas typology, however, have found that their specimens seldom fall neatly into one type or another. The High Plains specimens are often smaller than their counterparts in Central Texas, where many of the types were established and where the Edwards chert is a more abundant and tractable material than the materials generally available on the High Plains.

Of the more-than-two-dozen dart point types that have been explicitly identified in a Late Archaic context on the High Plains by various writers, the types that seem to be mentioned most frequently resemble what Suhm, Krieger, and Jelks (1954) called Edgewood, Ellis, Marcos, and Palmillas, followed by Ensor, Trinity, Williams, and Lange. These are mainly North Texas and Central Texas forms. They are also common in Oklahoma (Chris Lintz, personal communication). Influences from other directions are suggested by mentions of Duncan and Hanna points to the north, Augustin and Pinto Basin to the west, and Langtry and Paisano to the south.

There is some evidence from a few sites on the High Plains, sometimes agreeing with evidence from Central and southwestern Texas, that earlier dart point types during the Late Archaic substage include Castroville, Marcos, Marshall, Palmillas, and Williams, whereas later types include Edgewood, Elam, Ellis, Ensor, Kent, Lange, and Trinity. Most of the earlier types are notably larger, broader, and more strongly barbed than the later types.

Most of the High Plains dart points are made of various local materials, but occasional specimens made of exotic material evidently were imported from fairly remote sources—hornfels from northeastern New Mexico, Niobrara jasper from northwestern Kansas, Florence chert from North Central Oklahoma, and Edwards chert from Central Texas (although the last is also available in places along the southeast edges of the Llano Estacado). Obsidian from central New Mexico is rare to nonexistent in Late Archaic assemblages on the High Plains.

Chipped stone artifacts other than dart points found in Late Archaic components on the Southern High Plains include an abundance of knives (large, thin, triangular-to-ovate bifaces, usually fragmentary); key-shaped drills; crude bifaces (possibly preforms for points and knives); bifacial and unifacial choppers; many and varied scrapers (large end scrapers, small side scrapers, spokeshaves, discs, turtle-backs, retouched flakes and flake fragments); and gravers and denticulates. Chipping technology as indicated by cores and flakes has yet to receive much attention.

Hammerstones include large cobble pounders and small discoidal knappers. Grinding implements are abundant; metates are thin sandstone slabs with unshaped or partially shaped edges and shallow oval basins pecked and worn on one or both faces; the one-hand manos are small, unshaped or partially shaped quartzite or sandstone cobbles pecked and worn on one or both faces; they are round to subrectangular in outline and flat, convex, or wedge shaped in cross section.. Other stone items include grooved sandstone awl sharpeners, worn and scratched pieces of paintstone, and rare stone beads and pendants.

Scarce bone artifacts include awls of split deer cannon bone, flaking tools, gaming pieces, beads, and pendants. Food remains include bones of both large and small game animals. Some information on bison slaughtering and butchering techniques is available (D. Hughes 1977). Shell items are rare; disc, tubular, and *Olivella* beads and mussel and conch pendants have been reported.

To recap Late Archaic cultural developments on the Southern High Plains, it appears that Indian groups who had developed typical Archaic foraging efficiency during the Altithermal in surrounding regions less hostile than the High Plains grasslands began to return to the region with the onset of modern Medithermal climate and to redevelop bison-hunting skills reminiscent of their Paleoindian predecessors. Weapons, tools, faunal remains, and grinding implements indicate extensive exploitation of available food resources—game animals both large and small as well as wild plants—but most details remain to be explored.

The evidence for a gathering and hunting subsistence, the presence of brief camps wherever water was available, the location of base camps in the ecotonal scarps and breaks around and across the High Plains, and the heavy use of local lithic resources all are suggestive of seasonal rounds within limited territories. Occasional dart points of flints from remote sources, however, suggest some fast and far travel by hunting parties, and rare marine shells indicate some trade in coastal directions.

Except for some changes in dart point styles, the technological developments during the two millennia of Late Archaic life on the High Plains are still unknown. Work in bone and shell seems to have been minimal compared with stone, but the lack of perishable organic materials in the artifact inventory is more likely a reflection of the scarcity of dry cave deposits on and around the High Plains. Animal and plant materials probably were at least as important as stone. It seems likely that the Late Archaic cultures were so well adapted to the region that technological and other changes during the period were minimal, but it would not be surprising to find evidence that climatic fluctuations induced some cultural responses, such as a mesic interval at about 500 B.C. promoting more bison and more kills.

With regard to social organization, it may be speculated that Late Archaic people on the High Plains, like most of the world's foragers, lived most of the year in small patrilineal, extended family groups under the leadership of a headman, temporarily joining other groups only on special occasions. Interests beyond survival are barely hinted at in the form of rare gaming pieces, beads and pendants, paintstones, petroglyphs, and burials in the foetal position under protective slabs.

THE EARLY NEOINDIAN SUBSTAGE
(About A.D. 200 to 1100)

The Early Neoindian substage era on the Texas High Plains is defined as starting about A.D. 200 (between about A.D. 1 and 400 or 500) with the appearance of barbed arrowpoints and Woodland cordmarked and/or Mogollon brownware pottery; these are the chief diagnostic artifacts of the substage. The terminal date of about A.D. 1100 splits the difference between about A.D. 1000, when a Woodland/Village transition was taking place in the northern part of the Panhandle Plains, and about A.D. 1200, when a pit-to-surface-house transition was taking place on the southwestern part of the South Plains. As will be seen later, the transition in both areas was marked, not only by changes in house types, but also by a shift from barbed arrowpoints to side-notched triangular arrowpoints, and by many other developments.

The Early Neoindian substage on the Southern High Plains seems to have been a time when some of the Late Archaic foraging groups who had been hunting and gathering in the region for more than 2000 years without much change began to add some potentially revolutionary new ideas to the cultural inventory—the bow and arrow, pottery, pit houses, and doubtless some gardening or horticulture. Under influences from the Mogollon tradition to the southwest and the Woodland tradition to the northeast, they began a transformation from a nomadic camper-forager existence toward a sedentary villager-gardener lifestyle. The bulk of the items in the

Late Archaic assemblages continue on into the Early Neoindian assemblages, suggesting that the innovations represent mainly influxes of new ideas rather than new peoples. The extent to which collecting of wild plant food in the Late Archaic may have been preadaptive to the acceptance of horticultural ideas is an interesting matter for speculation.

On the Texas part of the Southern High Plains, three Early Neoindian complexes have been recognized. In the Panhandle Plains, a Lake Creek complex is found mainly in the Canadian breaks and northward, with some extension southward into the northern part of the Red River drainage, whereas a Palo Duro complex is found mainly in the Red River drainage and northward into the Canadian breaks and somewhat beyond. In the southwestern part of the South Plains, a sequence of two Early Neoindian phases (Querecho and Maljamar) occurs mainly in southeastern New Mexico but is well represented eastward into Texas.

The Lake Creek Complex

This complex was first identified on the basis of test excavations at a site on Lake Creek, a north-side tributary of the Canadian River in Hutchinson County (Hughes 1962). The complex is characterized primarily by a combination of Woodland cordmarked pottery with Scallorn-like arrowpoints, often accompanied by Mogollon plain brownware.

The Lake Creek complex has been tested and reported at eight or nine sites and tested but unreported at several others. Surface surveys have identified the complex at several dozen sites, a few of which are described in various survey reports. Sadly, there are no radiocarbon dates for any of these components, but a Woodland sherd at the Tascosa Creek site near Old Tascosa (now Cal Farley's Boys Ranch) has been dated by thermoluminescence at A.D. 520 (Couzzourt 1985, 1988). Radiocarbon dates at several Woodland sites in western Oklahoma and a couple in southeastern Colorado indicate a span of about A.D. 200 to 800 or 900.

Most of the known components of the Lake Creek complex are open camps on terraces along the Canadian River and its tributary creeks, usually in buried soil zones. Very little material is exposed at most sites, but some are extensive and rich enough to represent base camps. Features at the sites are little known; a possible dwelling at one site is yet to be exposed. Rock hearths are seldom well preserved. Refuse deposits are composed mainly of hearth stones, boiling pebbles, waste flakes, and animal bones. Bison bones are scarce at most sites, lending some credence to Dillehay's postulated Bison Absence Period II (A.D. 500 to 1200 or 1300). Human skeletal remains at three or four sites, and a few isolated burials with Scallorn-like points, indicate flexed burials, sometimes accompanied by a few personal tools and ornaments.

The diagnostic pottery is typical Plains Woodland ware. It is seldom abundant, usually consisting of a few big thick fragments of large conoidal vessels, tempered with liberal quantities of coarse particles of crushed rock and/or bone (in the northeastern Panhandle the rock is often scoria from pebbles in the Ogallala Formation), and boldly impressed with long parallel cordmarks. A few sherds of

Mogollon brownware are sometimes present, generally large thick pieces resembling Alma Plain, an early type with a smooth finish and dark paste speckled with whitish angular cleavage fragments of crushed plagioclase feldspar.

Most of the projectile points are small Scallorn-like arrowpoints, but other kinds of corner-notched arrowpoints are also found together with occasional specimens ranging from Ellis-like corner-notched dart points to Reed-like side-notched arrowpoints. The rest of the artifact inventory appears to be basically similar to the Late Archaic inventory, but future studies may be expected to reveal some significant differences. Grinding implements are impressively abundant at some sites.

The Palo Duro Complex

This complex was first identified on the basis of test excavations at the Deadman's shelter in Mackenzie Reservoir on Tule Canyon, a major tributary of Palo Duro Canyon (Willey and Hughes 1978). The complex has been much further defined on the basis of excavations at the Kent Creek site in Hall County near Turkey, Texas (Cruse 1989). The complex is characterized primarily by a combination of Mogollon plain brown pottery with a distinctive arrowpoint type called Deadman, often accompanied by Scallorn-like arrowpoints.

The Palo Duro complex has been tested and reported at a half a dozen sites and has been found in unreported tests at several others. A great many components have been described in survey reports, and dozens of others have been recorded but not published. Unlike the Lake Creek complex, radiocarbon dates have been obtained for several components of the Palo Duro Complex: A.D. 300 to 680 for Level 4 at the Canyon City Club Cave (Hughes 1969); A.D. 370 to 870 for the upper midden at the Chalk Hollow site (Wedel 1975); A.D. 120 to 710 at the Deadman's shelter (Willey and Hughes 1978); A.D. 690 to 1010 at the Kent Creek site (Cruse 1989); and A.D. 815 to 1110 at the Blue Spring shelter (unreported). These dates suggest that the Palo Duro complex spans most of the first millennium A.D.

Sites of the Palo Duro complex seem to occur at a wider variety of locations than do those of the Lake Creek complex. The Palo Duro sites are found mainly in the broken country in the upper Red River drainage, but they are also found in the breaks of the Canadian River, along the valleys and canyons, on high places and low, in exposed areas, sheltered areas, and rock overhangs, near and sometimes not so near water. Some large, deep, and rich components probably represent base camps.

Except for Mogollon-style pithouses at the Kent Creek site (Cruse 1989), and probably at another site near Buffalo Lake (Hays 1986), features at the sites, insofar as they are known, do not seem to differ appreciably from those at the Lake Creek sites. Both rock-lined and unlined fireplaces have been found. Bison bones are scarce to nonexistent in the middens. The few burials referable to the complex are flexed, with some personal possessions, like the burials of the Lake Creek complex.

Artifact assemblages are also similar, except for the peculiar Deadman arrowpoints that are diagnostic of the Palo Duro complex. These points are deeply notched from the base so as to produce long slender stems and equally long slender barbs.

Complete specimens are rare; the fragile stems and barbs that survived the notching process have seldom escaped postmanufacturing breakage. The points are usually accompanied by distinctive thin, ovate preforms. Deadman points are reminiscent of other long-stemmed arrowpoints in Texas—not only the early Alba and Bonham types of eastern and North Central Texas, but also the late Perdiz and Livermore types of Central and western Texas. As with Lake Creek components, Palo Duro components usually have a few sherds of Mogollon brownware resembling the early Alma Plain type. The sherds often have repair holes, suggesting that the imported vessels were highly regarded and reluctantly abandoned.

The Palo Duro complex may represent groups of nomadic foragers who were based in the upper Red River drainage, but who served as intermediaries between Mogollon groups to the southwest on the Pecos River and the Rio Grande and Woodland groups to the north on the Canadian River. If so, they may have carried more important, but less tangible, items than Mogollon pots, such as ideas about houses and horticulture.

Faunal evidence from some of the Palo Duro components, together with the buried soil zones containing some of the Lake Creek components, suggests that Panhandle climate may have been moister around the middle of the first millennium A.D. than it is today. The Palo Duro levels at the Canyon City Club cave, the Blue Spring shelter, and the Deadman's shelter all have yielded remains of the prairie vole (*Microtus ochrogaster*), which no longer lives in the Panhandle, preferring the moister regions to the east.

The Querecho-Maljamar Phases

On the basis of test excavations at several sites on the South Plains in southeastern New Mexico and surface collections at many others, Corley (1965) proposed an eastern extension of the Jornada branch of the Mogollon culture with a sequence of Querecho, Maljamar, and Ochoa phases. Tested sites included Boot Hill (Corley and Leslie 1960) and Merchant (Leslie 1965). Since 1965, components of the Eastern Jornada phases have been reported in excavations at several other sites, not only in southeastern New Mexico, but also at the Andrews Lake sites in Texas (Collins 1966, 1968) and are recognizable in excavation and survey reports at many other sites in the Texas part of the South Plains.

According to Corley (1965) and Collins (1966, 1968, 1971), the Querecho phase, which is thought to have evolved out of a local version of the Late Archaic Jornada-wide Hueco phase, is dated at A.D. 950 to 1100, and is characterized by sites without houses, a locally made plain brownware, a few kinds of intrusive wares, corner-notched arrowpoints, and, until A.D. 1000, some small dart points. (It should be noted that Querecho is an unfortunate label for a phase that is unrelated to the Querechos encountered by Coronado in 1541.) The Maljamar phase is dated at A.D. 1100 to 1300, and is characterized by pithouses, locally made plain and corrugated brown wares, more kinds of intrusive wares, corner-notched arrowpoints until A.D. 1200, and side-notched triangular arrowpoints thereafter. The Ochoa phase is dated at A.D. 1300 to 1450, and is characterized by jacallike surface houses with rock and adobe foundations, locally made Ochoa Indented Brown Ware, still more kinds of intrusive wares, and side-notched triangular arrowpoints.

In this Eastern Jornada sequence, the Querecho phase clearly is Early Neoindian. The Maljamar phase appears to represent a transition from Early to Late Neoindian, with a shift from corner-notched to side-notched arrowpoints in the middle of the phase (at about A.D. 1200), and shifts from pit to surface houses and from local plain and corrugated brownware to local indented brownware at the end of the phase (about A.D. 1300).

All of the dates for the Eastern Jornada sequence are estimates based on various intrusive types of earlier Mogollon and later Anasazi pottery (Runyan and Hedrick 1987). Ages of some of the types—especially the earlier Mogollon types—are merely estimates in themselves, and one wishes for some direct radiocarbon dating of the Eastern Jornada manifestations. Although events in the Eastern Jornada region did not necessarily occur at the same time as similar events in surrounding regions, comparisons suggest that some of the estimates for the Eastern Jornada may be a bit late. In the middle Pecos region (Jelinek 1967), the ceramic sequence has been dated from A.D. 900 to 1300 rather than A.D. 950 to 1450, although the replacement of corner-notched arrowpoints with the side-notched arrowpoints has been dated at the same time (A.D. 1200) as in the Eastern Jornada sequence. The ceramic sequence in the Guadalupe Mountains (Phelps 1974) has been dated from A.D. 850 to 1350. In the Hueco Basin beyond the Guadalupes (Whalen 1981), the ceramic sequence has been dated from A.D. 1 to 1400, with a much earlier starting date and with surface houses replacing pithouses between A.D. 1100 and 1200, rather than at A.D. 1300 as in the Eastern Jornada. Finally, it is curious that brownwares from the Mogollon seem to have reached the Panhandle Plains several centuries earlier (about A.D. 200) than they reached the South Plains (about A.D. 950).

Since no evidence of horticulture has been found at Eastern Jornada sites, it has been suggested (Collins 1971) that these sites represent people who managed to turn a Late Archaic foraging existence under influences from Jornada Mogollon cultures to the west, into a semisedentary lifestyle with villages and pottery, centered on the spring-fed draws and playas of the southwestern Llano Estacado and based mainly on hunting buffalo and gathering acorns. Collins notes, however, that in the Eastern Jornada sequence (Jelinek 1967), bison were scarce during the earlier phases, until about A.D. 1200. This accords well with the evidence from the Panhandle Plains and from the Southern Plains in general (Dillehay 1974).

From the Red River drainage southward across the drainages of the Brazos and Colorado rivers, along the eastern and southern margins and the uplands of the Llano Estacado, at least a dozen tested and reported sites (and many reported but untested sites) have yielded Scallorn-like arrowpoints, sometimes without pottery but usually with Mogollon plain brownwares that may be early, and occasionally with painted types that are known to be early. Unfortunately, these Early Neoindian materials are almost always mixed with later types of points and pottery and lack radiocarbon dates. These components appear to represent the spread of Querecho-

Maljamar influences entirely across the South Plains at an early date. (Perhaps Qué Mal would be an appropriate name for the complex!)

Along the western edge of the Southern High Plains, in eastern New Mexico, the combination of corner-notched arrowpoints and plain brownware pottery extends all the way up the Pecos Valley and across the low divide into the upper Canadian drainage. In the Brantley Reservoir area below Carlsbad, Henderson (1976) reports the combination in some of the 35 sites he assigns to his Ceramic Period, which he estimates as starting at about A.D. 900. In the middle Pecos area below Fort Sumner, Jelinek (1967) recorded 64 sites and found the combination in the sites that he assigns to his 18 Mile and Mesita Negra phases, dating from A.D. 900 to 1200. In the Los Esteros Reservoir area above Santa Rosa, Mobley (1978) found the combination in several sites that he assigns to his Pueblo Period, dating from A.D. 900 to 1300. These include three tested and radiocarbon dated components: Stratum IIIA at Old Coyote shelter, dated earlier than A.D. 1096; Stratum II at Helter shelter dated at A.D. 1158; and the Spillway site, dated at A.D. 1074 and A.D. 1141. In the upper Canadian drainage, the combination was reported by Roberts (1942) in the top level at the San Jon site; by Dick (1953) in one of two rock shelters at the Hodges site near Tucumcari; and by Hammack (1965) at three sites in the Ute Reservoir area north of Tucumcari, including the top Level 1 at site LA5573.

From the above review, it is now apparent that during the Early Neoindian substage, Scallorn-like and other barbed arrowpoints blanketed the entire Southern High Plains and bordering areas and that the Canadian River breaks were the meeting ground for Woodland cordmarked pottery from the north and Mogollon plain brown ware from the south, and perhaps for the exchange of important ideas between the bearers of these two radically different ceramic traditions of widely separated origins.

LATE NEOINDIAN

(About A.D. 1100 to 1541)

The phase of the Late Neoindian on the Texas High Plains is defined as starting at about A.D. 1100 with the appearance of side-notched triangular arrowpoints (Washita, Harrell), which together with other triangular arrowpoints (Fresno), become the principal diagnostic artifacts of the substage. As indicated previously, the initial date of about A.D. 1100 splits the difference between about A.D. 1000, when a Woodland/Village transition was underway in the northern part of the Panhandle Plains, and about A.D. 1200, when a pit-to-surface-house transition was underway in the southwestern part of the South Plains.

In the Panhandle Plains, the Woodland-Village transition involved not only a shift from barbed arrowpoints to side-notched triangular arrowpoints, but also many more important if less diagnostic changes, including expanded bison hunting and corn-bean-squash horticulture, growing populations in many homesteads, hamlets, and villages, increasing complexity in architecture and in stone, bone, shell, and ceramic technology, intensified exploitation of the Alibates agate quarries, and a growing trade network, especially with the Anasazi pueblos of northern New Mexico.

In the South Plains, the shift from corner-notched arrowpoints to side-notched triangular arrowpoints, and from pithouses to surface houses, seems to have been accompanied by similar but somewhat less spectacular changes, including increased bison hunting, more numerous villages with more numerous and complex structures, some technological innovations, and more Anasazi as well as Mogollon trade.

Although the arrival of the Coronado expedition on the High Plains in 1541 may mark the beginning of the historic stage, this event is more an arbitrary than a real terminus for the Late Neoindian substage of cultural development, which did not really end until the acquisition of horses by the Plains Indians in the late 1600s initiated what was perhaps the greatest cultural revolution in their long history—the Historic stage.

The small, thin, sharp, side-notched triangular arrowpoint seems to be a perfected bison-killing point designed for quick manufacture, damage resistance, and deep penetration; it is less significant in itself than as a readily recognizable signal of the renewed importance of bison hunting on the Texas High Plains. It seems to have come out of the northwestern Great Plains (Kehoe 1966) and to have been moving southward down the Southern High Plains from about A.D. 1000 in the north to about A.D. 1200 in the south, perhaps together with the returning bison, and only a century or two ahead of various Apache groups who were following the bison herds southward.

The triangular arrowpoint seems to have been accompanied on its southward journey by the lozenge-shaped Harahey knife with its four alternately beveled cutting edges, which appears to be a perfected bison skinning and butchering knife designed for prolonged use before having to be resharpened (Sollberger 1971).

At least four main complexes are recognizable on the Texas High Plains during the Late Neoindian substage: in the Panhandle Plains, the Antelope Creek focus of the Plains Village tradition, followed by a proposed Tierra Blanca complex representing an Apache group; and in the South Plains, the Ochoa phase of the Eastern Jornada sequence, followed by the Garza complex, which appears to represent another Apache group. A fifth complex has recently been postulated in the northeastern Panhandle—the Buried City complex (D. Hughes 1987, 1989).

The Antelope Creek Focus

Although a great deal remains to be learned about this complex, it is much better known than any other complex on the Texas High Plains and has been described so thoroughly and summarized so frequently that it will be given only minimal consideration in this paper.

The type site of this complex was on Antelope Creek, a south-side tributary of the Canadian River in Hutchinson County, in the oil fields between Fritch and Borger (Krieger 1946). A few years ago the extensive ruins were almost totally wiped out with a pass or two by a curious bulldozer operator during a lunch break from work on a nearby pipeline project. The Antelope Creek focus is marked by an association of many distinctive traits, including slab-house ruins, Borger Cord-marked pottery, triangular Washita, Harrell, and Fresno arrowpoints, "guitar-pick" arrowpoint preforms, large, oval-to-lozenge-shaped beveled knives, flake-base drills, large, thin end scrapers, big, thick grinding slabs with deep, oval basins, bison tibia, scapula, and rib tools, and mussel shell scrapers, among many other characteristic artifacts.

Hundreds of Antelope Creek components have been recorded, and many of these have been described in survey reports; nearly all of the sites have been vandalized, often beyond salvation. Scores of sites have been tested, and dozens of these have been described in excavation reports; few of the reports are scientifically adequate. Antelope Creek components are concentrated mainly in the Canadian breaks in the central part of the Texas Panhandle, but they are found at many other places in the Panhandle Plains, southward into the Red River drainage, westward into northeastern New Mexico, northward into the Oklahoma Panhandle, where similar remains have been assigned to the Optima focus (Watson 1950), and eastward toward the edges of the High Plains, where they mingle with components of the Washita River focus in the eastern Texas Panhandle.

A great many Antelope Creek components have been dated by radiocarbon analyses and by Anasazi trade pottery. The dates range from the 1100s into the 1500s with most of them falling between A.D. 1200 and 1450, the dates usually given for the focus (Baerreis and Bryson 1965; Lintz 1978b).

Most of the Antelope Creek sites are slab-house ruins at isolated homesteads, small hamlets, and large villages. The ruins are found mainly in the Canadian breaks, where the sites are so dense that when they were inhabited, the smoke of several neighboring settlements would have been visible from most of the settlements, but the ruins are known as far south as the Tule Canyon in Briscoe County. Some of the sites appear to be hunting camps, in the open and in rockshelters, and at least one of the open camps, as far south as the Little Red River in Briscoe County, is associated with a bison kill. Most of the hundreds of quarry pits at the well-known Alibates quarries, which are surrounded by large mining, manufacturing, and trading villages of the Antelope Creek focus, doubtless were dug by these people.

The ruins of the Antelope Creek settlements are found in many kinds of locations—along rivers and creeks, around headsprings and pouroff pools, in canyons and valleys, sometimes on highly defensible mesas and buttes (later, Apache-period fortresses?), but more often on indefensible ridges, bluffs, benches, and terraces (earlier, pre-Apache habitations?). Antelope Creek ruins may comprise from one to scores of structures. The dwellings generally were beautifully designed for serving environmental and social needs with available materials and technology. Many of the structures are large, rectangular, semisubterranean houses with vertical slabs lining the walls of the excavation, an east-west traffic channel with a central firepit surrounded by holes for four roof-support posts, wide benches along both sides of the channel for working and sleeping, a household altar bench or niche at the west end of the channel, a slab-lined entry tunnel at the east end of the channel, small storage rooms adjoining the tunnel, large bell-shaped storage pits outside the tunnel exit, and a trash dump beyond.

The architecture of the Antelope Creek ruins is highly variable (Lintz 1984). The structures range from separate to contiguous, small to large, square to round, deep to shallow, and with or without some or all of the aforementioned features, plus others, depending apparently on resources and functions, experiments and idiosyncrasies, and spatiotemporal style changes. Perhaps much of the architectural variability reflects a coalescence of diverse building ideas—not only from Mogollon and Anasazi influences, but also from Apishapa and Upper Republican refugees—added to local traditions.

Middens consist largely of ashes, boiling pebble fragments, animal bones, waste flakes, pot sherds, and discarded tools, except that in the industrial villages around the quarries they consist chiefly of debris from reduction of big, thick, bifacial quarry blanks. The faunal remains are mostly splinters of crushed and boiled bison bones, but many kinds of smaller game are represented. Charred remains of corn, beans, squash, and other plants have been recovered.

Many burials have been found under floors, in cache pits, and in sizeable graves partially filled with rocks. The skeletons are usually flexed and are seldom accompanied by more than a few personal possessions, except that the bison tibia dibble blades that were used to dig the graves were consistently left among the rocks in the grave fill (so these implements of death would not be used in gardening?). Some comparative typological studies have been made on the skulls, which are distinctively round and high.

The technology in stone, bone, shell, and pottery is rich and varied, practical, resourceful, and skillful. It gives the impression of thorough and effective exploitation of every material available. The chipped stone tools often exhibit the consummate craftsmanship of full-time professional flintknappers. The large, thin, sharp, oval knives are on a par with the best flint work anywhere in the world. An array of specialized knapping tools of stone, bone, and antler awaits expert study. Small elbow pipes were laboriously carved from a hard pinkish siltstone, at least some of which evidently came from nodules in the Triassic redbeds around Landergin Mesa. Paired shaft-smoothers and grooved awl-sharpeners of sandstone are among the several kinds of grinding tools. Bison tibia hoes, scapula trowels, rib rasps, and various kinds of awls and punches are common among the bone tools. Mussel shells were used for several kinds of tools and ornaments. Many kinds of beads and pendants were made from stone, bone, and shell; *Olivella* shell beads were favorites.

The Borger Cordmarked cooking pots were thoroughly functional: large, undecorated, ollalike vessels, wide mouthed for easy filling and emptying, high-necked for control of boiling, globular-bodied for maximum volume with minimum dimensions, round bottomed for stability on small firepits and soft ground, part tempered with angular fragments of crushed quartzose boiling pebbles for strong bonding with clay, thin walls compacted with a nonsticking cord-wrapped paddle for more strength and less weight, and cord-roughened exteriors to increase the surface area for faster heating with less fuel. Exotic items of many kinds indicate a strong trade network, especially with the Anasazi Pueblos to the west; obsidian, turquoise, painted pottery, and *Olivella* shell beads are some of the more common intrusives. Without much doubt, Alibates agate was the principal export.

The terminal culture of the Antelope Creek focus is basically so similar to that of many of other late prehistoric villagers in the Southern and Central Great Plains, who appear to have evolved into the historic Caddoan-speaking Kichai, Wichita, Pawnee, and Arikara tribes in different parts of the plains that the linguistic and ethnic affiliations of the group seem most likely to have been Caddoan (Hughes 1968). Future studies of the economic, social, and religious patterns implicit in the Antelope Creek evidence may therefore benefit greatly from the careful use of analogy with the ethnography of the historic Plains Caddoans.

The Antelope Creek focus in the Texas Panhandle may have been rooted in the Lake Creek complex, just as Village cultures elsewhere in the Plains seem to have evolved out of local Woodland cultures. In the Panhandle, however, the development may have received some special stimuli, at first from Mogollon, and later from Anasazi sources. Whether or not the Palo Duro complex was also involved in this development remains to be explored. Horticultural improvements, fortuitously coupled with an abundance of bison, seem to have promoted a rapid population increase, which may have been augmented by increases of related Apishapa and Upper Republican groups escaping from the drought at about A. D. 1300 in eastern Colorado and western Nebraska and Kansas, as some writers have suggested (Campbell 1976, Baerreis and Bryson 1965).

There is considerable circumstantial evidence to suggest that an Antelope Creek focus thus strengthened may have constituted a final holdout of the Caddoan villagers on the High Plains until about the middle of the fifteenth century, when increasingly hostile relationships with less sedentary trading together with raiding Apache immigrants forced a withdrawal to the northeast to join other Plains Caddoan relatives in fortified villages on the Arkansas and Platte (Hughes 1968).

The Ochoa Phase

Although it is not nearly so well known, the Ochoa phase seems to represent a development on the South Plains somewhat similar to but less spectacular than that of the Antelope Creek focus in the Panhandle Plains. As indicated earlier, the Late Neoindian Ochoa phase is thought to have evolved out of the Early Neoindian Querecho phase via a brief transitional Maljamar phase as part of an Eastern Jornada sequence on the South Plains.

The Ochoa phase has been identified at most of the sites where the earlier phases are recognizable; it is generally much better represented than they are, and is found at additional sites as well. The phase is marked mainly by a shift from pithouses to jacallike surface houses with stone and adobe foundations, increased dependence on bison, side-notched arrowpoints rather than corner-notched arrowpoints, beveled knives, locally made Ochoa Indented Brown Ware replacing locally made plain and corrugated brownwares, and increased quantities and varieties of imported Mogollon and Anasazi painted wares.

Late Neoindian trade in the South Plains was not exclusively Puebloan. Sherds of shell-tempered Nocona Plain from the Henrietta focus of North Central Texas, of clay-tempered Bullard Brushed from the Frankston focus of East Texas (or Little Deer Brushed from the Wheeler complex of western Oklahoma), and bone-tempered Leon Plain and Doss Red Ware from the Toyah focus of Central Texas have been found at several sites, especially along the eastern fringes of the Llano Estacado, but also far to the west in the valleys on the uplands. The Puebloan trade pottery indicates a span of A.D. 1300 to 1450 for the Ochoa phase. If these dates are reliable, the Ochoa phase may have been a holdout in the South Plains as the Antelope Creek focus was in the Panhandle Plains. The terminal dates that have been proposed for all of the local ceramic sequences from southeastern New Mexico northward into southeastern Colorado form a remarkably consistent pattern: A.D. 1350 for the Late Ceramic phase in the Guadalupe Mountains (Phelps 1974), A.D. 1300 for the McKenzie phase in the middle Pecos valley (Jelinek 1967), A.D. 1300 for the Pueblo Period in Los Esteros Reservoir (Mobley 1978), A.D. 1300 for the Cimarron phase in the Cimarron district (Kirkpatrick 1976), and A.D. 1300 for the Apishapa focus on the Chaquaqua Plateau (Campbell 1976).

In most of these localities, there are some later materials that have been tentatively identified as representing one Apache group or another. Were the Antelope Creek and Ochoa people like islands in an encroaching sea of alternately trading and raiding Apaches, who were spreading rapidly southward down the foothills and plains at about A.D. 1300 and forcing small isolated frontier Tanoan groups westward to their mountain pueblos and similar Caddoan groups eastward to their prairie villages or southward into the Canadian breaks? Was some of the Puebloan exchange manifested in the Antelope Creek and Ochoa cultures mediated by Apaches? Did the Great Drought of A.D. 1276 to 1299 in the Southwest have the same effect on the tiny Puebloan settlements of the eastern frontier along the Rocky Mountain foothills that it had on the mighty cliff-dwellings and pueblos in the Four Corners country?

One of the most fascinating problems remaining in the prehistory of the Western Great Plains is how the Tanoan-speaking Kiowa became bison-hunting Plains nomads closely allied with the Athapascan-speaking Kiowa Apache. Jelinek (1967) has suggested the possibility of Kiowa-Kiowa Apache roots in the McKenzie phase of A.D. 1200 to 1300 on the middle Pecos. The Ochoa phase of A.D. 1300 to 1450 on the South Plains would seem to be another likely possibility, perhaps even more likely.

Apache Complexes

Evidence that has been coming to light with increasing frequency in recent years seems to indicate that Apache occupation on the Texas High Plains may be represented by materials that are separable into two distinguishable complexes: a Tierra Blanca complex in the Panhandle Plains and a Garza complex in the South

Plains. Although the two complexes are identifiable at a great many sites scattered over their respective regions, much more work must be done before either can be characterized in any detail.

The type sites for the Tierra Blanca complex are the Tierra Blanca ruin on the creek of that name in Deaf Smith County (Holden 1931; Spielmann 1982, 1983), and the Fifth Green site on Palo Duro Creek in Randall County (Kalokowski n.d.). The complex seems to be manifested at two kinds of sites: some, like the Tierra Blanca ruin, are large villages marked mainly by stone foundations of jacallike structures, triangular side-and-base-notched Harrell, side-notched Washita, and unnotched Fresno and Talco-like arrowpoints, and much Anasazi trade material, including many sherds of glaze-polychrome and plain utility ware. Others, like the Fifth Green site, are small camps marked mainly by the same kind of utility ware accompanying the same kinds of arrowpoints.

The utility ware resembles Apachean Perdido Plain (Gunnerson 1971) and Puebloan Pecos faint-striated; it has recently been defined as Tierra Blanca Plain (Habicht-Manche 1987). The vessels were small, squat, olla-shaped cooking pots of the kind that might be worth taking along on hunting trips. The sherds are thin and dark, smooth and hard, with temper of fine sand, usually micaceous.

The Tierra Blanca complex seems to represent a semisedentary and semi-nomadic, bison-hunting and possibly corn-growing people who were much involved in trade with the Anasazi pueblos, with sites like Tierra Blanca their base villages and sites like Fifth Green their hunting camps. Several of the base villages have been recorded, mainly along Tierra Blanca Creek and Palo Duro Canyon, but only a few have been tested, and only two of the excavations have been reported. Many of the hunting camps have been recorded in various parts of the Panhandle Plains, and more than a dozen of these sites have been described in survey reports; a few have been tested and reported.

Some of the base villages of the Tierra Blanca complex, including the type site, are in exposed locations on valley or canyon rims. Others are on broad terraces in sheltered parts of the canyons. Exposed sites like the Tierra Blanca ruin may have been summer villages, whereas the more protected sites may have been winter villages. The Tierra Blanca village overlooks a broad floodplain in a well-watered part of the creek valley; charred corn was found in the excavations.

The glazewares from some of the base villages have been identified as mainly glazes C and D, dating at about A.D. 1450 and 1500. Radiocarbon dates have been determined for two probable components of the Tierra Blanca complex: A.D. 1550 and 1650 for the top Level 1 at the Canyon City Club Cave (Hughes 1969), and A.D. 1590 for the South Mouth site in the lower part of Tule Canyon (Katz and Katz 1976). The descriptions of the bison-hunting Querechos encountered on the Panhandle-Plains by the Coronado expedition in 1541 and of the corn-growing Faraones discovered by the Onate expedition in 1601 probably constitute eyewitness accounts of the lifestyle of the Tierra Blanca complex in both of its two main aspects.

The type site for the Garza complex is the site of that name in Garza County (Runkles 1964). A review of much of the data available for the Garza complex has been published (Johnson et al. 1977). The complex seems to be marked by Harrell, Washita, Fresno, and Talco-like arrowpoints and by glaze-polychrome and plain utility ware like that of the Tierra Blanca complex, but to have two additional distinctive arrowpoint types, the base-notched triangular Garza and Lott points, which are rare to absent in the Panhandle Plains, and to lack evidence of fixed dwellings, at least at any of the known components (Runkles 1964; Word 1991, this volume). At the Bridwell site, which is enclosed by a large, low, circular mound, glaze-polychrome sherds dating as early as the 1300s were found (Parker 1982). Was the mound formed by blowsand trapped in a brush pile surrounding a winter tipi camp?

Survey reports indicate that scores of Garza components have been encountered all over the South Plains; at least a dozen components have been described in excavation reports. Some of the components, including the type site, have produced no pottery; some, like the Lubbock Lake site (Johnson et al. 1977), have produced only utility ware; a few, like the Montgomery site (Word 1965; Northern 1979), have produced both utility ware and large quantities of glaze-polychrome sherds. This suggests that the Garza complex has the same kind of hunting camp/base village contrast as the Tierra Blanca complex.

Glaze-polychrome pottery at some of the Garza components suggests approximate contemporaneity with the Tierra Blanca complex. The glazeware of the Montgomery site is mainly E and F, dating from A.D. 1550 to 1700. Two radiocarbon dates of A.D. 1635 and 1665 for the Garza components (three camping areas and one processing station) at the Lubbock Lake site may be as much as 50 years too young (Johnson et al. 1977:105).

The Tierra Blanca complex in the Panhandle Plains and the Garza complex in the South Plains appear to represent two main groups of late prehistoric to early historic Apaches on the Texas High Plains, traceable perhaps to the Lipans and Mescaleros of later historic time. It should be noted, however, that Baugh (1986), in redefining the protohistoric Wheeler complex of western Oklahoma, suggests that the Garza complex may be a westward extension of the Wheeler complex, since Wheeler components sometimes have Garza arrowpoints, and Garza components sometimes have pottery identified as Edwards Plain and Little Deer Plain and Decorated, characteristic of the Wheeler complex. If the Garza complex is not Apache, there is the intriguing possibility that it as well as the Wheeler complex represents the Teyas, probable Caddoan-speakers found by Coronado in the barrancas to the southeast of their Querecho enemies. The Teyas directed Coronado to the Quiviran Wichitas in Kansas, who were painted like the Teyas and otherwise resembled them.

SUMMARY

An effort has been made here to assess the present state of our knowledge of prehistoric cultural developments on the Texas High Plains during Paleoindian, Archaic, and Neoindian times and to explore the possible effects on those developments of changes in the regional environment and in the surrounding cultures.

This synthesis is based on archeological investigations spanning all but the first and last few years of the twentieth century. Archeological research started earlier in the Texas High Plains than is some other parts of the state but has been pursued less intensively. As elsewhere in Texas, however, the research has been accelerating since midcentury, and enough progress has now been made with descriptive archeology (who, what, where, and when) to permit some beginnings on explanatory archeology (the how and why).

The Texas High Plains are part of a huge piedmont-plateau comprising the northwestern one-sixth of the state, looming over the Rolling Plains to the east and the Edwards Plateau to the southeast, seemingly level on top but actually sloping toward the east in the Panhandle and to the southeast in the South Plains (see Figure 1). This vast plateau, with its high rugged edges and flat uplands (the landscape, like the weather, is mostly mild but sometimes harsh) may seem like a barrier between the prairies and forests to the east and the mountains and basins to the west, but in reality it appears to have been more of a bridge than a barrier to prehistoric foot-travelers, since ample evidence indicates that it was traversed both eastward and westward by most of the native cultures from Paleoindian through Historic times.

The Texas High Plains are breached by the Canadian breaks across the Panhandle, and southward the uplands are interrupted by the shallow eastward- and southeastward-draining valleys of the headwater tributaries of the Red, Brazos, and Colorado rivers. These watercourses must have been like highways for east-west travelers and like rest stops for north-south trekkers. The intervening plains are dotted with thousands of playa lake basins that should have facilitated travel in all directions except during severe droughts.

There is a variety of vegetation along the watercourses, but over the thousands of square miles of level uplands between the valleys there was nothing but short grasses, and bison were about the only resource—but what a resource!

The valleys and canyons on and around the Texas High Plains have several kinds of megascopically distinguishable lithic resources that provide unusually favorable opportunities for lithic analyses and paleocultural interpretations.

Just as short-range weather changes strongly affect life on the Texas High Plains in modern times, so did long-range climatic cycles affect life during prehistoric times, especially since the uplands were little more than a great buffalo pasture—essentially a single-resource region. Increasingly numerous and varied kinds of paleoenvironmental studies seem to be approaching a consensus on the general trends of prehistoric climatic changes, but not yet on specific events and times (see Table 1). From about 11,000 years ago (circa. 9,500 B.C.) until around 6,000 B.C., there was an Anathermal climate, which was much cooler and wetter than the present. This climate moderated slowly, very gradually becoming less cool and wet.

Table 1. A Chronology of Hunting Cultures on the Southern High Plains of Texas.

9,500 B.C.–Anathermal climate. Much cooler and wetter than now; Late Pleistocene fauna: mammoth, horse, camel, giant bison; Early Paleoindian substage; free-roaming mannoth hunters; mass kills with lances; Llano culture; fluted Clovis points.

8,000 B.C.–Anathermal climate continues. Less cool and wet; Late Pleistocene fauna extinct except giant bison; Middle Paleoindian substage; free-roaming giant-bison hunters; mass kills with lances; Folsom, Plainview, and similar cultures; fluted Folsom points, unfluted Plainview points, and others.

6,000 B.C.–Anathermal climate ending. Less cool and wet; giant and modern bison; Late Paleoindian substage; free-roaming bison hunters; mass kills, some with lances, some with atlatls; Plano cultures; parallel-flaked points of several types, some stemless lance points like Texas Angostura, and some shouldered dart points like Scottsbluff.

5,000–2,000 B.C.–Altithermal climate. The Long Drouth—much warmer and drier than present climate; bison scarce; Early to Middle Archaic substage; territorial foragers; cultures like Bitter Creek, with barbed dart points like Bulverde, and Clear Fork gouges; barren summit of High Plains virtually abandoned in favor of brush breaks of the Rolling Plains; much use of hearthstones and boiling pebbles.

2,000 B.C.–A.D. 200.–Medithermal (modern) climate begins. Bison abundant; Late Archaic substage; foraging and renewed bison hunting; mass kills with atlatls; cultures like Little Sunday, with corner-notched dart points like Williams and Ellis, on the High Plains as well as the Rolling Plains; much use of bison-processing tools (trianguloid knives, end scrapers) and food-grinding implements (milling stones).

A.D. 200–1100.–Medithermal climate continues. Somewhat cooler and wetter than present; bison scarce; Early Neoindian or Ceramic substage; semisedenatry foraging, deer-hunting with bow and arrow, incipient horticulture; Plains Woodland cultures from Red River northward, like Lake Creek in the Texas Panhandle and Custer in western Oklahoma, with conical cordmarked cooking pots and barbed arrowpoints like Scallorn; Palo Duro culture in the Texas Panhandle, with Mogollon plain brownware trade pottery and barbed arrowpoints like Deadman; Querecho culture (early pit house phase of Eastern Jornada branch of Southwestern Mogollon) tradition) on southwestern Llano Estacado, with plain brownware and Scallorn-like arrowpoints.

A.D. 1100–1500.–Medithermal climate continues. Turning warmer and drier; bison abundant. Late Ceramic substage; village-based bison hunting, developed horticulture (corn, beans, squash); Plains village (Caddoan) cultures like Anasazi-influenced Antelope Creek in the Texas Panhandle, with Borger Cordmarked pottery; Washita River in western Oklahoma, with Lindsay Plain; and Henrietta in North Central Texas, with Nacona Plain pottery; globular-bodied, wide-mouthed cooking pots; Ochoa culture (late surface-house phase of Eastern Jornada) on the southern Llano Estacado, with Ochoa Indented; all villagers with perfected bison-hunting Washita arrowpoints (side-notched triangular) and bison-butchering Harahey knives (diamond-shaped beveled); various bison-bone tools, large bison-bone middens.

About A.D. 1300–1700.–Continued warm and dry. Bison still abundant; Late Prehistoric to Historic stage; foot-nomad to horse-nomad bison hunting; Apache cultures like Tierra Blanca in Panhandle and possibly Garza in South Plains; triangular arrowpoints like Harrell and Garza; Anasazi trade wares like Rio Grande Glaze polychrome, Tierra Blanca Plain.

1700–1874. Continued warm and dry.–Bison still abundant; horse-nomad bison hunting by Comanche bands in northwestern Texas; short bows, metal-tipped arrows; Hispanics from New Mexico visiting the region seasonally as ciboleros (mounted bison hunters with large iron lance points), comancheros (Comanche traders), and pastores (sheepherders).

1870s.–Southern Plains bison being exterminated by Anglo hunters with modern rifles; 1874–The Red River Wars, Comanche placed on Oklahoma reservations; 1876–Cattle ranching begins.

Much evidence supports the concept of an Altithermal Long Drought from about 5000 to 2000 B.C., when bison (and people) were scarce (because of too little short grass?), and of a mesic interval during most of the first millennium A.D., when bison (but not people) were scarce (this time because of too much tall grass?).

The various cultural sequences that have been proposed for the Texas High Plains and surrounding regions generally are based on essentially the same four main temporal units (Early, Middle, and Late Prehistoric, and Historic), but these units are still somewhat variably named, defined, and dated. Significantly, the least variability occurs in treatments of the Paleoindian stage, no doubt reflecting the free-roaming, far-ranging nature of the late Pleistocene big-game-hunting cultures.

In sharp contrast to the abundant evidence of Paleoindian presence on the Southern High Plains, including the Texas part, the evidence for Early and Middle Archaic presence during the Altithermal is scarce, and the much more abundant evidence of Late Archaic hunters-gatherers has not yet received the attention it deserves. In the bordering regions to east and west, the Archaic sequence seems to be more complete but is still poorly known; to the south and southeast in Trans-Pecos and Central Texas, the entire Archaic stage is well represented and much investigated, especially in Central Texas, where there is good evidence for transitional Paleoindian/Archaic cultures.

The Neoindian sequence in the Panhandle Plains generally resembles the sequences in the neighboring regions to the north, east, and west; Plains Woodland complexes followed by Plains Villages components, all of the sequences being marked by a shift from Late Archaic barbed dart points for bison hunting to Woodland barbed arrowpoints for deer hunting at circa A.D. 1 to 200, and another shift to Village triangular arrowpoints for renewed bison hunting at about A.D. 1000 to 1100. It seems likely that all of these changes involved groups ancestral to historic Plains Caddoan-speaking tribes. A far west exception to this general picture is the Anasazi Basketmaker-Pueblo sequence in the Canadian River headwaters region in the Sierra Madre foothills.

On the South Plains and surrounding regions, the Neoindian sequences are more varied. To the west of the South Plains and up onto the southwestern part of the plains are early (pithouse) to late (surface house) Jornada Mogollon complexes, with the sequences marked by shifts in projectile point styles comparable to those to the north, but generally somewhat later. The Mogollon-influenced Palo Duro complex, stretching from the Canadian breaks southward along the eastern Caprock escarpment of the Llano Estacado, was coeval with Woodland and early Mogollon complexes. In Central Texas, to the southeast of the South Plains, the "Late Prehistoric" sequence begins with a shift from barbed dart points to barbed arrowpoints, as elsewhere, but possibly later. At about A.D. 1300, new styles of barbed arrowpoints and some triangular arrowpoints appear. In the Rolling Plains to the east and in the Trans-Pecos region to the south, the shift is to triangular arrowpoints about this time.

Available evidence (in the form of dated remains, early dart point types, and Clear Fork gouges) for an Early to Middle Archaic presence on the Southern High Plains in Texas and elsewhere indicates that the upland valleys and basins were seldom visited during the Altithermal Long Drought, and that if the sheltered, spring-fed breaks along the eastern and northern edges of the Llano Estacado were more frequently occupied than the uplands, Altithermal arroyo-scouring may have removed most of the remains.

With the end of the Long Drought at about 2000 B.C., it seems that grass and bison began returning to the uplands of the Southern High Plains, followed by groups who had been developing a foraging lifestyle involving several new technologies, in the comparatively resource-rich environments of the neighboring broken lands since the end of Paleoindian big game hunting. Coming mainly, perhaps, from the Rolling Plains to the east and the Edwards Plateau to the southeast, these groups apparently started a revival of Paleoindian bison hunting techniques which, added to their Early Archaic foraging strategies, enabled them to develop a new, highly efficient hunting-gathering lifeway that led to a Late Archaic population increase and endured for at least two millennia. The Little Sunday complex in the Palo Duro Canyon area may be representative of this Late Archaic substage on the Texas High Plains.

In the breaks of the eastern and southeastern Panhandle are numerous arroyo-trap bison kills with barbed dart points, like the Twilla site near Turkey, Texas. Since some of these kills have been radiocarbon-dated to between 90 B.C. and A.D. 970, it has been suggested that they may be Woodland rather than Late Archaic in age (Lintz et al. 1991, this volume). The dates may be too late, however, since they are on bone, which is notoriously unreliable (cf. Cox and Smith 1991, this volume). Bison bone is abundant at most Late Archaic camps, but it is scarce at most Woodland campsites in the region.

The masses of bison bones in most of these kills are deeply buried at the heads of old arroyos, where they are exposed in the cutbanks of modern arroyos that have eroded headward and somewhat beyond along the courses of the earlier healed-over arroyos. These circumstances indicate that the kills took place near the end of the last episode of arroyo-cutting (xeric interval) before the present climate and just before an episode of arroyo-filling (mesic interval). Bison must have been extremely abundant and killing extremely effective during this xeric interval, since butchering is minimal at most of the sites. The mesic interval seems likely to be the one that spanned most of the first millennium A.D. More reliable dating of these very significant kills is sorely needed.

It appears that with the onset of cooler and moister conditions on the Southern High Plains near the beginning of the Christian era, the many bison herds on which Late Archaic foragers depended for much of their subsistence began to disappear from the region, and a new lifestyle, which can be labeled Early Neoindian, began to evolve. This transition is marked not only by increasing numbers of deer remains over bison remains in the campsites, but also by increasing numbers of barbed arrowpoints over barbed dart points, implying changes not only in the principal game being hunted but also in the main weapons and techniques being employed. Coevally, the appearance of pottery throughout the region—of the Woodland tradition in the north and the Mogollon tradition in the south—suggests a shift to a less nomadic existence. This inference is more directly supported by evidence of houses at some of the Woodland components and especially at some of the Mogollon components. Although it seems likely that some horticultural experimentation was beginning at this time, little or no direct evidence of incipient gardening has yet been reported.

In the Panhandle Plains area, Late Archaic complexes such as Little Sunday were being replaced by Woodland complexes such as Lake Creek and by Mogollon-influenced complexes such as Palo Duro. In the South Plains, Late Archaic complexes such as Hueco were being replaced by Mogollon complexes such as Querecho/Maljamar. The frequent present of Mogollon brownware at Woodland sites in the Texas Panhandle suggests that the region may have played a significant role in an exchange of horticultural, housing, and other important ideas between the

Woodland tradition to the north and east and the Mogollon tradition to the south and west during Early Neoindian times.

Toward the end of the first millennium A.D., it appears that the mesic interlude on the Southern High Plains was giving way to a warming and drying trend that continues to this day. Bison herds evidently began returning to the region in increasing numbers, perhaps attracted by a renewed dominance of nutritious short grasses on the uplands. The herds may have been spreading southward from the Northwestern Great Plains, where—in contrast to the Southern High Plains—they were abundant throughout the first millennium A.D. This is indicated by many bison kills attributed to the Avonlea complex, which is marked by the earliest known appearance of Washita-like arrowpoints and Harahey-like knives. The Avonlea complex may represent former Arctic caribou-hunting Athapascans who were migrating southward during the early Christian era into Montana and Wyoming, where they perfected this specialized tool kit for killing and butchering bison.

As the first millennium A.D. was ending on the Southern High Plains, a new millennium was beginning both literally and figuratively. It seems likely that the southward-migrating bison herds were accompanied by the southward-diffusing tool kit, and that the bison herds were so abundant and the tool kit was so effective that by A.D. 1000 the Early Neoindian Plains Woodland deer-hunting campers were rapidly being transformed into Late Neoindian sedentary bison-hunters, represented by complexes such as Upper Republican, Apishapa, Optima, and—in the Texas Panhandle—Buried City and Antelope Creek. Sedentary hunting is a rare phenomenon, perhaps best exemplified elsewhere in this country by the marine-mammal-hunting villages of the Northwest Coast.

Bison must have been so numerous that individual animals could be taken as needed from herds surrounding the villages. Kill sites are rare, and household middens are full of bison bones representing all parts of the animals, which suggests that they were often procured at no great distance from home.

On the Texas South Plains, a comparable transition was taking place in the Eastern Jornado Mogollon sequence at a somewhat later date, around A.D. 1200, producing the Late Neoindian Ochoa complex. Meanwhile, along the eastern Caprock escarpment of the Llano Estacado, the deer-hunting Palo Duro complex, with Scallorn and Deadman arrowpoints, may have been drifting southward to become the bison-hunting Toyah complex of Central and West Texas, with Perdiz and Toyah arrowpoints. At some Palo Duro components along the southern part of the scarp, Deadman points seem to be changing into Perdiz points.

In the Rolling Plains to the east, similar Plains Village developments were producing the Washita phase in western Oklahoma and the Henrietta focus in North Central Texas. To the west, Jornada Mogollon surface-house village complexes were developing along the Pecos River valley in eastern New Mexico and spreading northward into the upper Canadian River drainage in northeastern New Mexico, whereas frontier Anasazi Pueblo settlements were being established in both drainages along the Rocky Mountain foothills.

During the next two or three centuries, on the Southern High Plains and in the prairies to the northeast and east, there was a florescence of the bison-based Plains Village tradition, as populations increased and countless homesteads, hamlets, and villages appeared. A far-flung trade network developed among the villagers and with the Pueblos to the west, contributing to significant horticultural, architectural, and other innovations in material, social, and ideological culture.

By the A.D. 1300s, however, the Apishapa and Upper Republican villages to the north and northeast were disappearing, as were the Anasazi and Mogollon pueblos to the west, while the first traces of Apachean bison-hunting nomads were appearing in those regions and on the Texas High Plains as well. Although the Great Drought of A.D. 1276 to 1299 in the Southwest may have been partly responsible for these abandonments, a great southward movement of the sometimes trading, sometimes raiding Southern Athapascans down the mountain-plains borderlands seems likely to have been the main factor.

The foothill Puebloans probably withdrew westward, seeking refuge among the large pueblos in the mountains; some of the Apishapa and Upper Republican villagers may have retreated southward, forming a coalescence with their Antelope Creek kindred in a kind of great refugium along the Canadian breaks in the Panhandle Plains (Campbell 1976). As of now, this postulated coalescence is based mainly on circumstantial evidence such as a shift in Antelope Creek architectural styles at about A.D. 1300 (Lintz 1978b, 1984). The hypothesis needs to be tested by searching for more direct evidence in the form of possible immigrant communities in the Antelope Creek area; for example, further study is needed of a few sites with peculiar architecture and Upper Republican-like collared-rim pottery.

For the next century and a half, until about A.D. 1450, the Antelope Creek villages in the Panhandle Plains and the Ochoa villages in the South Plains may have endured like islands in a sea of Apaches, represented by the Tierra Blanca complex to the north and, perhaps the Garza complex to the south. During this period the Apaches appear to have become semisedentary and increasingly involved in trade with the mountain Pueblos, perhaps to some extent as intermediaries in trade between the Pueblos and the plains villages.

On the Texas High Plains of late prehistoric times, however, the pattern of Apache-Pueblo interaction of the 1600s in New Mexico may have already been anticipated—good-times trading interrupted occasionally by hard-times raiding. As Alex Krieger suggested long ago (1946), severe droughts at around A.D. 1450 may have left the Antelope Creek villagers without any surplus crops for trading, bringing on Apache raids that made their already precarious position intolerable and forcing them to abandon their ancestral homeland in favor of the comparative safety afforded by kindred Caddoan-speaking villages in the prairies to the northeast (Hughes 1968).

Did some of the Ochoa villages holding out on the South Plains find a different solution to the Apache problem? Did they trade their village life for a nomadic existence with the Apaches? Does this help explain the enigmatic Kiowa-Kiowa Apache alliance (of Tanoan- and Athapascan-speaking groups) during historic times on the western plains? If you can't lick 'em, join 'em!

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The 1975 Field School of the Texas Archeological Society

James H. Word

ABSTRACT

The 1975 Field School of the Texas Archeological Society was held at the Floydada Country Club site (41FL1) in Floyd County. Surface collections and previous excavations at the site suggested that three differing cultures at the site were very closely associated geographically and dated from the Late Prehistoric to Historic periods. The most intensive occupation of the site dates from A.D. 1200 to 1500, when there were trade relationships in Protohistoric to Early Historic times among three ethnic groups: the Apache, eastern and southern Pueblos, El Paso Mogollon, and perhaps a Caddoan-related group. A subsequent occupation of the site, demonstrated by historic artifacts, dates after the invasion of the Comanche, who used the site from the mid-1750s until Col. Mackenzie's successful campaign secured western Texas from the Indians in 1874.

DEDICATION

This report is dedicated to Dorothy (Dot) Word, my deceased wife. She willingly contributed her time and talents to many Texas Archeological Society activities. Without her support, concern, and love, the 1975 TAS field school could not have succeeded. Her death in 1981 was a great loss to me.

James H. Word

INTRODUCTION

In 1954 the author started collecting surface materials, predominantly of Late Prehistoric and Historic age, from roads and erosional areas adjacent to the White River at the Floydada Country Club site (41FL1). In the early 1960s, test pits were excavated in an attempt to determine a sequence of occupation. A report on this work (Word 1963:37–63) was published by the South Plains Archeological Society.

The large number of artifacts collected from this site prompted the Texas Archeological Society to hold its annual field school there in 1975. Dr. S. Alan Skinner, of Southern Methodist University, was the field archeologist; he visited the site and examined the author's collection of arrowpoints, scrapers, drills (perforators), bifacial tools, bone artifacts, and shell and bone beads associated with Late Prehistoric times. Archaic projectile points were few in number, but suggested that there had been some occupation before Late Prehistoric times. Historic artifacts consisted of metal projectile points, glass beads, metal awls, gun parts, and early rifle cartridges of the 1870s.

Because play continued on the golf course (Skinner 1975c), the field school activity had to be in areas where it would not interfere with the golfers and where the safety of the field school participants would not be compromised. As a result of these two factors, the areas searched were limited.

HISTORICAL BACKGROUND

Francisco Vasquez de Coronado in 1541 was the first European explorer to cross the area of which the Floydada Country Club is a part. He made contact with the Apaches on the Llano Estacado, and with the Teyas—who, according to Newcomb (1961:99) could have been the Plains Caddo—near the headwaters of the Brazos River (Newcomb 1961:105). Bolton (1970:2) stated that the Caddo hunted bison on the western prairie and that the Wichita who were located on the Red River at Spanish Fort were of Caddoan extraction. The Wichita were allied with the Comanche in the 1740s (Newcomb and Field 1967:241) and were trading with the French for weapons (ibid.:268), which they supplied to the Comanches in exchange for horses, mules, and Indian captives (Bolton 1970:121).

Vincente de Saldivar Mendoza came into the area in 1599 to hunt bison for fat and encountered the Apache (Newcomb and Field 1961:105), and Don Juan Onate explored the Llano Estacado in 1601. However, Onate's expedition, in the part of the Canadian River area near the present boundary between Texas and Oklahoma, went north of the Floydada Country Club area (Bolton 1916:250–255).

Little contact with the Apache is recorded until the early eighteenth century when in 1702 they began to raid Spanish settlements (Thomas 1935:23–24). The Comanches, who are a branch of the Shoshones, began an invasion of the Llano Estacado in 1705 and were in control of much of the area by the mid-1750s, dominating the area that includes the Floydada Country Club (Thomas 1935:57). In 1786, Pedro Vial's expedition, trying to establish a more direct route from San Antonio to Santa Fe (Loumis and Nasatir 1967:xvi, 29, 291, 313), described what is probably the Mont Blanco area on the White River in the extreme northern part of Crosby County and the southern part of Floyd County.

The Comanche were raiding the early settlements of western Texas and had established trade with the New Mexican-Spanish traders, who became better known as Comancheros. During the Civil War the U.S. Army was not a deterrent to this trade; many of the Texans were soldiers of the Confederacy. Texas cattle and captives became important trade items with the Comancheros, who traded guns, knives, cloth, and other items for livestock and captives (Wallace and Hoebel 1942:268).

After the the Civil War ended, the U. S. Army was again active in attempts to control the Comanches (Wallace 1964:33–57). In 1871 Colonel Randall S. Mackenzie was unsuccessful in an attempt to force the Comanche from the Llano Estacado to the reservation in Oklahoma. He followed the Comanche up the Blanco Canyon, but a mid-November blizzard thwarted his efforts (Ratgen 1973:199). In 1872 another effort by Mackenzie to drive the Comancheros from the Llano Estacado and to eliminate trade with the Comanches was unsuccessful (ibid.:60–76), but in 1874 he finally defeated the Comanche in the Battle of Palo Duro Canyon. Before the Battle of Palo Duro Canyon, one of Mackenzie's forces came up Blanco Canyon and was met by another of his forces that that had moved northeastward from the present Slaton area; they met near the Floydada Country Club. Mackenzie's various forces met near the junction of the White River and the North Fork of the Brazos River at Camp Supply in southeastern Crosby County (Ratgen:60–76). The army then proceeded to its successful encounter at Palo Duro Canyon, which ended the Comanche occupation of the Llano Estacado and the adjacent Rolling Plains (ibid.:128–149).

After the Comanches were driven from the Llano Estacado, the New Mexican-Spanish traders, or Comancheros, returned to the area as sheep herders and were called Pastores. Anglo ranchers eventually moved into the area and displaced the Pastores, and by 1890 farming was becoming an increasingly important factor; today agriculture is dominant.

PRIOR INVESTIGATIONS

The author published a report on the Floydada Country Club site in 1963, and reports have been published on sites with similar characteristics downstream on the White River. The Montgomery site (Word 1965) is about 11 km (7 miles) downstream, and a more recent research project on this site was reported by Northern (1979). Parker (1982) published a report on the Bridwell site about 24 km (15 miles) further downstream in the northeastern part of Crosby County. In the southwestern part of Dickens County, about 48 km (30 miles) southeast of the Bridwell site, is the Pete Creek site, which has been reported by Parsons (1967). The Floydada Country Club site, Montgomery site, and the Bridwell site are on the White River drainage, but the Pete Creek site is on the North Fork of the Double Mountain Fork of the Brazos River, just below its confluence with the White River.

All of these sites have similar artifact assemblages, but eastern Puebloan pottery decreases southeastward. Locally made and Caddoan-like sherds continue to dominate, and the percentage of Edwards chert increases.

Among more distant sites with similarities in time of occupation and artifact assemblages are the Garza site (Runkles 1964) about 100 km (62 miles) to the south, the Garza occupation at the Lubbock Lake site (Johnson, Holliday, Kaczor, and Stuckenrath 1977) about 38 km (24 miles) west southwest, and the Lott site (Runkles and Dorchester 1986).

GEOGRAPHY AND ENVIRONMENT

The Floydada Country Club site (41FL1) is on the White River Canyon in the southern part of Floyd County near the eastern edge of the Llano Estacado (Figure 1).

As soon as the Running Water Draw cuts through the Caprock of the Llano Estacado and forms a canyon, it becomes the White River, the northernmost tributary of the Brazos River. The Floydada Country Club site, which is bisected by the White River, is in the first widening of the canyon, on the first terrace above the river at the western boundary of the Country Club property (Figure 2). Cochran's Mesa, to the south of the White River, is the southern boundary of the site, and the northern boundary of the site is below the Caprock where the land surface slopes upward; so from north to south the site measures about 250 meters. The canyon narrows at the northeastern boundary of the Floydada Country Club property and is the eastern limit of the site; the western limit is the western boundary of the Country Club property; the site measures about 825 meters from east to west.

The elevation of the site is 3015 feet (920 meters) high, and of the adjacent Llano Estacado is 3150 feet (960 meters). The average rainfall is 51 cm (20.18 inches), most of which comes in May, June, and September, generally in association with strong winds and thunderstorms. Most of the winter moisture comes as snow and sleet in December and January, but the amount is normally insignificant. The lowest temperature, usually coming in January, averages –4 degrees C. (26 degrees F.). The warmest month is July, with a mean temperature of 34 degrees C. (94 degrees F.) (Kingston 1986).

The White River was an active stream until 1944, when the lowering of the underground water table—a result of exploitation of the Ogalalla aquifer for irrigation purposes—dried up the springs that fed it.

The vegetation on the Floydada Country Club property is an extension of the Rolling Plains flora. Gould (1969) described the vegetation of the Rolling Plains as various bluestem, buffalo, and Bermuda grasses. Shinnery oak and sand sage are common on the Rolling Plains, but they are not dominant at the Country Club site. Other vegetation commonly found on the Rolling Plains includes hackberry, pecan, willow, eastern cottonwood, western soapberry, algerita, little sumac, juniper, and ephedra. Various cacti are common in the grassland; prickly pear is the most common variety. Forbs are represented by sunflower, buffalo weed, Russian thistle, cattail, and less common weeds (Gould 1969).

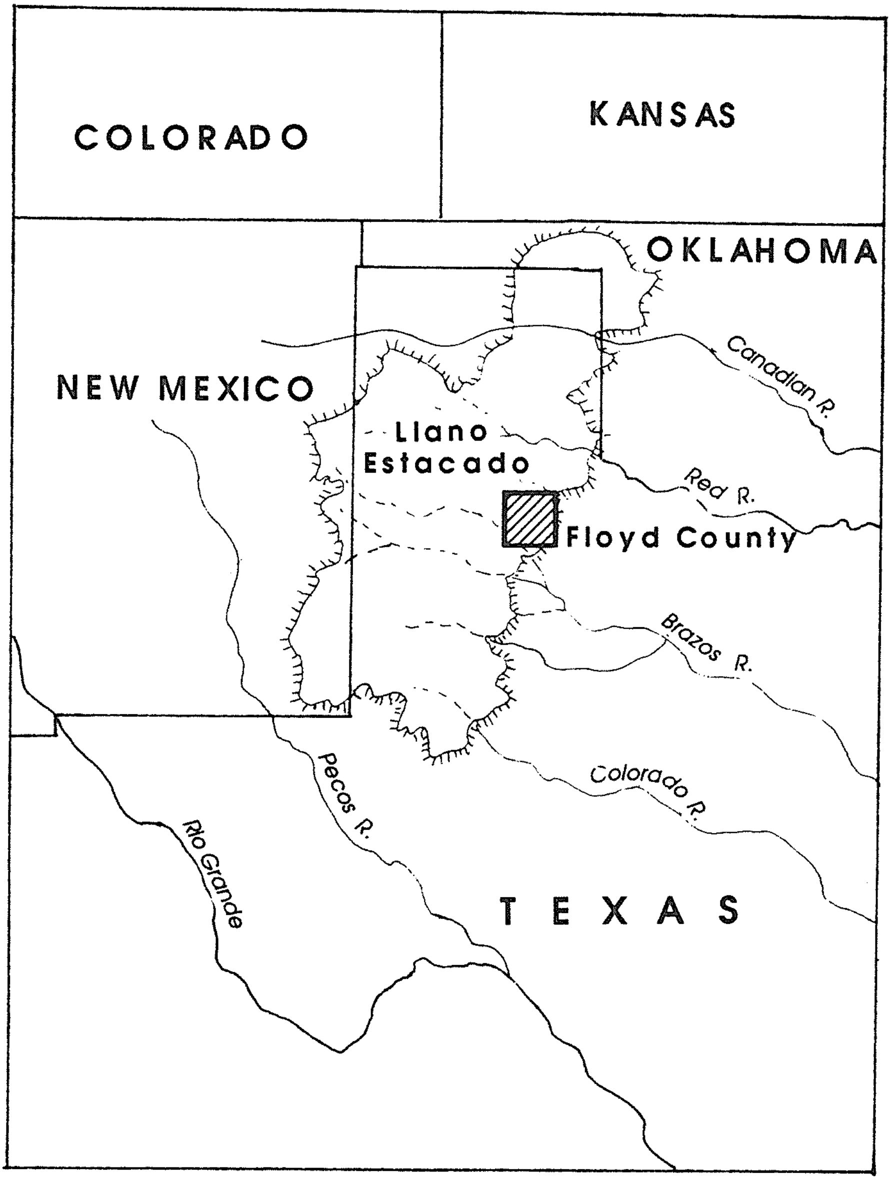

Figure 1. Map showing the location of Floyd County.

Vegetation on the adjacent part of the Llano Estacado differs considerably (Gould 1969). Grasses and forbs are similar, but trees and shrubs were practically nonexistent before the area was settled by early ranchers and farmers. Mesquite was introduced when cattle were brought into the area in the latter part of the nineteenth century.

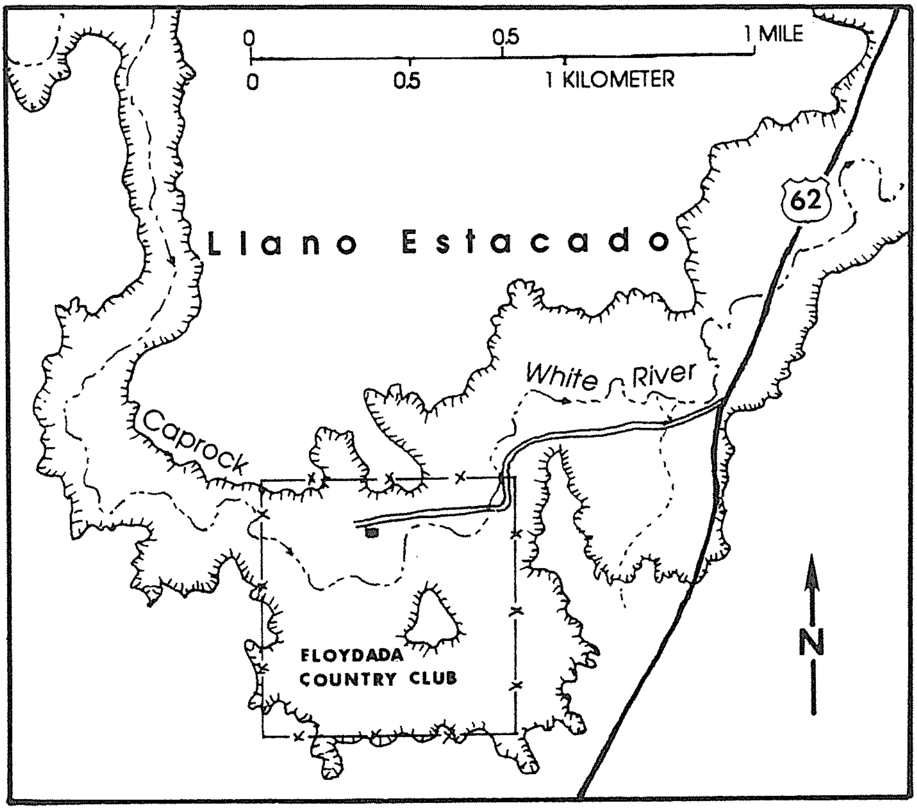

Figure 2. Map of part of Floyd County, showing the relation of the Floydada Country Club to US 62, the White River, and the Caprock.

The slope of the Caprock and of the White River Canyon is a transitional biotic zone between the Rolling Plains and the Llano Estacado. The slightly greater moisture resulting from runoff from the slopes of the canyon nurtures a limited flora not common on the Llano Estacado, such as little leaf sumac, juniper, and infrequent shinnery oak, algerita, and ephedra. Various species of cactus are common.

The soil at the Floydada Country Club site is of the Berda-Potter Association (Neitsch and Blackstock 1978); it varies from deep to shallow, gently sloping, and moderately permeable loams overlying thick beds of caliche. These soils are in general not suitable for agriculture.

Animal life in aboriginal and early pioneer times consisted of bison, antelope, coyote, wolf, white-tailed prairie dog, mule deer, raccoon, panther, bobcat, black bear, black-tailed jackrabbit, desert cottontail, striped and hog-nosed skunk, and a wide variety of small rodents.

Birds common to the area include both permanent residents and migratory species. The lesser prairie chicken, bobwhite, scaled quail, killdeer, mourning dove, roadrunner, blue jay, various owls, red-shafted flicker, cactus wren, mockingbird, cardinal, and western meadowlark are native to the area. Vultures and some species of hawks live there the year around, and various ducks, geese, plovers, flycatchers, scissortails, and robins are the most common migrants.

Snakes are the most common reptiles; bullsnakes, puff adders, and rattlesnakes are found throughout the area. Horned lizards and tortoises are common in both the Rolling Plains and on the Llano Estacado. The habitat of the collared lizard (mountain boomer) is confined to the crevices of the Caprock.

Amphibians are generally confined to the Rolling Plains environment, but in excessively wet years toads are common on the Llano Estacado in association with playa lakes.

AREAS OF THE SITE

Analysis of collections, consisting of lithics, potsherds, bone, and historic artifacts from the Floydada Country Club site suggested that the site was in fact three very closely associated sites, so the Field School Archeologist, S. Alan Skinner, divided the site into three areas (Figure 3) for testing (Skinner 1975a).

Area 1 (41FL1-1) is centrally located. The dominant pottery type represented by the sherds recovered by the author from surface collecting and four test pits (Word 1963) is eastern Puebloan; the dominant lithic material is Edwards chert from the Edwards Limestone (Lower Cretaceous). Area 2 (41FL1-2), about 100 meters from Area 1, is across the White River. Here, southwestern sherds from the El Paso and southeastern New Mexico areas dominate. At Area 3 (41FL1-3), about 250 meters east of Area 1, the principle types, represented by locally made pottery, are Caddoan and imitation Caddoan wares, and most of the lithic debris is of Tecovas jasper (Tecovas Formation, Dockum Group, Upper Triassic; Holiday and Welty 1981).

RESEARCH DESIGN

It was hoped that dividing the site into these three areas would make it possible to determine what happened in the past. It appeared from the author's collections that occupation of all three areas was contemporaneous, in the Late Prehistoric and Historic periods, and it was hoped that the excavations would also reveal evidence of Archaic and Paleoindian occupations.

The major goal of testing the three areas (41FL1-1, 41FL1-2, 41FL1-3) was to gather data to determine how the site was used and how the three areas related to each other (Skinner 1975a). More specifically, the research program of the field school was designed to test four hypotheses.

The first hypothesis was that the area had been intensively occupied from Paleoindian through the Historic periods. The second hypothesis was that, in the intensive occupation between A.D. 1200 and 1500 by indigenous groups, there was close trade with eastern and southwestern New Mexico and with the Antelope focus to the north, that there were ties to Caddoan areas to the east as well, and that the site was a rendezvous area.

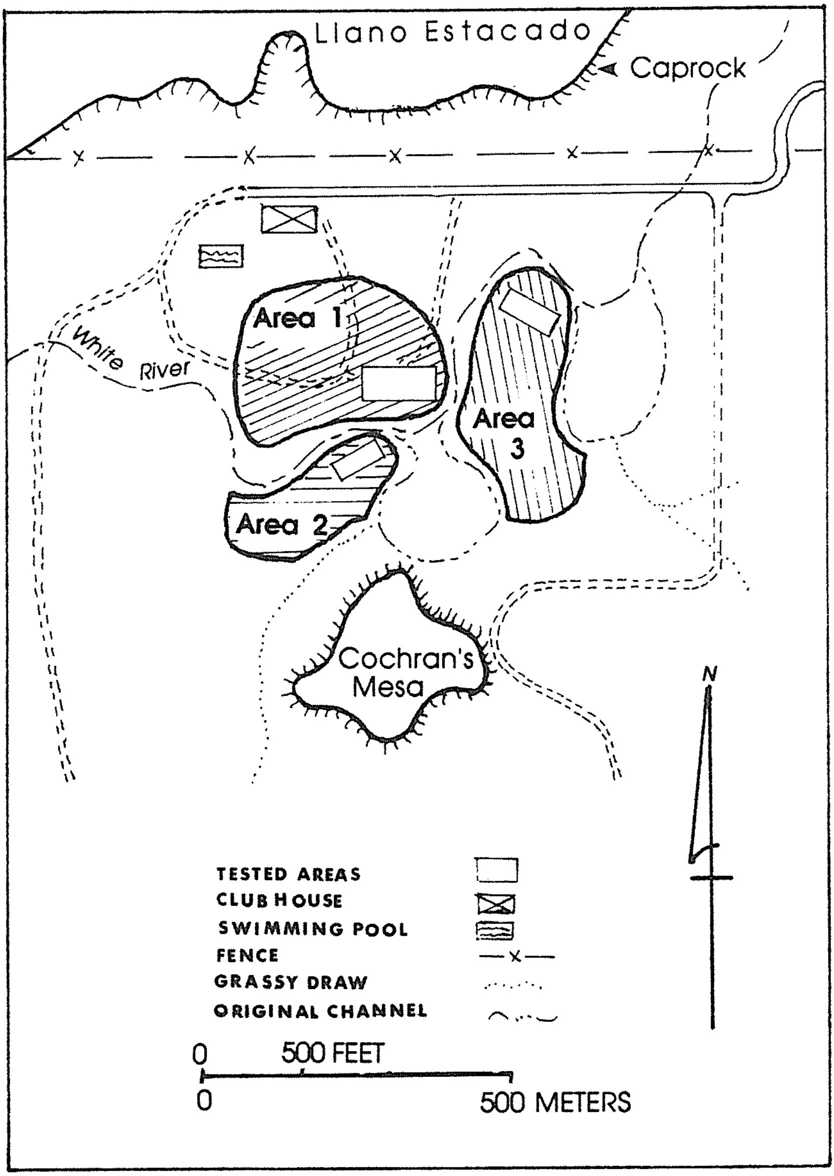

Figure 3. Plan of site 41FL1, showing Areas 1, 2, and 3.

The third hypothesis was that immigrant groups from the southeastern and eastern Puebloans were coming into the area for bison hunting and meat preparation.

The fourth hypothesis was that Historic Indian occupation of the site was of short term by late (perhaps Protohistoric) Apachean groups or by the succeeding Comanches, who dominated this area from early historic times until the aboriginal occupation was terminated by the Mackenzie campaign of 1874.

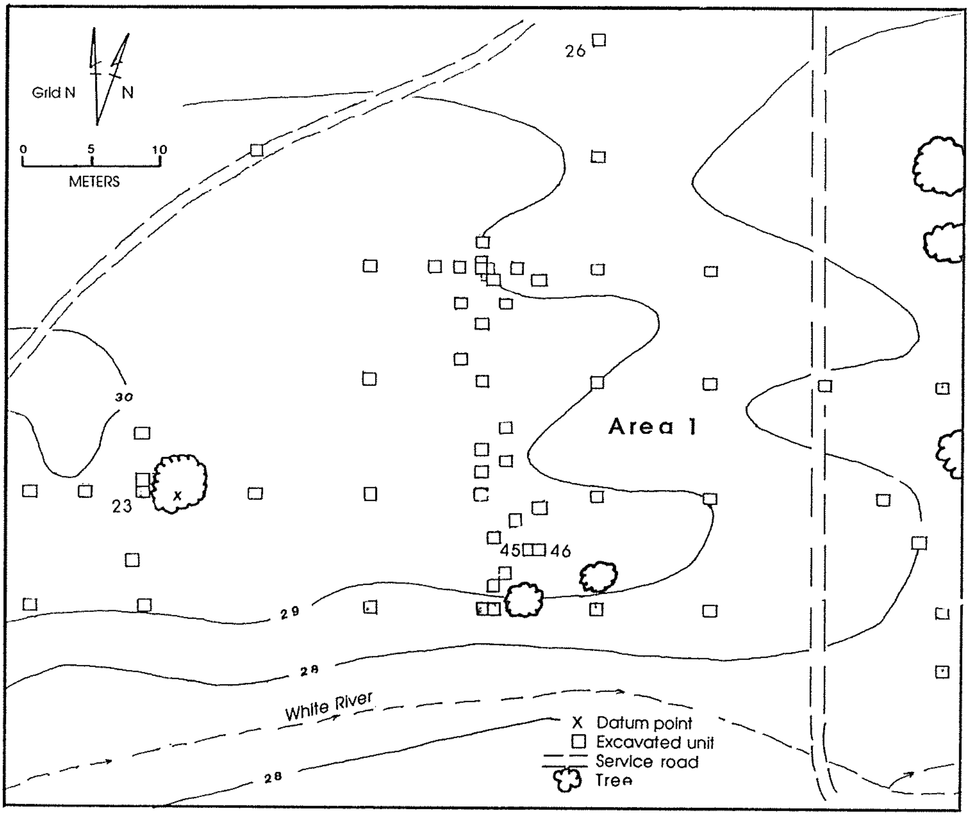

Figure 4. Topographic map showing excavated units in Area 1.

PROCEDURES AND RESULTS

Area 1 (41FL1-1)

Before work was started in Area 1, a nail was driven into a mesquite tree; all elevations were recorded from this datum point (Figure 4). An east-west base line was established from the datum point, and locations of all units were related to the base line. Stakes were sunk at 1-meter intervals to form the site grid, and line levels were used to determine depths. Eighty 1-meter units were laid out in case there should be sufficient time to test them, but only 52 1-by-1-meter units ere excavated. When features were discovered, partial units were opened around them to expose as much of the features as time allowed. This resulted in excavation of three partial units. The units, numbered from the grid readings at their southwest corners, were excavated to a depth of 60 cm in 20-cm levels. Unit 26 was excavated to a depth of 100 cm to determine the depth of occupation.

Soil Description

No features were recorded from Unit 26, but, since it was tested to a depth of 100 cm (Figure 5), the soils encountered are described in the field notes.

Level 1 (0–20 cm)

The soil is dark brown and very compact. The surface was covered with native grasses and the roots extended through Level 1. The soil consists of a sandy loam of very fine texture. Specks of charcoal are common from the surface down to 20 cm.

Level 2 (20–40 cm)

The soil continues to be dark brown, sandy loam compact in consistency. Grass roots continue to a depth of 23–25 cm. Specks of charcoal were recorded as in Level 1.

Level 3 (40–60 cm)

The soil is compact and gradually becomes less dark brown. Charcoal flecks are less common.

Level 4 (60–80 cm)

The soil contains charcoal specks, but in diminishing frequency. Small, rounded nodules of caliche appear at about 70 cm. The lighter brown soil continues to be fine grained and very compact.

Level 5 (80–100 cm)

The soil becomes light brown or tan and continues to be very compact. No charcoal specks were recorded, and the occurrence of small nodules of caliche increases.

It is evident that no stratification is present. The density of charcoal gradually diminishes with depth, small caliche pebbles appear in the lower depths and increase in frequency with depth, and there is a gradual change in soil color from dark brown to light brown to tan from the surface to the 100-cm depth. There was very little moisture in the soil and, when it was dry, its color changed to a very light gray-brown. The soil is very compact from the surface to the 100-cm depth and is very fine in texture. Small nodules of caliche, which appear at about 70 cm and increase in frequency down to the 100-cm level, are the result of percolation of moisture containing calcium and magnesium, a common occurrence in the South Plains area.

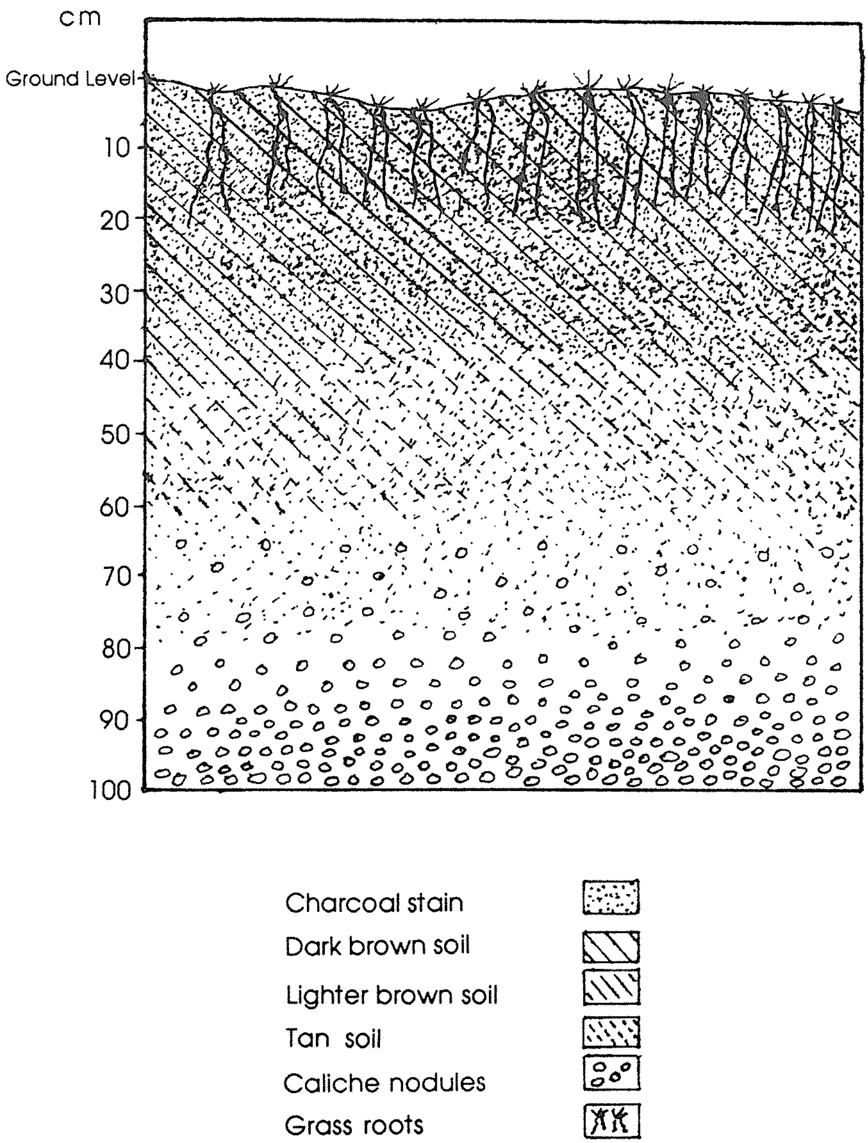

Figure 5. Profile of Unit 26, Area 1.

Area 1–Historic Cultural Materials (Historic Artifacts)

Both glass and metal artifacts were recovered in Area 1, indicating both very recent and historic use of the site.

Glass

The most common historic artifacts recovered were of glass, well distributed over the site. All but two of the specimens were badly fragmented.

Type 1

All Type 1 specimens were badly fragmented, patinated, and of a lightly tinted green color. Seventeen small fragments were recovered, but the vessel types cannot be determined. All came from Level 1 (0–20 cm) except for one from Level 2 (20–40 cm).

Type 2

A very small (3 by 4 mm) fragment of brown glass, probably from a beer bottle, was recovered from Level 1.

Type 3

Two small unidentifiable fragments of clear glass were recovered from Level 1.

Type 4

Seven green-tinted unpatinated glass fragments recovered from the surface and Level 1 vary from 6 mm to 5 mm in thickness and have slightly oval lengthwise ridges; the largest specimen (37 by 31 mm) is slightly convex on the outer surface, reminiscent of a Coca Cola bottle.

Type 5

Two examples of clear glass were recovered from level 1. The largest fragment (Figure 6, A) is 81 mm long and 50 mm thick, apparently the center of a large container. The interior is slightly convex, and the exterior is flat. In the center of this specimen is an *a* in a circle 16 mm in diameter. Along the edge of the base of this triangular fragment is what appears to be a *5*, followed on the right by a *1*, a short dash, and an *E*. The trademark is *51-E*. The smaller specimen has no identifying marks, but it appears to be from the same vessel; it is curved—probably part of the vessel body near the bottom.

Glass Bead

A single large, sky blue, opaque, round necklace bead of simple construction was recovered from Unit 23 in Level No. 1 (Figure 6, B). It measures 8 mm in diameter. Harris and Harris (1967:153) state that this type usually has a ridge around the circumference suggesting pressed construction. This specimen does not have the ridge, but it has all the other characteristics of the Harris and Harris Bead Type 159.

Metal

Six metal objects were recovered, all from Level 1 (0–20 cm).

Type 1

A fragment of badly rusted sheet metal is probably from a tin can, since it is .05 mm thick and measures 20 by 15 mm. There is no indication that it was cut from the original object, since the edges are irregular.

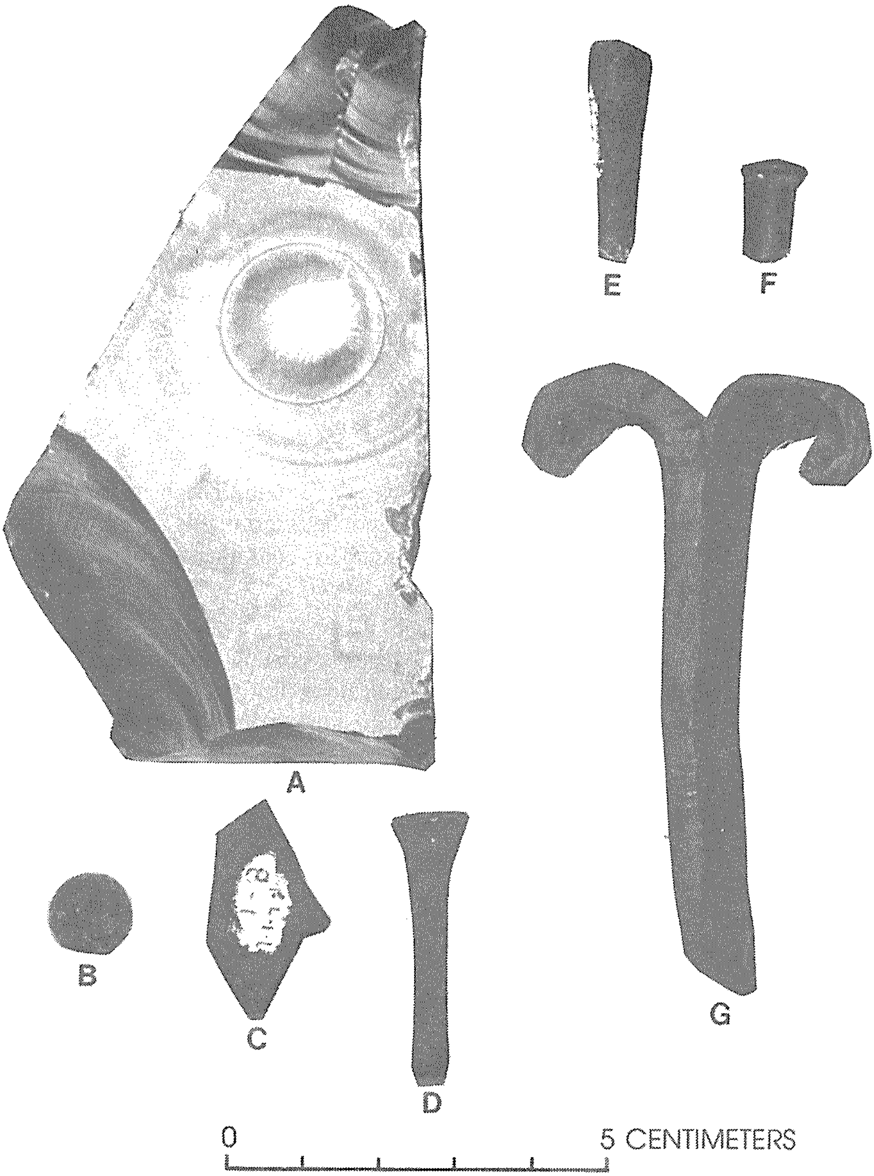

Figure 6. A, glass fragment; B, glass bead; C, metal object with cut and file marks; D, horseshoe nail; E, metal tinkler; F, .22 caliber cartridge; G, ox bow pin.

Type 2

This specimen is 1 mm thick, 23 mm long and 12 mm wide at the widest part. One edge has coarse file marks, and another edge appears to have been cut (Figure 6, C). It cannot be identified, but it may be a scrap from making a projectile point.

Type 3

A fragment of a horseshoe nail, broken at the distal end, 28 mm long (Figure 6, D).

Type 4

A tubular metal tinkler contained a glass bead in the narrow part (Figure 6, E). Jay C. Blaine (personal communication, June 14, 1975) stated that it was a common practice—in order to prevent loss of the tinkler—to string a sinew with a bead at the end through the narrow or distal opening. The sinew was then attached with the tinkler to the garment. The tinkler was made from a thin iron strip which was possibly from a metal can. It is conical, 23.5 mm long, 7 mm wide at the proximal end, and 3 mm wide at the distal end.

Type 5

A .22 caliber rimfire short cartridge case was found. The base has an *H* trademark (Figure 6, F). The time of its use can not be determined. The *H* was first put on the heads of cartridges in the early 1870s and has continued into recent times (Wilson, personal communication, January 23, 1987).

Type 6

A hand-forged iron artifact (Figure 6, G) has the proximal end rounded on one side, forming a blunt end. The distal end was split along the forged union of the two pieces comprising the shaft and curled outward on the proximal end. There is no evidence of pounding to separate the forged parts. Faint evidence of screw threads can be discerned near the proximal end just above the rounded part. Apparently two pieces of iron 106 mm long were forged to form a flat unit. The distal end was then separated along the seam and curled outward. The unseparated parts were originally 54 mm thick. The edge with the screw threads is slightly battered. The author was unable to find a similar object reported, but it was examined by Jay C. Blaine (written communication, February 7, 1987), who suggested that it might be a pin to join an ox bow to the yoke. Examination of ox bows and yokes at the Texas Tech Museum in Lubbock and the Panhandle Plains Museum in Canyon appears to support Blaine's opinion.

Area 1–Prehistoric Cultural Materials

Lithics

Dart Points

One of two basal fragments of dart points of Edwards chert (Figure 7, A), was recovered from the surface, and one (Figure 7, B) came from Level 1. They are corner notched with slightly expanding stems; the bases are slightly rounded and resemble the Palmillas point (Suhm and Jelks 1962:229–230).

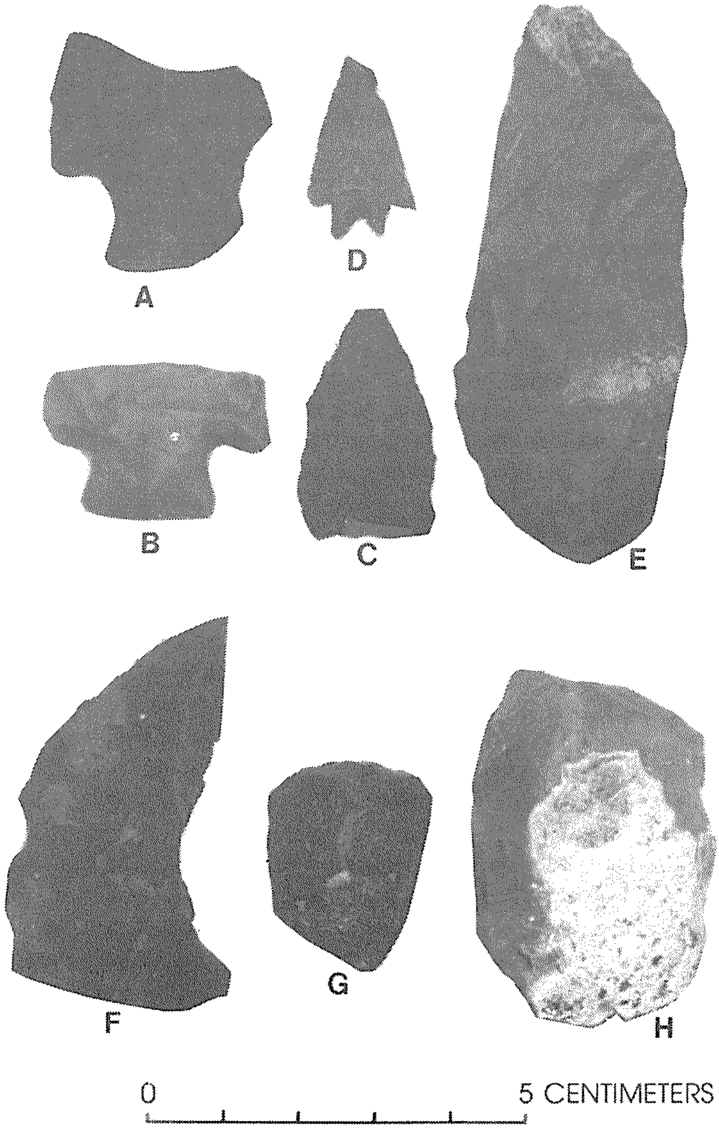

Figure 7. Stone artifacts: A and B, Palmillas point fragments; C, Fresno point; D, Cuney point; E, preform; F, *Combination* tool; G and H, scrapers.

Arrowpoints

Two complete arrowpoints and two basal fragments were recovered; one from the surface, two from Level 1, and one from either Level 1 or 2 (the field notes are not precise as to location).

Type 1.—A complete Fresno point (Suhm and Jelks 1962:273–274) from either Level 1 or 2 is of Tecovas jasper, with convex sides, 25 mm long and 14 mm wide at the base (Figure 7, C). It is crudely made and could be a preform. Two basal fragments of Edwards chert with slightly concave bases were recovered from Level 2.

Type 2.—A Cuney point of Edwards chert (Suhm and Jelks 1962:271–273) from Level 1 (Figure 7, D) is well barbed from the corner of the slightly bifurcated base. It is about 22 mm long, and 12 mm wide at the barbs; the edges of the blade are straight. It does not correspond exactly to the illustrations and description of the Cuney point as defined by Suhm and Jelks, but there is a strong similarity in characteristics other than the basal notch.

Bifaces

One complete biface of Tecovas jasper, probably a preform (Figure 7, E), from either Level 1 or 2 is 62 mm long and 24 mm wide. There are also six midsections of bifaces and the distal end of a biface that could be the end of a dart point. None have evidence of bevelling, but they could be midsection knives. One fragment is an off-white Alibates agate from the Alibates Dolomite (upper part of the Quartermaster Formation, Permian; Holliday and Welty 1981), and the other six are of Edwards chert.

Scrapers

Four scrapers, two of Edwards chert and two of Tecovas jasper.

Type 1.—This specimen, found on the surface, is a fragment of a side scraper that was converted into a *combination tool*, 48 mm long and 24 mm wide. A small spokeshave 6 mm wide and 2 mm deep was formed on the edge of the scraper, and a graver was formed from the fractured part, the fracture being used to form the beak of the graver (Figure 7, F).

Type 2.— The other three scrapers are end scrapers. The smallest, 25 mm long and 18 mm wide, was made from Tecovas jasper (Figure 7, G). The other two are more typical of the type since they match the usual size of this artifact. One is of Tecovas jasper, measuring 37 mm by 30 mm, and the third scraper, 39 mm long and 26 mm wide, is of Edwards chert (Figure.7, H). Two were recovered from Level 1, and the third was found in Level 2.

Spokeshave

A single white quartzite spokeshave was recovered from Level 1 (Figure 8, A). The *notch* is 8 mm wide and 4 mm deep.

Drills

Two drills or perforators of Edwards chert were recovered from Level 1; one, a fragment and the other, a complete specimen (Figure 8, B and C). The bit of each specimen is well worked on both surfaces. The complete specimen is 22 mm long; the proximal end, or base, is convex and only 8 mm long, not altered from the original flake.

Pigment

A small (12 mm) piece of malachite was recovered from Level 1. The surface is irregular and lumpy, and there is no evidence of smoothing.

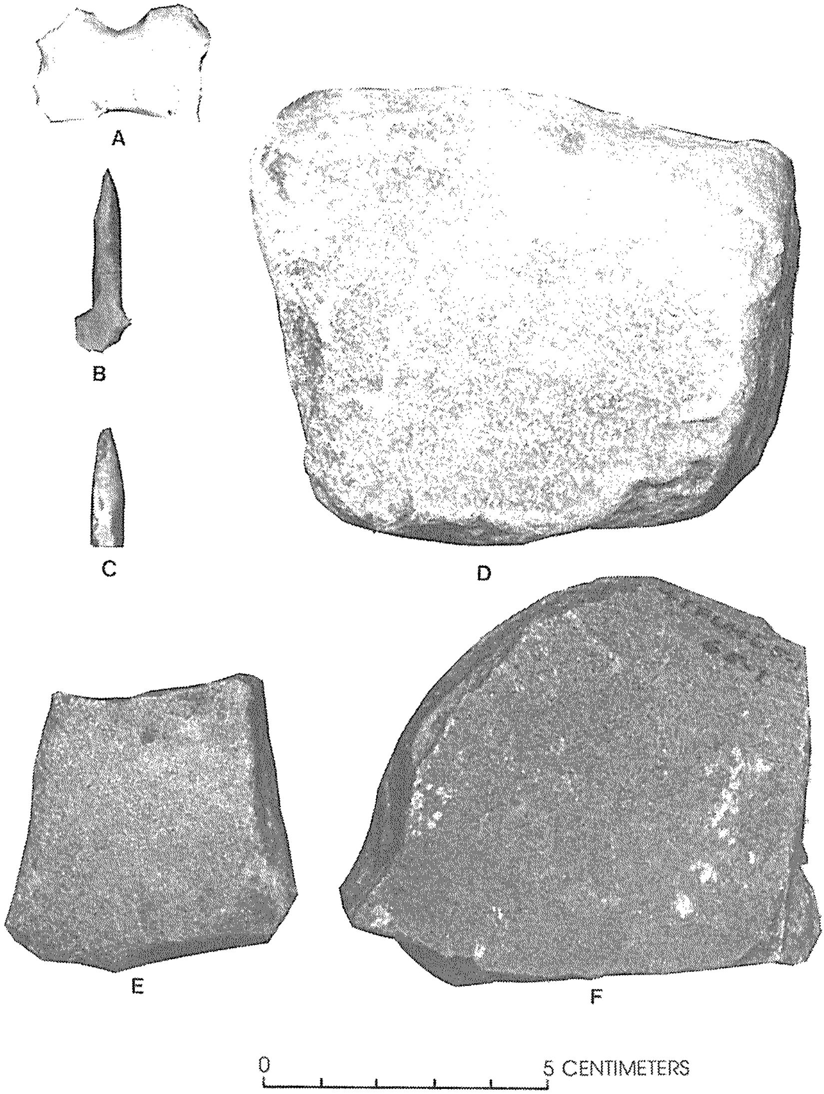

Figure 8. Stone artifacts: A, spokeshave; B and C, drills; D and E, mano fragments; F, metate fragment.

Abraded Stone

Three fragments of abrading artifacts were recovered.

Type 1.—Two fragments of manos were recovered from Level 1. One is of a relatively coarse, dark tan sandstone (Figure 8, D) and has a slightly convex abrading surface. The second specimen is of very light red or dark pink quartz with a convex surface. The manner in which it was fractured suggests that it may have been used as a boiling stone (Figure 8, E).

Type 2.—The third fragment was also recovered from Level 1. It is off-white and is of very fine grained limestone with fine sand inclusions. Its slightly concave surface suggests that it was a metate (Figure 8, F).

Lithic Debris

Only 4 of 52 units were excavated below Level 2 (20–40 cm), so these four units are not included in the analysis of lithic debris to determine the density of occupation. In all, 1,120 lithic flakes and chips were analyzed.

Level 1 (0–20 cm).—The total of lithic debris from Level 1 was 874 specimens. Edwards chert totaled 485 specimens (55.52 percent), Alibates agate totaled 55 specimens (6.21 percent), and Tecovas jasper was represented by 169 flakes and chips (19.31 percent). Obsidian totaled 14 specimens (1.61 percent). Quartz, available just to the east of the site where the Ogalalla gravels are exposed, accounts for 14 specimens (1.61 percent). *Local* materials from the limestone exposures in the face of the nearby Caprock account for 101 specimens (11.60 percent of the total), and a lithic material whose source is unknown is called *Other*, for a total of 36 (4.13 percent).

Level 2 (20–40 cm) .—The sum of all lithic debris for Level 2 was 247. Edwards chert was the dominant material with 134 specimens (54.36 percent). Alibates agate continued to be a minor lithic source with 17 specimens (6.25 percent). Tecovas jasper was represented by 50 specimens (20.48 percent). Three obsidian flakes and chips (1.08 percent) and four specimens of quartz debris were recovered (1.75 percent). *Local* material was the third most common lithic material utilized, accounting for 30 specimens (12.20 percent), and *Other* material accounted for 9 specimens (3.78 percent).

Table 1. Analysis of Lithic Debris: Area 1 (41FL1-1)

	Level 1 0–20 cm		Level 2 20–40 cm		Total 0–40 cm	
Lithic Type	N	%	N	%	N	%
Edwards	485	55.52	134	54.36	619	55.22
Alibates	55	6.21	17	6.25	72	6.42
Tecovas	169	19.31	50	20.48	219	19.53
Obsidian	14	1.61	3	1.08	17	1.52
Quartz	14	1.61	4	1.75	18	1.61
Local	101	11.60	30	12.20	131	11.69
Other	36	4.13	9	3.78	45	4.01
TOTAL	874	99.99	247	99.99	1,121	100.01

Bone and Shell

Awl

The distal fragment of a bone awl was recovered in Level 1 (Figure 9, A). It was formed from a segment of a large bone, is subrectangular in cross section (at the extreme distal part it is triangular in cross section), and 22 mm long. Wear is visible along the entire length of the fragment, and the inner (calcareous) surface has been worn or removed by use.

Butchering Marks and Alteration by Percussion

Type 1.—Four fragments of ribs with transverse cut marks (Figure 9, B, C) were recovered from Level 1

Type 2.—This type has evidence of battering or percussion (Figure 9, D). Level 1 produced five specimens. A single rib altered by percussion and three battered phalanxes were recovered from Level 1, and a battered phalanx and vertebra were recovered from Level 2.

Faunal Remains

One hundred ten animal bones were recovered in Area 1. Of this total, 99 were bison (Speer 1976:1–3), and Schultz (n.d.) identified four antelope or deer metapodials, four bird bones, and three snake bones. No information as to level number was provided in Schultz's analysis of the animals smaller than bison.

Seventy-five identifiable and fragmentary bison bones were recovered from Level 1 (Speer 1976). Lower foot bones consisting of phalanxes, tarsals, metacarpals, carpels, and sesamoids accounted for 41 specimens (54.67 percent). Upper limb bones consisting of femurs, tibiae, and fragments of sufficient size for identification as limb bones totaled 9 specimens (12 percent). There were six ribs (8 percent), fragments of three mandibles (4 percent), 6 vertebra fragments (8 percent), 6 teeth and molars (8 percent), and 3 (4 percent) fragments too small to be identified but probably from bison.

Eighteen specimens were recovered from Level 2: 9 lower foot bones (50 percent), consisting of phalanxes, tarsals, metacarpals, carpels, and sesamoids, a single tibia and radius (11.11 percent), a fragment of a cranium (5.56 percent), vertebrae (11.11 percent), two teeth (11.11 percent), and two fragments too small to be identified but probably from bison (11.11 percent).

Only six specimens came from Level 3: two phalanxes (33.33 percent), a fragment of a femur (16.16 percent), and a fragment of a limb bone, a fragmentary vertebra, and a fragment too small to be identified (16.67 percent each).

Shell Bead

One round, flat shell bead was recovered from Level 1 (Figure 9, E). It is 5 mm in diameter and 1 mm thick. The perforation for stringing, which is 1 mm in diameter, does not have the typical cone shape characteristic of beads of this type that are drilled with a lithic drill, so a historic metal drill probably was used to make the perforation.

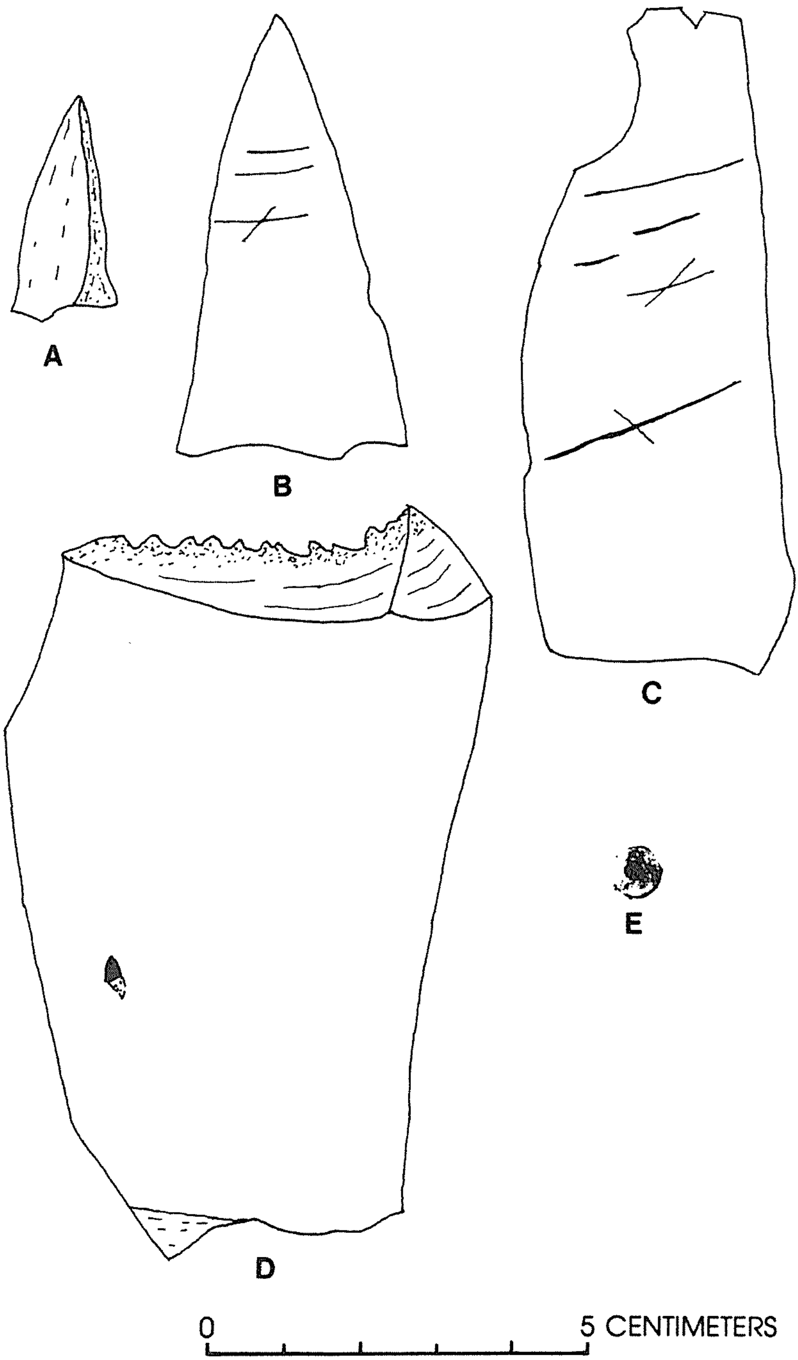

Figure 9. Bone and shell artifacts: A, awl; B and C, artifacts with transverse cut marks; D, battered bone with cut marks; E, shell bead.

Pottery

Seventy prehistoric sherds were recovered from Area 1. Of this total 43 were described as *Local Wares* by Runyon and Hedrick (n.d.) based on clay samples from nearby sources provided by the author. Six sherds probably originated in eastern and central New Mexico, and 25 are possibly of Caddoan origin. A single sherd of Jornado Mogollon Brown was recovered, and four specimens are of Pecos Glaze II or III. Runyon and Hedrick classified all of the sherds.

Type 1 (Local Variety)

This group was the most numerous, with 29 specimens. The tan to orange-buff to gray sherds are of coiled construction. The paste is fine and slightly porous, with moderate density, the surface is smooth and floated, and the core is sharply defined by a light gray central streak. The temper, which accounts for 30 to 35 percent of the sherd mass, is 80 percent very fine, clear quartz, 15 percent small tan clay balls, and 5 percent white dolomite. The vessels are small bowls and jars, with rounded rims; this type accounts for 36.71 percent of the total sherds recovered.

Runyon and Hedrick's description of Type 1 *(Local Variety)* resembles the Little Deer sherd type as described by Parker from the Bridwell site (1982:58–59) and by Baugh from the Edwards I site (1982:75–81).

Type 2 (Local Variety)

This type was represented by 14 specimens (17.72 percent of the total recovered sherds). Thirty percent of the sherds have temper consisting of 70 percent very fine quartz and 30 percent crushed limestone. The sherds are dark gray with fine-to-medium porous paste and gray cores with no streaking. The method of construction of the vessels (small jars and bowls) could not be determined. No rim sherds were recovered.

Type 3 (Eastern and Central New Mexico)

Type 3 vessels are of coiled construction and are represented by six sherds (7.60 percent of the total). The exteriors are dark gray, corrugated, and slipped with a carbon wash. The interiors are smooth but not carbon slipped. Temper comprises 30 percent of the sherd mass, of which 60 percent is white to brownish feldspar of very fine texture. Colorless subrounded quartz comprises 30 percent of the tempering material, and golden mica flakes make up the remainder of the tempering material. The origin of these sherds was probably eastern and central New Mexico.

Type 4 (Caddoan)

The second most common sherd type is represented by 25 percent of the specimens (31.65 percent of the total). It was not possible to determine the vessel types due to the small size of the sherds. They are of coiled construction, tan to light gray, and have gray-to-black cores with well-defined central streaks. The surfaces are smoothed and semifloated. The temper makes up 30 percent of the sherd mass; it consists of very fine, colorless, subrounded sand (90 percent) and white crushed shell (10 percent). The sherds are weathered from leaching of the shell temper. Runyon and Hedrick (n.d.) postulated that the source of this variety is Caddoan because of the shell temper and the similarity to Caddoan utility wares.

Type 5 (Jornado Mogollon Brown)

Jornado Mogollon Brown is represented by a single sherd (1.27 percent of the sherds recovered) (Mera 1943; Runyan and Hedrick n.d.; Lehmer 1948; Jelinek 1967), of coiled construction from an undecorated tan-to-gray bowl with a tan, slightly porous core. The sherd is 40 percent temper, of which 60 percent is white feldspar of very fine quality and white in color, made angular from crushing. Very fine clear-to-opaque quartz comprises 30 percent of the temper; 10 percent is golden platy mica.

Type 6 (Pecos Glaze II or III)

Pecos Glaze II or III (Kidder and Sheppard 1936) is represented by four tan-to-light red sherds (5.06 percent of the sherds recovered). Surface decoration is a glazed, black design 30 mm below the rim. The paste is fine to medium and slightly porous. The core is tan with no streaks; it is the same color from the surface to the interior of the sherd. The clay is from the Rio Grande basin. Thirty percent of the sherd is the temper, 60 percent of which is very fine white feldspar and 40 percent of which is very fine black, angular hornblende. There is very slight evidence of magnetite.

The author reported (Word 1963:56–57) that other western varieties were recovered from Area 1; Pecos Glaze wares and Mogollon types were recovered in the western part and local varieties and Caddoan sherds were more dense in the eastern part of this area.

Features

Five hearths were exposed. However, due to shortage of time, none were completely excavated, but estimates of size based on extending the curvature of the exposed edges of the feature indicate that the hearths varied in diameter from about .5 to 1.35 meters and were bowl shaped in cross section. The basins of the hearths were lined with limestone from the nearby Caprock escarpment. Reuse of the hearths was evident, for in one instance a hearth had been cleaned out and reused (Figure 10). The original hearth had a light charcoal stain, and some of the hearth stones had been discarded. No lining of hearth stones had been added when the hearth was reused.

One hearth has been used as a trash pit; in it were 35 pieces of lithic debris, only one of which had been fire fractured. Other cultural material in the hearth included 11 bone fragments, only one of which was burned,a graver, a utilized flake, a single fragment of a bifacial tool, and a basal fragment of a triangular point similar to a Fresno point (Suhm and Jelks 1962:273–274). It is evident from these artifacts that the hearth had two episodes of use.

Area 2 (41FL1-2)

Area 2 is about 100 meters south of Area 1, on the south bank of the White River. It is on the east side of the Floydada Country Club's No. 7 fairway and just south of the No. 7 green.

In order to establish a base line for testing, an arbitrary north was established at 45 degrees west of true north; the baseline parallels the White River.

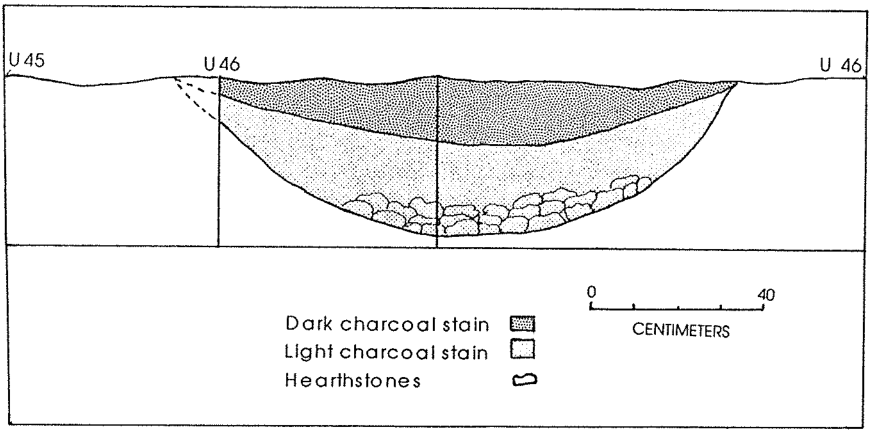

Figure 10. Cross section of reused hearth, Units 45 and 46, Area 1.

Nineteen randomly located 1-meter squares were excavated in Test Area 1 to determine whether the occupation varied over the area (Figure 11). Eleven 1-meter units in Test Area 1 were excavated to 40 cm depth, two were excavated to 50 cm, and six, to 60 cm. The author (Word 1963:46) made a test in the extreme eastern part of the area and found there a concentration of bison bones that were exposed in the bank of a borrow pit, so 12 more 1-meter squares were sunk in this part of the site (Test Area 2) to investigate the possibility of more bone concentration and to determine whether different periods of occupation were separated stratigraphically (Figure 11). Four units "stair-stepped" down the slope of the borrow pit were excavated to a depth of 40 cm. Just to the east, another test of five stair-stepped units was excavated to a depth of 40 cm, and three units to the east of the previous test also were excavated to 40 cm.

In general, in the main part of the site (except for the stair-stepped tests) there was no evidence of any sudden soil change; the soil changed gradually from light reddish brown to light brown. The soil contained fine particles of charcoal, lithic debris, fragmented bone scraps, and an occasional hearthstone, but the soil was generally homogeneous in texture. Rodent burrows and nests, and insect burrows containing deposits of seeds were common. The soil had a high percentage of wind-blown sand mixed with clay; when it was dry, it became very hard, compact, and difficult to trowel.

In Test Area 2, light brown, sandy clay extended to the depth of the stair-stepped excavation. Because Area 2 is from 1 to 2 meters lower, it is subject to flooding, which is probably the cause for its consistency of soil color and texture. The soil contained lithics, sherds, and fragmented faunal remains, but, since this area is subject to flooding, no rodent burrows.

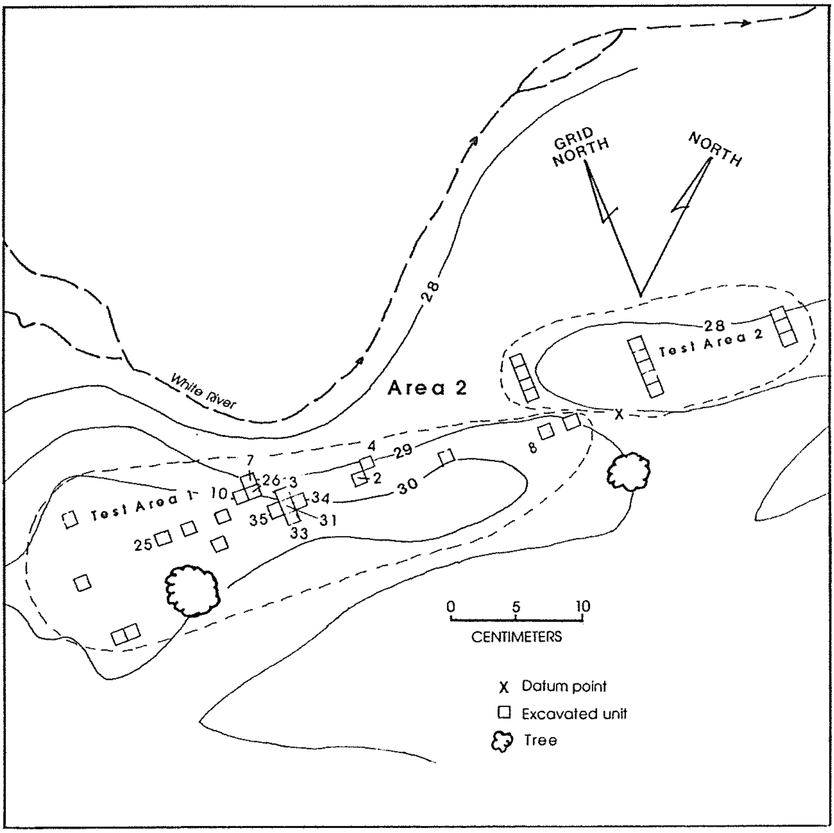

Figure 11. Topographic map of Area 2, showing units tested and Test Areas 1 and 2.

Area 2–Cultural Materials

Historic Artifacts

Nine historic artifacts were recovered, two of which were on the surface and were obviously associated with Floydada Country Club golfing activities. One is an aluminum *pop top* device used to open a beverage can; the second is a wooden golf tee.

Glass and Ceramics

Type 1.—Two small fragments of brown bottle glass were recovered, one of which has small round raised dots. It is slightly concave and is probably a basal fragment.The circular dots are 1.5 mm in diameter, spaced 1.5 mm apart. This fragment is 13 mm long, 11 mm wide, and 5 mm thick. The second fragment of glass is 15 mm long, 8 mm wide, and 1.5 mm thick. Both were recovered from the surface and were probably fragments of beer bottles.

Type 2.—Five sherds of white crockery were recovered, all from the surface. Four were recovered from Unit 8 and fit together to form what appears to be part of the base of a large vessel, since they are flat and have potter's wheel impressions. These sherds are white on both the inner and outer surfaces and are 8 mm thick, with highly glazed outer surfaces and not as heavily glazed inner surfaces. The paste is very fine grained white clay; occasional small air pockets exposed on the surface do not exceed 1 mm in diameter.

The fifth sherd, recovered from Unit 33, which is 21 meters to the east in Area 2, Test Area 2, is similar to the previously described crockery sherds. Both the inner and outer surfaces are highly glazed and slightly curved, suggesting that it was a body fragment of a large crockery vessel. It is 6 mm thick. In spite of the significant distance separating the fifth sherd from the others, all five sherds are believed to be from the same vessel.

Unfortunately, because the sherds have no trademarks or decoration, it is impossible to identify the manufacturer or to determine the approximate date of manufacture. Crockery of this type has been made since the nineteenth century and is still being produced.

Lithics

Arrowpoints

Three projectile points and 10 fragments of projectile points were recovered.

Type 1.—Two Fresno arrowpoints were recovered (Suhm and Jelks 1962:273–274). One of the points, from Level 1 (0–20 cm), is of light gray Edwards chert and has a broken basal corner (Figure 12, A). It is 26 mm long, and the width at the slightly concave base is estimated to have been 14 mm. The second specimen, made of Tecovas jasper (Figure 12, B), was recovered from Level 2 (20–40 cm). It is a complete specimen, 14 mm long and 11 mm wide at the base. The sides are convex and the base is concave. It is probably reshaping of the distal end that accounts for its short length.

Type 2.—A single fragmented projectile point of Tecovas jasper recovered from Level 1 is either a Harrell (Bell 1958:30) or a Washita arrowpoint (ibid.:99). The basal part has been broken off just below the side notches, and the distal end is broken off; the original length is estimated at 22 mm. It is 12 mm wide just above the lateral notches (Figure 12, C).

Ten fragments of arrowpoints were recovered, three of Edwards chert and seven of Tecovas jasper. Two proximal fragments cannot be identified as projectile points, and six distal fragments are probably from points.

Scrapers

Six scrapers were recovered, five of Tecovas jasper and one of Alibates agate.

Type 1.—No side scrapers or fragments of this type were recovered.

Type 2.—The six end scrapers vary considerably in size. The smallest, 18 mm long and 13 mm wide at the distal end (Figure 12, D), was made from Alibates agate. The largest, 38 mm long and 16 mm wide (Figure 12, E), is of Tecovas jasper. The remaining four specimens are fragments of this variety. Four of the six specimens were recovered from Level 1, one, from Level 2, and one was at unknown depth.

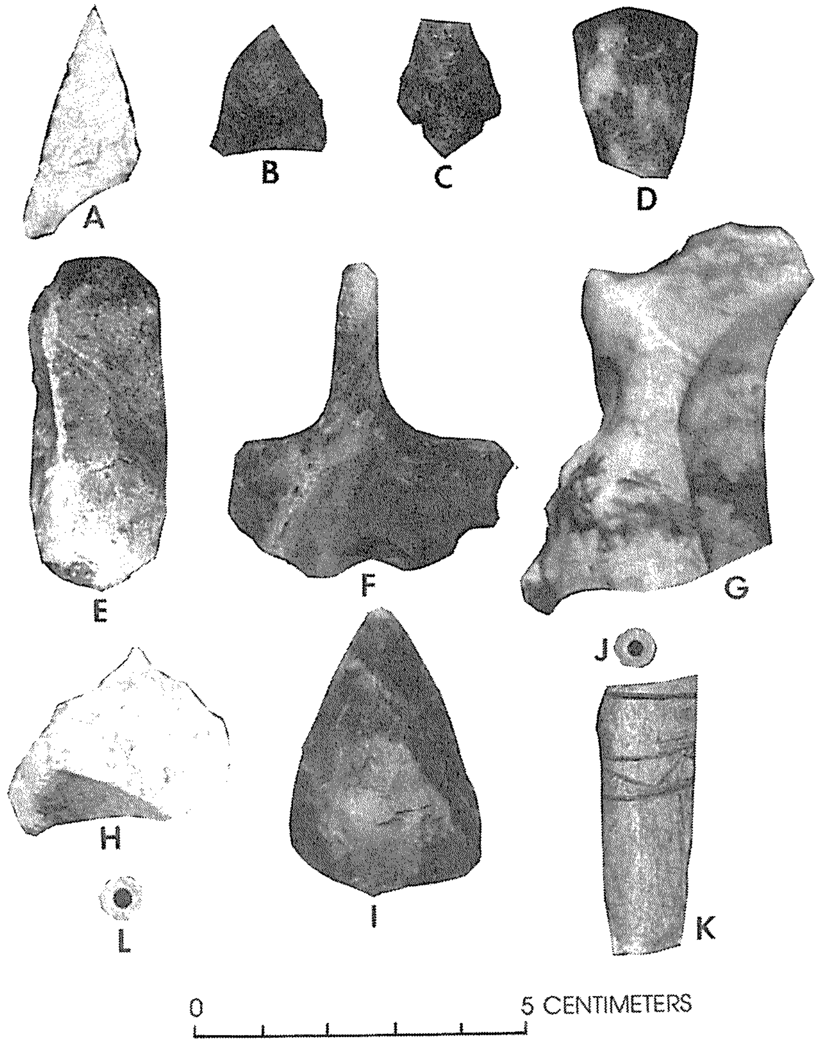

Figure 12. A and B, Fresno point; C, Harrell or Washita point; D and E, end scrapers; F, drill; G, spokeshave; H, graver; I, biface; J and K, bone beads; L, shell bead.

Drill

A single drill, or perforator, of Tecovas jasper was recovered from Level 1. The unaltered proximal end is 33 mm wide, and the drill stem is 20 mm long. The distal end is broken, so the exact length cannot be determined (Figure 12, F).

Spokeshave

A single spokeshave of Alibates agate, made from a large flake 49 mm long, 29 mm wide, and 12 mm thick, was recovered from Level 2 (Figure 12 G). The lateral part has a slight concave indention 15 mm wide and 5 mm deep. On one end a small spokeshave 6 mm wide and 3 mm deep was formed.

Graver

A single graver recovered from Level 1 was made by lightly chipping a flake of Tecovas jasper (Figure 12, H).

Bifaces

Two fragments of unidentifiable bifaces were recovered. One, found in Level l, is of limestone from the nearby Caprock. Two complete preforms were also recovered. One of the specimens, made from Tecovas jasper (Figure 12, I), is triangular, 34 mm long, has a maximum width of 22 mm, and convex sides and base; its provenience was not recorded. The second specimen, a flake altered by percussion, was also formed from Tecovas jasper; it is 59 mm long and 23 mm wide.

Utilized Flakes

Twenty utilized flakes were recovered. Five (25 percent) were made from Edwards chert. A single specimen of Alibates agate (5 percent) and 14 (70 percent) are of Tecovas jasper. Five were recovered from Level 1, 12 from Level 2, and the remaining 3, from Level 3.

These artifacts were not intentionally made, but are the result of usage. Nine of the 20 specimens appear to be complete. The other 11 are fragments that were probably originally flakes. The complete specimens vary in size from 19 mm to 31 mm. The use flakes are on the convex surfaces.

The author, in experimenting with small flakes to butcher deer and groove bones, discovered that during these operations small flakes varying from .05 mm to 1 mm were removed from the convex surfaces. It was also found that continued use of flakes for severing bone created relatively steep edges, similar to the edges of scrapers, but that the flakes removed were of the previously mentioned dimensions.

Lithic Debris

Thirty-two units were excavated in Area 2. Twenty of these were excavated to Level 2 (20–40 cm), and in one unit, Levels 2 and 3 (40–60 cm) were combined into one level extending from 20 cm to 60 cm.

To determine if the density of occupation varied in time, comparisons were confined to the 20 units excavated through Level 2. Amounts of lithic debris were calculated by level. From the total of 894 flakes and chips recovered, Level 1 yielded 557 specimens (62.30 percent), and Level 2 had 337 specimens (37.70 percent). From these statistics it appears that Area 1 was more heavily occupied in Protohistoric times. Occupation tended to be less dense in the Late Prehistoric period. This bears out Hughes's (n.d.) theory in his "Chronology of Hunting Cultures on the Southern Plains" that bison were not plentiful until after about A.D. 1000.

In order to determine what lithic sources were exploited by the people occupying this area, the lithics were analyzed by type. In Level 1 Edwards chert was represented by 62 specimens (11.13 percent), Alibates agate by 156 specimens

(28.01 percent), Tecovas jasper—the most common type—by 252 specimens (45.24 percent), *Local* material from the nearby Caprock by 42 specimens (7.54 percent), and *Other* lithics of unknown source, by 41 specimens (7.36 percent). Quartz and Potter chert (Pliocene) produced two examples each, or .36 percent.

Table 2. Analysis of Lithic Debris: Area 2 (41FL1-2)

	Level 1 0–20 cm		Level 2 20–40 cm		Total 0–40 cm	
Lithic Type	N	%	N	%	N	%
Edwards	62	11.13	32	9.50	94	10.51
Alibates	156	28.01	117	34.72	273	30.54
Tecovas	252	45.24	158	46.88	410	45.86
Obsidian	–	–	1	.30	1	.11
Quartz	2	.36	–	–	2	.22
Local	42	7.54	25	7.42	67	7.50
Other	41	7.36	4	1.19	45	5.03
Potter	2	.36	–	–	2	.22
Total	557	100.00	337	100.01	894	99.99

There were 337 fragments of lithic debris in Level 2: 32 of Edwards chert (9.50 percent), 117 of Alibates agate (34.72 percent), 158 of Tecovas jasper, which continued to be the most common material with 46.88 percent, a single obsidian flake (.30 percent), 25 *Local* lithics (7.42 percent), and 4 *Other* lithics (1.9 percent).

Ground Stone

Type 1.—A complete mano was recovered from Level 2. The abrading surface is slightly convex and was pecked to enhance its efficiency. The opposite surface is slightly concave and smooth, suggesting that it is a mano. It is subrectangular with rounded corners, 117 mm long, 83 mm wide, and from 12 to 28 mm thick.

Two fragments of quartzite manos were also recovered from Level 2. Their strongly convex grinding surfaces are the basis for their classification as manos.

Type 2.—A fragment of a metate identified by its slightly concave surface was recovered from Level 1. The abrading surface was pecked to enhance its efficiency, but the opposite surface was not altered. This fragment is 53 mm long and wide and is 34 mm thick.

Type 3.—Three fragments of an abrading stone that probably was a palette for grinding pigment were recovered from the same unit (Unit 25) in Level 2. Two of the fragments fit together, but it is impossible to determine the original dimensions of the artifact. It is 5 mm thick at its rounded edge and 4 mm thick toward its inner surface. It was made from a single piece of fine-grained sandstone containing minute particles of mica.

Cores

Two cores of stone from the nearby Caprock were recovered, one from Level 2 and the other from Level 3. They were reduced from their original size by percussion. Flakes were removed from all sides of the larger specimen, which measures 69 mm. Percussion flakes were removed from only one side of the second specimen, which is 95 mm long, 60 mm wide, and 33 mm thick.

Pigment

Type 1.—Four small fragments of hematite were recovered, two from Level 1 and two from Level 2. One specimen contains very fine grained sand and has a smoothed surface. The second specimen contains fine-grained sand and is smoothed on one surface. The third specimen is of greater density and does not have a smoothed surface. The fourth example is a fragment of petrified wood of soft texture with no smoothed surface.

Type 2.—A single small, pebblelike specimen of limonite was recovered from Level 2. It is very soft in texture.

Faunal Remains

Bone and Shell

Type 1.—Two fragments of ribs, one from Level 1 and the other from Level 2, had cut marks resulting from butchering processes.

Type 2.—A single rib fragment recovered from Level 2 had evidence of sawing at both ends.

Type 3.—A fragment of a scapula with smoothed surfaces was found in Level 3.

Type 4.—A scapula fragment with a notched edge was recovered in Level 2. Its function could not be determined.

Type 5.—A battered fragment of a vertebra was recovered from Level 1.

NOTE: The faunal remains with evidence of processing were not included in the cultural material received by the author. The descriptions above are based on the analysis of faunal remains by Speer (1976).

Type 6.—A circular bone bead 5 mm in diameter and 1 mm thick (Figure 12, J) was recovered from Level 2. The slightly biconical perforation for stringing is 2 mm in diameter.

Type 7.—A fragment of what was possibly a tubular bone bead made from a bird bone was recovered from Level 4 (from the stair-stepped excavation in sub-Test Area 2). There is evidence that one end was cut, and a groove on the vertical axis varies from 1 mm to 2 mm from the cut to the end. Two other diagonal grooves, parallel to the previously described groove are from 6 to 7 mm long. These two grooves are 4.5 mm apart, and inside them are two grooves 8 mm long that angle toward the distal third groove and join to form a triangular design (Figure 12, K).

Type 8.—A small fragment of burned bone was recovered from Level 5 (in the stair-stepped excavation in sub-Test Area 2). Due to the small size of the fragment, its original size and function cannot be determined. A *V*-shaped groove has been cut into the bone.

Shell Bead

A circular shell bead 4.5 mm in diameter with a perforation 1 mm in diameter and 1 mm thick was recovered from Level 1 (Figure 12, L). The perforation has parallel sides, possibly the result of being drilled by a metal drill.

Other Faunal Remains

One hundred twenty-one animal bones were recovered in Area 2. Of this total, 85 (70.25 percent) were bison (Speer 1976:4–6); Schultz (n.d.) identified 36 specimens of animals smaller than bison (29.75 percent). An antelope third phalanx and a canine molar were also recovered. The remaining 24 faunal remains consisted of one prairie dog ulna, 11 mole remains, one gopher bone, one cotton rat bone, and three pocket mouse bones. Reptiles were represented by two snake vertebrae and fragments of a tortoise carapace and plastron. Two frog or toad limbs were recovered, and bird bones consisted of a pelvis, a scapula, and a corpus.

Level 1 yielded 14 bison bones: two lower foot bones (14.29 percent), consisting of a single metapodial and phalynx, one radius and one rib (7.14 percent each), four vertebrae (28.57 percent), two fragments (14.29 percent), obviously of limb bones, a single skull fragment (1.74 percent), and three teeth (21.43 percent).

Sixty-three bison bones were recovered from Level 2:. 11 lower foot bones (17.46 percent), consisting of metapodials, tarsals, carpals, phalanxes, sesamoids (17.46 percent), nine upper limb bone fragments, consisting of femurs, humeri, tibiae, and radii (14.29 percent), 12 fragments of what were obviously limb bones (19.05 percent), a single fragmentary scapula (1.59 percent), eight ribs (12.70 percent), five vertebrae fragments (7.94 percent), two pelvis fragments (3.17 percent), four fragments of skulls and mandibles (12.70 percent each), and seven teeth (11.11 percent of the faunal remains recovered).

Level 3 yielded only eight bison bone fragments: three lower foot bones (one phalanyx, one carpal, and one sesamoid (7.50 percent), one rib fragment, one fragment of a scapula, and one skull fragment (12.50 percent each of the total).

Pottery

Twenty-seven prehistoric sherds were recovered from Area 2, eighteen of which probably originated in eastern and central New Mexico. Five specimens were of El Paso Brown Ware, and four were of Chupadero Black-on-White. Eighteen sherds are of a corrugated type of pottery. Runyon and Hedrick (n.d.) classified the sherds.

Type 1 (El Paso Brown)

This sherd variety is represented by five specimens from an undecorated bowl (18.52 percent of the total sherds recovered) (Mera 1943; Runyon and Hedrick 1973; Lehmer 1948; Jelinek 1967). The sherds are tan to gray, and the tan core is slightly porous. The sherds are 40 percent temper, of which 60 percent is very fine textured white feldspar that is angular from crushing. Very fine clear to opaque quartz makes up 30 percent of the temper, and golden, platy mica makes up 10 percent .

Type 2 (Corrugated Variety)

This type is of coiled construction and is represented by 18 sherds (66.67 percent of the total sherds recovered). The exterior is dark gray, corrugated, and slipped with a carbon wash. The interior is smoothed but not slipped with carbon. Temper comprises 30 percent of the sherd mass, of which 60 percent is very fine white to brownish feldspar. Colorless subrounded quartz sand makes up 30 percent of the temper, and golden mica flakes make up 10 percent. These sherds probably originated in eastern and central New Mexico (Runyon and Hedrick n.d.).

Type 3 (Chupadero Black-on-White)

The four sherds of this variety (14.82 percent of the total sherds recovered) (Mera 1931; Hawley 1950; Runyon and Hedrick 1973; Breternitz 1966) are of coiled construction, grayish white with black paint on the slip, of silky fine, dense paste, and have a gray, very dense core, with no central streak. Kaolinite was used in the vessels, and the surfaces are smooth and thinly slipped. The tempering material is 20 percent of the sherd mass, 90 percent very fine to fine colorless subrounded quartz sand, and 10 percent yellowish white limestone.

Feature

Grass-impressed daub weighing 3,547 g was recovered from Level 1 (0–20 cm) and 5,251.8 g was recovered from Level 2 (20–40 cm). The area comprising Units 2 and 4; Units 3, 31, 33, 34, and 35; and Units 7, 10, and 26 yielded 3,420.4 g of daub (96.44 percent of the total recovered from Level 1). The same units yielded 5,117.2 g from Level 2 (97.43 percent of the recovered daub). The outlining units that were tested yielded only 3.56 percent of the daub from Level 1 and 2.57 percent of the daub from Level 2. This indicates that the feature was confined principally to an area of about 105.0 cm from east to west and 60.0 cm from north to south (Figure 13).

Within this concentration of grass-impressed daub was evidence of a structure of undetermined size and construction. In Units 7, 10, and 26 and Units 2 and 4, there were compacted surfaces varying from 4 to 10 cm in diameter at about 14 cm depth. Unfortunately the excavations were watered down each evening in order to facilitate the removal of the matrix. Dr. Jack T. Hughes (oral communication, June 13, 1975), upon examining these compacted surfaces, stated that the excavators had inadvertently dug through remnants of a floor or living area, not realizing that a floor or living surface was there.

Field notes recorded what were possibly three post holes in Unit 4, but none were cross sectioned to determine whether they were post holes or rodent burrows.

Area 3 (41FL1-3)

Area 3 is about 250 meters east of Area 1 on the south bank of the White River, west of an older oxbow of the river. The area tested is east of the Floydada Country Club's No. 1 fairway.

Following the same procedure as in Area 1, a nail was driven into a hackberry tree to serve as the datum point for Area 3, and all elevations were recorded from this point. An east-west base line was extended westward from this datum point, and

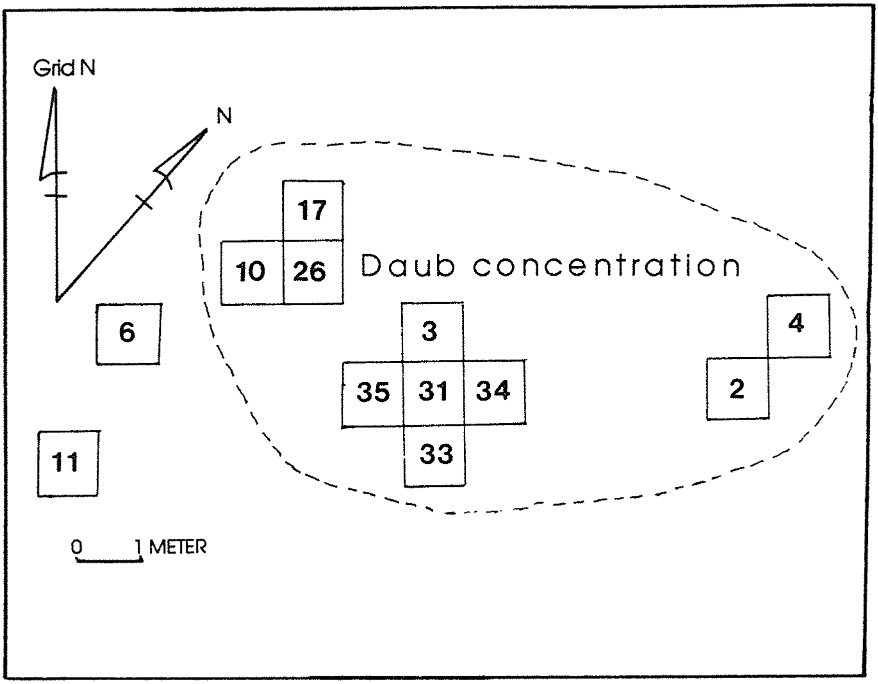

Figure 13. Plan of the area of daub concentrations, Area 2, Test area 1.

a north-south base line was laid out intersecting the first line 11 meters west of the datum point (Figure 14). Twenty-four 1 by 1-meter units were tested. Twenty units were excavated to the 30 cm depth, 14 to the 40 cm depth, nine to the 50 cm depth, and a single unit was excavated to a depth of 70 cm. When a feature was discovered, additional units were opened to expose as much of the feature as time allowed. Units were excavated in 10 cm levels; a line level was used for horizontal control. The reference point for each unit was the grid reading at its southwest corner.

Area 3–Soil Description

Of the 24 units tested, only Unit 10 was excavated to 70 cm. No features were recorded in this unit, but the excavation provides an opportunity to describe the soils (Figure 15).

Level 1 (0–10 cm)

The soil is brown, sandy, compact loam. The roots of the native grasses that covered the surface extend down throughout this level. Specks of charcoal and signs of rodent activity are common throughout.

Level 2 (10–20 cm)

The soil color and consistency are unchanged. Grass roots, charcoal specks, and signs of rodent activity continue.

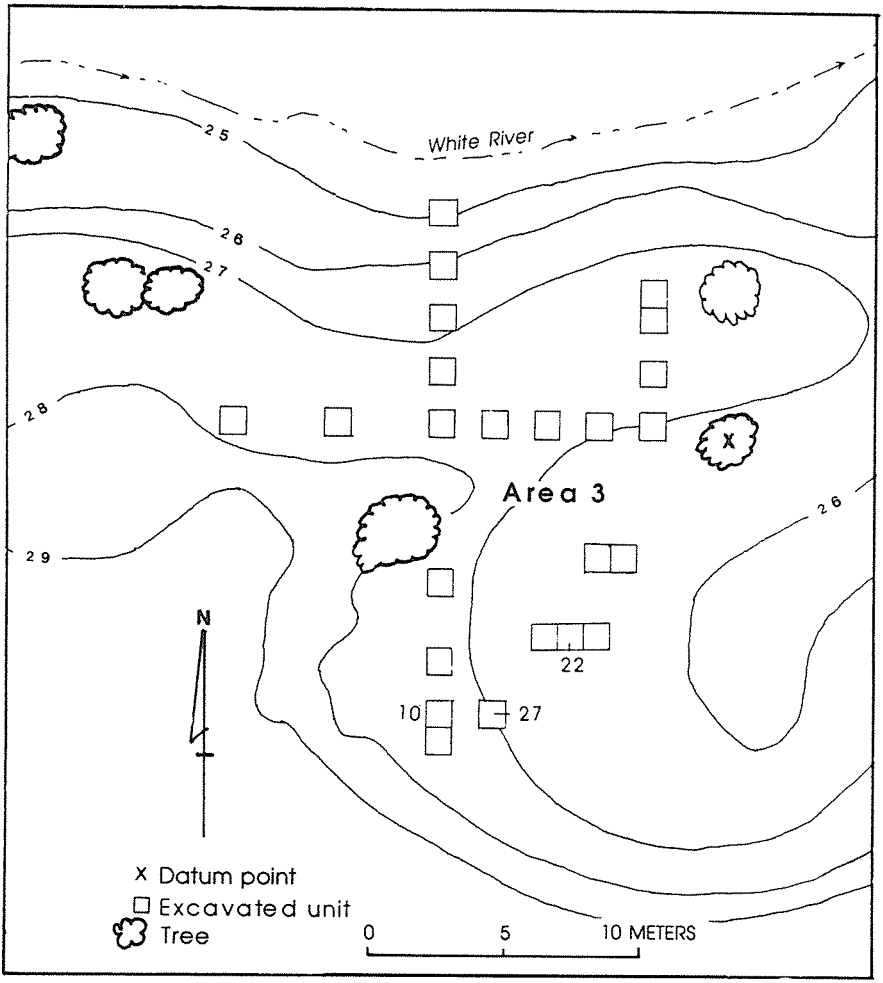

Figure 14. Topographic map of Area 3, showing units tested.

Level 3 (20–30 cm)

Soil characteristics are similar to Levels 1 and 2. Grass roots do not penetrate below the 25 cm level, but signs of rodent activity continue.

Level 4 (30–40 cm)

The matrix is similar to but less dense than that in the upper levels. However, an irregular surface was found from 32 cm to the 40 cm depth (Figure 15). Color changes below this irregular surface to a light brown-gray loam with small caliche nodules varying in size from 1 to 5 mm. Charcoal specks decrease in number, and signs of rodent activity disappear in the lower part of the level.

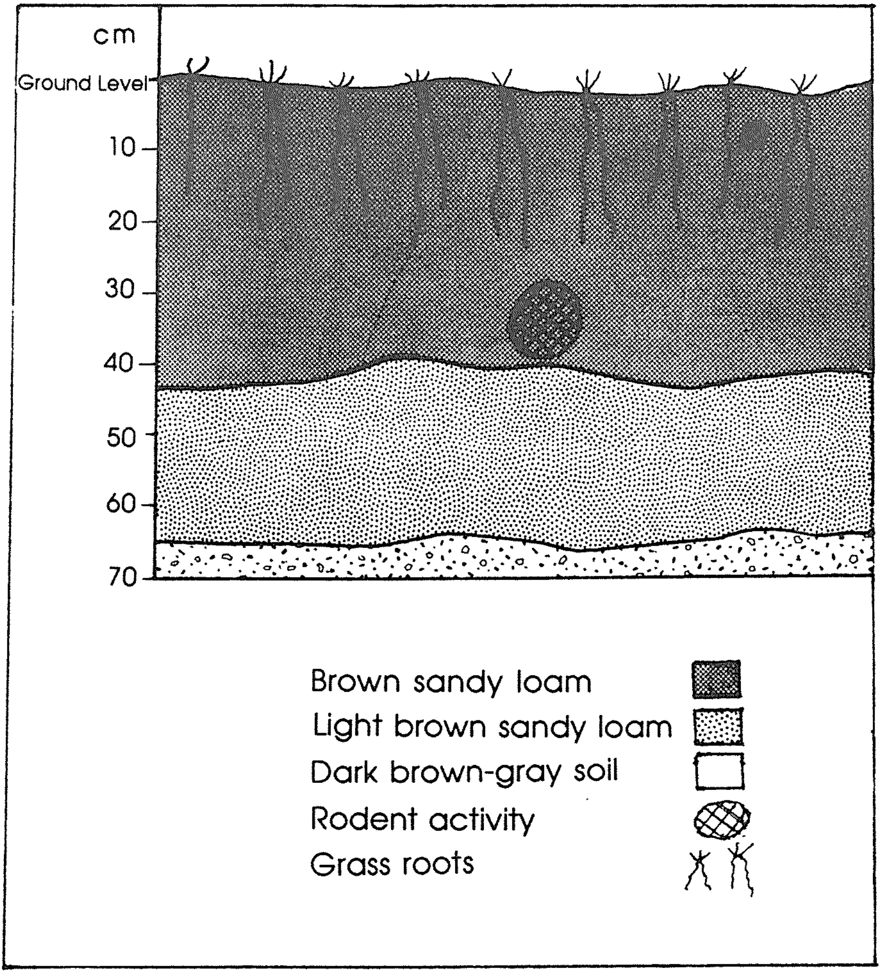

Figure 15. Profile of Unit 10, Area 3, showing soil changes.

Level 5 (40–50 cm)

The soil is of the same texture and color as in the lower part of Level 4. Charcoal specks are scarce.

Level 6 (50–60 cm)

The content and texture of the matrix are similar to those of Level 5.

Level 7 (60–70 cm)

The soil gradually changes from light brown-gray to darker brown-gray at the 63 cm level. From 63 cm to the 70 cm level caliche pebbles increase in frequency and measure as much as 10 cm. Charcoal becomes scarce, with only an occasional small speck appearing.

Area 3–Cultural Materials

Area 3 was excavated in 10 cm levels in contrast to Areas 1 and 2, which were excavated in 20 cm levels. In order to facilitate statistical comparison of the density of occupation of Area 3 with that of Areas 1 and 2, pairs of 10 cm levels in Area 3 are combined. That is, Levels 1 and 2 of Area 3 are combined to make a 20 cm level, which corresponds to Level 1 in Areas 1 and 2. The other 10 cm levels in Area 3 are similarly combined in pairs for comparison with Areas 1 and 2.

Historic Artifacts

Eighteen fragments of glass were recovered from the upper part of Level 1 (0–10 cm). The units from which these specimens were recovered are in an area that has been actively used by golf carts; this accounts for the small size of the glass particles.

Glass

Type 1.—Five pale, clear translucent green glass fragments vary in size from 6 to 11 mm and are as large as 12 to 21 mm. It is not possible to identify the original objects, but they are reminiscent of Coca Cola bottles.

Type 2.—Nine green translucent glass fragments varying from 3 to 6 mm to as large as 9 to 16 mm were recovered, but the original objects cannot be determined.

Type 3.—Three clear glass fragments varying in size from 4 to 6 mm to as large as 7 to 8 mm were recovered. The nature of the original container can not be determined.

Type 4.—A single brown glass fragment was recovered. It measures 12 to 15 mm and has the characteristics of a beer bottle.

Lithics

Arrowpoints

Type 1.—The basal part of a probable Fresno point made from Edwards chert was recovered from Level 1 (Suhm and Jelks 1962:273–274). The base is 12 mm wide and slightly concave. The length can not be determined, since the distance from the base to the distal part is only 14 mm.

Type 2.—A Harrell arrowpoint (Bell 1958:30) of Tecovas jasper recovered from Level 1 is 28 mm long and 12 mm wide at the base. The edges are highly convex. The lateral notches are 8 mm from the base. The base is concave and the basal notch is an open *U* (Figure 16 A).

Type 3.—A fragment of a Washita arrowpoint (Bell 1958:99) made from Edwards chert was recovered from Level 1. The base is straight and is estimated to have been 15 mm wide; the length is estimated to have been 21 mm. The sides are slightly convex (Figure 16, B), and the lateral notches are 6 mm from the concave base.

Type 4.—Two Perdiz arrowpoints (Suhm and Jelks 1962:283–284) were recovered from Level 1. One, made of light gray Edwards chert, lacks a distal end. The blade is estimated to have been 38 mm long. The sides of the blade are gently convex, and the shoulders are slightly barbed. It is 25 mm wide at the base of the blade. The stem is contracting, and the tip, which was about 10 cm long, is broken

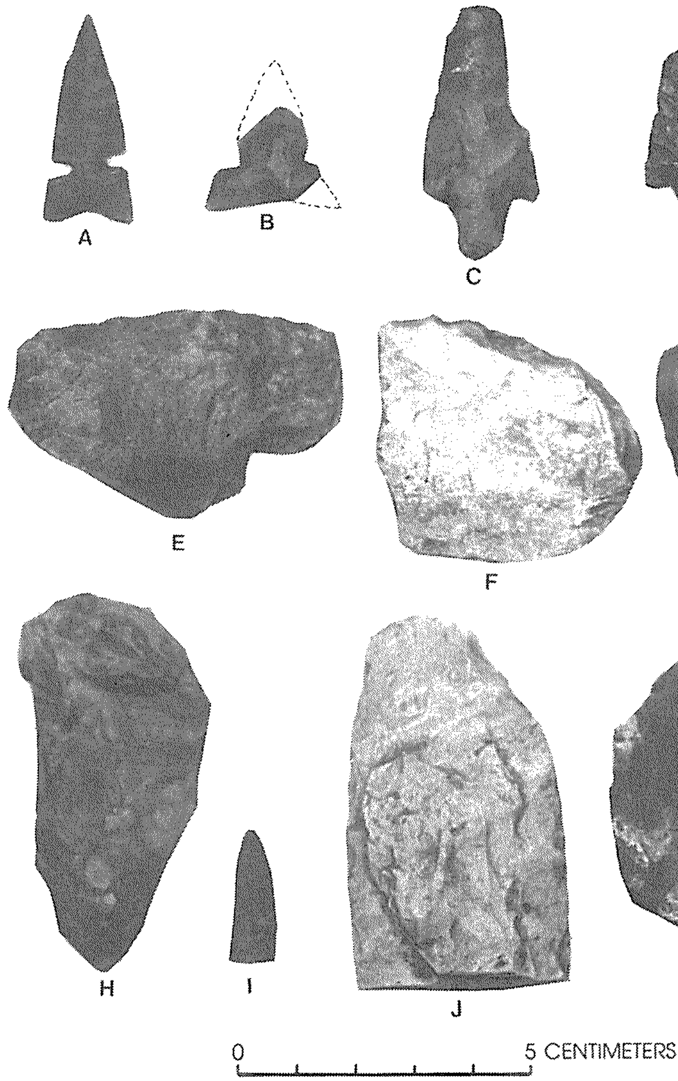

Figure 16. A, Harrell point; B, Washita point; C and D, Perdiz points; E and F, side scrapers; G, end scraper; H, combination end and side scraper; I, stem of drill; J, preform; K, core.

(Figure 16, C). The second specimen is of obsidian. The distal end is broken, but the original length is estimated to have been 30 mm. The blade is straight, and the shoulders are at right angles to the blade. The contracting stem is 3 mm long (Figure 16, D).

Three fragments of what, based on point characteristics, were arrowpoints, were recovered from Level 1. Two are distal ends, one of Edwards chert and the other, of Tecovas jasper. The third specimen is a midsection of Edwards chert.

Scrapers

Scrapers are the most common lithic artifact recovered from Area 3. Four are made of Tecovas jasper and one each of Alibates agate and Edwards chert. There are two side scrapers, two end scrapers, and one combination side-end scraper. One is a fragment too small to classify.

Type 1.—Both of the side scrapers recovered from Level 1 are made from Tecovas jasper. The largest is 45 mm long and 29 mm wide (Figure 16, E). The smaller specimen is 37 by 32 mm (Figure 16, F).

Type 2.—One of the two end scrapers recovered from Level 2 is made from Edwards chert (Figure.16, G). It is 33 mm long and 27 mm wide. The distal end is steep, or blunt from resharpening. The second specimen, recovered from Level 1, is a fragment; it is not possible to estimate its original length, but the fragment is 13 mm long and 27 mm wide at the point of fracture. The working surface is blunt, indicating that it had been resharpened and reused many times.

Type 3.—A single combination side-and-end scraper recovered from Level 1 (Figure 16, H) was made from Alibates agate. It is 51 mm long and 26 mm wide. The side-and-end scraping edges extend from the proximal to the distal end. One side is broken; it cannot be determined whether the fracture occurred when the artifact was made or at a later date.

Drill

The distal part, or stem, of a drill or perforator of Tecovas jasper was recovered from Level 2 (Figure 16, I). The fragment is 20 mm long; in cross section it is slightly bevelled, suggesting that it had been resharpened. At the broken or proximal end it is 6 mm wide; at the distal end it tapers to a point.

Preform

A single fragment of a preform made from Tecovas jasper was recovered from Level 1 (Figure 16, J). It is 52 mm long and 31 mm wide at the point of fracture. Both sides are percussion flaked.

Core

A core of Tecovas jasper reduced by percussion (Figure 16, K) was recovered from the lower part of Level 1. It is 47 mm long, 31 mm wide, and 19 mm thick.

Utilized Flakes

Six utilized flakes were recovered, two from Level 1 and four from Level 2. Four are of Tecovas jasper and two are of Edwards chert. The largest is 41 mm long and 27 mm wide. The smallest is a fragment 16 mm long and 12 mm wide.

No other lithic artifacts such as manos, metates, or pigments were found in the 1975 TAS Field School excavations.

Lithic Debris

In order to analyze the lithic concentration to determine if there is an increase or decrease in density of occupation represented by lithic debris, the 14 units completed through Level 2 (0–40 cm) are compared. Three hundred forty-one pieces of lithic debitage were recovered. Level 1 (0–20 cm) yielded 194 specimens (56.89 percent), and Level 2 (20–40) yielded 147 specimens (43.11 percent of the total.lithics). Lithics were identified by type. Outcrops of Tecovas jasper, of the Tecovas Formation (Dockum Group, Upper Triassic; Holliday and Welty 1981) are found 48 to 96 km (30 to 60 miles) north of the Floydada Country Club site. Tecovas jasper is represented by 121 specimens (62.37 percent). Twenty lithics of Alibates agate, which occurs in the upper part of the Quartermaster Formation (Permian) (ibid.) constitute 10.31 percent. Thirty-five specimens (18.04 percent) are of Edwards chert, which is not found in this area. Seven obsidian flakes (3.61 percent) came from eastern central New Mexico. Four specimens (2.06 percent) are of quartz, commonly found as cobbles in the Ogallala Formation (Tertiary). *Local* material from the nearby Caprock escarpment accounts for four specimens (2.06 percent). A single flake of Potter chert (.52 percent of the total) came from the Ogallala Formation (Pliocene). Two specimens (1.03 percent) are of quartzite from the nearby Tecovas outcrops (Table 3).

Table 3. Analysis of Lithic Debris: Area 3 (41FL1-3)

	Level 1 0–20 cm		Level 2 20–40 cm		Total 0–40 cm	
Lithic Type	N	%	N	%	N	%
Edwards	35	18.04	27	18.37	62	18.18
Alibates	20	10.31	15	10.20	35	10.26
Tecovas	121	62.37	92	62.59	213	62.46
Obsidian	7	3.61	5	3.40	12	3.52
Quartz	4	2.06	3	2.04	7	2.05
Local	3	2.06	3	2.04	7	2.05
Potter	1	.52	1	.68	2	.59
Tecovas Qtz	2	1.02	1	.68	3	.88
Total	194	100.00	147	100.00	341	99.99

Level 2 (20–40 cm) yielded 147 lithics (43.11 percent of the total of 341). There was a slight variation in the percentage of each type. Ninety-two (62.59 percent) are of Tecovas jasper; 15 (10.20 percent) are of Alibates agate. Twenty-seven (18.37 percent) are of Edwards chert, and five (3.40 percent) are of obsidian. Quartz and *Local* material from the nearby Caprock escarpment were represented by three examples each (2.04 percent each). Potter chert and Tecovas quartzite were represented by one specimen each (.68 percent). Judging from the lithic debris recovered, there appears to be a slightly less density of occupation in Level 2 than in Level 1.

In the six units excavated through Level 3 (40–60 cm), only 12 lithic specimens were recovered. Levels 1 and 2 yielded 190 lithics (94.06 percent), and the total for all three levels was 202, Level 3 accounting for only 5.94 percent. However, six units—only one-fourth of the total units tested—are not sufficient for accurate determination of the density of occupation, but it is probable that the density of occupation was considerably less in the time represented by Level 3.

Bone

Butchering Marks and Alterations from Percussion

Type 1—Twelve specimens with cut or butchering marks were recovered: six ribs, one humerus, and five fragments of upper limb bones. Two ribs and two upper limb bone fragments (33.33 percent) were recovered from Level 1. One humerus, three ribs, and three upper limb bone fragments (58.33 percent) came from Level 2, and a single rib (8.33 percent) was recovered from Level 3.

Type 2.—An axis vertebra was recovered from Level 2 that had transverse cut marks and was also battered.

Type 3.—A carpal from Level 1 and a tarsal from Level 2 had evidence of battering.

Bones with butchering or cut marks constituted 80 percent of the total. A single specimen (6.6 percent) had evidence of butchering and battering, and 13.33 percent of the bones had evidence of battering only.

Fragmented Faunal Remains

Small fragments of bone too small to be identified are not included in the following analysis. Thirty-eight fragments that could be identified were recovered. Fourteen were recovered in Level 1: five lower foot bones (two metatarsals, one tarsal and two phalanxes), upper limb bones (fragments of one possible femur, one radius, one humerus, and two limb bones), two rib fragments, and two tooth fragments. Twenty-one specimens were recovered from Level 2: eight lower foot bones (five carpals and tarsals, two sesamoids, and a single phalanx), upper limb bones, four ribs, a single axis vertebra, and four tooth fragments. Level 3 produced only three specimens consisting of a single carpal, a fragment of a tibia, and a rib. The bison remains were analyzed by Speer (1976:7, 8).

Pottery

One hundred seventy-nine prehistoric sherds were recovered from Area 3; 150 were identified as *Local* wares based on clay samples provided by the author from sources adjacent to the Floydada Country Club, and six specimens were probably from the eastern New Mexico and eastern Rio Grande areas. Thirteen specimens were Jornado Brown (Mogollon), and one Rio Grande Pecos Glaze II or III specimen was recovered. Runyon and Hedrick (n.d.) classified all of the sherds, using microscopic analysis and hydrogen chloride tests.

Type 1 (Local Variety)

One hundred forty-two sherds are of coiled construction. Sherd color varies from tan to orange buff to gray; paste is fine and slightly porous with moderate density; surfaces are smoothed and floated; cores are sharply defined by light gray central streaks; temper comprised 30 to 35 percent of the mass. The temper varies from 100 percent very fine, clear quartz to 80 percent very fine quartz sand, 15 percent small tan clay balls, and 5 percent white dolomite; vessels are small bowls and jars with rounded rims, occasionally incised in the interior just below the rim. Type 1 represented 85.53 percent of the total sherds recovered.

Type 2 (Local Variety)

Eight sherds (4.75 percent of the sherds recovered) varied from Type 1. Thirty percent of the sherds have temper consisting of 70 percent very fine quartz and 30 percent crushed limestone. The sherds are dark gray and smoothed and floated both inside and out. The cores are gray with no streaking. Due to the small size of the sherds, the type of vessel could not be determined.

Las Lunas Smudged

Six sherds were identified as Las Lunas Smudged of the Cederville Phase (Breternitz 1966). Temper comprises 30 to 35 percent of the sherd mass; it is 85 percent white subangular feldspar, 10 percent very fine black magnetite, and 5 percent very fine mica.The sherds are dark gray on the exterior and black on the interior. The exterior and interior are smoothed and floated. The sherds came from two bowls and represented 3.53 percent of the recovered sherds.

Brown Wares

Roswell Brown.—Two sherds were classified as Roswell Brown (Jelinek 1967). They are of coiled construction and varied from tan to brown in color with smoothed and floated surfaces and interior streaks. Temper is 30 to 35 percent of the sherd mass and consists of 60 percent very fine feldspar, 30 percent quartz sand, 10 percent very fine white limestone, and a very slight trace of black magnetite. Roswell Brown ware makes up 1.12 percent of the total.

Jornado Brown (Mogollon).—Eleven Jornado Brown Mogollon ware sherds (7.65 percent) varying from tan to redish tan to gray, and coiled, were recovered. The surfaces vary from smoothed and floated with occasional striations and are slightly porous. Tempering material varies from 50 to 80 percent very fine feldspar, 10 to 30 percent very fine quartz, and 10 to 20 percent very fine magnetite. Three Jornado Brown sherds had 40 percent temper, consisting of 60 percent very fine feldspar, 30 percent quartz, and 10 percent very fine golden mica. The contours of the sherds indicate that the vessels were jars and bowls (Mera 1943; Runyan and Hedrick 1973).

Pecos Glaze II or III

A single body sherd of a Pecos Glaze II or III bowl (Kidder and Sheppard 1936) was recovered. It is coiled, tan to light red with a black carbon glazed band 33 mm below the rim, has smoothed and polished surface, and temper comprising 30 percent of the sherd mass. The temper is 60 percent very fine feldspar and 40 percent very fine black hornblende. This specimen represents .59 percent of the total sherds recovered.

Local sherds, as defined by Runyan and Hedrick, represented 88.24 percent of the total, which implies that there was very little influence from the southeastern and west central New Mexican cultures.

Features

Feature 1

Feature 1 (not illustrated), in Unit 27, extended from the lower part of Level 1 (0–20 cm) beginning at 15 cm and continuing into Level 2 (20–40 cm) to a depth of 22 cm. A small cluster of fire-fractured hearth stones measuring 15 to 30 cm in diameter was discovered. Small pockets of charcoal varying from about 2.5 cm to 5 cm in size were scattered among the hearth stones. The uppermost part of this feature consisted of a scatter of 172 very small fragments of bison bone. A fragment of the distal end of a tibia was in the eastern edge of the unit; other large fragments of bone were in the northern and western limits of the unit. Five of the fragmented bones were burned, and a fragment of tooth enamel was recorded.

Six flakes and chips were scattered randomly throughout the feature area. Three sherds of Local Variety (Type 2) and a single Local Variety (Type 1) fragment were scattered about the cluster of fire fractured hearthstones. Two fragments of burned clay were also noted.

This feature probably was a dump area resulting from cleaning out a nearby hearth which was not discovered in Testing Area 3. No evidence of a burned soil area above or below the feature was recorded.

Feature 2

Feature 2 was in the eastern part of Unit 22 (Figure 17). In 1961, the steep banks of the White River were graded to a slope to facilitate maintenance of the golf course. This grading caused the surface of Unit 22 to slope to the east and exposed Feature 2. While surveying after the bank was sloped in 1961, the author recovered a metate and fragments of a large Harrell point in the disturbed hearth midden. It is estimated from the 1961 survey field notes and the field notes of the 1975 field school that the hearth was about 60 cm in diameter.

Associated with the undisturbed part of the feature were a single chert flake, 17 fragments of bison bone, and, between the surface and the 5 cm depth, four small green glass fragments. Below the 5 cm level the hearth bottomed out at 20 cm (Level 1). A Harrell point of Edwards chert and a utilized flake of Tecovas jasper were recovered from the lower part of Level 1. Eleven flakes were scattered throughout the deposit. Two fragments of limb bones with butchering marks, 116 very small bone fragments, and a fingernail-punctated sherd of Tierra Blanca variety (Habicht-Mauche 1987) or Local Variety 2 (Runyon and Hedrick n.d.) were associated with this feature.

There were charcoal stains throughout the hearth and closely associated with the surrounding area.

DISCUSSION

The Floydada Country Club site on the Southern High Plains of the Llano Estacado provided an opportunity to study both cultural and temporal relationships among three differing cultural groups in Late Prehistoric times (Skinner 1975a). The author is unaware of any other area that provides an opportunity for study of

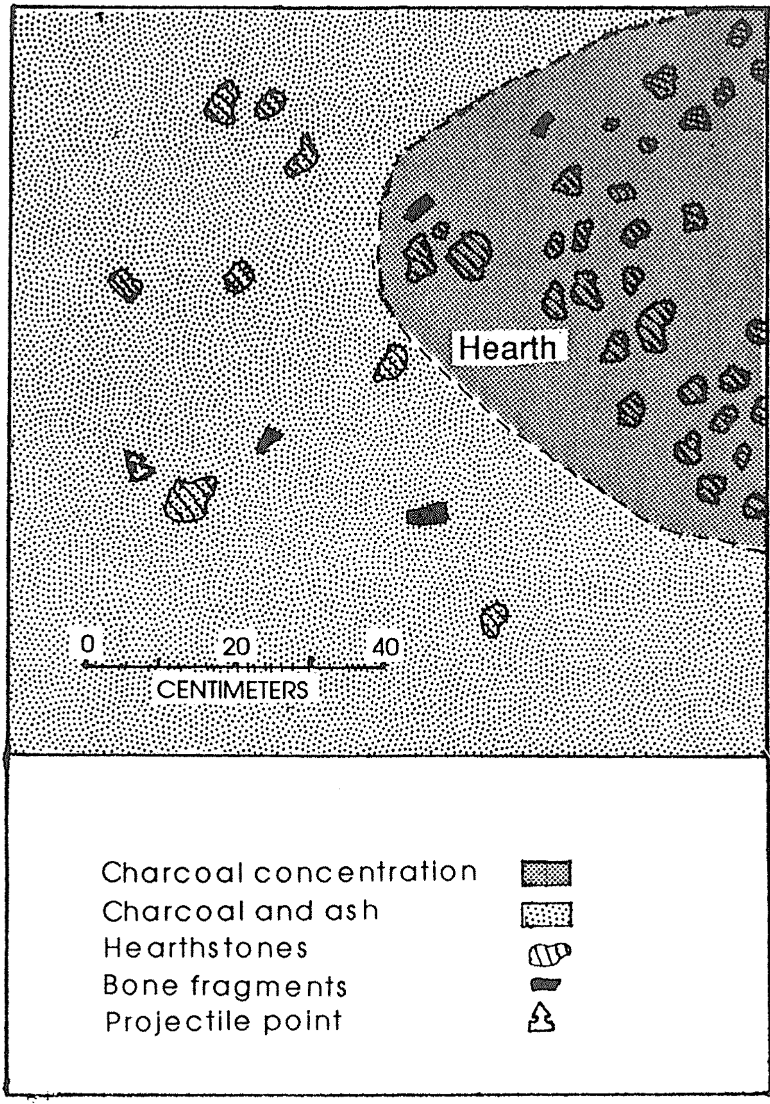

Figure 17. Hearth, Feature 2, Unit 22, Area 3.

three distinct cultural groups in such close geographic and temporal association (Figure 3). The lithic artifacts of the three groups are similar, but the pottery styles of the three cultures differ.

In the 30 years during which the author has collected surface material from service roads eroded by wind action and from the eroded bank of the White River, the site has yielded a variety of projectile points such as Washita, Harrell, Fresno, Lott, Garza, and Perdiz. In addition, bevelled knives, scraping tools, gravers, utilized flakes, drills or perforators, spokeshaves, and pipe fragments were recovered, together with bone artifacts consisting of awls, a serrated rib (music rasp?), a metapodal fleshing tool, and a finely serrated rib of unknown function. Ornaments collected are turquoise beads, olivella beads, tubular bone beads and a single olivia bead. Artifacts associated with the Historic Period are metal projectile points, steel awls, rifle cartridge cases, and parts of rifle locks; several home-made flints for a flintlock rifle were also found on the surface of the site.

Pottery was the most common artifact recovered in the surface survey. The sherds vary considerably and include eastern Puebloan, Mogollon, and Caddoan sherds consisting of Killough Pinched and La Rue Neck Banded (written communicationm, R. King Harris, April 22, 1971). Most of the sherds were unlike any classified sherds.

In 1962 the author (1963:40–49) put three tests into the central part of the site (Field School Area 1) to a depth of 24 inches (61 cm) to determine whether cultural changes could be detected. In 1963 a test pit was put into the eastern part of the site (Field School Area 3) where a Killough Pinched sherd was exposed on the surface. It was hoped that material could be found associated with this sherd variety, but no other cultural material was discovered. In 1964 another test was excavated to a depth of 5 feet (1.5 meters) in the bank and into the first terrace of the White River in the southeastern part of the central area (Field School Area 1). Small flecks of charcoal and an occasional flint flake pointed to occupation to the bottom of the test, but no diagnostic artifacts were recovered below 15 inches (38 cm) from the surface.

By accepted definition, the site is not a permanent base camp, but it is evident that throughout the Late Prehistoric Period it was occupied over and over by a nomadic people (Apaches) and by two other divergent cultural groups. If Runkles and Dorchester's (1986:109) definition of a base camp is adapted to use in the Southern High Plains of the Llano Estacado, it is indeed a base camp.

As previously mentioned, the site was divided into three areas based on the more than 1,000 sherds in the author's collection (Skinner 1975a), which also has more than 400 identifiable fragments and complete lithic artifacts.

The Floydada Country Club site is unique in that the three areas tested are so closely related. Until the author became aware of differences in percentages of lithic types in each area as well as variations in sherd types recorded, the areas seemed to be parts of one site. However, after analysis there appear to be significant differences. The dominance of Edwards chert and Puebloan sherds in Area 1 implies a Late Prehistoric Apachean people. The dominance of Tecovas jasper and Alibates agate, as well as Mogollon Brown Wares, in Area 2 suggests some association with peoples to the southwest and west. Emmet Shedd (personal communication) has found Tecovas jasper and Alibates agate cobbles in the northern Brazos River drainages to the south of the Floydada Country Club site.

In Area 3, Tecovas jasper and Edwards chert are the dominant lithic materials. Imitation (locally made?) and genuine Caddoan wares and sherds classified as *Unknown* are the dominant cultural material.

It is theorized that the routes taken into the area can be determined by analysis of the lithic samples (see Tables 1, 2, 3). Evidence from Area 1 suggests active trade with eastern Puebloan groups. Data from Area 2 suggest that people there were associated with Mogollon groups from the El Paso region and as far to the north as mideastern New Mexico. Evidence from Area 3 identifies a Late Prehistoric people associated with both the western Caddoan people who migrated to the west and the eastern Caddoans. In their journey to the west, if they followed the Red River or Brazos River drainage, they would have come into contact with outcrops of Tecovas jasper and Edwards chert, which would account for most of the Tecovas jasper and Edwards chert lithics.

Ceramics are a basis for determining cultural origins and dating when funds are not available for radiocarbon dating (Skinner 1975b). Analysis of the sherds from each area by Runyon and Hedrick (n.d.) supports the suggestion that the occupants of the three areas actively moved about in their search for meat (primarily bison) and in trading with other groups. What are the possible items of trade? The Apachean people in Area 1 had access to ample quantities of bison; they produced dried meat and processed hides for trade. The Apachean peoples in Area 1 used bows for hunting buffalo, which were plentiful, but bois d'arc wood—shown from collections at the Panhandle-Plains Museum in Canyon, the Texas Memorial Museum in Austin, and the Texas Tech Museum in Lubbock to be the wood of choice for bows—is not common in the Southern High Plains (Gould 1969:38), so it is quite possible that the Apachean people traded their surplus dried buffalo meat and hides to the Caddoan people of Area 3 in return for the bois d'arc wood they needed for bows. In the same way, the Mogollon people in Area 2 may have exchanged their surplus salt with their neighbors for materials that were scarce in Area 2.

However, invasion of the area by the Comanchean people and their dominance by the mid-1750s put an end to the trade relationships that had existed among the earlier cultural groups. Historic materials such as metal tinklers and awls, glass beads, and gun parts are probably associated with the Comanches. The pins that join yokes to ox bows are associated with either the Comancheros (Wallace 1974:23–52) or the Pastores, who returned to the Llano Estacado after the defeat of the Comanches at the Battle of Palo Duro in 1874.

Modern artifacts such as golf tees and fragments of beverage bottles are the result of more recent Country Club activities (Skinner 1975c).

CONCLUSIONS

Skinner (1974, 1975a) proposed four hypotheses to be tested. The first hypothesis was that the Floydada Country Club site had been intensively occupied from the Paleoindian through the Historic periods. Due to the limited duration of the Texas Archeological Society Field School, this hypothesis could not be tested adequately (Skinner 1975b). It is hoped that future investigators can examine this issue.

The second hypothesis was that intensive occupation between A.D. 1200 and 1500 was by indigenous groups that had close ties to eastern and southwestern New Mexico Puebloans and the Antelope Creek focus to the north, as well as some ties to the Caddoan areas. Was the site a rendezvous area? It was demonstrated that there was a trade relationship between indigenous people (Apache) and the eastern and southwestern Puebloan people as evidenced by items of trade such as pottery, obsidian, and turquoise, which were probably traded for processed meat and hides. From examination of the pottery, Runyon and Hedrick (n.d.) determined that the Caddoan people, who probably both traded bois d'arc wood for processed bison meat and hides and hunted bison, also were occasional occupants of the site. There is no evidence of contact with the Antelope Creek focus people, since no cord-marked sherds were recovered, nor have any been found on the surface by the author. However, Alibates agate lithic debris and artifacts indicate that there was possibly a contact with the area to the north where this type of material originates, probably after the Antelope Creek focus people abandoned the Panhandle area. The three distinct subdivisions of the site (Areas 1, 2, and 3) and the variations in lithic material percentages imply a rather intensive occupation of the site from A.D. 1200 to 1500.

The third hypothesis was that immigrant groups from the southwestern Mogollon and eastern Puebloan groups came into the area to hunt and process bison. There is some evidence that the southern and eastern Puebloans hunted bison, but there is no evidence that these cultural groups were at the site for that sole purpose. Various Brown Ware and Chupadero sherds were recovered in Area 3, but the faunal remains of bison were sparse. These people had access to salt, which was probably an item of trade, since the Apache had no access to a ready source of salt, so they may have come to trade rather than just to hunt and process meat.

The fourth hypothesis was that the historic Indian occupation was a short-term occupation by Protohistoric Apachean groups and the succeeding Comanche, who dominated this area from Historic time until the aboriginal occupation was terminated by the Mackenzie campaign of 1874. Such occupations were identified by the presence of historic artifacts (metal artifacts, glass, etc.) associated with contact with people of European origin.

The limited time spent in testing the areas of the site by the 1975 TAS Field School was sufficient for the establishment of some chronology. Obsidian dating (Baugh, written communication, January 22, 1985) indicates that the occupation lasted from the first quarter of the fifteenth century to the late seventeenth century. It is possible that the site was occupied from as early as A.D. 900 to as late as A.D. 1400, based on the ceramic analysis by Runyon and Hedrick (n.d.) of sherds of various Brown Wares and Chupadero. However, the scarcity of bison before A.D. 1100 (Hughes, n.d.) implies that the greatest density of occupation by various indigenous groups probably occurred from A.D. 1100 to the late nineteenth century. Point types such as Harrell and Washita (Bell 1958:30, 98) indicate an occupation from A.D. 1100 to 1600. Although no Lott or Garza points were recovered in excavations, a few specimens of these types are known from surface collections.

Based on Runkles and Dorchester's report (1986:106–108) on the Lott site and their radiocarbon dates, there was some occupation from A.D. 1325 to 1505. Johnson, Holliday, Kaczor, and Stuckenrath (1977:104–106), in their report on the Garza occupation at the Lubbock Lake site, date the Garza point by radiocarbon assay from A.D. 1635 to the mid-1600s. Harris and Harris (1967:158) identified a glass bead dated from A.D. 1820 to 1836 recovered from Area 1.

It is concluded that the Floydada Country Club site was occupied intermittently from as early as A.D. 1100 to the mid-1750s by the Apache and eastern and southwestern Puebloans as well as the El Paso Mogollon and a Caddoan-related people. It is evident that an active trade relationship existed among these cultural groups. The subsequent reoccupation of the site by the Comanche was eventually terminated by Mackenzie's defeat of the Comanche in 1874.

ACKNOWLEDGMENTS

The participants in the 1975 Texas Archeological Society Field School are specially thanked for their hard work and their tolerance of the mosquito infestation. Without those dedicated people the information that makes this report possible could not have been collected. More than 210 people participated (Richmond, Richmond, and Greer 1985); too many to recognize individually here.

Area Supervisors and crew chiefs assumed an important responsibility and contributed their skills to make the 1975 field school a success. Their field notes were indispensible to the completion of this report.

Area 1 site supervisor and crew chiefs were R. L. Smith, R. L. Carter, Norma Hoffrichter, Jimmy Smith, Jay C. Blaine, Billy Bunch, William L. Fullen, Bransford Eubank, and Emmet Shedd.

Area 2 site supervisor and crew chiefs were C. K. Chandler, James E. Warren, Jack Hedrick, Teddy Lou Stickney, Jack Klatt, and Jane Schweitzer.

Area 3 site supervisor and crew chiefs were Robert L. Turner, Roy Thompson, Norman G. Flaigg, Tommy Hicks, Paul Lorrain, Ralph Vinson, Elizabeth Perry, and Roy Dickerson.

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Investigations of the Buried City, Ochiltree County, Texas:

With an Emphasis on the Texas Archeological Society Field Schools of 1987 and 1988

David T. Hughes

ABSTRACT

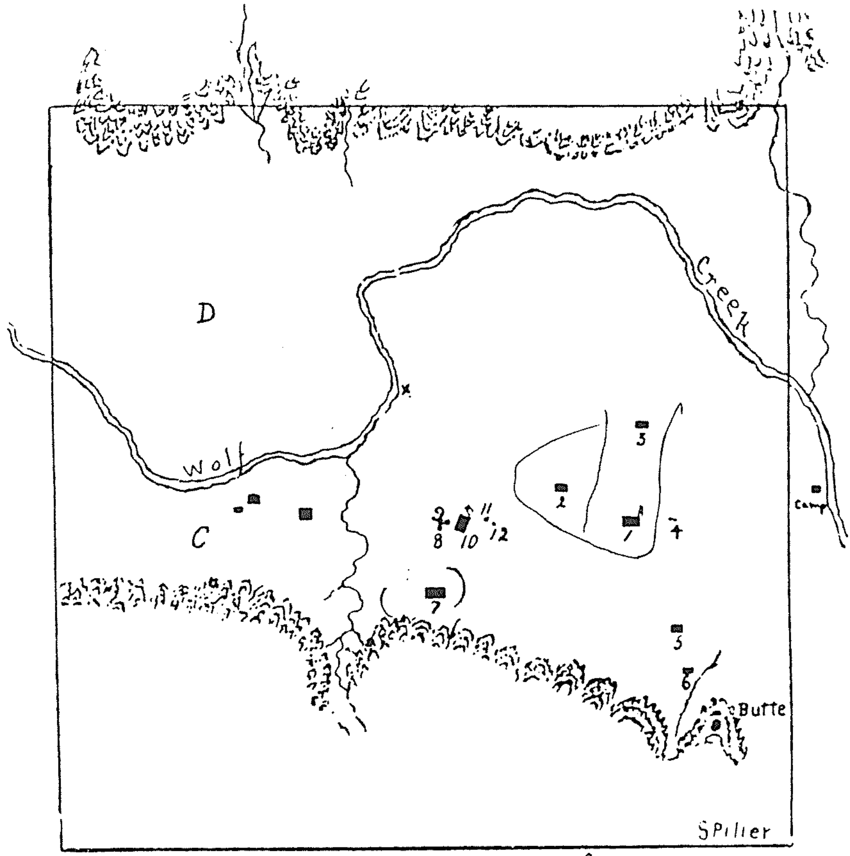
The first four seasons of investigations on the Courson ranch on Wolf Creek in Ochiltree County resulted in excavation of six prehistoric house sites, intensive archeological survey of several square miles of the creek bottom, and the salvage of a Pleistocene mammoth. The results of these investigations have provided us with information on an unusual village assemblage in the northeastern Texas Panhandle that dates from about A.D. 1200 to A.D. 1400 and includes large, stone-based houses, ornamented pottery, and excellent information about the distribution of trash and artifacts in relation to the houses. These investigations have shown that the Buried City and adjacent sites are a unique resource that has been too long overlooked or misplaced in interpretations of Southern Plains prehistory.

INTRODUCTION

After 80 years of investigations, evaluation of the sites and archeological resources of the Buried City of the Texas Panhandle and its surrounding area is definitely in order. This locality is the site of the earliest documented archeological excavations in Texas (Eyerly 1907; see Hughes and Hughes-Jones 1986). For 10 days in the summer of 1987, and again in 1988, more than 300 members of the Texas Archeological Society (TAS) participated in the excavation of six prehistoric village-period sites, test excavations of two areas on another site, archeological survey of several square miles of the Wolf Creek valley, and salvage of a Pleistocene mammoth that was eroding into a tributary of Wolf Creek.

The three major expeditions to the Buried City before the inception in 1985 of the Courson Archeological Projects were directed by T. L. Eyerly in 1907 (Figure 1), Warren King Moorehead in 1917, 1919, and 1920 (Moorehead, 1931), and Thomas S. Ellzey (1966).

The activities of the previous investigators, interested laymen, and vandals seriously disturbed some of the ruins. Today, dimensions and orientation of the individual houses cannot be determined from surface inspection alone. One of the goals of all investigations so far has been to determine the extent of damage and loss of information from these sites. For this report, rather than making an attempt at a



Map of Section 565, Block 43, Ochiltree County, Texas, containing Site of "Buried City."

Figure 1. T. L. Eyerly's map of the Buried City. *(Reproduced from "The Student," Bulletin of the Canadian Academy 1907).*

comprehensive review of the nature of the whole complex of prehistoric structures and villages, the author will endeavor to provide the flavor of the local settlement system and to offer some details about the areas that have been investigated since 1985.

The Sites

There are five major groups of sites on the Courson ranch and at least two kinds of ancillary activity sites beyond the houses (Figure 2). The first, and best known of the site groups is the Buried City proper, defined by T. L. Eyerly in 1907 and renamed in error the *Handley* (a misspelling of the landowner's name) ruins by Moorehead (1931) in honor of Sam Handly, the owner of the property. Directly to

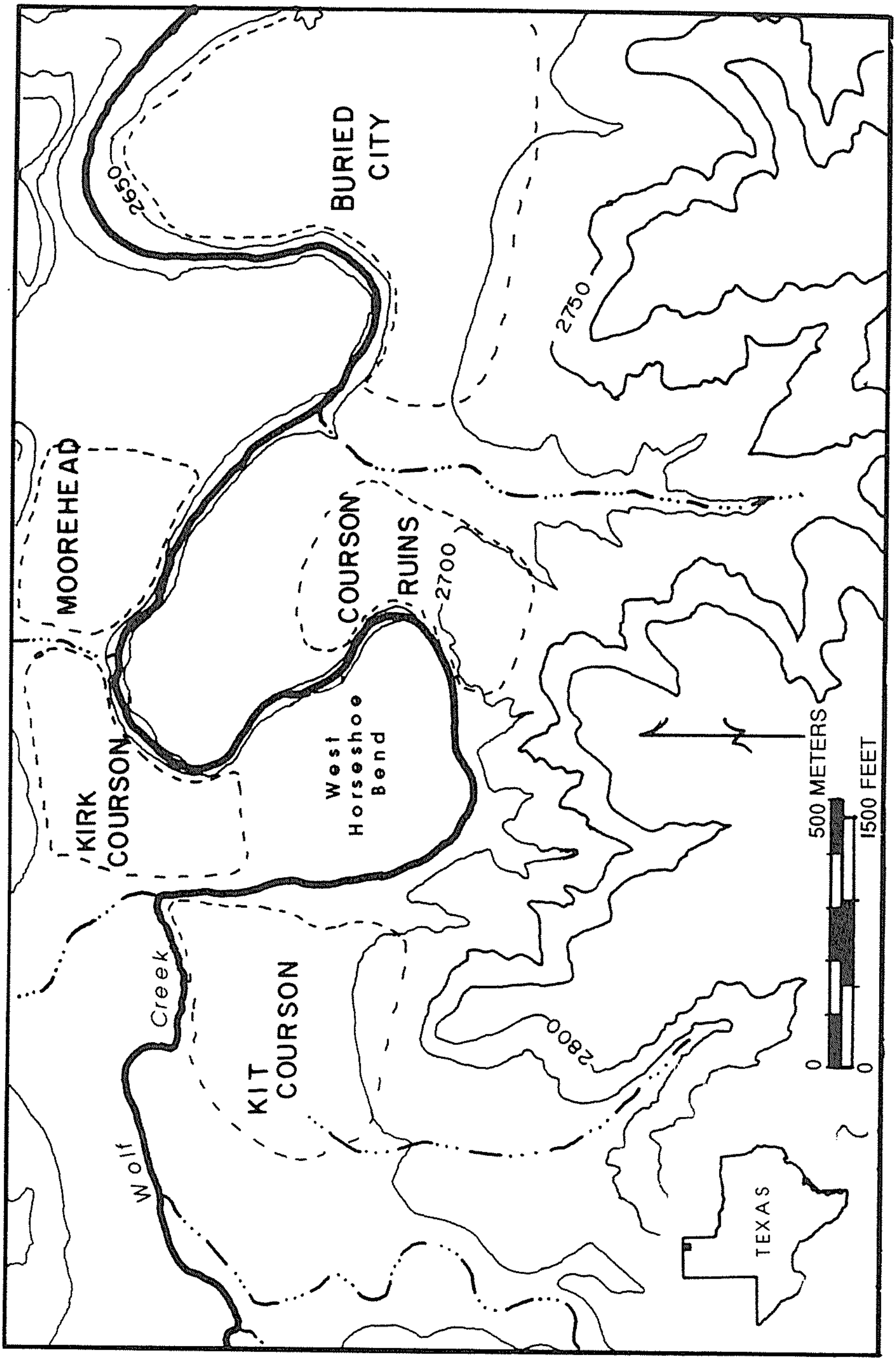


Figure 2. Topographic map showing archeological sites on Wolf Creed, Ochiltree County, Texas.

the west of the Buried City are the Courson ruins, the focus of most of the Courson Archeological Projects and the TAS Field School efforts (Figure 3). North of the Courson ruins, on the north side of Wolf Creek, is a newly rediscovered area, here named the Moorehead ruins in honor of Professor Warren King Moorehead, whose original field map found during background research for the 1985 investigations led to their identification. West of the Moorehead ruins on the north side of Wolf Creek are the Kirk Courson ruins. West of these and south of Wolf Creek are the Kit Courson ruins, an area studied during the 1986 and 1987 Courson Archeological Projects and in 1987 and 1988 by the TAS Field School. Still more sites upstream from the Courson ranch await further study.

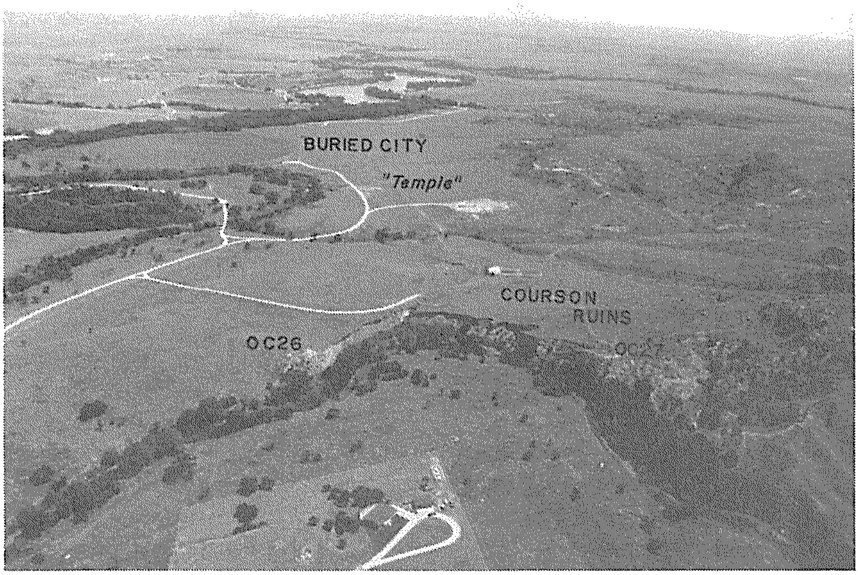


Figure 3. Aerial photograph of Wolf Creek showing the setting of the Courson ruins and the Buried City, looking east.

The subdivision of the locality into these groups of sites is based both on physiography and the distribution of cultural materials. Each group has five or more prehistoric house sites that date from the middle to late Village periods. Distance between structures within any given group is substantially less than the distance between any two or more adjacent groups. In addition to the houses, each set appears to have many external activity areas for tasks relating to the daily lives of the occupants. Evidence from the Buried City and the Courson ruins suggests a separate cemetery at each locality. All localities have earlier occupations, but only on the Courson ruins has sufficient information been obtained to suggest continuity from Woodland time into the Village period.

Ancillary activity sites beyond the structure and house sites include cairn burials (of undetermined antiquity) on the promontories above the sites, crevice or overhang burials in the bluffs along the valley margin, and probable occupied bluff shelters and overhangs. No direct evidence of bison jumps, lithic workshops, or other activities has been found yet on the Courson ranch.

The Buried City

Eyerly published four major reports on his investigations (Eyerly 1907a, 1907b, 1910, and 1912). The first of these (1907a) is the source for much of the following discussion. "The place has been known as 'The Buried City' so long that the appellation is retained . . . [and] the place has been visited by a number of scientists and a superficial examination of the ruins made a number of times" (Eyerly 1907a:29). Within the 70-acre area Eyerly defined as the Buried City, he noted that there were 12 mounds, that some of the mounds were about .61 meters (2 feet) above the surface, and that on each it "is easy to distinguish the outline of an enclosure made of stone" (Eyerly 1907a:30). In addition to the 12 mounds in the Buried City, Eyerly noted a circular mound about 7.5 meters (25 feet) in diameter on the butte south of the Buried City.

The key structure in the catalog of prior investigations is the large, rectangular structure known locally as the "Temple" at the turn of this century and so identified by Eyerly (1907:33). Additional sites were found west of the Buried City (marked *C* on Eyerly's map). On the north side of the creek are "indications of an Indian village . . . and the adjacent ground cultivated . . . . Parts of tepee poles, in a state of fair preservation lie abut the field" (Eyerly 1907:34). Eyerly concluded his presentation by arguing that the stone enclosures along Wolf Creek are not the remains of a village or of houses but that they were established solely for burial.

Ten years after the Eyerly investigations were first published, Warren King Moorehead, of The Robert S. Peabody Foundation of the Phillips Academy at Andover, Massachusetts, contracted with Fred H. Sterns, then a recent Harvard graduate, to visit the Buried City as part of a survey of the Arkansas River Valley under Moorehead's general direction (Moorehead 1920, 1931). The three Phillips Academy expeditions in 1917, 1919, and 1920, were fraught with interpersonal and procedural difficulties. Some reconstruction of the events of those expeditions has been attempted (see Hughes and Hughes-Jones, 1987).

The Andover Academy expeditions identified 12 houses and tested or excavated at least six of them. Because of the difficulties with the Moorehead expeditions and records, there are several important points of confusion that may never be adequately clarified. First, and most important to placing the Courson Archeological Projects and TAS Field Schools in perspective, is the question of the Bluff No. I ruin identified by Moorehead as being 180 meters (600 feet) southeast of the Franklin ruin (Moorehead 1931:103) and shown in the extreme left of his Figure 30 (a photograph purportedly showing "the plain where the Handley ruins lie"). A rephotograph of Moorehead's Figure 30 shows that the promontory on the extreme left of that photograph is in fact the location of site Courson A, 41OC26 (Hughes and Hughes-Jones 1987:Figure 7). The problem is that this location is more than .8 km (half a mile) west of the probable Franklin site; not 180 meters (600 feet) southeast as Moorehead indicates. Except for the location, the bulk of the description of Bluff No. 1 ruin (Moorehead 1931:103) adequately describes site Courson A. Despite these difficulties, some agreements between Eyerly's and Moorhead's studies can be found. The unusual size of Moorehead's Gould ruin clearly shows it to be the same as Eyerly's Temple or ruin No. 10.

Moorehead concluded his observations about the Handley ruins (Buried City) by suggesting that

> because of the peculiarities here in evidence that this small and picturesque plain may be justly considered one of the strategic centers in American archaeology. Apparently all agree that the remains are not Pueblo. Admitting this, yet it is a distinct departure from the ordinary Plains or buffalo culture, as we understand the term [Moorehead 1931:106].

In his 1920 field report, Moorehead concluded that these people may have been the ancestors of the Pueblo cliff dweller people (Moorehead 1920:8), a conclusion attested to by the stone marker that still stands on the site of the Moorehead excavations.

For 50 years after the Phillips Academy expeditions, no visits to the Buried City were reported or published. In 1966, Thomas S. Ellzey, the son of a local rancher, returned from his studies in anthropology at the University of Texas and undertook test excavations at a midden in the Buried City (41OC4) and at the Eyerly ruin (41OC3). Ellzey's excavations included the eastern half of the north wall and the east wall of the Eyerly ruin. The east wall of the house was about .61 meters (2 feet) thick and averaged as much as .75 meters (2.5 feet) in height (Ellzey 1966:61). A large hearth was found in the gap [entryway?] in the east wall but was destroyed by vandals before it could be fully traced. Vandalism of the excavations and severe weather forced Ellzey to abandon the excavations before he could obtain more information about the structure. Ellzey's conclusions offer yet a different interpretation of the sites, that was more in keeping with then current knowledge about Texas Panhandle cultures.

> From the evidence it is rather conclusive that we are dealing with plains influence. The decorations of the pottery from the midden especially indicates this influence (Wedel 1959). The architecture indicates a Pueblo influence, but this seems to be emphasized less in the other cultural remains. It is my opinion that at this site we are dealing with a Plains people who had come into contact with a culture, probably the Puebloans, from which they learned the trait of stone architecture [Ellzey 1966:64–65].

Throughout the 80 years of known investigations on the Buried City, several of the archeological sites were reported to the Texas Archeological Research Laboratory at The University of Texas at Austin, andwere assigned trinomial site numbers by that agency. The Buried City proper became site 41OC1. Part of the site is listed on the National Register of Historic Places. Within 41OC1 are sites 41OC2, 41OC3, and 41OC4. A revision of the site numbers was suggested in 1986, to include seventeen subareas, identified as 41OC1-A through 41OC1-Q, to replace existing and previous nomenclature and site numbers.

Courson Ruins (41OC26, 27, 28, 29)

These sites are west of and across a broad ravine from the Buried City (Figure 4). Eyerly (1907a) discussed them as Area C, Moorehead (1931) as ruins V, VI, and VII (and possibly Bluff No. 1, see above). Four primary archeological sites have been defined here: 41OC26 (site Courson A), 41OC27 (site Courson B), 41OC28 (site Courson C), and 41OC29 (site Courson D). Each of these comprises one or more houses and is separated from others within the group by topographic breaks and by an apparent thinning of cultural debris between the sites. Each is on a distinct elevation or ridge adjacent to one of the shallow swales that run through the locality. Most of the sites are obscured by recent accumulations of eolian silts and sands.

Courson A (41OC26) is on the west side of a caliche-capped knoll at the northwest limit of the Courson ruins. It has been largely destroyed by erosion, or possibly by earlier excavation.

Courson B (41OC27) is south of Courson A on a promontory that is being cut by Wolf Creek and an arroyo that drains into Wolf Creek. Moorehead's ruin V may be the same as Courson B. East of Courson B is site Courson C (41OC28), apparently a single large house. Courson C may be Moorehead's ruin VI.

On a knoll east of Courson A and north of Courson C is site Courson D (41OC29). Courson D may have five or more house sites. Moorehead's ruin VII may be the same as the main Courson D structure excavated by the TAS in 1987 and 1988.

The Courson ruins have been the focus of much of the activity for the 1985 through 1988 investigations. The sites are similar in age and content to those of the Buried City proper. The Courson ruins may represent a separate contemporaneous community or a slightly different period of occupation of the valley by the same people who built and lived in the Buried City.

Moorehead Ruins (41OC46)

The Moorehead ruins lie north of and across Wolf Creek from the Courson ruins on an elevated floodplain of the creek. The sites were first identified during the 1986 field season and were further recorded by the TAS in 1987. The entire area has been assigned site number 41OC46. It encompasses the remains of three, or possibly, four house sites, which are almost completely obscured by deep accumulations of modern alluvium and eolian silts and sands that prevent more information from being obtained without intensive field investigations. The limited number of artifacts and debris found on the surface suggest contemporaneity with the Courson ruins and the Buried City proper.

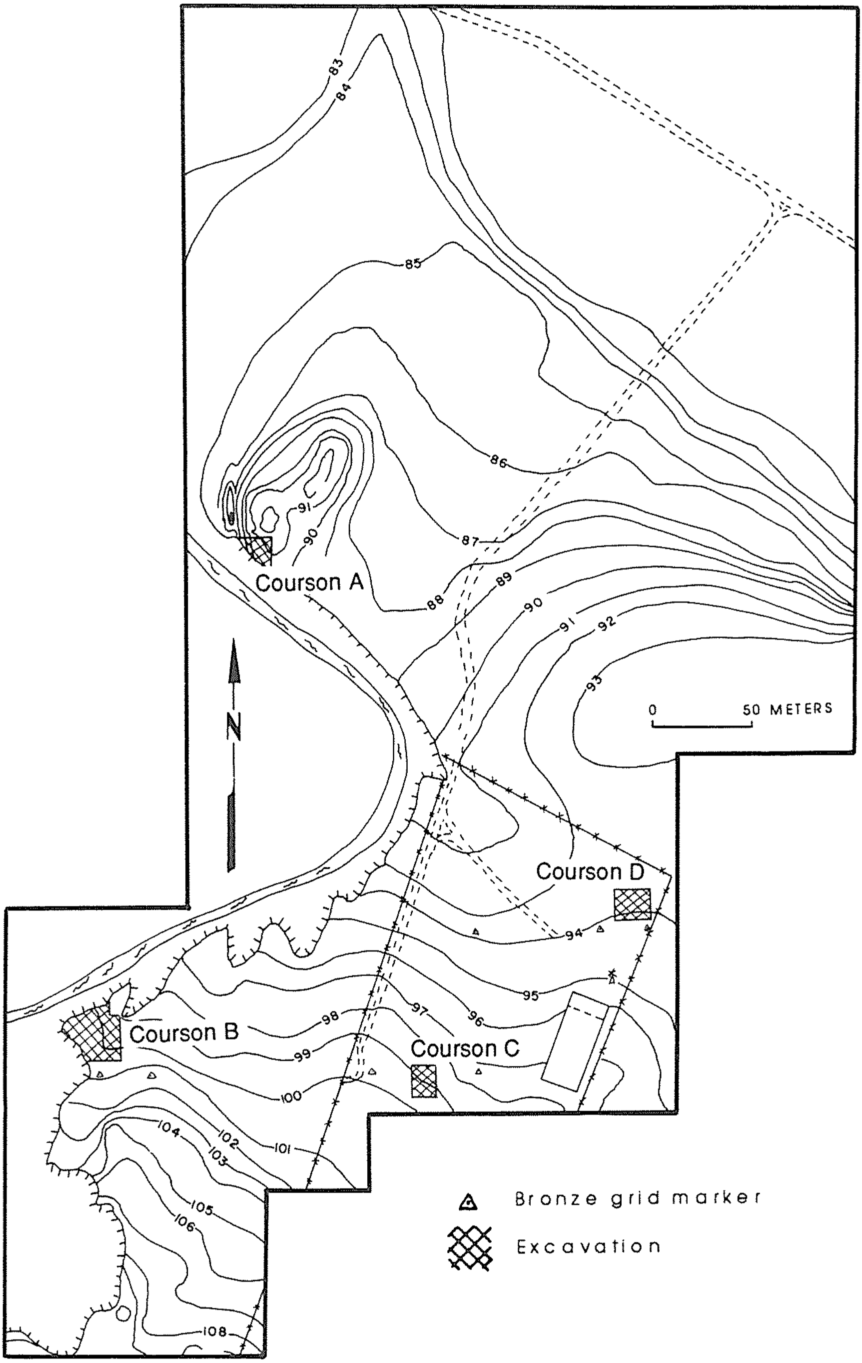


Figure 4. Topographic map of the Courson Ruins, showing locations of Courson sites A, B, C, and D.

Kirk Courson Ruins (41OC47, 41OC48)

The Kirk Courson ruins are adjacent and to the west of the Moorehead ruins, north of Wolf Creek, on the inside of Horseshoe Bend, on a second terrace of the creek. The location is topographically identical to the setting of the Moorehead ruins and is separated from them by a small arroyo. At least two discrete areas have been identified and assigned site numbers 41OC47 and 41OC48. Site 41OC47 is west of the Moorehead ruins across a small south-draining wash and 10 meters north of the eroding bank of Wolf Creek. The site is a single structure on a low promontory; one east-west-trending line of stones more than 7 meters long is barely visible on the surface. No other walls of the structure are visible. No midden debris or features that could be useful in identifying additional sites or components show in the creek bank at this point. Although site 41OC47 is geographically midway between the Moorehead and Kirk Courson ruins, it is included here because of its topographic similarity to the Kirk Courson ruins.

Site 41OC48 of the Kirk Courson ruins is a large area on the second terrace that almost certainly comprises remains of several houses. It is completely obscured by modern soil mantle; disturbance from rodent activity and farm improvements have limited the surface expression, but three probable house sites and a possible cemetery complex have been identified. Artifacts recovered from excavations for a water well indicate that this site is generally contemporaneous with the others. In addition to the Plains Village components, the recovery of a Deadman point and scoria-tempered pottery suggest a Woodland component in the roughly 1.5 meters of deposit. Because so little information is available for the Kirk Courson ruins, no precise subdivision of the site(s) into separate structural sites or areas can be made at this time.

Kit Courson Ruins (41OC40, 41, 43, 51)

The Kit Courson ruins (named in honor of Harold Courson's father) is the westernmost group of sites on the Courson ranch. It occupies the second and third terraces of Wolf Creek, and, like the Courson ruins, it consists of sites and structures on elevations surrounding low swales that run through the complex. Five distinct areas have been identified within the Kit Courson ruins: site 41OC40 is at the northeast end of the locality on a ridgelike projection of the second terrace. Sites 41OC41 and 41OC42 occupy the northwest and southeast ends, respectively, of a long, low ridge projecting northwestward from the bluffs into the Wolf Creek valley, and sites 41OC43 and 41OC51 are on the east edge of the second terrace, separated by a low swale. This complex includes at least four house sites and several middens and related habitation features.

Excavations at 41OC43 and 41OC51 by the 1986 Courson Archeological Projects and the 1987 and 1988 TAS Field Schools indicated contemporaneity between these sites and the others. In 1987, a TAS survey crew led by Emmett Shedd located a house 100 meters southeast of the main Kit Courson site. They recorded chert flakes and cores, a potsherd, mussel shell, marine shell, burned limestone, and quartzite flakes from the vicinity of the house. This part of 41OC43 measures 35 meters east to west and 80 meters north to south. As with the Kirk Courson and Moorehead ruins, a complete evaluation of the structural remains and probable contents of these sites will require a substantial field investigation because of the modern silt mantle that obscures most of the remains.

EXCAVATIONS

The Courson Archeological Projects and the TAS work of 1987 and 1988 approached these sites with several specific goals. At Courson A (41OC26), testing in 1985 disclosed a trash-filled pit and a dense ceramic scatter. One of the goals of the TAS was to identify the nature of the ceramic scatter and evaluate the remaining contents of the site.

At Courson B (41OC27), 1985 and 1986 explorations defined deep and extensive deposits. The TAS sought to delimit the vertical and horizontal boundaries of the site, to identify the specific components, and to find exterior activity areas related to the prehistoric houses. Since Courson C had been badly damaged by relic collectors, our primary goal with the TAS was to determine the condition of the site, delimit it, and obtain information on the distribution of cultural material .

Investigations at the fourth area, the Courson D site (41OC51), began in 1987 with the evaluation of a disturbed prehistoric house in Area A and the securing of a controlled surface collection from Area D. In 1988 we added test excavations of a large area (Area B) north of the main structure where there might be additional structural and nonstructural features. Area C was set aside for test excavations to evaluate possible damage from farm improvements.

At the Kit Courson site, the 1986 excavations exposed a large, well-preserved house that contained several clearly defined activity areas but no indication of an adjacent midden. The goals of the TAS were to excavate around the house to locate exterior activity areas, midden, and dump area, and, if possible, find additional earlier or later components.

The final prehistoric cultural site excavated by the TAS was the Temple (Eyerly 1907a) or Gould ruin (Moorehead 1920, 1931), site 41OC1, Area A. Because this unusually large structure had been so thoroughly excavated by virtually all previous visitors, the only goal for beginning the 1988 excavation was to evaluate the condition of the site and identify the nature and extent of the previous excavations.

In addition to the specific excavation goals of the project, TAS survey crews went out to gather information on other sites in the vicinity in order to place these sites in local perspective. As part of the 1987 investigation, an extensive survey of much of the Wolf Creek valley upstream from the Courson ranch was undertaken. The final episode of activities at the TAS Field Schools was the salvage of a Pleistocene mammoth on the Dutcher ranch, a few kilometers below the Wolf Creek Park.

One of the perpetual problems in presenting summary results of such an extensive series of excavations is how to provide the most information in the least space. In the following discussions related to distribution of artifacts, a series of charts showing frequencies of different classes of artifacts and debris are offered in the form of contour maps (Figures 6–9, 13b, 14, 16, 17, 19, 20). These maps were prepared with the aid of the SURFERc system and related series of routines using data from the catalog database of the project.

A few special cautions are in order about reading the plots. First, the numbers plotted are the "raw" quantities or weights of material. No allowance has been made at this stage for variations caused by depth of deposit, cultural features, or other factors. Second, in areas beyond excavations the software that created the plots used the best information from surrounding areas to predict the probable amounts of material present. The results are useful for providing information on the gross nature of the findings and tell much about the horizontal distribution of material across the sites.

Courson A (41OC26)

On Courson A was what may be one of the earlier houses in the Texas Panhandle, dating to or before about A.D. 1200 (Figure 5). An attempt to secure an archaeomagnetic date was inconclusive, perhaps because magnetic alignments have been disturbed by slumping of the point on which the site is situated (Jeff Eighmy, personal communication, 1988). A 1985 radiocarbon date from an associated feature yielded an uncorrected date of A.D. 1210±50 (DIC-3281). Samples from the 1988 investigations were submitted to Beta Analytic in fall 1990, but results have not yet been returned.

There is excellent evidence for identification of activities in and around the house (Figure 6). Mussel shell is distributed throughout the interior area of the house, which is otherwise relatively clean of debris (Figure 6, a). The Courson A house is square with a central firepit, southeast entryway, post wall, and an unplastered floor; all of these make the outline irregular and difficult to interpret.

Two trash or cache pits were found; Pit 1, found and partially tested in 1985 and excavated completely in 1987, yielded charred corn, a canid maxilla, and Toyah-like arrowpoints, together with Fresno points or preforms. There was very little bone or debris in the pit, but a substantial amount of daub suggests that it had been backfilled. Pit 2 was found in 1988 at the end of the field school; the sample of its contents, from an arcuate area about 20 cm in diameter truncated east and south, yielded substantial amounts of debris, including most of the bison bone found on the site. There may be an adult male burial in the unexcavated part of the pit.

Comparison of this map with the plan of Courson A (Figure 5) shows that in addition to recognizable peaks of material from Pits 1 and 2, there are two main areas of increased material concentration in the vicinity of the house (Figure 6, b). One is south and southeast of the house in squares 21–23E/20–21N. The other is in squares 19E/21–24N. Square 31N/23E yielded an unusually high concentration of artifacts and debris, none of which is directly associated with the house and hearth but all of which seems to relate to ancillary or later activities.

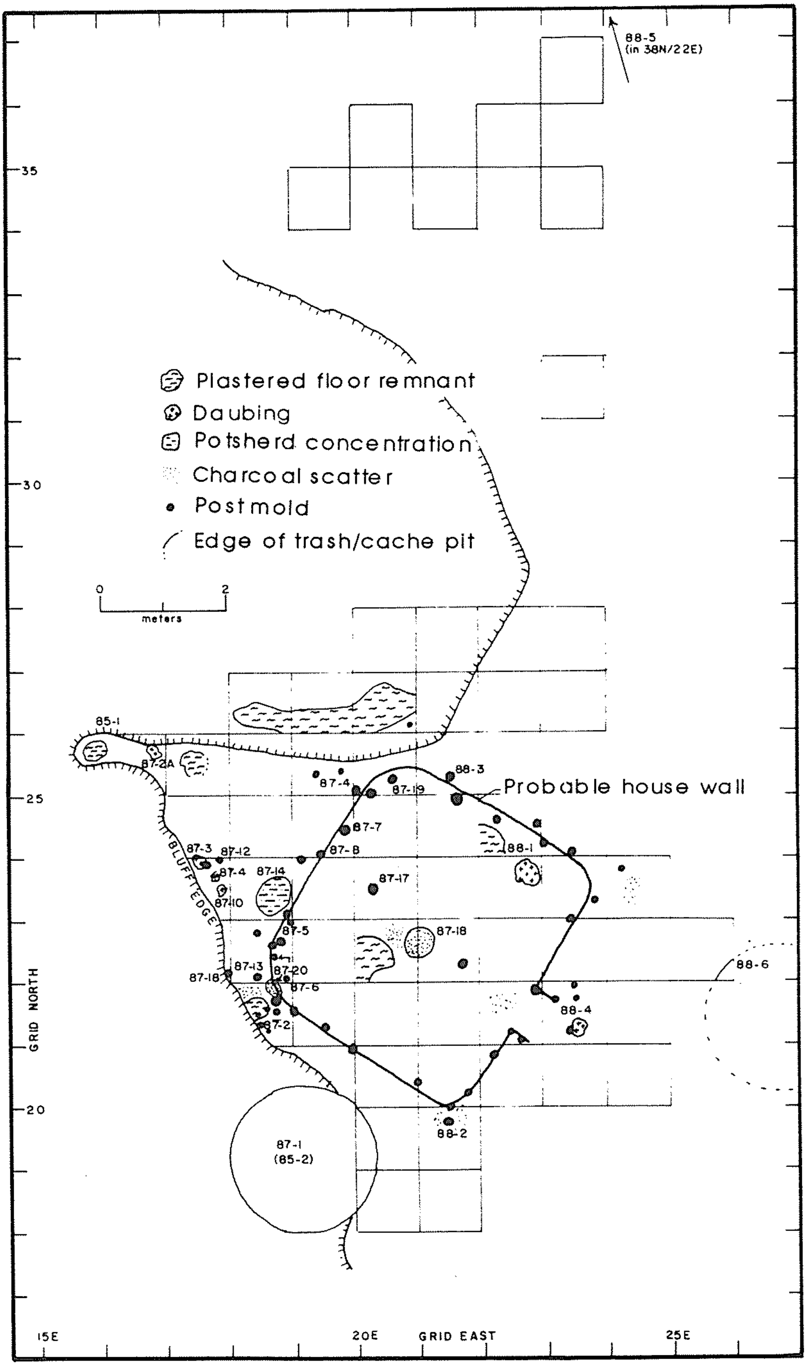


Figure 5. Courson A: plan of excavations and features.

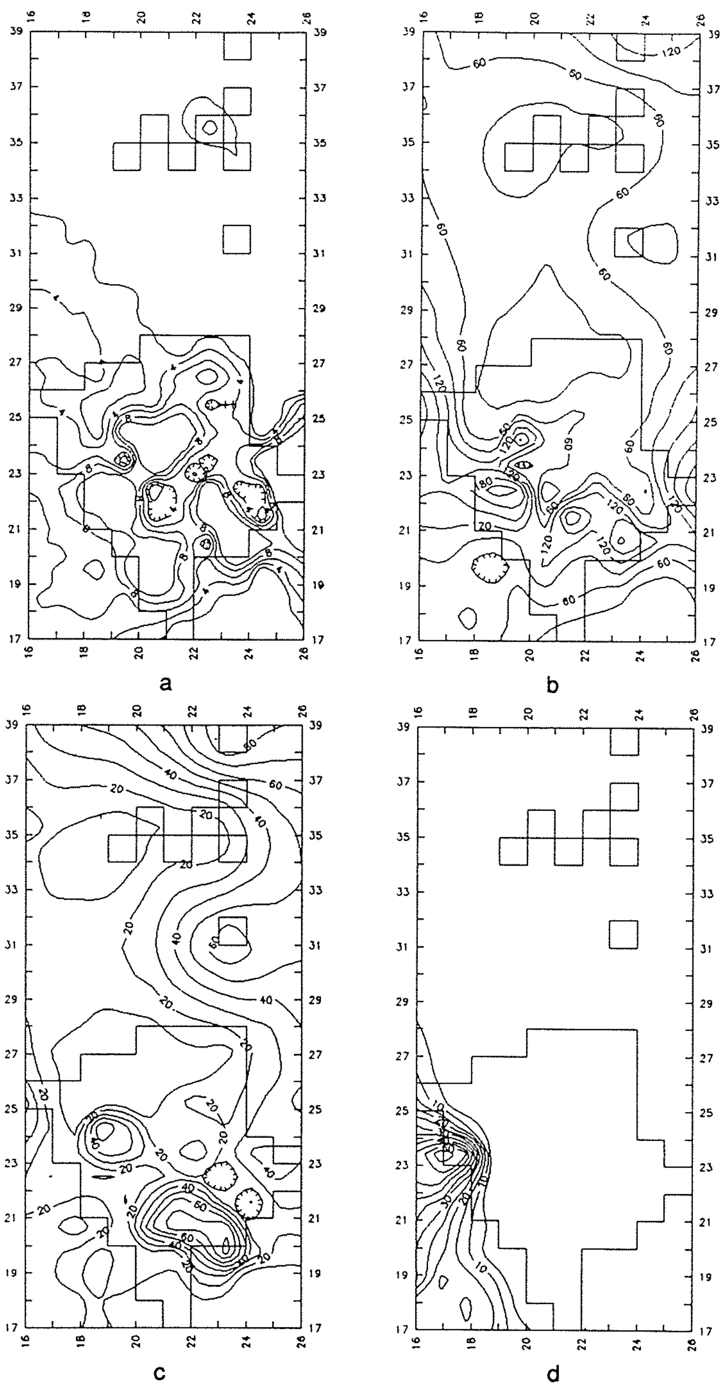


Figure 6. Courson A: contoured diagrams showing distribution of shell (a), all debris (b), burned rock (c), and daub (d). Contour numbers indicate number of items recovered.

The discrete patterning of bone in relation to the two pits—very little bone next to Pit 1 and quite a bit at Pit 2—suggests either functional or temporal differences; the latter may be likely. There is also a substantial increase of bone and burned rock—the only material found in this region in any concentration—on the northern end of the site associated with Feature 88-5 (Figure 6, c). There are several anomalous post molds west of the house that may be more closely associated with the scoria-tempered pot. Since this is where most of the daubing is, perhaps the post holes represent an earlier house that the square house (Figure 5) cut through during construction.

Although daub (Figure 6, d) was found over much of the site, the greatest concentration was found in 23N/17E, near the broken pot. Daubing does not seem to be associated with the square house. Bone debris that is not from Pit 2 seems to be located mainly south of the house; more is on top of the hill at the extreme north end of the site. There is very little bone debris from Pit 1 and little from inside and around the house. Mussel shell, on the other hand, is predominantly inside the house around the hearth, and there is some in the southwest and southeast grid quadrants of the site. Little or no shell came from the northern tests, suggesting that shell and bone mark two functionally different sets of activities. The shell may have come from food preparation or consumption or it may be fragments of ornaments.

Except for the dense concentration surrounding the broken pot in 23N/18E, pottery is extremely scarce. There is a slight increase in pottery sherds north and south of the presumed entryway of the house. Flakes are distributed irregularly across the site; the greatest concentrations are south and east of the house, with a slight increase in flakes just north of the hearth. Square 31N/23E yielded only flakes, but in relatively high concentration. Pit 1 yielded substantially fewer flakes than the surrounding sheet midden, suggesting that the pit was not filled with general habitation debris.

Courson B (41OC27)

At the Courson B site—the most complex site we have dealt with—several series of occupations are represented (Figure 7). They begin at or near the same time as the Courson A house, perhaps early in the current millennium. Excavations in 1985 and 1986 showed a basic architectural sequence beginning with a small, roughly circular pit that may represent a pithouse with a central hearth but no evidence of wall posts. This was overlain by the main Courson B house, which was about 8 meters square, inside the nearly 1-meter-thick stone wall bases. The main house had a long, extended east entryway, four primary support posts with two auxiliary support posts, and the central one-third of the floor surrounding the prepared, cylindrical fire pit was lowered. Following abandonment and filling-in of the main house, a small, stone-outlined house, apparently with a wall-gap entry and post walls with stone bases was built over the filled main house area. The work of the 1987 and 1988 TAS Field School investigations uncovered evidence of an isolated hearth south of the main site area that could represent another prehistoric house in the same style as the Courson A house, but there was no evidence of posts or other structural features to support this interpretation. Additionally, the testing of the Courson B site yielded many small areas that appeared to be plaster or fragments of architectural features, indicating that there has been a complex history here of construction, reconstruction, and abandonment.

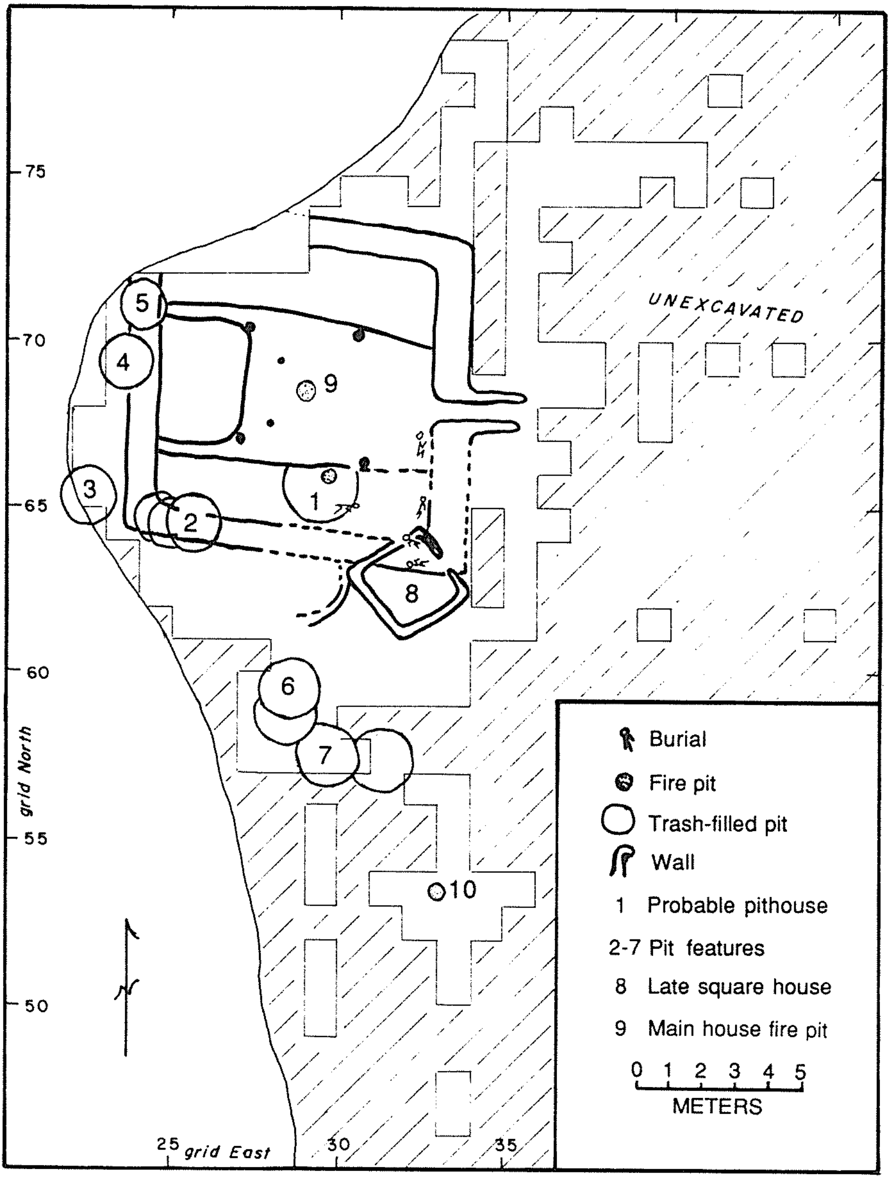


Figure 7. Courson B: plan of excavations and features.

Two trash or cache pits were excavated in 1985 and 1986 by the Courson Archeological Projects, and several others were identified. One of these, which was more thoroughly investigated by the TAS Field Schools in 1987 and 1988, turned out to be at least three interlocking pits. All of the pits identified to date on this site appear to be roughly cylindrical, about 1 meter in diameter, and about a meter or slightly less deep. Much of the TAS effort focused on an area directly south of the main Courson B house that may be a large area of interlocking trash/cache pits, an early structure, a large borrow area backfilled with trash, or some other kind of expedient or constructed feature. Some unusual aspects of all of the pits in the main structure of the Courson B site seem to predate the construction of the large house, and in almost all cases the pit fills were relatively sterile, containing some bone and mussel shell and large quantities of daub, but otherwise often having less cultural debris than the surrounding thinner areas of sheet midden. The 1988 TAS investigations at Courson B did detect south of the main house a distinct area of sheet midden that comes to an abrupt end some 20 meters south of the house. This midden varies in thickness and in it there may be one or more other structures or related features from time periods earlier or later than that of the main house. An additional concentration of midden debris was found northeast of the house, apparently along the swale margin northeast of the house entryway.

The final event at the Courson B site was identified in the 1986 Courson Archeological Project and consisted of reuse of rocks and other structural elements from the houses for the construction of a cairn over what appears to be a mass burial of at least five individuals: four adults and one juvenile (Hughes and Hughes-Jones, 1986). The skeletons were in various orientations, and, although there were no obvious grave goods or funerary offerings with any of the adults, a stone pendant was found with the juvenile.

The heaviest density of material on the Courson B site is from the interlocking trash-filled pits beneath the south wall of the main house and from the pit directly west of them (Figure 8, a). Most of this material, whether by weight or by count, is bone—principally Bison bone—and daubing. Northeast of the house a sharp increase in density of material suggest midden debris. South of the house another increase in density of material suggests a trash area rather than merely a sheet midden or another residence, but the distribution here is more diffuse, covering an area of perhaps 20 square meters; it is not a point source, as are the other trash-filled pitlike features. There is no special accumulation of trash that could indicate the house, but distribution maps for specific classes of artifacts suggest that the distribution of burned rocks differs obviously from the distribution pattern of general debris. The concentrations of pottery (Figure 8, b), bone (Figure 9, a), daub (Figure 9, b), and shell (Figure 9, c) coincide with the trash-filled pits and midden areas. Burned rock (Figure 9, d) follows the same pattern except for a substantial increase in burned rock directly southeast of the main entry of the house. These burned rocks, even though they are principally caliche, may be boiling pebbles—stones heated for use for secondary warming of other substances. Caliche pebbles seem to bear up well when used for stone boiling of water, with only a slightly lower thermal efficiency than other rock.

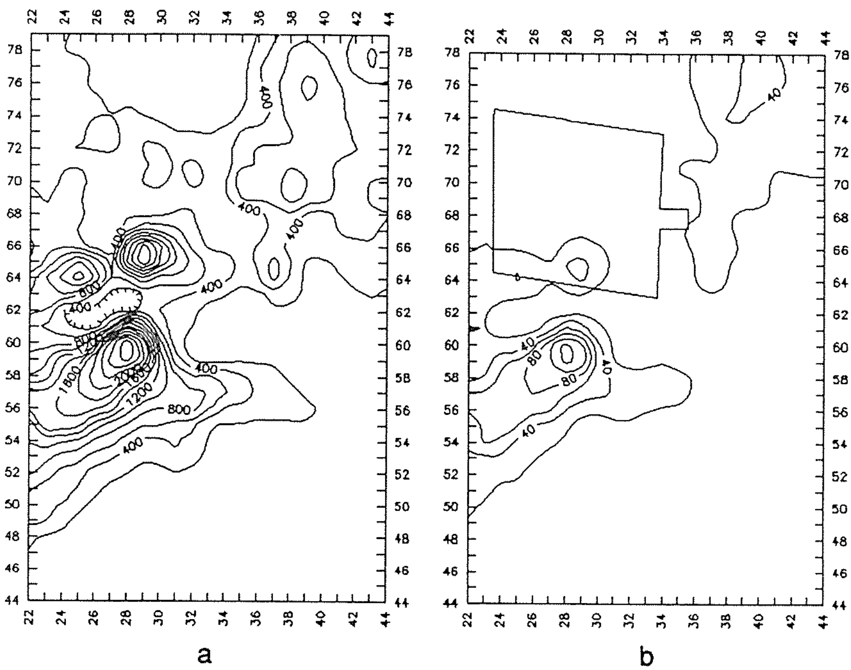


Figure 8. Courson B: contoured diagrams showing distribution of all materials (a) and pottery (b). Contour numbers indicate number of items recovered.

Courson C (41OC28)

The condition of 41OC28, the Courson C site (Figure 10), was at best disappointing. The work was remarkably unproductive of artifacts and debris. The very deep but filled pothunter trench that crosses from north to south through the center of the site could be one of the later excavations that we have only hints of (e.g. Studer or efficient local people) and may well be screened backfill. Although all of the houses were characterized by lower concentrations of debris within their walls, this house yielded the least material. Material densities were so low that contour plots of density here are meaningless. Concentrations of bone, shell, and flakes at about 47N/190E could reflect either residuum from activity areas or a screen dump from a previous excavator.

An unusual feature recorded in profile during the 1988 excavations was a double depression in the subsoil suggestive of two parallel trenches beneath the rocks that may have marked the northernmost wall of the suspected house. A virtually identical feature was later seen beneath the north wall of 41OC29 and may give us an important clue to how many of these houses were built. The possibility of a double-post wall has been offered for the primary house construction (D. Hughes, in press). It is conceivable that a wide, deep trench was dug to outline the

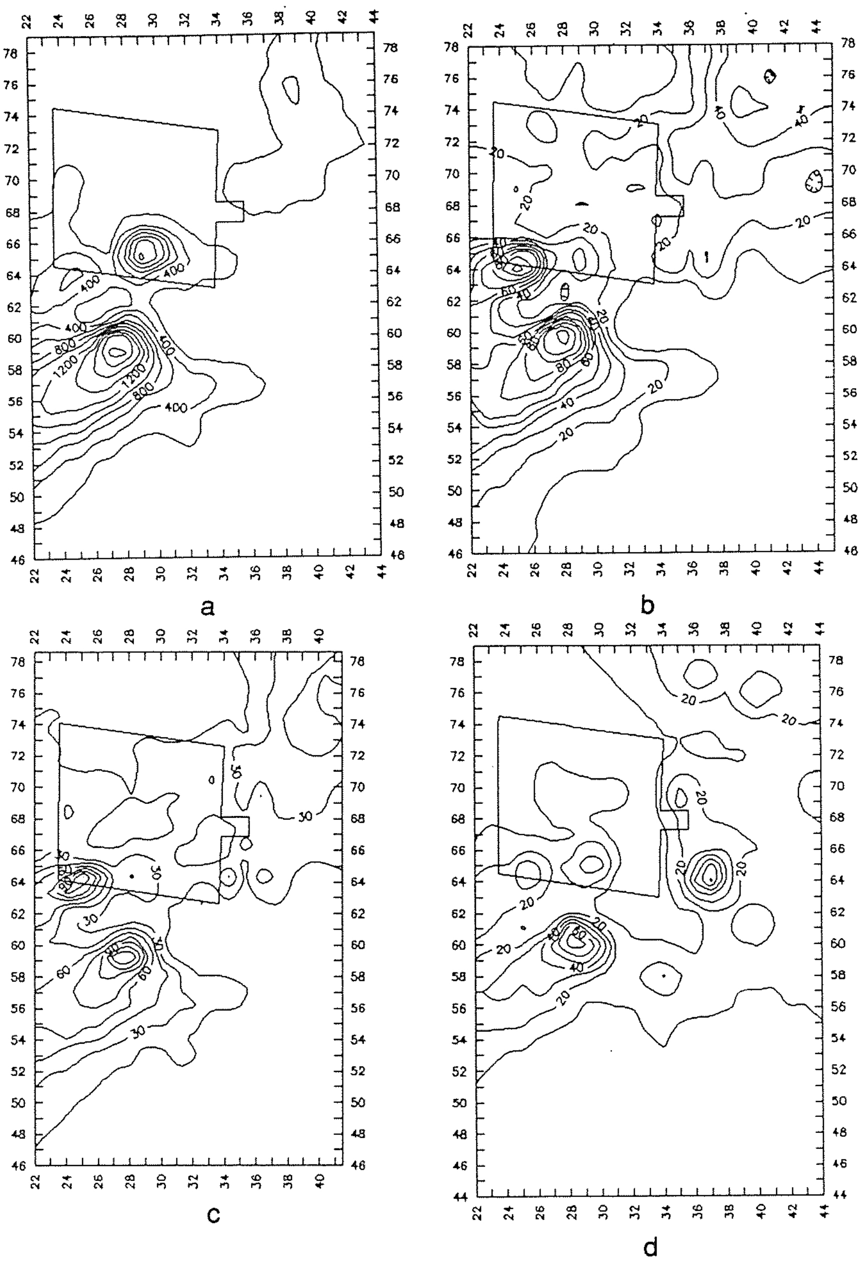


Figure 9. Courson B: contoured diagrams showing distribution of bone (a), daub (b), shell (c), and burned rock (d). Contour numbers indicate number of items recovered.

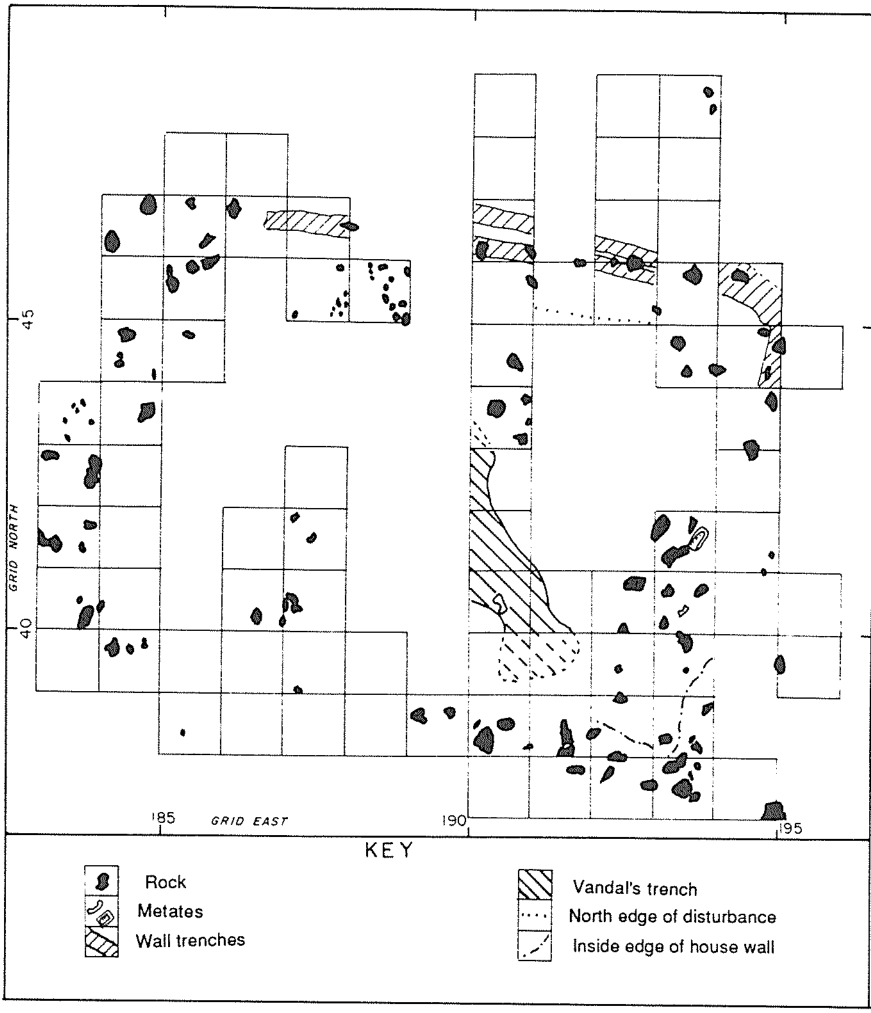


Figure 10. Courson C: diagram of excavations and features.

construction site, followed by a double picket of posts set 50 cm to 80 cm apart. The trench was then backfilled, and rocks were set on top to keep the poles from pulling in while the pickets were woven into a pair of parallel wickerwork walls. This would explain the double postmolds, the erratic placement of rocks, their lack of association with the house floor, and the double wall trench; the edges of the trench would have been dug deeper to accommodate the posts, but the center would have been scooped out only enough to make excavation easier.

Courson D (41OC29)

Three distinct areas of Courson D, site 41OC29, were investigated by the TAS field schools (Figure 11). These investigations included controlled surface collections, broad-area testing, evaluation of a disturbed house site, and evaluation of an area disturbed for the drilling of a water well. Area A, the disturbed house (Figure 12), was the focus of most of our activities for the two seasons.

The house site apparently had suffered rather severely from previous digging. Upon reviewing the notes and records of the work, it is apparent that some of the digging may have been undertaken as part of prehistoric remodelling of the house. The central hearth, found in 1988, was not the kind of fire pit the other houses have, but was rather a flat surface of extensively burned soil that appeared to have been planed smooth. Evidence from confusing possible wall alignments has lead the author to believe that this house may have gone through several stages of remodelling or reconstruction, and that each new phase of the process began with new excavations inside the structure. The little evidence of interior features other than the hearth suggests that the house probably conformed, at least in broad outline, to the large stone-based houses at Courson B and the Kit Courson site. A rock pile in the southeast corner of the house was thought to be a burial cairn like the one at Courson B, but exploration of the pile revealed no graves, and, in retrospect, this particular rock pile is more than likely a discard pile left by some previous but historic digger at the site who left only the traces in the soil to record his passage. No pit features or other ancillary features were found during our investigations here.

Areas A and C (Figure 13, a) are nearly contiguous, and a plot of materials from both (Figure 13, b) clearly shows a difference in the densities of material between the two areas, suggesting that they supported different activities.

In Area A, two distinct concentrations of material are apparent in the overall pattern of material recovered (See Figure 14, a). The first and greatest concentration is in the south center of the house where a deep north-south trench was cut to the house floor. The second appears to be just southeast of the entryway. Both of the concentrations are caused primarily by the bone and, near the hearth, burned bone recoveries (Figure 14, b). Leaving those out of the analysis, several other discrete increases in material are apparent. In the north and northwest quadrant of the house is the greatest density of flakes (Figure 14, c) except for a small accumulation just south of the center of the east wall, suggesting that the first concentration may reflect some kind of interior activity and the second concentration may reflect an exterior activity. Shell distribution here, as on the other sites, appears to have its own unique distribution, with concentrations in the center of the east wall, roughly in line with the probable entryway and another main concentration in the center of the south half of the house, just south of the hearth. The quadrant of the site directly southeast of the structure is relatively free of trash and debris, as if this area had been left intentionally trash free or had been periodically cleaned.

Testing in area B, the north and east flanks of the hill that is Courson D (Figure 15), yielded one child burial, which was first thought to represent a cemetery because fragments of human skull were found over an area of roughly 400 square

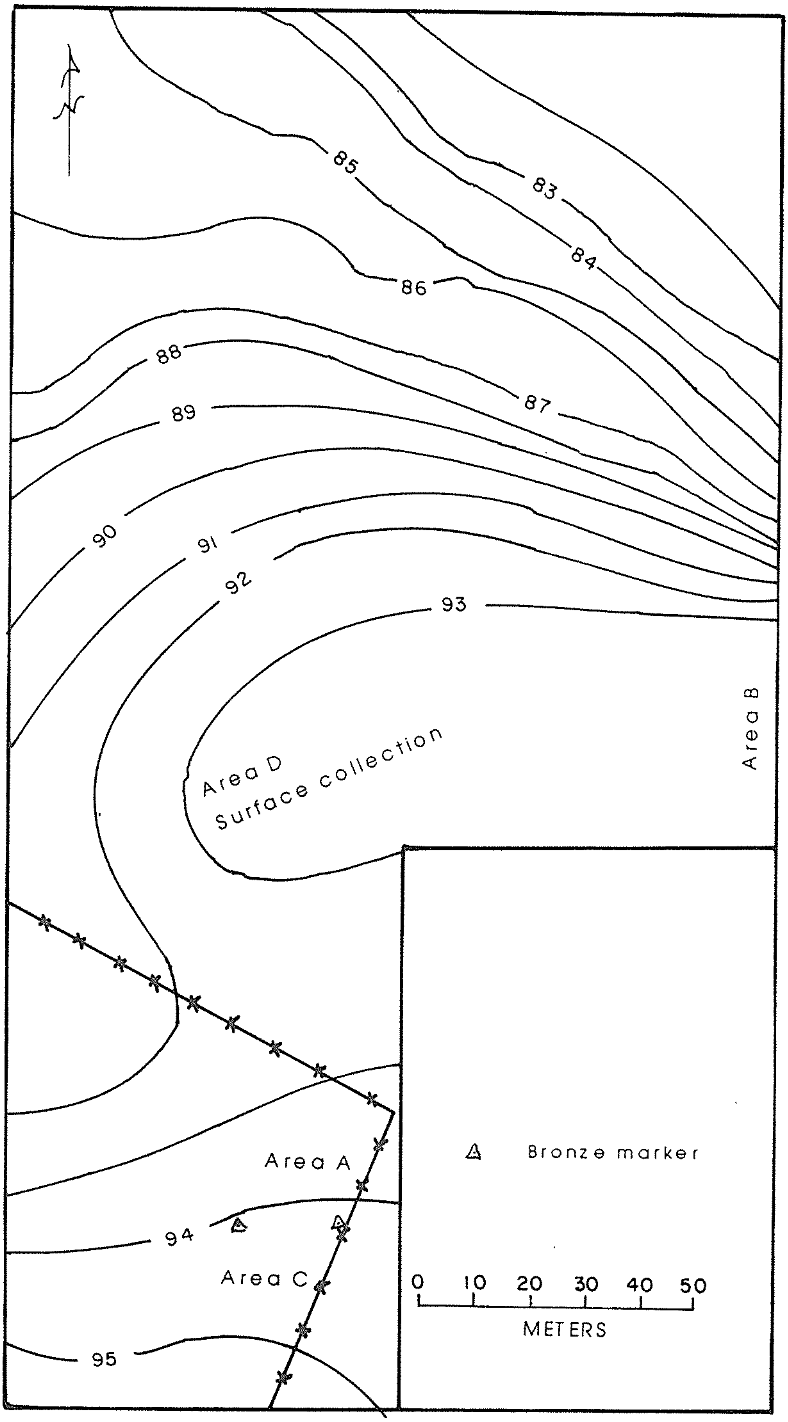


Figure 11. Courson D: topographic map showing subareas of the site.

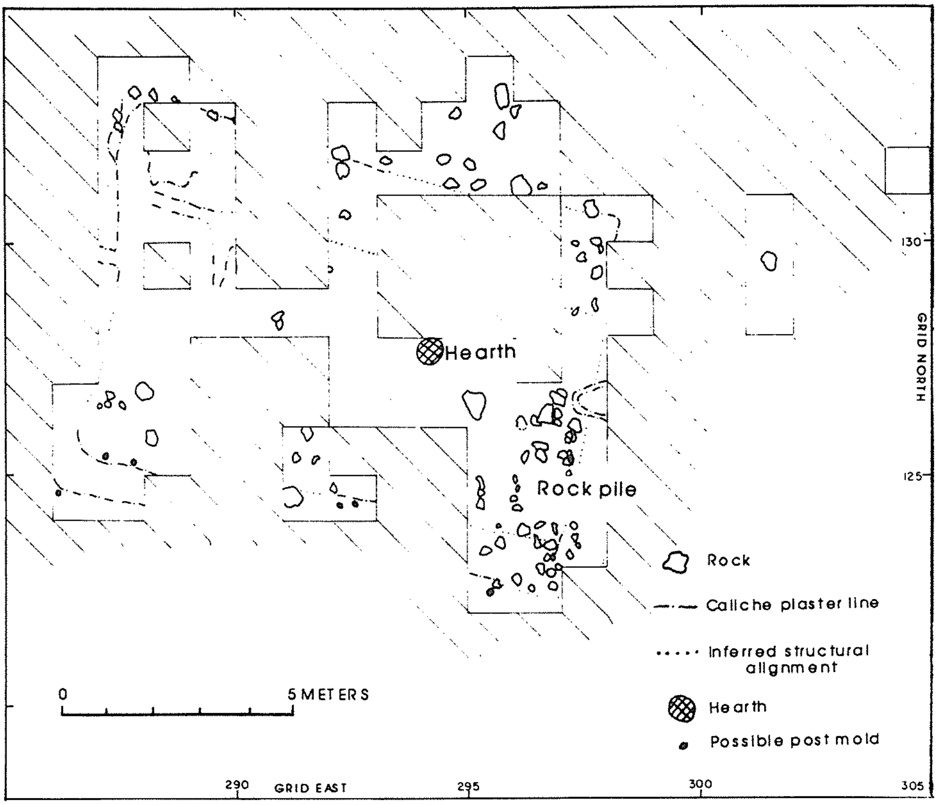


Figure 12. Courson D, Area A: plan of features and excavation areas.

meters. However, forensic anthropologists at the Wichita State University, who examined the fragments, suggested that all of the skull fragments could have come from the same individual, a juvenile in the 8-to-10-year age range. There were no offerings or direct associations that could be useful for inferring a date for this burial, and because there had been rodent disturbance in the grave pit, all charcoal at the level of the skeleton is suspect, so no definite age can be assigned to it. Other testing disclosed a possible additional house area at the east center of the main Courson D hill.

Test excavations in Area C showed one substantial concentration of material at the southern edge of the test block (Figure 16). However, this concentration may be material moved in by rodents or other burrowing animals from a nearby trash-filled pit that was damaged or destroyed in preparation for drilling the water well and putting it in service.

Surface collections from the Courson D site yielded several areas of material concentration. The greatest concentrations are on the southwest and east slopes of the hill; there is relatively little material on the hill crest (Figure 17). Several

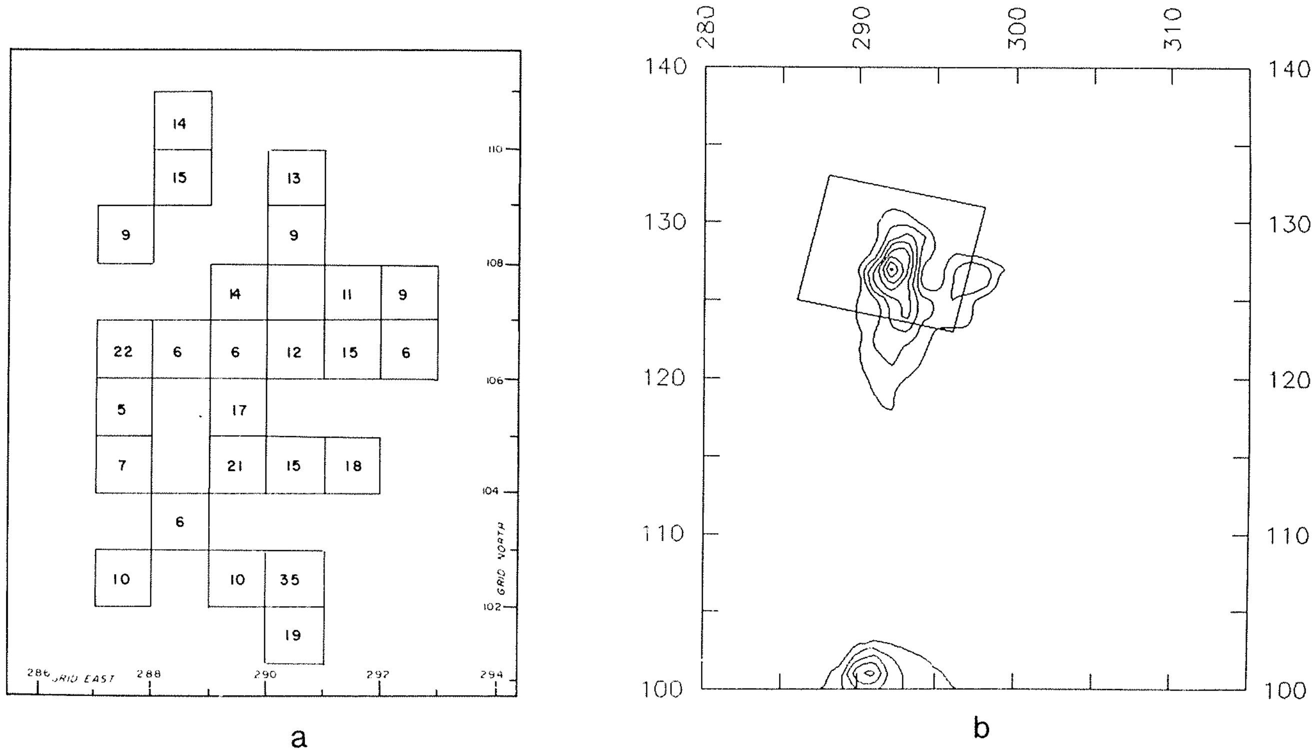


Figure 13. Courson D: plan showing depth of excavation in Area C units (a), and contoured diagram showing distribution of all materials in Areas A and C (b).

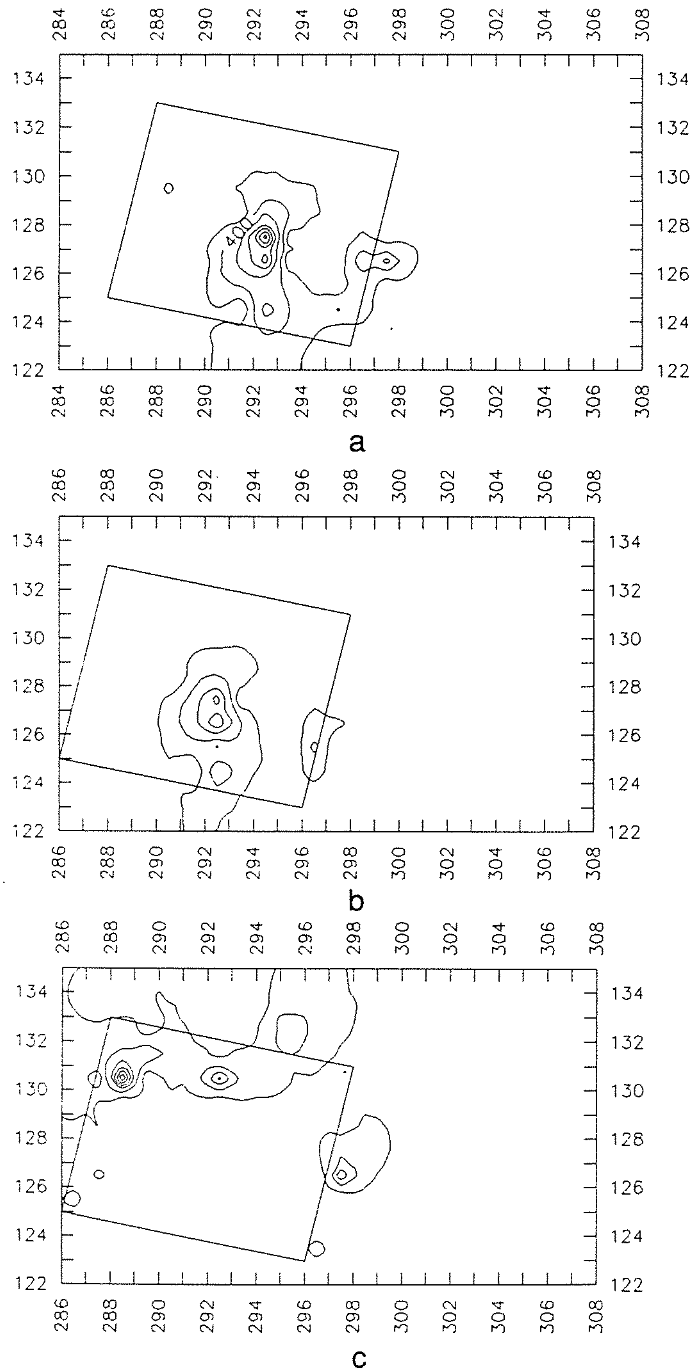


Figure 14. Courson D, Area A: countoured diagrams showing distribution of all materials (a), bone (b), and flakes (c).

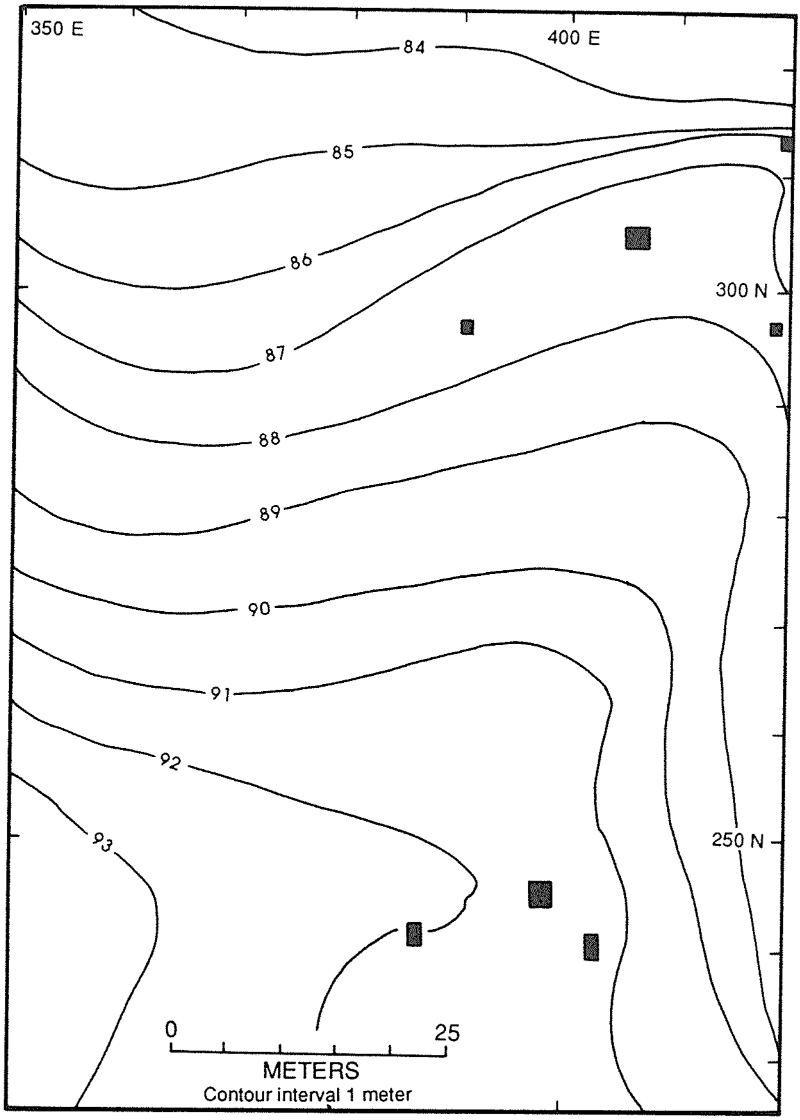


Figure 15. Courson D, Area B: topographic map showing test excavations.

concentrations of debris, centering roughly on coordinates 215N/250E, 220N/365E, 270N, 350E, and 275N/315E, may mark individual houses or other related activities.

Kit Courson Site (41OC43)

The main Village period component of the Kit Courson site, 41OC43, has been extensively studied, and the TAS excavated test units east of the house, looking for

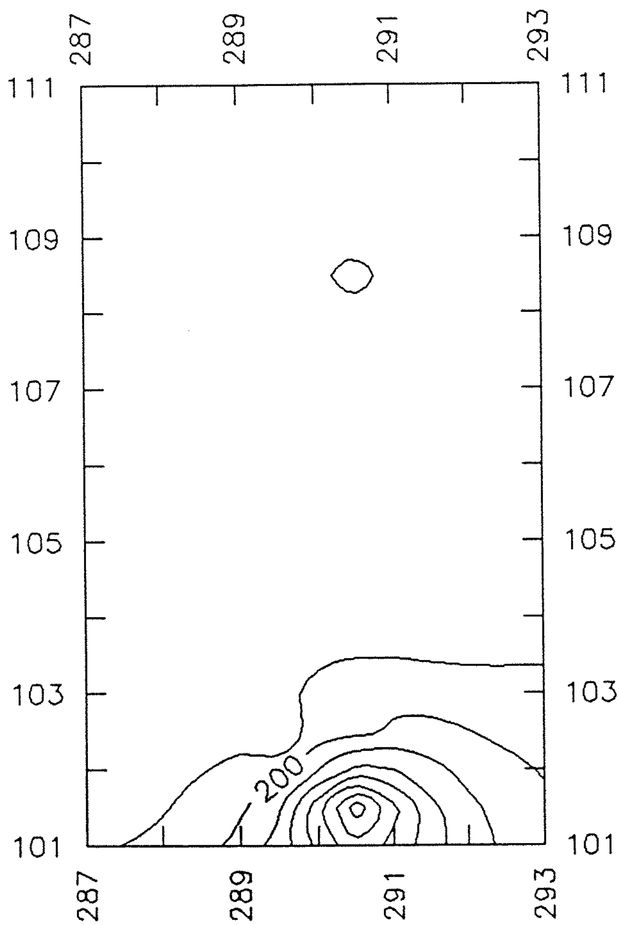


Figure 16. Courson D, Area C: contoured diagram showing distribution of all debris recovered.

the midden and activity areas associated with the main structure (Figure 18). The primary goal of the TAS—to identify the midden area for this structure—was clearly achieved. A substantial deposit of midden debris was found east of the house, bounded by grid coordinates from 39E to 46E and from 30N to 42N. There is a distinct decline in trash and debris that forms a buffer zone about 4 meters wide between the house and this midden area (Figure 19, a). Concentrations of shell seem, as at the other sites, to mark a special activity that is distinct from the routine household processing tasks (Figure 19, b). Daubing is distributed in a tight cluster well separated from the main house, suggesting a second house southeast of the one already studied (Figure 19, c). The distribution of flake debris presents a similar picture (Figure 20, a); the midden reaches its greatest density between 8 and 15

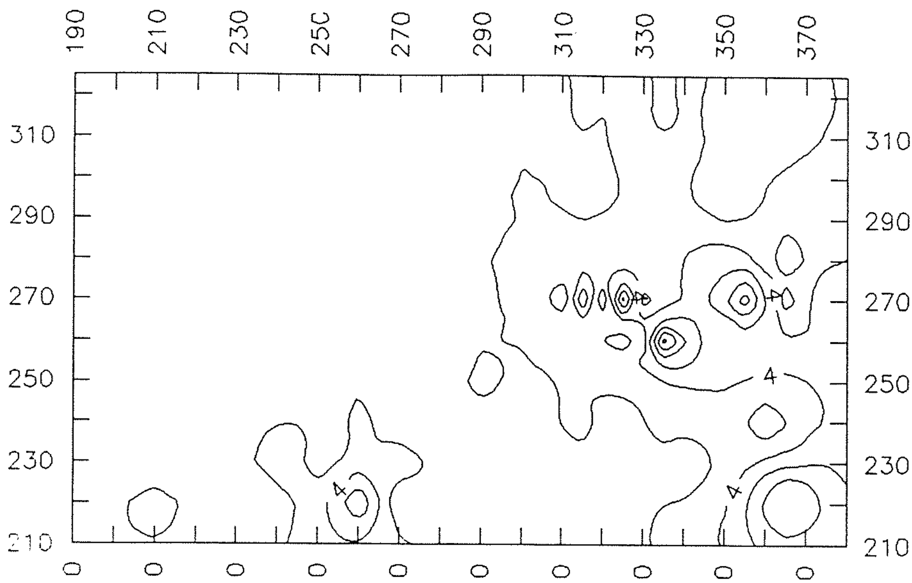


Figure 17. Courson D: contoured diagram showing distribution of material recovered from the surface.

meters east of the house. There is a small amount of charcoal distributed to the northeast of the doorway and around the hearth (Figure 20, b).

A relatively complete description of the Kit Courson house has already been published (Hughes and Hughes-Jones 1987). The house is similar to those described above, measuring some 9 meters east to west and 7 meters north to south, inside the 50-cm-to-1-meter-thick walls (Figure 21). The entryway was not stone lined, but a distinct compaction of the soil and an opening in the rock in the center of the east wall clearly marked its beginning. The compact soil of the entry floor could be traced for slightly more than 2 meters before it became indistinguishable from the other soils in the area. The house had a central firepit about 45 cm in diameter, four deep primary support posts that were as much as 50 cm in diameter, and plastered faces on the raised north, south, and west benches. In addition, it was suspected that there was a series of small post molds on each side of the rock wall bases that surrounded the house. The post molds were identified in 1986 by probing, and the regularity of their pattern and the few that could be traced lend credence to the theory that the rocks at this house served as footing or foundation stones at the base of a double-pen wicker wall with vertical uprights.

Attached to the south wall of the house, and extending beyond its southeast corner, was a small, lightly constructed addition of posts and rocks that had its own clay-lined central firepit and appears to have had relatively clean floors except for parts of two broken pots found inside the west edge of this structure. Between the north wall of this addition, which was made by extending the south wall of the main house, and the extended entryway of the main house, was a distinctive exterior

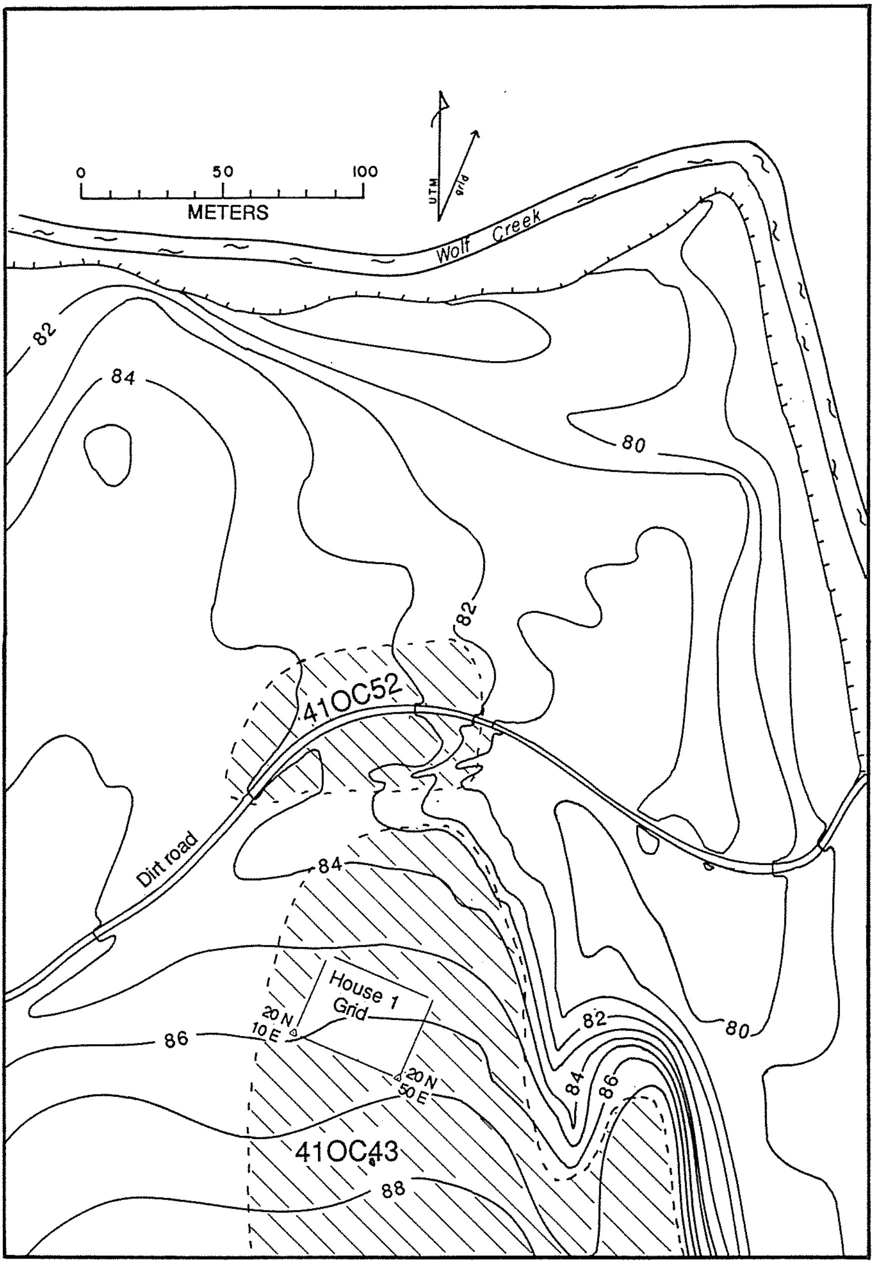


Figure 18. Kit Courson site: topographic map of the area.

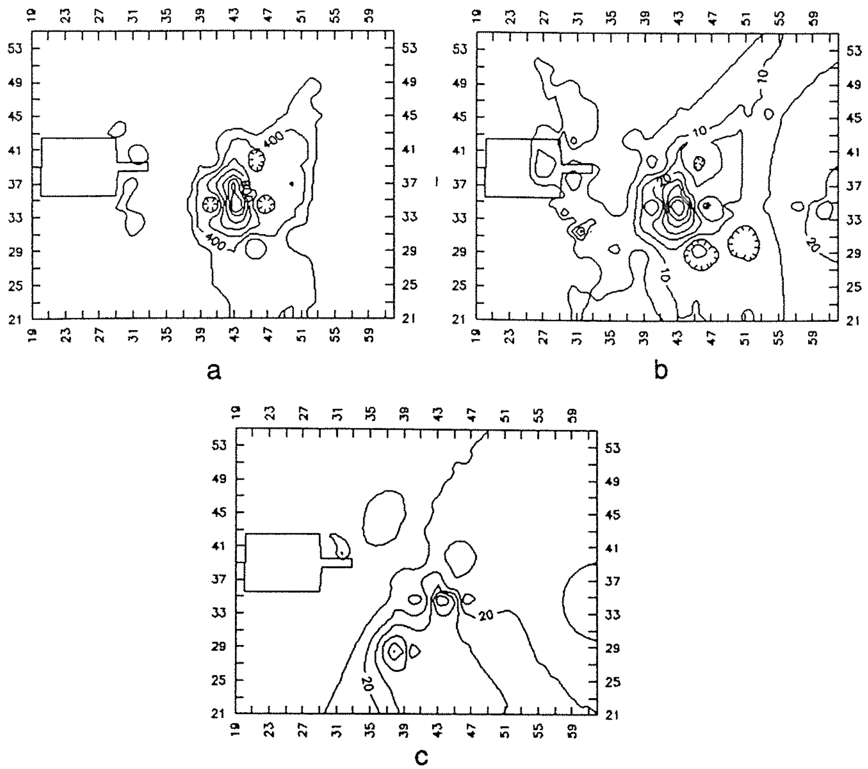


Figure 19. Kit Courson site, Part 1: contoured diagrams showing distribution of all debris (a), shell (b), and daub (c).

activity area for food and material processing (Figure 22). The area yielded several grinding stones, several deer antler tines, a large part of one complete antler, halves of two different pots, and a deer-jaw sickle.

Test excavations by the TAS east of the house disclosed several discrete areas of material concentration including the midden area discussed above. Billy Harrison, site supervisor for this part of the work, believes that there may be a Woodland pithouse southeast of the main house at Kit Courson.

Dutcher Mammoth (P404)

The TAS began salvaging the Dutcher Mammoth in 1988, and the work was completed by volunteers and members of the Courson Archeological Projects later in that season. Part of the skull and much of the postcranial material from one mammoth, including pelvis, femorae, one tibia, and two humeri were recovered, together with one tusk and an assortment of vertebrae and ribs (Figure 23). During the excavations, evidence of additional riverine deposits of gravel, coarse sediments,

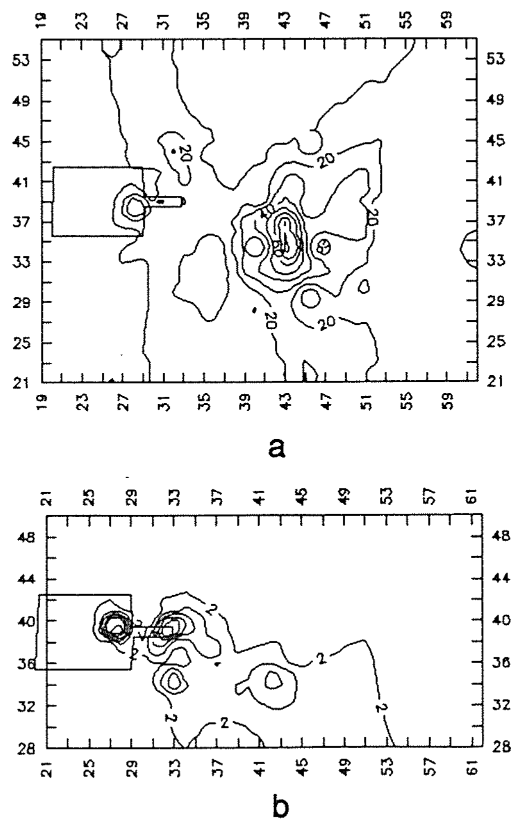


Figure 20. Kit Courson site, Part 2: contoured diagrams showing distribution of flake debris (a) and charred materials (b).

and reworked Pleistocene fossils were found to be mixed in with the mammoth remains. This could indicate a pluvial event after burial of the carcass had begun, perhaps a terminal Wisconsin event. No artifacts or evidence of human activity were found with the remains, and no estimate of the age of the mammoth's death can be offered at this time. The bones are being restored by employees of Courson Oil and Gas in Perryton for interpretive display.

Temple, or Gould, Ruin (41OC1:A)

The final area of primary investigations by the TAS was at site 41OC1, Area A (41OC1A), known variously as the Temple (Eyerly 1907a, 1907b, 1910, 1912) or the Gould ruin (Moorehead 1920, 1931). The TAS exposed the west wall and tried to find the northeast and southeast corners in order to define the limits of the structure. These investigations were undertaken despite many excavations of this structure since 1907 because none of the records of previous work included an

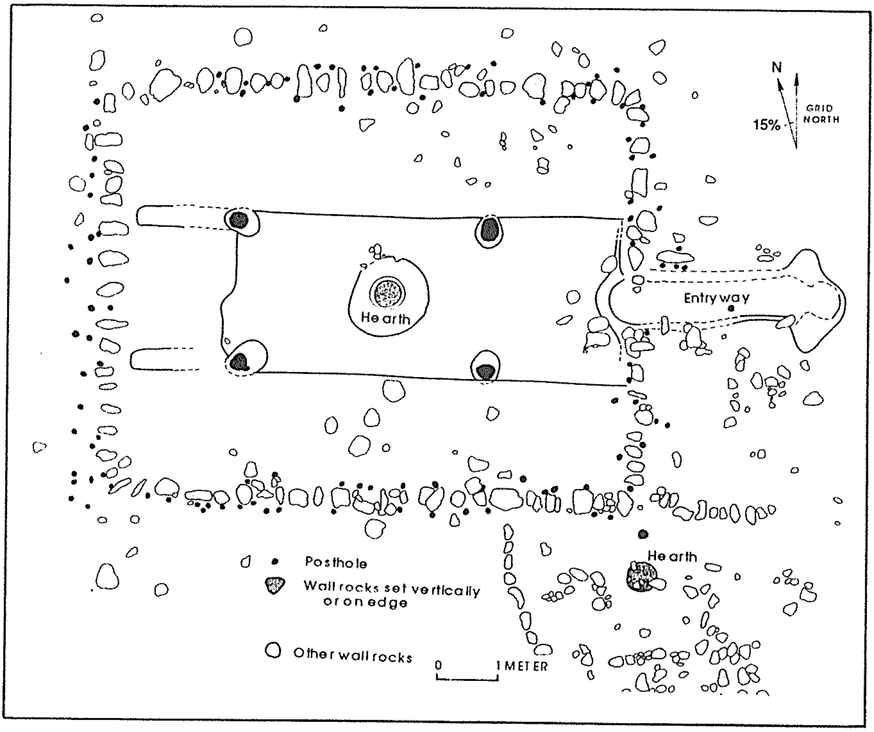


Figure 21. Kit Courson site: plan of the house and related features.

adequate map of the building layout or contents. Conflicts in publications and field notes made even the rough dimensions questionable. However, the TAS found several floor features in good condition

Post molds lined the inside of both the east and west walls about 50 cm from the base of the rocks. These may represent structural wall posts along the inner margins of a stone foundation. The main cross trench encountered one of two large central support posts and part of a small hearth near the center of the excavation that probably was one of the firepits in use when the building was occupied. Also exposed in the cross trench were a trash or cache pit southeast of the small hearth and the clearly defined trench Moorehead excavated in 1920 from north to south through the center of the structure. Jeff Eighmy, from Colorado State University, secured an archaeomagnetic dating sample from the clay rim of the firepit that was exposed in 1988. The results suggest an age for the firepit of from A.D. 1250 to 1375 (personal communication, J. Eighmy 1990).

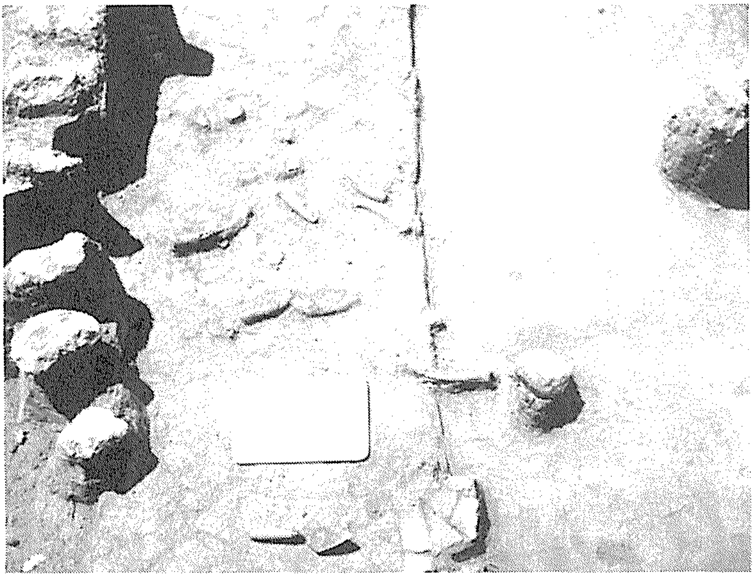


Figure 22. Kit Courson site: photograph of the material in a possible processing activity area southeast of the entryway to the house.

At the end of the brief excavations in 1988, several important questions were left unanswered. The north and south walls had not been clearly defined, but enough information was obtained to support an educated guess about the north wall; the south wall was still a complete question. Excavations within the walls suggested that enough structural features might be found to make it possible to deal with several important questions about the house. Among these are

1) Is this a single, open-room structure, or was it subdivided into several rooms?

2) Is this in fact a single structure or could it be two (or more) closely spaced structures that have been considered a large single structure through accidents and interpretations of previous excavations or site development processes?

3) Does this structure reflect an initiation or termination of the locally defined culture—the Buried City Complex? Or does it reflect another facet of the primary cultural development?

To answer these questions and several others, the Wichita State University field school was held at the Temple site in the Summer of 1990. Although analysis is still in progress on the results, the field map and tentative interpretations conclude that this is in fact a single structure, probably a large open room without partitions, and that it had three firepits, a large central fire pit almost 1 meter in diameter, an auxiliary firepit in the center of the south half of the building (identified by the TAS

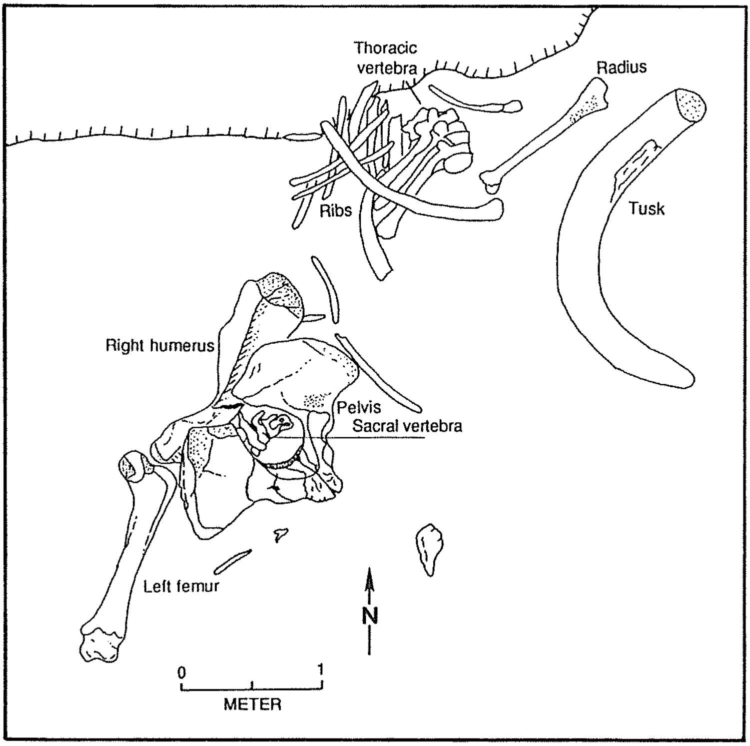


Figure 23. Dutcher Mammoth site: plan of bones and associations.

as noted above), and probably another auxiliary firepit in the northern half of the structure (alluded to in Moorehead's field notes). The north wall was found to run at an oblique angle from the west wall, giving the structure a rather unusual shape, and the south wall was still not found. However, detailed examination of the southern part of the site, together with study of the vertical and horizontal distribution of material, indicate that the wall may have been in about the position shown on the map (Figure 24).

Of continuing interest is what may have happened to the south wall. A close examination of Moorehead's published and field photographs from the 1990 investigations suggest that there was no south wall when Moorehead dug here, and there is every indication that it had been removed in prehistory, or perhaps never existed. More details about the conclusions from the Temple ruin investigations will be included in a report planned for completion in spring 1991.

OTHER TASKS

The extensive archeological survey conducted in 1987 discovered many sites directly upstream from the Buried City, but the main group of sites and village material does not extend more than a few kilometers upstream from the Courson

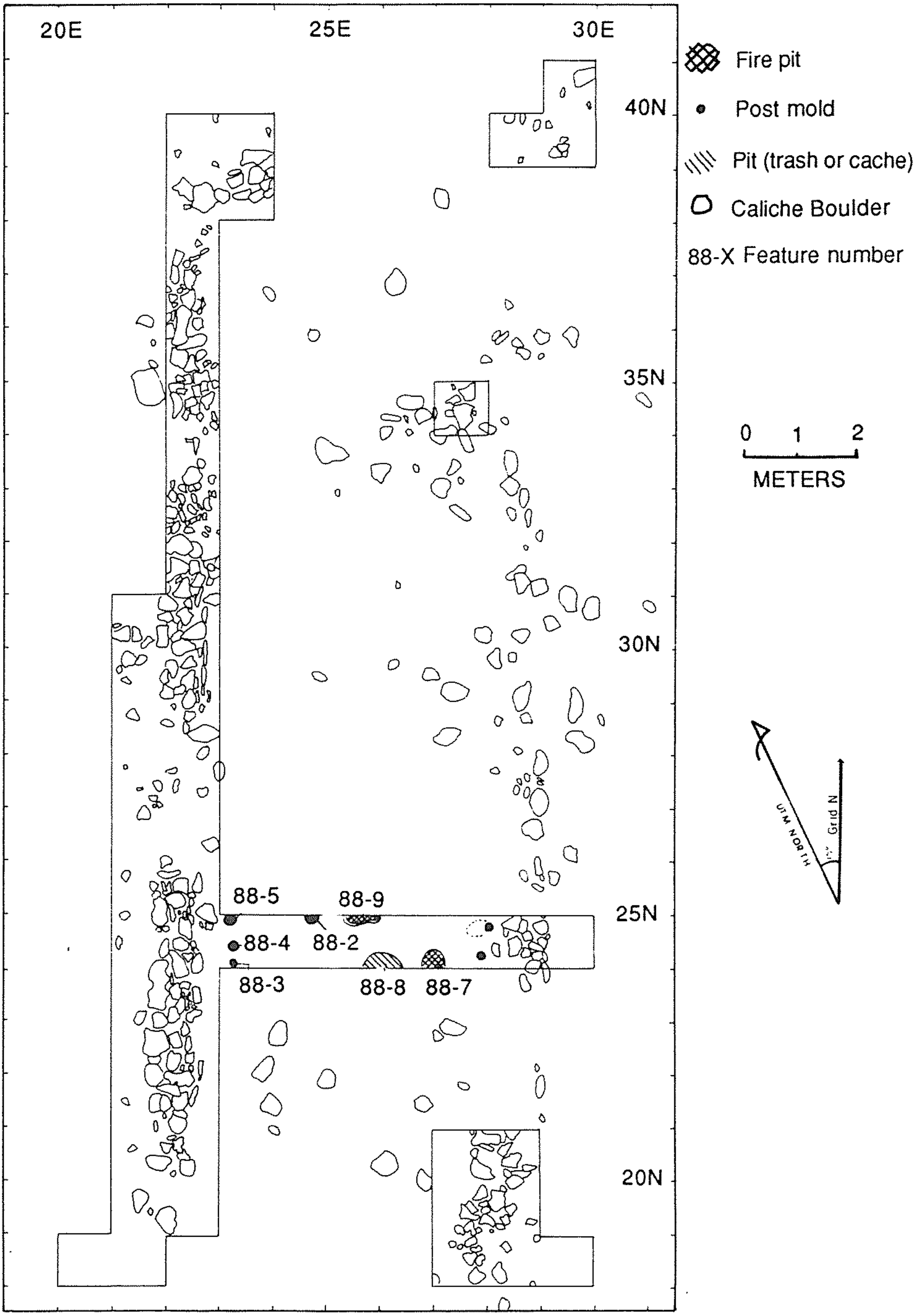


Figure 24. Temple site (Gould ruin): plan of TAS excavations and features.

ranch. One of the questions addressed during the survey was whether settlement was restricted to the main valley of Wolf Creek or there are components in the tributary valleys that have not been found. No such other components were found during the survey in 1987 or during subsequent investigations in 1988, 1989, and 1990. For some reason, the major settlement pattern seems to have focused on the main drainage of Wolf Creek.

Many isolated sites and nonarchitectural sites—beyond the defined site groups—have been found and recorded during the past 80 years; information on these sites was expanded by the Courson Archeological Projects and the TAS survey. Included here as miscellaneous sites are one site of undetermined function (41OC5), two rock overhangs that may have had some limited prehistoric occupations, one possible crevice or overhang burial, one possible disturbed crevice or overhang burial, and three cairns, possibly for burials on the valley rim. Several other likely overhangs for bluff shelters were identified by the TAS survey crews, but review of these sites showed no direct evidence of occupation. In addition to these nonstructural sites, one possible house site was found west of the Kit Courson ruins.

Two of the cairns identified were apparently burial cairns, as indicated by the presence of some human bone in the disturbed fill around them. Both had been excavated at some time in the past by persons unknown; age and cultural affiliation of the cairn burials on the rim cannot be assessed from observations made at the sites. No diagnostic artifacts or other remains were associated with the cairns. According to Danny Witt (personal communication), one of the burials (possibly 41OC44) was dug at some time during the past 30 years and may have yielded a flintlock and other metal fittings, suggesting an early Historic or Protohistoric time for that site.

Southeast of the Buried City proper is an isolated promontory known locally as “Lookout” or “Signal” Peak. The promontory is an ideal location for some kind of special activity. Eyerly (1907) mentions this site as a burial ground, and Moorehead refers to it but offers no information about it. In 1987 there were no artifacts or other prehistoric debris on the clean caliche bedrock, but there were substantial quantities of plaster of paris scrap were found there, together with enough stone-work to indicate that something had been built there.

A series of late prehistoric or protohistoric sites is situated south of the Kirk Courson sites on the second terrace of Wolf Creek. There is only minimal archeological material in this area, shown by Eyerly as an old Indian camp where he noted the presence of tepee poles. Local collectors have gathered several metal arrowpoints from these sites through the years, adding some confidence to Eyerly’s assessment of the site function and age.

To the west of the Kit Courson ruins, a long, bevelled projectile point or knife reminiscent of the Meserve type projectile point was found eroding out of a wash that flows into Wolf Creek. No additional material was found with this specimen to suggest whether it represents terminal Paleoindian, Archaic, or some other time period more closely related to the Village period sites that are so abundant.

A lithic scatter of chert flakes and burned pebbles was found by TAS survey crews in a field about 6.5 km (4 miles) west of the Buried City. It is a small scatter encompassing about 100 square meters on a low rise above a constructed pond. Another lithic scatter that includes an arrowpoint is on upper Wolf Creek about 7 km (4.5 miles) west of the Buried City. This scatter encompasses some 750 square meters and includes some burned caliche cobbles.

SUMMARY

Both the excavations and the surveys conducted by the TAS were extremely successful and yielded important information on the archeology of this unique part of the Wolf Creek valley. Research in the area is continuing, but several observations can be made from the information developed to date.

Site Distribution

All of the observed architectural sites or communities are above the first terrace or active floodplain level of Wolf Creek. In the Buried City, Moorehead, Kirk Courson, and Kit Courson ruins, the houses are more than 200 meters from the base of the bluffs that line the Wolf Creek valley. Frequently, the houses were built on the terrace margins or on the crests of the terraces near the terrace margins. The Courson ruins has one house, Courson B (41OC27), relatively close to the bluffs and two structures (Courson C and Courson D) well back from the terrace margin. The latter structures are set on low rises adjacent to broad swales with almost level or U-shaped channel floors.

The general pattern throughout this small area is one of isolated, single-room houses of about 64 square meters of floor space, situated on low knolls, rises, or ridges adjacent to shallow swales that drain the flanks of the Caprock Escarpment. In all cases, the houses are high enough to be well out of the floodplain of Wolf Creek, but they are below the maximum elevations of the valley floor. Where several structures are apparent on the surface, they seem to be at least 30 meters apart and may be somewhat further apart. The primary controlling factor is probably microtopographic variations in the valley floor. Despite very intensive survey work, no indication of structures or related long-term habitation activities or features have been found on any of the side channels entering Wolf Creek at the Buried City, and upstream survey suggests that the structural sites do not extend more than 1.5 to 3 km (1 or 2 miles) upstream from the area that has been the focus of our study. Information from local informants suggests that the main concentration of sites may extend some 3 to 5 km (2 or 3 miles) downstream from the study area, and a study of the Wolf Creek Park, adjacent to the Courson ranch, suggests equally high density for at least 1.5 km (1 mile) below the Courson ranch (Ellzey 1985, 1987).

Time

The Courson ranch on Wolf Creek encompasses archeological sites representing time periods from at least the early Woodland through the late prehistoric Village period and—perhaps with a hiatus during the terminal prehistoric—into the protohistoric and Historic periods (Table 1). There is a possibility of Archaic material, reflected by the Meserve-like point. Other time periods and events are undoubtedly represented, but evidence of them is obscured by the recent soil mantle; it will require an extensive geomorphic assessment to determine the age of the land surfaces and test excavations to identify specific components.

Table 1. Radiocarbon Dates From Selected Sites on the Courson Ranch

Sample No.	Site	Material	^{14}C Age	Date A.D.
DIC-3227	42OC27	Charcoal	520+60–55 B.P.	1430±55
DIC-3228	42OC27	Charcoal	610±50 B.P.	1340±50
DIC-3280	41OC27	Bone	240+60–70 B.P.	1710±65
DIC-3281	41OC26	Charcoal	740±50 B.P.	1210±50
DIC-3300	41OC27	Charcoal	800+50–60 B.P.	1150±55
DIC-3301	41OC27	Charcoal	710+50–40 B.P.	1240±45
DIC-3302	41OC48	Charcoal	630±40 B.P.	1320±40
DIC-3303	41OC1:K	Charcoal	590+50–40 B.P.	1360±40
DIC-3338	41OC1:M	Charcoal	740±60 B.P.	1210±60
BETA-20276	41OC27	Charcoal	770±80 B.P.	1180±80
BETA-20277	41OC43	Charcoal	840±100 B.P.	1110±100
BETA-20871	41OC43	Charcoal	580±60 B.P.	1370±60

SOURCE: Hughes and Hughes-Jones 1987:Table 7.

Appraisal of Cultural Resources

This small part of the Wolf Creek valley is a truly unique archeological setting. Site densities during the Late Prehistoric period are high enough that extensive components of the cultural complex are found on every second and third terrace setting for at least 1.5 km (1 mile) above the Buried City and for perhaps 3 km (2 miles) or more downstream. Despite this dense settlement, there is no indication of such habitation on the side drainages of Wolf Creek, and there is little or no evidence of even secondary activities associated with the primary habitations. Earlier cultures, representing Woodland and earlier times, are poorly represented in all samples, but this is because they have been obscured by rapid deposition in this part of the Wolf Creek valley and the extensive mantling of the sites with the Village period materials.

The Village period pottery recovered from these sites is particularly interesting; perhaps the primary characteristic of Buried City complex pottery is diversity (Hughes and Hughes-Jones 1987:104). Ceramics of most Panhandle sites are tempered with crushed rock and are thin, hard, and simply cordmarked (Hughes, 1986:11); the ceramic tradition of the Courson ruins, however, is thick, poorly fired, rounded, globular or subconoidal vessels tempered with fine to very fine quartz sand (Hughes and Hughes-Jones 1987). The neck, shoulder, and rim sherds show that vessels frequently had high, slightly flaring rims. Body sherds of comprise about equal proportions of smoothed ware (including manufactured plain wares) and smoothed-over cordmarked wares, and cordmarked wares. Larger sherds normally have additional surface treatments—chevron-incised plain and cordmarked wares, crenelated, filleted, pinched, gouged, incised, punctated, and fluted rims, and many other treatments (Figures 25 and 26). Virtually any surface treatment or rim treatment imaginable can be found among the sherd collections from these sites. Pottery types from these sites are closer to the Kansas Geneseo types than to other Texas and Oklahoma Panhandle types (Hughes and Hughes-Jones 1987:106).

The unusual character of this site complex may be largely the result of the unique ecological setting of this part of the Wolf Creek valley. At the point where the sites seem to begin on the upstream end of the valley, the creek has just begun to cut through the Ogallala aquifer, and the house sites continue downstream until the creek widens out and the Ogallala is mantled completely by silt and sand. Hence, the area where most of the sites are found is the part of the creek where seeps and springs from the Ogallala would have been most abundant. The probability is excellent that the prehistoric levels of the aquifer would have kept the terrace settings here subirrigated, providing optimum conditions for gardening and habitation as well as nourishing the abundant timber and other materials that were essential to living on the Plains.

Such a dense concentration of village period sites is almost unknown in the Texas Panhandle; some of the areas around Lake Meredith on the Canadian River only approximate this settlement situation. However, several questions about the individual sites need to be addressed, as do several questions about the internal community structure within each site or village and the interactions between the sites or villages. Because of the unusual setting, these sites should be considered singly and together as of the utmost importance to our understanding of the local and regional prehistory. The potential of these sites for answering questions about prehistoric community structure and interactions, cultural growth and development, human response to environmental change, and the impact of low-technology horticulturists on a strictly limited microniche is very high.

In order to address any of these questions, a long-term program of investigation by a multidisciplinary team on several individual structures and nonstructural areas on each site focusing on developing environmental data, precise chronological data, and examination of cultural and aesthetic microevolutionary trends as reflected in the stylistic attributes of the buildings, external activity areas, and artifacts will be required. Because of the potential of these sites for helping to solve significant archeological research questions and the possibility that the information developed could help us understand the impact of modern low-technology farming on marginal environments, they are a resource that should be treasured and managed with the greatest care.

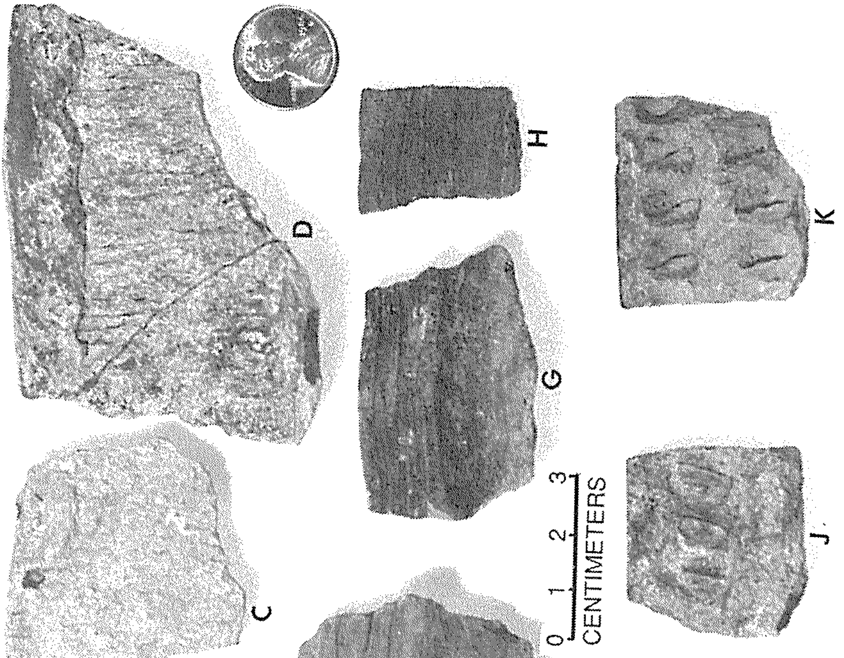


Figure 25. Examples of decorated pottery. A–E. fingertip impressed and compressed; F–H, collared incised; G–I, fingernail gouged. A, C, D, E, G, I, and J from Courson B; B, F, H, and K from the Kit Courson site.

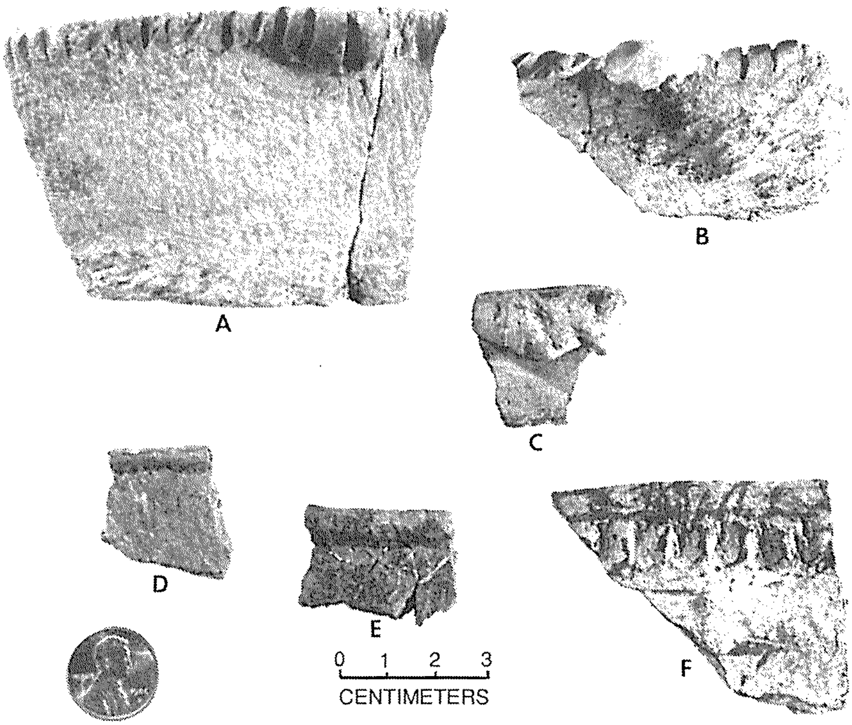


Figure 26. Examples of decorated pottery. A, B, notched rims; C, notched lip tab; D, E, rolled lips on low rims; F, alternative fingernail gouge pattern. A. D. amd E fom the Kit Courson site.

ACKNOWLEDGMENTS

These investigations have been supported since 1985 materially, financially, and with the labor and patience of the Courson family. Such a degree of personal commitment in the current age is as refreshing as it is unusual, so I would like to express a very special thanks to all of them for their deep concern with helping us preserve and understand this small piece of the past. The Texas Archeological Society provided some funding for the field seasons with them in the summers of 1987 and 1988. Trailers and heavy equipment were made available by Zenith Drilling, and water wells and services were maintained by Howards Well Service. The North Plains Electric Cooperative donated the use of a cherry picker for several

seasons to aid in the recording of the final excavations on many of the sites, and laboratory space and facilities have been provided by the University of Oklahoma Archaeological Research and Management Center and The Wichita State University Anthropology Laboratory.

Foremen for the early investigations included Nick Petruccione (1985) and Jim Couzzourt (1986), who dutifully served as crew chiefs, records clerks, confidants, and tour guides as needed. During the TAS investigations, the able involvement of the various site archeologists including Doug Boyd, Jim Couzzourt, E. Mott Davis, James Everett, Joan Few, Billy Harrison, Johnney Pollan, Ron Ralph, Emmett Shedd, and Jim Word made the work not just go more smoothly; they made it possible. Alicia Hughes-Jones devoted many long hours to helping develop the recording, concordance, and analysis system that made this report possible. The courageous efforts of several special expediters throughout the several seasons work, including Greg Mason, Danny Witt, and Dee Fuchs, were seldom seen but always felt, for their arduous duty was to insure that what was needed was present in a timely manner. Danny Witt also served yeoman duty in setting up and closing each season's work and in maintaining the equipment between seasons.

The work reported here has spanned half a decade and has involved perhaps as many as 1,000 people in one capacity or another. To thank each individually would require a more lengthy document than this report. The many names not listed here represent the greatest contribution of all. I hope each of you who has been involved will accept my personal thanks and debt of gratitude.

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The Lipscomb Bison Quarry: Continuing Investigation at a Folsom Kill-Butchery Site on the Southern Plains

Jack L. Hofman, Lawerence C. Todd, C. Bertrand Schultz, and William Hendy

ABSTRACT

Since the initial investigations by the Nebraska State Museum in 1939, the Lipscomb Bison Quarry in Lipscomb County, Texas has been a key Paleoindian site. Although repeatedly cited in discussions on Folsom lifeways, published information on Lipscomb is limited to a brief report on the first excavation. Recent study of collections and field work allow an expanded documentation of the site. Within the 138 square meters excavated at Lipscomb, the remains of more than 50 bison and more than 40 Folsom artifacts have been collected. Significant variation exists in the state of preservation, articulation, and fragmentation of the bone. Distributional patterning in the chipped stone assemblage is also indicated but the extent and degree of spatial variation is yet to be determined for either lithics or fauna. Information on excavations in 1939, 1946, and 1988, together with recent analysis of collections are summarized in terms of Lipscomb's role in the interpretation of early Paleoindian adaptations on the Southern Plains.

INTRODUCTION

The 1930s was a dynamic and exciting period for research in Early Man in North America (e.g., MacCurdy 1937; Wormington 1957). Following the Folsom discovery in 1926 and its widespread acceptance by 1928, there was a flurry of research pertaining to the association of prehistoric Americans and Pleistocene faunas. Much of this activity was centered at the University of Nebraska State Museum (Barbour and Schultz 1932, 1936; Schultz 1932, 1938, 1943, 1983; Schultz and Eisley 1935, 1936).

Roberts's (1935, 1936, 1940) detailed research at the Lindenmeier Folsom Campsite in Colorado, however, overshadowed most other Folsom studies of the period. Investigation of the Lipscomb site in 1939 provided relatively anticlimactic documentation of a second key Folsom bison kill site. A preliminary report on the investigation at Lipscomb (Schultz 1943) has provided the source for continuing discussion and speculation concerning the nature of the site and circumstances of this highly significant Folsom bison kill. This paper provides an up-to-date account of the history of investigations at the site and an assessment of the place of the Lipscomb site in Folsom period research and Paleoindian studies in general. The Lipscomb site is in the northeastern corner of the Texas Panhandle (Figure 1).

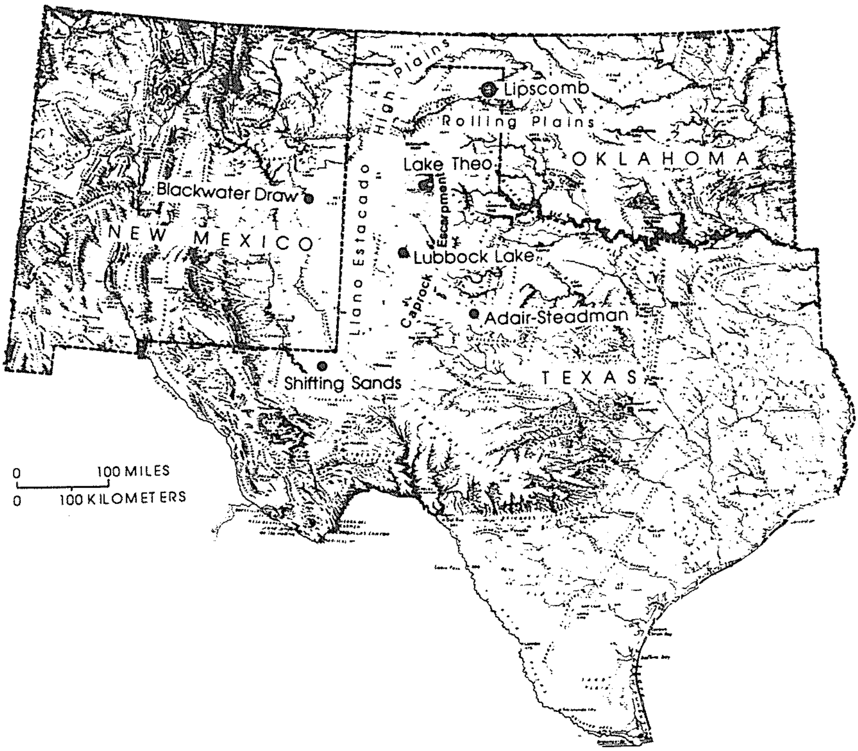

Figure 1. Physiographic map of Texas, Oklahoma, Kansas, Colorado, and New Mexico, showing location of the Lipscomb and other Folsom sites. From *Physiographic Map of the United States* by Erwin Raisz.

HOT AND COLD RUNNING BISON: PREVIOUS INTERPRETATIONS OF THE LIPSCOMB SITE

The first published documentation on the Lipscomb site appeared in the *Bulletin of the University of Nebraska State Museum* (Barbour and Schultz 1941:67–68). Because this early report includes information about the history of investigations at Lipscomb, it is included here in full, with the exception of a table listing measurements of a bison skull from the site.

> In the fall of 1938 a large deposit of bison bones was reported to the University of Nebraska State museum by Mr. Charles H. Falkenbach of the Frick Laboratory, American Museum of Natural History. The deposit was located on the farm of Mr. Commodore Hopper, 16 miles north of Canadian, near Lipscomb County, Texas, on Sand Creek, a branch of Wolf creek. A preliminary examination had been made by Mr. Falkenbach, who arranged to exchange the prospect with the University of Nebraska for

excavating privileges in certain Nebraska quarries. On May 20, 1939, the Texas bison locality was visited by a field party consisting of Messrs. Charles H. Falkenbach, John C. Blick and N. Z. Ward of the Frick Laboratory, and Messrs. E. E. Brier, John Adams, Lynn Robert Wolfe, and C. Bertrand Schultz of the University of Nebraska State Museum.

A careful examination of the bone deposit showed that the remains, although they were very near the present surface of the ground, were well fossilized and at one time had been deeply buried. Several terraces are well developed along Sand Creek and the bones appear to be located in the highest (35 to 40 feet) terrace.

A flint scraper was found in situ among the bones and it was at once decided to make further excavations to determine the species of bison and the type of artifact. A field party composed of Messrs. John Adams, William Hendy, and James Crosby was sent from the University of Nebraska to the Lipscomb Bison Quarry, as it is called in the field records. The group arrived at the quarry on June 10 and immediately began excavations. A grooved Folsom-type dart point was found in situ on the first day of excavation. Work at the site continued until August 26, with Messrs. Harry Tourelot and Robert Kubicek joining the party on July 31. Mr. and Mrs. C. Bertrand Schultz visited the site three different times during the season, and aided in the excavating.

A total of nine essentially complete grooved Folsom points, nine partial Folsom points, four large scrapers or knives, and a snub-nosed scraper were found. A number of chips of flint, including a longitudinal channel flake from a groove of a Folsom point, gave evidence that Early man probably camped at the site and chipped artifacts there. Charcoal and burned bones were found at various places throughout the quarry, especially along the borders. Some of the skeletons of the bison were almost completely articulated, but the bones around the fringe of the quarry were disarticulated and badly broken. Most of the skulls were closely associated with each other at the south end of the excavation.

A total of thirty-eight boxes and crates of fossil bison material was collected from the site to add the Morrill Paleontological Collections. a study of the specimens shows that the bison is identical with the form found at the Folsom quarry in New Mexico, i.e., *Bison antiquus taylori*. The measurements of one of the largest male skulls is given here for reference. A complete report on the bison from the Lipscomb quarry, together with a record of the fossil bison from other localities in America, will be published in a forthcoming paper.

The more extensive 1943 report by Schultz included more details about the site and excavation as well as two tables, one describing the artifacts collected from the site and the second providing the metric description of a large bison skull. The 1943 report (Schultz 1943:244–248) is in part redundant to the 1941 paper, but contains substantial information published for the first time and is reproduced here in part.

> The bones appeared to be larger than typical *Bison bison*, and since the members of the staff of the University of Nebraska State Museum were anxious to obtain comparative material of late Pleistocene and early recent bison, excavating privileges were obtained from the Frick Laboratory in exchange for rights in certain Nebraska fossil quarries.
>
> The members of the field party making this preliminary investigation found a "snub-nosed" scraper (Pl. XII, No.17001-39) in situ among the bones protruding from the bank, but this type of artifact was, of course, not diagnostic. On the slope of the hill west of the bone deposit, however, a fragment of a Folsom point (No. 17000-39) had been previously found on the surface, so it was considered a possibility that more artifacts would be encountered when the bones were excavated.... Dr. and Mrs. Loren C. Eiseley of the University of Kansas, Dr. and Mrs. E. H. Sellards of the University of Texas, and Mr. Floyd Struder of Amarillo, Texas were visitors at the site during the excavations.
>
> The location of the bones had been known for at least twenty years by persons in the neighborhood, and some excavating had been done by local citizens. There was no visible excavation showing previous work but undoubtedly the numerous bones and bone fragments in the talus below the outcrop were the result of digging rather that erosion.
>
> Excavations were begun on the west side of the deposit in the area where the bones were the thickest. A trench was started but it soon became evident that this method of removal would have to be altered because there were a number of articulated skeletons in the quarry and the bones lay close together. The quarry was marked off in five-foot squares and the outlines of the various important specimens were plotted on a large-scale sketch map. A topographic map was also made showing the region along Sand Creek in the vicinity of the site. Several terraces are well developed along this drainage, and the bones appear to be located in the highest (35 to 45 feet), or oldest, of these.
>
> Most of the overburden covering the bones had been removed as a result of erosion by wind and water, only six or seven inches remaining at the northeast side of the deposit and thirty inches at the southeast edge. On the west side, where the bones were exposed along the bank, the depth of the deposit varied from seven to fifteen inches. The bones nearest the surface were in a poor state of preservation because of the penetration of grass roots.
>
> The quarry extended for a distance of about one hundred feet from north to south and twenty feet from east to west. At the north end of the quarry the fossils were badly broken and scattered, but those to the south were mainly complete and in most cases articulated. Fourteen articulated skeletons, including skulls, were located in a section which was only

twelve feet wide and twenty feet long. The skeletons were headed chiefly in an easterly or southerly direction and overlapped one another, considerably. Nine additional skulls were unearthed in the area immediately surrounding the skeletons. The skeletal remains of some individuals were entire, even including the caudal vertebrae. From a paleontological standpoint, the Lipscomb Bison Quarry is an important site because of the completeness and preservation of the bones, including skulls. At the original Folsom quarry in New Mexico many of the bones were crushed and incomplete, and accurate measurements were difficult to obtain.

Twenty-two artifacts and a number of flint chips, all in situ, were found scattered throughout the quarry. Four additional specimens were recovered from the quarry talus. The artifacts compare favorably with those of the Folsom complex which Dr. Frank H. H. Roberts, Jr., reported from the Lindenmeier site in Colorado, but show much more variation in form than do those the original Folsom locality. Some of the most diagnostic specimens from the Texas site are figured in Pl. XII, and all of the archaeological material recovered is listed in Table 1. One of the chips (17013–39) which was found in situ in the quarry resembles the "gravers" found by Roberts, but no evidence of worked bone was observed. The artifacts are made of a light to dark gray flint and flinty chalcedony which is occasionally streaked with red.

Charcoal and ashes were associated with the bones in many parts of the quarry, especially in the southern part, where there was evidence of individual fires. Along the north and east sides of the deposit the bones were scattered and many of them had been split and cut by the ancient hunters. The artifacts as well as the bones often were incrusted with lime on the lower side and the flint itself was found to be deeply patinated. Some large pieces of limestone, foreign to the immediate area, were uncovered among the bones in the northern part of the quarry. The stones may have been employed in the breaking and shattering of the bones.

The chips of flint found in the quarry would suggest that tools were resharpened at the site, but the presence of the complete channel flake (Pl. XII, No. 17070-39) of a Folsom point would not necessarily mean that the projectile points were made there. This flake had probably been used as a knife by the hunters.

It is difficult to postulate why so many articulated animals had been left in the concentration which was mentioned in a previous paragraph. Perhaps there was more food than necessary, and after the butchering of a sufficient supply had been completed, only the pelts were taken from the remaining animals. Burial must have taken place shortly afterward, or the carnivores would have dismembered the skeletons.

Thirty-eight boxes and crates of fossil bison material were collected from the Lipscomb site to add to the Morrill Paleontological Collections. Although the specimens show a great amount of variation, they compare

Table 1. Inventory of Lithic Artifacts from the Lipscomb Bison Quarry
(Modified from Schultz 1941, Table 1)

Specimen Type	Catalog Number	Date Found	In Situ?	Raw Material Type
Folsom point	17000-39	Oct. 1938	no	Edwards chert
End scraper	17001-39	May, 1939	yes	Edwards chert
Folsom point	17002-39	6-10-1939	yes	Alibates agate
Folsom point	17003-39	6-11-1939	yes	Edwards chert
Folsom point	17004-39	6-11-193	no	Edwards chert
Folsom base	17005-39	6-11-1939	no	Edwards chert
Folsom base	17006-39	6-22-1939	yes	chert
Folsom point	17007-39	6-22-1939	yes	Edwards chert
Folsom fragment	17008-39	6-23-1939	yes	Edwards chert
Folsom point	17009-39	6-27-1939	yes	Edwards chert
Folsom tip	17010-39	6-1939	yes	Edwards chert
Side scraper	17011-39	7-1-1939	no	Edwards chert
Seven flakes:	17012-39	6-29-1939	yes	
6 retouch flakes				Edwards chert
1 retouch flake				Alibates agate
4 retouch flakes				Edwards chert
Four flakes:	17013-39	7-2-1939	no[a]	
2 retouch flakes				Edwards chert
1 possible point midsection				Alibates agate
1 tertiary flake				Alibates agate
Gastropods	17014-39	1939	yes	
Folsom point	17015-39	7-3-1939	yes	Edwards chert
Side scraper	17016-39	7-7-1939	yes	Alibates agate
Side scraper	17017-39	7-14-1939	yes	Alibates agate
Folsom tip	17018-39	7-31-1939	yes	Edwards chert
Folsom fragment	17019-39	8-7-1939	yes	Alibates agate
Channel flake	17020-39	8-11-1939	yes	Alibates agate
Folsom base	17021-39	8-11-1939	yes	Alibates agate
Folsom point	17022-39	8-11-1939	yes	Edwards chert
Folsom point	17023-39	8-21-1939	yes	Edwards chert
Folsom tip	17024-39	8-22-1939	yes	Edwards chert
Flake tool	17025-39	8-22-1939	yes	Alibates agate
Folsom point	17026-39	1939b	yes	Edwards chert
Flake tool	17027-39	1939[b]	yes	Edwards chert
Flake tool	17028-39	1939[b]	yes	Edwards chert
Folsom point	7545	1946	no	Edwards chert
Folsom base	7546	1946	no	Edwards chert
Flake tool/spur	7547	1946	yes	Alibates agate
Flake tool	7548	1946	yes	Edwards chert
Folsom base	7549	1946	no[a]	Edwards chert
Folsom base	7028	1946	no	Edwards chert

Table 1. (Continued)

Specimen Type	Catalog Number	Date Found	In Situ?	Raw Material Type
Flat rock	—	1946	yes	limestone
Smoothed stone	—	1946	yes	quartzite ?
Folsom point, broken	A78-28-1	1978	—	Alibates agate
Flake tool	41LP1-86-1	12-2-1986	no	Edwards chert
Channel flake	41LP1-86-2	12-2-1986	no	Edwards chert
Flake tool fragment	41LP1-88-1	2-26-1988	no[a]	brown quartzite
Flake fragment	41LP1-88-2	8-11-1988	no[a]	Edwards chert
Flake fragment	41LP1-88-3	8-11-1988	no[a]	Edwards chert

[a] Pieces found in screening.
[b] Artifacts found in situ when excavating block in museum.

favorably with the collection of *Bison antiquus taylori* from the Folsom Quarry in New Mexico (see Table 2). There is a certain amount of overlapping in the size and form of the smallest Lipscomb individuals and modern *Bison bison*. The bison material from Lipscomb is also being compared with the extensive collection from the Scottsbluff Bison Quarry in western Nebraska, where Yuma points were collected in 1932, in order to determine whether the bison associated with the two artifact complexes differ from each other.

Several important aspects of Schultz's (1943) report are summarized as follows:

1. There was a distinct concentration of articulated and partially articulated bison in a small area of the site.
2. There were at least 23 bison represented by 14 partially articulated skeletons and 9 additional skulls. A concentration of skulls was noted in the southern area (Barbour and Schultz 1941).
3. The skeletons were oriented primarily toward the east and south.
4. There was evidence of fire and probable hearth areas located primarily on the margins of the dense bone bed. Other evidence of processing activity on the margins of the bone bed were split bones and limestone cobbles found in the northern part of the excavation.
5. Variation in the condition of the bone was correlated with depth below the surface and was apparently due to differential weathering and the action of grass roots. Bone at the north end of the quarry was relatively shallow and

Table 2. In Situ Artifact Positions With Bison Elements at Lipscomb Bison Quarry, 1939

Catalog Number	Specimen Type	Condition of Specimen	Associated Skeletal Elements	Date Found
17002-39	Folsom point	complete	unknown[1]	6-10-39
17003-39	Folsom point	complete	proximal radius	6-11-39
17006-39	Folsom point	base	ulna	6-22-39
17007-39	Folsom point	complete	distal humerus	6-22-39
17008-39	Folsom point	tip	none[2]	6-23-39
17009-39	Folsom point	complete	ribs behind scapula	6-27-39
17012-39	Flakes		among ribs	6-29-39
17011-39	"Knife" tool		none[2]	7-1-39
17013-39	Flakes		none[2]	7-2-39
17015-39	Folsom point	complete	radius	7-3-39
17016-39	"Knife" tool		none[3]	7-8-39
17017-39	"Knife" tool		radius & ulna	7-15-39
17018-39	Folsom point	tip	unknown[4]	7-31-39
17019-39	Folsom point	broken	unidentified bones	8-7-39
17021-39	Folsom point	base only	base of skull	8-11-39
17022-39	Folsom point	complete	skull	8-11-39
17020-39	Channel flake	midsection	scapula	8-11-39
—	Flake		mandible	8-17-39
17023-39	Folsom point	complete	radius	8-21-39
17024-39	Folsom point	tip	unknown[5]	8-22-39
17025-39	"Knife" tool		unknown[5]	8-22-39
17026-39	Folsom point	complete	with bones[6]	—

[1] West edge of the central bone concentration
[2] Eroded terrace slope wesst of the bonebed
[3] Perimeter trench
[4] Eastern extension trench
[5] Northern part of excavation area
[6] Found in Museum during preparation of cast

poorly preserved, whereas bone at the south end was more deeply buried and better preserved.

6. The articulated skeletons were seen as evidence for very limited postoccupation carnivore disturbance to the bonebed. Also, encrusted lime or carbonates on the lower surface of bones and tools indicated that they had not been greatly disturbed.
7. The limited evidence for butchering of the many articulated units were interpreted to reflect overkill or a surplus of usable bison products.
8. The central area of the bone bed was interpreted to have been buried soon after the kill, judging by its intactness, lack of carnivore evidence, and degree of preservation.

9. The significance of the site as a paleontological resource is noted by comparison with the less well preserved remains from the Folsom site.
10. The number of projectile points, flakes, and tools in conjunction with the evidence of hearths suggested processing and perhaps camping by Folsom hunters adjacent to the kill.

Most interpretations and discussions of Lipscomb that have appeared to date are based on Schultz's 1943 paper, but there has been considerable variation in the interpretations offered for the Lipscomb kill as witnessed by the following quotations. These are ordered chronologically and are only a selection intended to show the perspectives of various researchers on the Lipscomb site.

Sauer (1944:543) has suggested that fire drive was used to trap the bison at Lipscomb an interpretation noted subsequently by Wedel (1961:76). Sauer's comments follow.

> A herd of lumbering animals, feeding on the plains, could be cut off by a line of fire before they gained the shelter of a valley. Or, panic-stricken, they could be driven toward a valley in such a fashion that they piled up in the ravines at its edge of tumbled over the rimrock that hems many plains valleys. In either case the fire hunters had only to dispatch maimed and injured animals. That such kills sometimes far exceed the needs of the hunters is indicated the the piling up in one spot of numerous complete skeletons. The conditions at the Lipscomb Bison Quarry are especially illustrative.

Sellards (1952:58–59), who visited the Lipscomb site during excavations in 1939, provides an extended discussion of the site.

> In the Lipscomb County, Texas, Schultz (1943) excavated a site which evidently represents a bison kill by Folsom man. The bones at this place were distributed over an area about 100 by 20 feet. In the part of the quarry where the bones were most concentrated Schultz reports fourteen articulated skeletons, including skulls, in an area 12 by 20 feet. "The skeletons were headed chiefly in an easterly or southerly direction and overlapped one another considerably. The skeletons of some individuals were entire, including even the caudal vertebrae" (Schultz, 1943, p. 246).
>
> Twenty-two artifacts were found by Schultz at this locality in 1939. Of these were eighteen were projectile points, and of the eighteen projectile points (whole or broken) fifteen were found situ in the bone bed and three in the talus removed in excavating. The remaining artifacts include scrapers, flake knife, and one channel flake. The projectile points are of the Folsom culture.
>
> The description of the skeletons as heading in one direction, one overlapping the other, suggests that the animals, during a storm, entered one of many depressions of the plains where the snow was of such depth as to compel them to stop, some to freeze, and others to be killed by man.

Certain it is that the skeletons were in a natural depression and many of the animals, if not all, entered the depressions at the same time as a herd or part of a herd.

An incident of modern bison caught by a snowstorm and falling an easy victim to hunters is related by Garreston (1938, p. 88) from Shoemaker as follows: "The buffalo were all huddled together, up to their necks in snow, in a great hollow space known as the sink in the heart of the White Mountains, near the present town of Weiket, Union County, Pennsylvania. The animals were numb from cold and hunger, and were unable to move, so deep were they crusted in the great drift. The hunters started at once to slaughter the helpless bison. Some were shot, but most of them were killed by cutting their throats with long bear knives. Many of the tongues were saved, and that was about all, as the snow was too deep to attempt skinning them."

Hornaday (1899, p. 384) records an incident in which bison in the vicinity of Hay and Peace Rivers near Great Slave Lake, Canada, caught in an exceptionally heavy snowstorm of 1821, froze to death by the thousands, their skeletons having persisted on the plains until at least as late as 1871.

Suhm, Krieger, and Jelks (1954:65) described Libscomb somewhat inaccurately as follows:

Pleistocene lake bed site 11 miles southwest of Lipscomb, Texas. Extinct bison the principle fauna. Eighteen points of Folsom type, two scrapers, a flake knife, and a channel flake in association with the bison. Excavated in 1939 by C. Bertrand Schultz for Nebraska State Museum.

Wormington (1957:40), provided this paragraph concerning the Lipscomb site.

Another interesting site, which was reported by C. Bertrand Schultz (1943), is the Lipscomb Bison Quarry, which lies eleven miles southwest of Lipscomb, Texas. Here were found fourteen articulated bison skeletons and nine skulls which, for the most part are like those found at the Folsom Quarry. Eighteen artifacts were found scattered among the bones, and four were found in the quarry talus. They closely resembled those obtained at the Lindenmeier Site. They included Folsom points, scrapers, channel flakes, and utilized flakes that probably served as knives.

Wedel (1961:62), in his widely used source book, summarized the findings at Lipscomb.

At the Lipscomb bison quarry. sixteen miles north of Canadian, Texas, eighteen projectile points, several side scrapers, an end scraper, two flake knives, and a number of chips were found in association with a mass of fossil bison skeletons. Charcoal and ashes were noted among the bones, as well as indications of hearths; and some of the bones had been split and

> cut. Many of the skeletons are reported to have been in articulation, including fourteen with skulls in an area measuring but twelve by twenty feet. Of these, it was said that the "skeletons were headed chiefly in an easterly or southerly direction and overlapped on another considerably." It has been suggested that the animals may have been a herd which, caught perhaps in a snow storm, wandered into a depression, stopped, and perished by the hand of man.

In his 1968 dissertation, Henry Irwin commented on the Lipscomb site as a kill having no campsite debris and stated that

> Lubbock and Blackwater are kill sites by pond edges, while the type site and Lipscomb are kill sites of the kind where the bison were undoubtedly captured by drive and surround techniques. Bonfire shelter represents an excellent instance of a drive over the cliff, and in [is] the earliest evidence we have for such a kill technique.

Wheat (1972:160) provided this discussion of the Lipscomb situation.

> There is one Folsom period site which indicates the use of a mass kill technique, although the published evidence is not detailed enough to reconstruct more than the broad outlines of the kill. This is the Lipscomb Bison Quarry site (Schultz 1943:244–248). Here the evidence suggests that a pond or gully in or near Sand Creek had been used as a trap for a small herd of bison driven or stampeded over a low hill to the west. The bone bed extended about 30m. north to south, and 7m. east to west, and varied from 18 to 38 cm. in thickness. At the south end of the quarry there were 14 articulated skeletons, including skulls, in an area only 3.6 m. wide and 7.0 m. long. All were oriented east or south, and overlapped each other to a considerable extent. Some of these skeletons were entire, but others had been partly butchered. In the area immediately surrounding the skeletons were 9 additional skulls. At the north end of the quarry most of the skeletons had been more heavily butchered and the bones were badly broken and scattered. Folsom points and other artifacts were scattered. Folsom points and other artifacts were scattered throughout the quarry, and charcoal and ashes were associated with the bones in several parts of the bone bed, especially in the southern part where separate fires were indicated. The fact that many of the bison were not completely butchered suggests the the hunting party was not large, or that only meat, skins, and so forth, for immediate need were taken.

Frison (1974:12) suggests that "the Lipscomb site (Schultz 1943) could have been a trap or drive over bank of a stream. Unfortunately the actual number of animals is not given, but complete specimens were found."

Frison (1978:114, 247) also mentions Lipscomb in his discussion of Folsom culture and the evolution of bison hunting on the plains.

> The Lipscomb site on the Southern Plains (Schultz 1943) with 14 articulated or partially articulated bison skeletons may be a communal kill. Analysis of the Lipscomb dentitions should yield information on the nature of the kill (whether a single event or several events over a period of time) and possibly also some information of seasonality.... The evidence suggests that systematic, communal hunting began early. Folsom groups were aware of bison jumping methods if the data from Bonfire Shelter have been properly interpreted. Trapping methods appear almost certain to have been around considering the age structure of the Folsom site bison and the number of animals at the Lipscomb Bison Quarry.

Johnson (1978:99) suggests that Lipscomb represented a single-event bison drive.

> These localities, such as Plainview, Lipscomb, and Rex Rodgers, are multiple-animal bison drives into narrow draws or stream channels ... the bison were all killed in single drives, and none of these areas was used again for that purpose.

Nicholson (1982) has argued that Paleoindian bison hunting was a small group affair with no convincing evidence for organized communal bison hunts until Archaic times. He incorporates Lipscomb into the discussion (1982:7).

> Several sites such as the Lipscomb Bison Quarry (Schultz 1943) and Plainview (Sellards 1947) indicate that the bison were driven over low hills or shallow escarpments which, in themselves, would not have constituted a trap or a serious fall. A further indication of seasonality is the presence [sic] at Plainview of several near full term fetal skeletons (Sellards 1947). If these low areas were filled with snow, they would have constituted an effective trap. Many of the areas where Paleoindian kills are recorded are locations where, due to the growth of tall reeds or brush such as willows, concealment would be offered to waiting hunters, and snow could accumulate in deep drifts so that a stampeded herd would flounder and be severely restricted in mobility. Hunters, wearing rawhide or basketry snowshoes, would be able to approach and dispatch the animals under these circumstances.
>
> Evidence for something as ephemeral as a snowdrift trap is going to be extremely difficult to recover or to demonstrate in a convincing manner. If it can be assumed that gestation and seasonality of birth are identical in extinct and extant species of bison, then the precise aging of thanatic assemblages may indicate whether these "open spaces" kills occurred at a time when the digging of holes in frozen ground would have been a problem, and when deeply drifted snow could have been present. The same sort of precision in aging, coupled with exact provenience, might indicate, through vertical and/or horizontal stratigraphy, whether kills were catastrophic single events or accretional deposits built up over several

> months. It may be that some distinctive pattern associated with processing, such as the restriction of elements associated butchering artifacts to pathways which had been trampled in the snow, could be identified as winter bison procurement complex, utilizing snow entrapment, developed on the High Plains, the technology may have been lost with the reduction in both precipitation and the number of bison available during the Altithermal, a period of supposed desiccation of the environment.

Johnson (1987:157) mentions Lipscomb in what has become a fairly common perspective on Folsom bison hunting as a small-scale version of the larger kills of later times.

> By Folsom times the scaled-down version of large-scale bison kills was beginning to occur. Twenty-three animals each were recorded at Folsom (Wormington, 1957) and Lipscomb (Schultz, 1943), and a larger number from Bonfire Shelter (Dibble and Lorrain, 1968). The kill at Lake Theo (Harrison and Smith, 1975; Harrison and Killen, 1978) appears to be another smaller version of the large-scale kill. Such kills continued into post-Folsom times, exemplified by Jurgens (Wheat, 1979) with 35 bison.

In their recent general discussion of Folsom bison hunting, Bonnichsen and others (1987:413) use Lipscomb as a possible example of an arroyo trap.

> Folsom bison-hunting techniques include cliff drives such as at Bonfire, arroyo knickpoint traps at Folsom and possibly Lipscomb, and especially simple ambush around springs and playa lakes such as at the Linger and Zapata sites. Compared to later Plano kill sites, Folsom kill sites have usually less than 10 animals. These small and under-utilized bison kills may reflect an opportunistic hunting strategy rather than the larger well-organized communal bison kills seen in the ensuing Paleoindian periods on the Plains.

Gunnerson (1987:15) recently summarized the Lipscomb site.

> The Lipscomb Bison Quarry, located in the northeast corner of the Texas Panhandle, is interesting and potentially important, but excavation there has never been fully reported. In a preliminary article Schultz (1943) lists 26 stone artifacts, several of which are illustrated. Included are 18 projectile points or fragments (of the 10 illustrated, all are fluted and some conform to the classic Folsom shape), one end scraper, 4 side scrapers, 2 possible flake knives, and a channel flake. Eleven chips were also recovered. *Bison antiquus* remains included 14 articulated skeletons with the bones well fossilized; detailed measurements are given on one of the largest male skulls. Charcoal and ash from the site gave evidence of fire.

Summary of Previous Interpretations: What Was Lipscomb Really Like?

There have been a variety of interpretations offered for the Lipscomb site as to nature of the kill, number of bison present (cf. Agenbroad 1978; Hester 1967:180; Wendorf and Hester 1962), hunting methods used, and topography and geomorphology of the site area. The Lipscomb site has been interpreted as a fire drive, a snow drift trap, a surround, and a possible arroyo trap. The land surface has been reported as a pond, gully, Pleistocene lake bed, shallow escarpment, and natural depression. The question or possibility of multiple kills has been noted, and the site has been said to lack campsite evidence, to have campsite evidence, and to represent a simple kill and processing site.

These diverse interpretations highlight the need for further investigation of the site's geochronology, seasonality studies, paleoecology, bone bed analysis, and functional-technological lithic analysis. Detailed reconsideration of the 1939 investigations and further field work are needed in order to clarify misunderstandings and erroneous interpretations, and to develop an accurate picture of the site's history. Study of the seasonality and taphonomic aspects of the bone bed have been discussed (Todd et al. 1988). Aspects of the geology, geomorphic history, soils, and paleoecology must await further fieldwork.

1939 EXCAVATIONS AT LIPSCOMB

The most extensive field work at the Lipscomb site was in 1939, and by far, most of materials recovered from the site came from the 1939 field season. As noted, this work extended from June 10 through August 26, with a field crew consisting of three to five. Schultz's (1943) report has provided some interpretation of the 1939 work in terms of geological setting, taphonomic circumstances, nature of the bone bed, description of the artifacts, and comparison with other localities. These aspects of the analysis will be considered in more detail below, and deserve continued research. The 1939 field notes prepared by William Hendy (1939) are very insightful, of high quality, and provide an important body of information about the Lipscomb site. Aspects of these notes that pertain to the field methods, historical information about the site, the nature of the bone bed, condition of the bone, and the associated artifacts are reproduced here. Catalog numbers assigned each day are also listed in the field notes. For many days, the last number listed was the first to be used on the following day.

> Saturday, June 10, 1939.—The bones are exposed along a bank for about 50 feet and are about 6" to 1 foot beneath the surface. The bank is about 3' high and is about 20 feet above an intermittent stream to the west. We screened some of the wash at the base of the bank without any results. We started to follow some of the exposed bones back and found those near the surface quite soft and rotten though hard and in good condition where exposed. John Adams found a Folsom point in place and partially exposed.

The bone in which the point was found was pretty well disintegrated but was probably a scapula.

Sunday, June 11, 1939.—William Hendy uncovered another Folsom point in place near the upper end of radius (?) and about 15" from point found yesterday. John Adams found a point at the base of the bank associated with some fragmentary bones. The upper part of a small point was also screened out of the material removed.

The procedure followed was to skim off the sod with a shovel and then work back from the exposed ends of the bones with hand tools.

Bones collected mostly lower extremities of limbs 16,100-39 to 16,110-39.

Monday, June 12, 1939.—Rain soaked into the working face of quarry making the bones very fragile and hard to work out. Bones collected mostly limb bones. 16,111-39 to 16,120–39.

Tuesday, June 13, 1939.—Bones are so thrown together that it is difficult to work individual bones out. Many of them are scattered. Are beginning to uncover some vertebra. One small flint chip was collected. Bones collected included a number of ribs and limb bones, 16,121–39 to 16,124–39.

Wednesday, June 14, 1939.—Work progresses rather slowly due to the bones being so jumbled together. Many of the limb bones are in an articulated condition, also a number of vertebra but usually a number of miscellaneous bones are scattered in with these. Bones collected 16,125–39 to 16, 135–39.

Thursday, June 15, 1939.—Work still progresses rather slowly due to jumbled mass of bones which necessitates slow work with hand tools. Uncovered several ramii but all in poor condition. . . Bones collected 16,136–39 to 16,138–39.

Friday, June 16, 1939.—Uncovered a fair scapula and a number of leg bones which usually have poor ends. Quite a few of the bones are those of immature animals. Bones collected 16,139-39 to 16,150-39.

Saturday, June 17, 1939.—Spent the morning in sieving and working wash at base of ledge with hand tools but only found one possible flint chip. Continued work on bone pile in afternoon. Bones collected 16,151-39 to 16,156-39.

Sunday, June 18, 1939.—Met H. Tourtelot who had a tent, sack of plaster, and a sure seal for us.

Monday, June 19, 1939.—Uncovered a horn core today but did not get it worked out enough to tell much about its size or condition of skull to which it is attached. Only seems to be one horn on the skull and probably several skulls in close proximity to one another. Bones collected 16,157-39 to 16,174-39.

Tuesday, June 20, 1939.—Bones collected 16,175-39 to 16,182-39.

Thursday, June 22, 1939.—One skull minus one horn was removed, also an immature skull and another large skull was uncovered. A number of vertebra were removed.

John Adams found the top of a small point while digging out the skull. It was evidently associated with as ulna found under the skull. William Hendy uncovered a small point at the lower end of a humerus.

Bones collected 16,183-39 to 16,197-39.

Friday, June 23, 1939.—The tip of a point was found by John Adams in the wash at the base of the bank to the north of the main area.

Sunday, June 25, 1939.—The large skull does not seem to have been hurt by the rains and as far as it is uncovered is complete. A Mr. Baldwin who once owned the land on which the quarry is located visited the site and said he first noted the bones exposed here about 30 years ago. Commodore Hooper said he first noted the bones at this exposure about 1911 or 1912. Bones collected 16,197-39 to 16,207-39.

Monday, June 26, 1939.—Are still working at the same spot and the bones are still in abundance. So far we have not found a scapula, ulna, pelvis and some of the vertebra complete, but with the amount of material apparently at the site we should be able to get a complete skeleton. Bones collected 16,207-39 to 16,230-39.

Tuesday, June 27, 1939.—William Hendy uncovered a point in place between the ribs of a young specimen. It was some distance back of the scapula which was articulated with the rest of the front leg bones. The point was protruding from between the ribs toward the outside on the right side. It had apparently entered from the left side and had worked through to the right side during burial.

A small skull partly disintegrated was removed from over the large skull which is complete. The left horn is partly gone but the right horn is complete. Bones collected 16,230-39 to 16,240-39.

Wednesday, June 28, 1939.—Bones collected 16,240-39 to 16,243-39.

Thursday, June 29, 1939.—Completed the removal of the large skull today. It was articulated with a number of vertebra which were in good condition except for the spines. A large radius and ulna were articulated with this skull and vertebras but the scapula was in poor condition. A number of ribs in good condition are showing up. John Adams found several flint chippings in some ribs. Bones collected 16,243-39 to 16,250-39.

Friday, June 30, 1939.—Worked out a number of vertebra articulated with the large skull and also a number of ribs. Bones collected 16,400-39 to 16,410, 16, 250-39 to 16, 265-39.

Saturday, July 1, 1939.—Mr. Schultz suggested that we sieve some of the wash along the base of the cliff in preparation for putting a trench around the site to determine its limits. A knife was found in the wash at the south end. Bones collected 16,410-39 to 16, 431-39.

Sunday, July 2, 1939. —C. B. Schultz began the digging of a trench at the south end of the site and work was also started at the northern limit of the bones which were found to be scattered and only to extend about 18" back from the face of the bank. Some articulation of metapodials and phalanges was found. A few pieces of flint were found in the wash while sieving.

Monday, July 3, 1939.—William Hendy found a point. . . associated apparently with a radius. The radius was broken off near the lower end and [the] point was in a matrix lying on two phalanges as if it may have been associated with them.

The afternoon was spent in wrapping all bones, cleaning up all fragmentary bones and fencing in the site. Bones collected 16,265-39 to 16,290-39.

Saturday, July 8, 1939.—Continued working on the trenches to outline the extent of the site today. Found a knife in the trench.

Monday, July 10, 1939.—Continued work on the trenches this morning. Worked on a trench through the center of the site to intersect the trench outlining the area. Bones collected 16,290-39 to 16,300-39.

Tuesday, July 11, 1939.—Finished the trench around the outside of the area. Found bones in only a few scattered places and at approximately the level of the floor making them deeper than in [the] main part of the quarry. Made two extensions of the trench at the southeast corner of the site. Found a few fragments of bone 6' south of the corner and some teeth 11' east but nothing beyond these extremities.

Wednesday, July 12, 1939.—Made casts and collected the bones exposed. Bones collected 16,301-39 to 16,331-39.

Thursday, July 13, 1939.—Continued work on the trench through the center of the quarry. Began the removal of a second articulated skeleton which runs off in a southerly direction. Bones collected 16,331-39 to 16,341-39.

Friday, July 14, 1939.—Completed the trench through the center of the quarry. The bones thin out as the outer trench is reached and the present picture seems to indicate there was a pile of carcasses here. Bones collected 16,341-39 to 16,350-39.

Saturday, July 15, 1939.—Laid off the area in 5' squares in order to be able to plot the position of important finds. James Crosbie found a knife associated with a radius and ulna. Bones collected 16,350-39 to 16,364-39.

Monday, July 17, 1939.—Uncovered a square (5 x 5) north of the central trench and began working down from the top. Two skulls in poor condition and one with one horn and upper part of skull gone due to proximity to the surface were partially uncovered. Most of the bones in this area are articulated. Bones collected 16,364-39 to 16,379-39.

Tuesday, July 18, 1939.—Began the uncovering of a square in the south east corner. The bones are scattered here and are from 1' to 2' below the surface. The bones are better preserved in this area much of which seems to be overlain with a calcareous soil, the bones being at the edge of this or in a sandy zone below.

Wednesday, July 19, 1939.—Continued work in same area in which we were working yesterday. Uncovered a skull in fair condition. Removed two small but complete scapulas and a number of scattered metapodials and phalanges, all in good condition. Bones collected 16,379-39 to 16-400-39.

Thursday, July 20, 1939—Completed casting and removal of the skull today. One ramus was broken off and lay underneath the skull. A complete scapula lay underneath and to the back of the skull.

Did some work in the area worked the first of the week. Uncovered a mandible lying across the nasals. This skull is apparently twisted and turned so that it lies top up on its own vertebra. The atlas and axis are visible at the back. Removed several articulated bones, one piece including the entire front leg from humerus on.

Friday, July 21, 1939.—Mr. Schultz and Dr. Eiseley accompanied by their wives arrived about 10:00. A few minutes later Dr. Sellards, State Geologist of Texas and wife arrived to inspect the work which apparently has his approval. Mr. Schultz and Dr. Eiseley did some digging in the afternoon. Removed a skull in poor condition and several leg bones. Mr. Schultz said he did not believe it worth while to save unassociated and badly broken bones. Bones collected 16,451-39 to 16,476-39.

Saturday, July 22, 1939.—Removed an unassociated ramus and scapula from the southwest corner both in good condition. Bones collected, 16,476-39 to 16,487-39.

Monday, July 24, 1939.—Worked around skull which appeared to be lying on its own vertebra but find that there is no skull attached to the vertebra underneath it and the skull is attached to vertebra at its side some of the spines of which lie across the skull. The vertebra underneath have two scapulas and front leg bones articulated with them. Bones collected, 16,487-39 to 16, 494-39.

Tuesday, July 25, 1939.—Had a visit this morning from Judge Mead of Miami, Texas and W. D. Mateer, late of Oklahoma but now with the Bureau of Economic Geology of Texas. Both men seemed to be interested in doing some excavating at our site. Continued work on northeast part of quarry. Bones collected, 16,494-39 to 16,510-39.

Wednesday, July 26, 1939.—Worked out several more vertebra belonging to the large skeleton and uncovered part of the sacrum and pelvis. Continued work on the two skeletons on the north side of our site (skeletons A & B) but they are so closely associated that it is difficult to block our parts to be cast.

Thursday, July 27, 1939.—Cast the skull and the vertebra and scapulas belonging to another skeleton which lay underneath it. The entire front leg bones are also there. Removed the top toward the northeast and found a skull with the mandible and maxillary left. Toward the edge the bones are almost at the surface and scattered. The[re] were a number of calcareous rocks associated with the bones here. Found two rounded pieces of quartz associated with the bones in this area. Bones collected, 16,510-39 to 16,539-39.

Friday, July 28, 1939.—Found a mandible and maxillary partly overlaying the vertebra of skeleton C. to the cervical vertebra of this skeleton we found a scapula and front leg attached. Underneath was another complete leg but no scapula was found. Toward the edge of the site just west of here there seems to be a concentration of limb bones and lumbar vertebra. Bones collected, 16,431-39 to 16,438-39 and 16,539-39 to 16,550-39.

Saturday, July 29, 1939. —Continued work this morning on skeleton C and completed its removal. Bones collected, 16,550-39 to 16,560-39.

Sunday, July 30, 1939.—C. B. Schultz arrived about 7:00 and we spent an hour and a half at the site receiving directions for the continuation of the work. Tourtelot and Kubicek are to join us tomorrow.

Monday, July 31, 1939.—Uncovered 3 more skulls and parts of several others in the same area. The skeletons seem to be completely articulated and do not appear to have been butchered though they are much twisted in the position they occupy.

Harry Tourtelot and Robert Kubicek arrived about 10:30 P.M. John Adams found a broken point on the bank of [the] eastern extension of the trench on the southern edge of the quarry. It was partly in the matrix characteristic of this area and was probably thrown out with some of the loose dirt worked away from the bones. Bones collected, 16,660-39 to 16,671-39.

Tuesday, August 1, 1939.—Dug a trench to the north along the edge of the bone bed. Found no bones more than 3' from the bank so that there is not a very great concentration of bones to the north of the main area. Uncovered more in the afternoon and began to work out some blocks.

Wednesday, August 2, 1939. —Jack Crosbie, Harry Tourtelot and William Hendy made a map of the quarry this morning. In the afternoon they began a general map of the area while John Adams and Robert Kubicek continued work in the quarry. Bones collected, 16,674-39 to 16,678-39.

Thursday, August 3, 1939.—Work was continued on the map and at the quarry by the parties mentioned yesterday. The party at the quarry is working on several blocks of bones. Bones collected, 16,678-39 to 16,687-39.

Friday, August 4, 1939.—Work was continued in the afternoon at the quarry and on the map. One large block was removed at the quarry. Bones collected, 16,687-39 to 16,692-39.

Saturday, August 4, 1939.—The mapping party finished work this morning. All of the personnel worked at the quarry this afternoon. Are starting to block out several large areas of bones to be case.

Bones collected, 16,692-39 to 16,698-39.

Sunday, August 6, 1939.—Jack Crosbie and William Hendy made a traverse to measure the elevations of the various terraces.

Monday, August 7, 1939.—Robert Kubicek found a piece of a point associated with the bones. All work is being concentrated on the northern part of the area in working out several large blocks of bones.

The bones near the edge at the north are only a few inches below the surface, though they become deeper and the thickness of the layer increases rapidly to the south. There have been a number of rather large calcareous rocks (2" to 6" in largest dimension) found associated with the bones around the periphery of this area. A definite slope to the south and west is noticeable which in the floor which contains many calcareous concentrations (lumps crumble when dug out).

Tuesday, August 8, 1939.—Continued work on several large blocks. In order to get them out it is necessary to remove some of the bones which interlace the area together but by careful work it is possible to save most of the bones. Bones collected, 16,698-39 to 16,706-39.

Wednesday, August 9, 1939.—Continued work on the blocks being taken out and got most of them blocked out and ready to be cast. Began work on the south side of the quarry. Uncovered several scapulas and ramii about 18" below the surface. The matrix is more sandy and the[y] rest on the sandy floor. Quite a number of invertebrates are recovered in this area (Gastropods). Bones collected 16,706-39 to 16,710-39.

Thursday, August 10, 1939.—Continued work on the south part of the quarry. The bones lie about 15" to 18" below the surface and are in a more sandy matrix. They are more scattered and are in better condition. Two skulls were uncovered about in the center along the south trench.

Friday, August 11, 1939.—Harry Tourtelot found the base of a point at the back of a skull and on turning the skull over found a point in the matrix of the maxillary, no mandible being attached. William Hendy found a knife or a flake from the center of a point near a scapula and slightly below the floor on which the bones rest. Another skull upside down also found close to the one carrying the point. Bones collected, 16,710-39 to 16,724-39.

Saturday, August 12, 1939.—Continued work on the south side. In one area six scapulas were found, a few front limb bones and a few scattered vertebra. Bones collected, 16,724-39 to 16,736-39.

Monday, August 14, 1939.—Continued work on the south side. Along the bank on the west the bones are only a few inches below the surface and are in poor condition. deeper several columns of vertebra were found. Bones collected, 16,736-39 to 16,741-39.

Tuesday, August 15, 1939.—Mr. F. V. Studer paid us a visit today and seemed pleased with the finds we were making. He was very much interested in the artifacts. Work was continued on the south side of the quarry. Bones collected, 16,741-39 to 16,571-39.

Wednesday, August 16, 1939.—Removed two skulls and uncovered a third one, which is upside down and in poor condition. Bones collected, 16,745-39 to 16,751-39.

Thursday, August 17, 1939.—Continued work on the south side again today. Uncovered a small skull complete with mandible. A large flint flake was found at the front of the mandible. Bones collected, 16,751-39 to 16,759-39.

Friday, August 18, 1939.—Along the bank on the west side of the quarry a skeleton complete, except that due to the nearness to the surface the skull and parts of the spines on the vertebra and the ribs are in poor condition, has been uncovered. Bones collected, 16.759-39 to 16,767-39.

Saturday, August 19, 1939.—Removed the skull found Thursday. Several ramii were near it but it had a complete mandible. Bones collected, 16,560-39 to 16,568-39.

Sunday, August 20, 1939.—Worked at the quarry all day casting all possible material in preparation for removing remaining bones the first of this coming week.

Monday, August 21, 1939.—Uncovered the remaining bones in the main part of the quarry and began to work out several blocks. Found two skulls in the area and the back of another including the horn cores. John Adams found a point associated with a radius and ulna. Bones collected, 16,568-39 to 16,578-39.

Tuesday, August 22, 1939.—Worked on the north end of the quarry and took out most of [the] dirt along the edge with a shovel. The bones were very scattered with a concentration of bones being found at intervals and with few or no bones between the spots where they are concentrated. William Hendy found the tip of a point and John Adams found a knife. Upon discovery of these artifacts more pains were taken is removing the matrix but no more artifacts were found. Most of the bones in this area were limb bones, but a few vertebra, ribs, scapulas and teeth were also found. These bones were from 4" to 8" below the surface and the grass roots had broken up all but smaller heavier bones. We worked back to the trench previously excavated along the eastern side of this and removed all material between it and the from the bank.

Commodore Hopper informed me that the land had been sold to Mr. Sam Waters who expects to take over next May when Com's lease is up.

Bones collected, 16,578-39 to 16,586-39.

Wednesday, August 23, 1939.—Continued work on the center of the quarry. Removed two blocks and cast up the last block. The plaster which we had to purchase in Canadian was not too good and it was necessary to go to town this evening and order more plaster which is to be sent from Amarillo tomorrow morning.Bones collected, 16,438-39 to 16,446-39 and 16,767-39 to 16,796-39.

Thursday, August 24, 1939.—William Hendy went to town early this morning to get the plaster. The other boys spent the time in filling in the quarry. Completed the removal of all material and filled in the quarry in the afternoon. Bones collected, 16,796-39 to 16,803-39.

Friday, August 25, 1939.—Spent the [day] building boxes and loading the freight car.

Saturday, August 26, 1939.—Broke camp and finished our business in Canadian.

Summary of the 1939 Lipscomb Excavations

Several key aspects of Hendy's 1939 excavation field notes should be emphasized:

1. The field methodology was quite good and was geared to recovery and preservation of the bison fauna; care also was taken to locate and record artifacts in situ (Table 1). Screening (seiving) of the fill was apparently standard practice, but it is uncertain whether the fill that was removed from around the dense bone concentrations was always screened. The five-square grid map with plotted bones has not been found

.2. Clusters of skulls are noted in the excavation. Some of these were still articulated, but others may reflect butchering/processing activities or even intentional postprocessing arrangement. Patterned placement of crania was evident at the Vore site (Reher and Frison 1980), and patterned distribution of elements is noted for other Paleoindian kill sites (e. g., Wheat 1972). An illustration of the Folsom site bone bed (Wormington 1957:Figure 3) shows two overturned skulls adjacent to one another. A unique Folsom feature at the Lake Theo site located near the Caprock escarpment 120 km south of Lipscomb, contained a small circular arrangement of selected elements, consisting of a thoracic vertebra, mandibles, tibiae, and a femur all placed in an upright position in a small pit (Harrison and Killen 1978). It has been suggested that a bison skull was placed atop this feature as an offering.

3. Patterned occurrence of projectile points with forelimb elements is indicated by the in situ finds of Folsom points mentioned in the field notes (Table 2, Table 3). All eight projectile points found in situ were associated with the front half of the bison, from the ribs just behind the scapula to the crania. This information provides some limited clues to the actual tactics used in bison hunting by Folsom hunters.

4. Different types of sediment underlie the bone bed; sediments on the south end of the deposit contain sand and gastropods. The presence of gastropods in the bone

Table 3. Crosstabulation of Point and Tool Associations With Skeletal Elements at Lipscomb Bison Quarry, 1939

Points/ Tools	Upper Forelimb (Scapula, humerus, ulna, radius)	Other Locations (Skull, rib cage)	Totals
Points	5	3	8
Tools	2	1	3
Flakes	0[1]	present[2]	
Totals	7	4	11

[1] The single excavated channel flake was found in association with a scapula and is included here with the tools.
[2] One flake was found in association with a mandible, and several flakes were found together among the ribs.

bed level and a sandy substrate was also noted in the southern area during the 1988 testing.

5. The land surface on which the bone bed occurs, which was apparently the surface at the time of the kill, slopes to the southwest. This lower southwest part is also where the sandy substrate occurs and where the gastropod fauna is common. If the animals were moving to the south and east, as suggested by the orientation of the articulated units in the bone bed, they would have been moving downgrade, but perhaps also up the east bank of a stream, pond, or gully located to the west of the kill spot.

6. Different kinds of materials, such as the large rocks and charcoal concentrations, and uneven frequencies of elements in different areas of the excavation may reflect butchering and processing activities at the margins of the bone bed. Present evidence suggests possible processing and camp activities at the northern end of the bone mass and, possibly, similar activities in the less well documented areas to the east and south.

7. Nothing in the field notes (or in the present topography) suggests any natural features that might have contained, impeded, or demobilized the bison. This is similar to many other Paleoindian sites that lack evidence for natural or man-made features that might have aided in procurement (Frison and Todd 1987; Stanford 1978; Emory and Stanford 1982). It had been interpreted that a common Folsom hunting tactic was the simple stalking and ambush of small herds (Emory and Stanford 1982; Bonnichsen et al. 1987:413).

1946 EXCAVATIONS AT LIPSCOMB

Information for the 1946 field work comes primarily from small maps that were made by W. D. Frankforter from field notes and are now in the University of Nebraska State Museum. These maps have been redrafted (Figures 2 and 3) and indicate the extent of excavations at Lipscomb in 1946 which were less intensive than during 1939. This is also corroborated by participants in the work (Lloyd G. Tanner, personal communication). Only 44 catalog numbers were assigned to materials from the 1946 work, whereas more than 1000 numbers had been assigned to materials collected during the 1939 season. The most important part of the 1946 work was documentation of the relationship of the excavation units of the two seasons and of the specific provenience of test pits and artifacts found during the 1946 work (Figure 2).

According to Hendy's (1939) notes, the excavated area was outlined with a narrow trench, and two exploratory extensions of this trench were extended from the southeast corner of the excavation (Figure 2). It is uncertain whether the entire area within the 1939 perimeter trenches was excavated. In 1946, one flake was recovered from an irregular excavation made in the northwest part of the 1939 excavation area (Figure 3). The obtuse angle at the northeast corner of the 1939 excavation was encountered during the 1988 excavation, and the area directly inside the perimeter trench did not appear to have been previously excavated. It is likely that the excavation in 1939 extended only to the perimeter trenches in the locations where bone was still being encountered.

No artifacts were mapped in the 1946 excavation units that were east and south of the 1939 area. Three Folsom points—one complete point and two base fragments—were collected in 1946 from the west slope of the terrace; two of these were found on the surface; the third was from screening of the slope sediment. A fourth Folsom point base was found in 1946 on the high terrace about 400 meters southeast of the site. A flake tool, flake, smooth stone, and flat rock were mapped in the actual excavation. Also, 20 pieces of bone that were considered worked were plotted in the 1946 excavation area. These pieces have not been restudied, and, considering the difficulty in distinguishing natural from purposeful human modification of bone pieces, the presence of bone tools at Lipscomb remains to be verified. The flat rock and cobble from the 1946 excavation are concordant with the 1939 records, which indicate that several limestone rocks were found in the northern part of the bone bed where the bones were more scattered and fractured. As initially suggested by Schultz (1943), this may have been a processing area adjacent to the main area of the kill.

1988 EXCAVATIONS AT LIPSCOMB

Goals of the 1986 survey and 1988 testing at Lipscomb were fairly simple, but further investigation is needed before they will be attained. The goals are as follows:

1. Relocate the site and assess its situation with regard to potential disturbances.
2. Relocate the earlier excavation units.
3. Prepare a map of the site vicinity.
4. Determine whether intact buried deposits remain at the site.
5. Assess the potential for dating the site.
6. Evaluate the topographic and geologic setting.

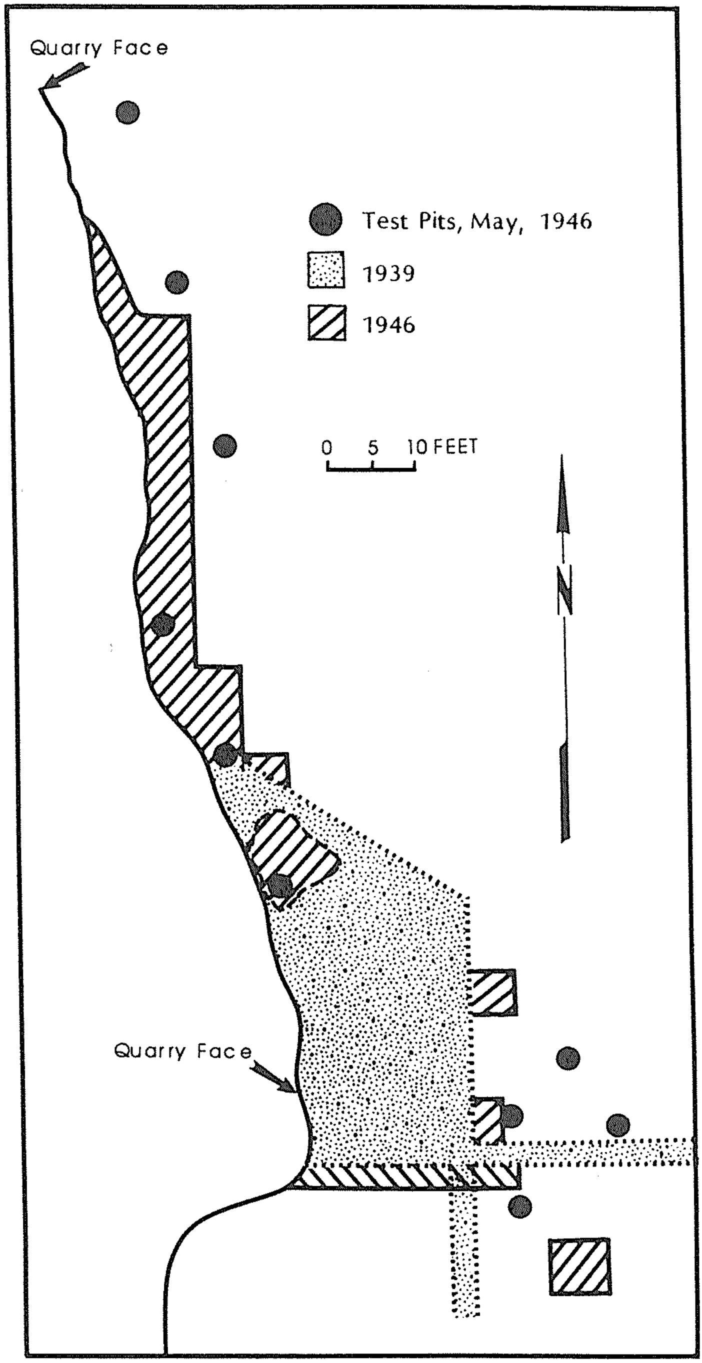

Figure 2. Plan of the 1939 and 1946 excavation areas, test pits, and units at the Lipscomb Bison Quarry.

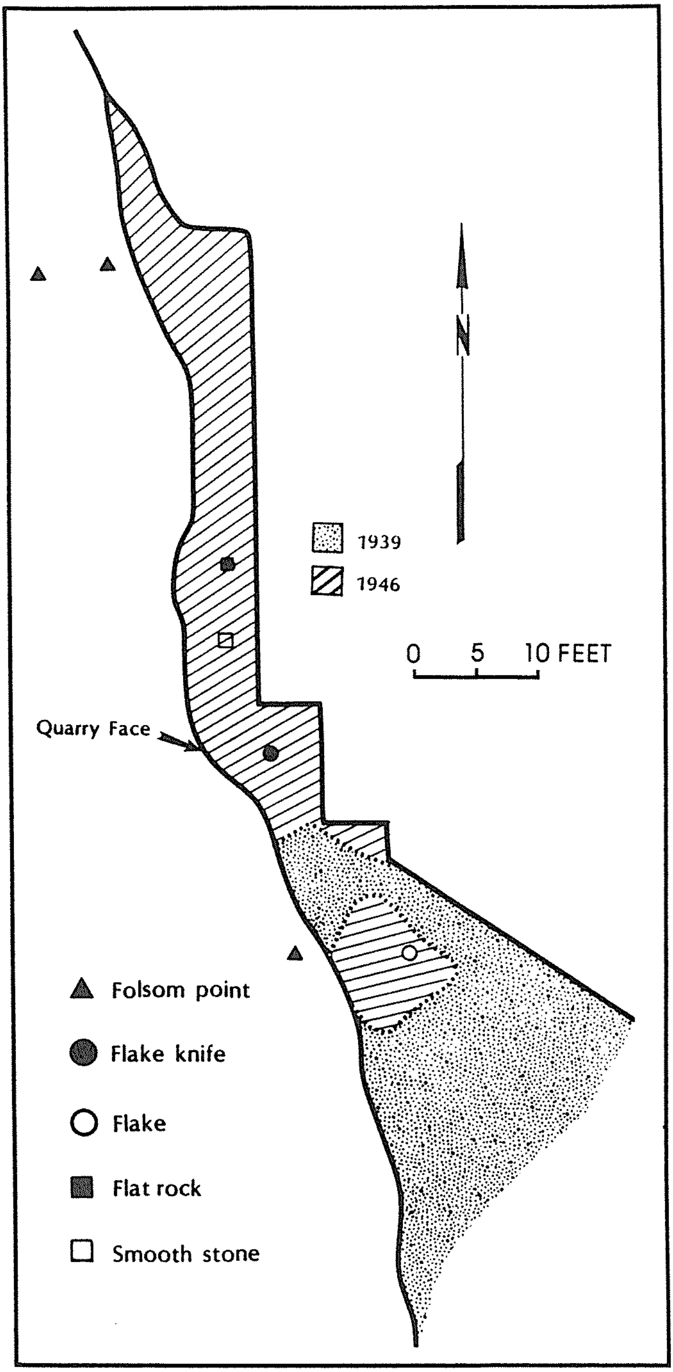

Figure 3. Detail map showing locations of stone artifacts from the 1946 excavation, Lipscomb Bison Quarry.

7. Evaluate the site's long-term research potential.
8. Provide a better understanding of the geologic context from which the Lipscomb bison fauna was collected.

Upon relocating the Lipscomb site, it was learned that the land-owners were very much aware of the site, had controlled access to it, and had not allowed any indiscriminate digging there. Some erosion of the western edge of the site has occurred during the past decades, so the shallowness of the deposit leaves the site highly susceptible to future disturbance.

A depressed area about 6 meters (20 feet) long (north to south) and 3 to 3.5 meters (10–12 feet) wide (east to west) was noted on the edge of the terrace where many small pieces of bison bone had eroded out. Testing at the edge and outside of this depressed area was done to evaluate whether it represented part of the University of Nebraska State Museum excavation (Figure 4). Based on the current information from testing in February and August of 1988, this depressed area does correlate well with the location, size, and shape of the primary 1939 excavation (Figure 5). The distinctive obtuse angle of the northeast corner of the 1939 excavation (perimeter trench) was encountered during the 1988 test work (Figure 6); this angle provides a key reference point for correlating the current testing efforts with the previous excavation. Unfortunately, the 1946 excavation plan was not found until after the 1988 test work was completed, more testing will be required in order to gain full confidence in the precise location of the various earlier excavation units with regard to the 1988 tests (Table 4) and the modern edge of the terrace.

The results of the 1988 testing were significant in several ways. Because the primary concern of the original University of Nebraska State Museum excavations was the collection of a comparative sample of late Pleistocene to early Holocene bison, the portions of the site which did not yield well preserved bone or which had only a limited amount of bone were not fully investigated. These marginal areas are the ones most likely to contain evidence of bison processing or camping activities. The finding of artifacts north of the main bone bed during the 1946 excavation, the presence of a point in the eastern extension trench excavated in 1939, and the finding in 1988 of two flakes at the north edge of the 1939 excavation area and a flake tool 10 meters further to the north (Figure 7) all suggest that there remains much to be learned about the type and positioning of activities surrounding the main bone bed at Lipscomb.

In 1988, evidence of intact bone bed on the fringes of the 1939(?) excavation unit was also found The bone is in a relatively poor but variable state of preservation, and the nature and extent of the remaining bone bed is unknown. Testing at the south end revealed in place a poorly preserved and overturned bison skull, a sacrum, a metacarpal, and a tibia, as well as many small bone fragments (Figures 8 and 9). In the matrix surrounding these elements were scattered flecks of charcoal and gastropods were common. The extremely small samples of charcoal have been submitted for radiocarbon dating to the University of Arizona and to Beta Analytic. The feasibility of dating the samples has not yet been determined. However, if the

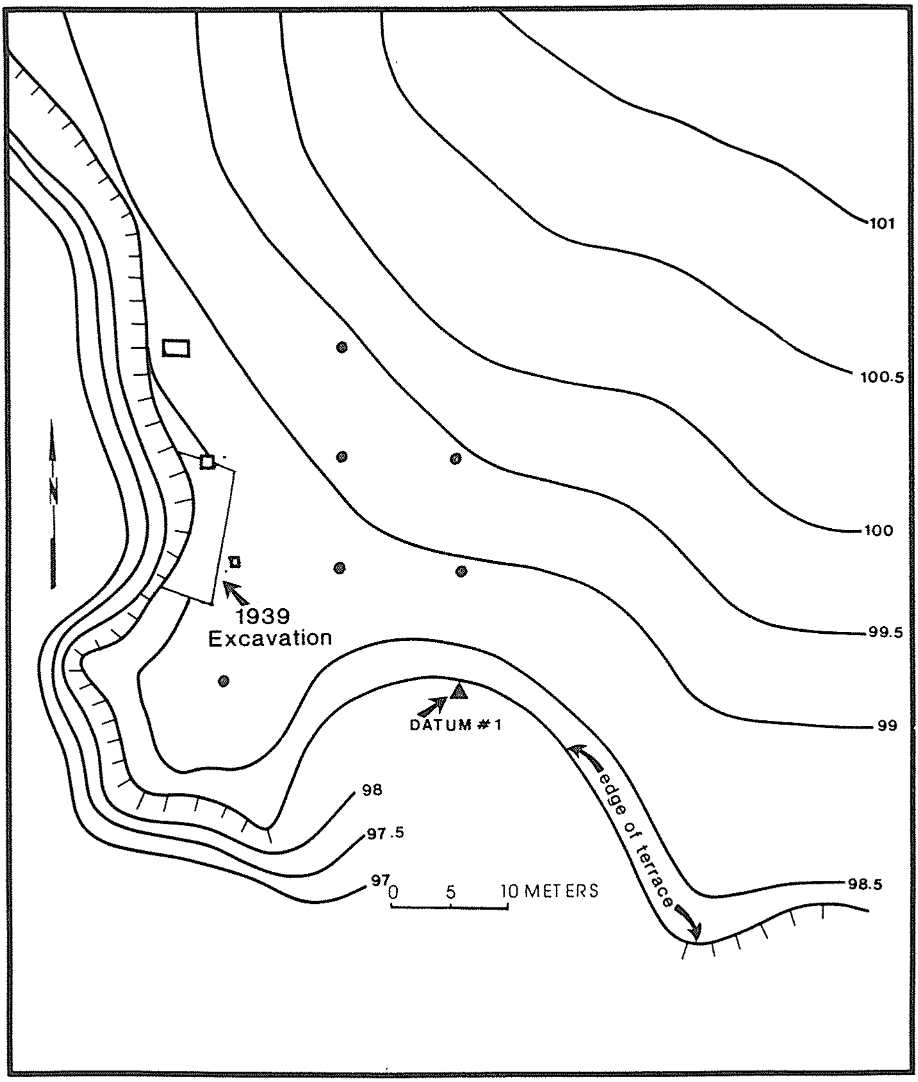

Figure 4. Topographic map showing location of the primary 1939 excavation and the initial 1988 test units.

sample should prove too small to date, it should be possible to collect a more substantial charcoal sample from the site.

Study of the stratigraphy and geomorphology of the Lipscomb site remains one of the key issues, for this information should aid in deciphering the nature of the land surface on which the kill occurred. Paleoecological study, through analyses of snails, phytoliths, and perhaps pollen, will also enhance understanding of the site area at the time of the kill.

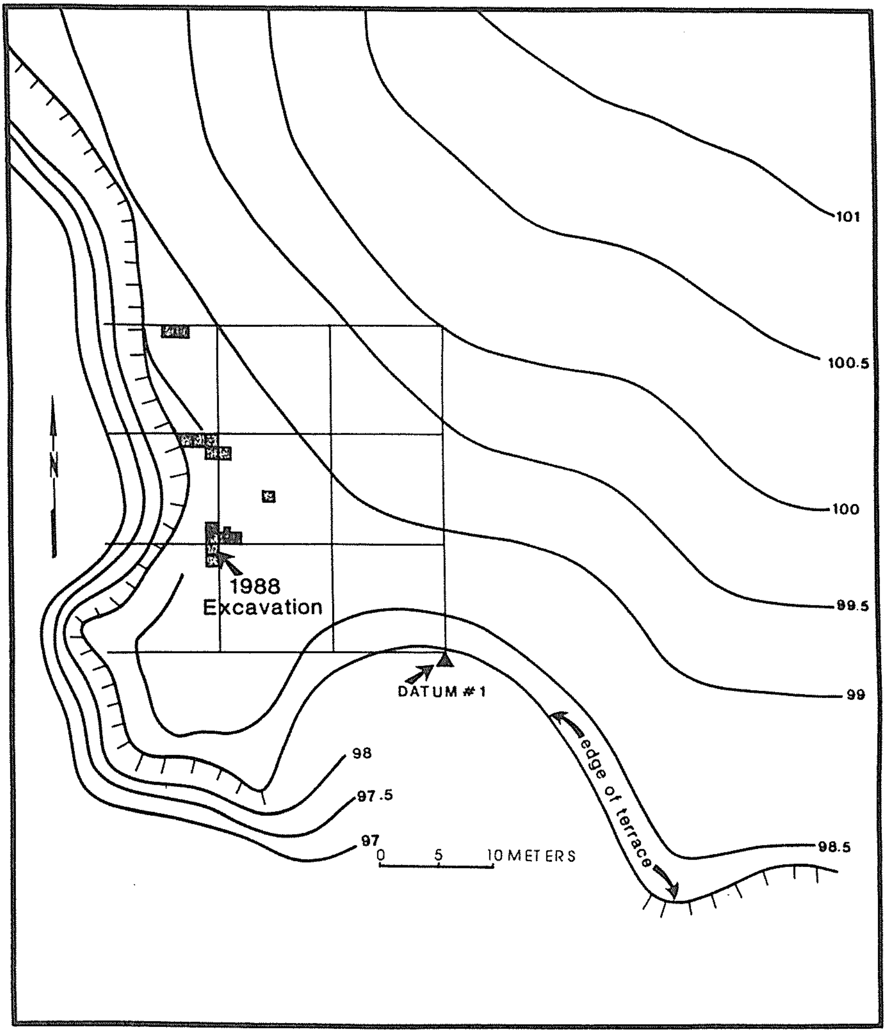

Figure 5. Topographic map showing area grid and all 1988 test units at the Lipscomb Bison Quarry.

Research on the Lipscomb bison bone collection, reported in more detail elsewhere (Hillerud 1970; Todd et al. 1988), indicates that a minimum of 54 bison are represented in the kill at Lipscomb. This figure is based on the number of left astraguli, and is significantly higher than the MNI of 23, which is usually cited for the site. This larger size of the kill herd has implications for better understanding of Folsom period bison hunting, which usually has been interpreted as a small group activity involving few animals (e.g., Hofman and Ingbar 1988:Table 3), although

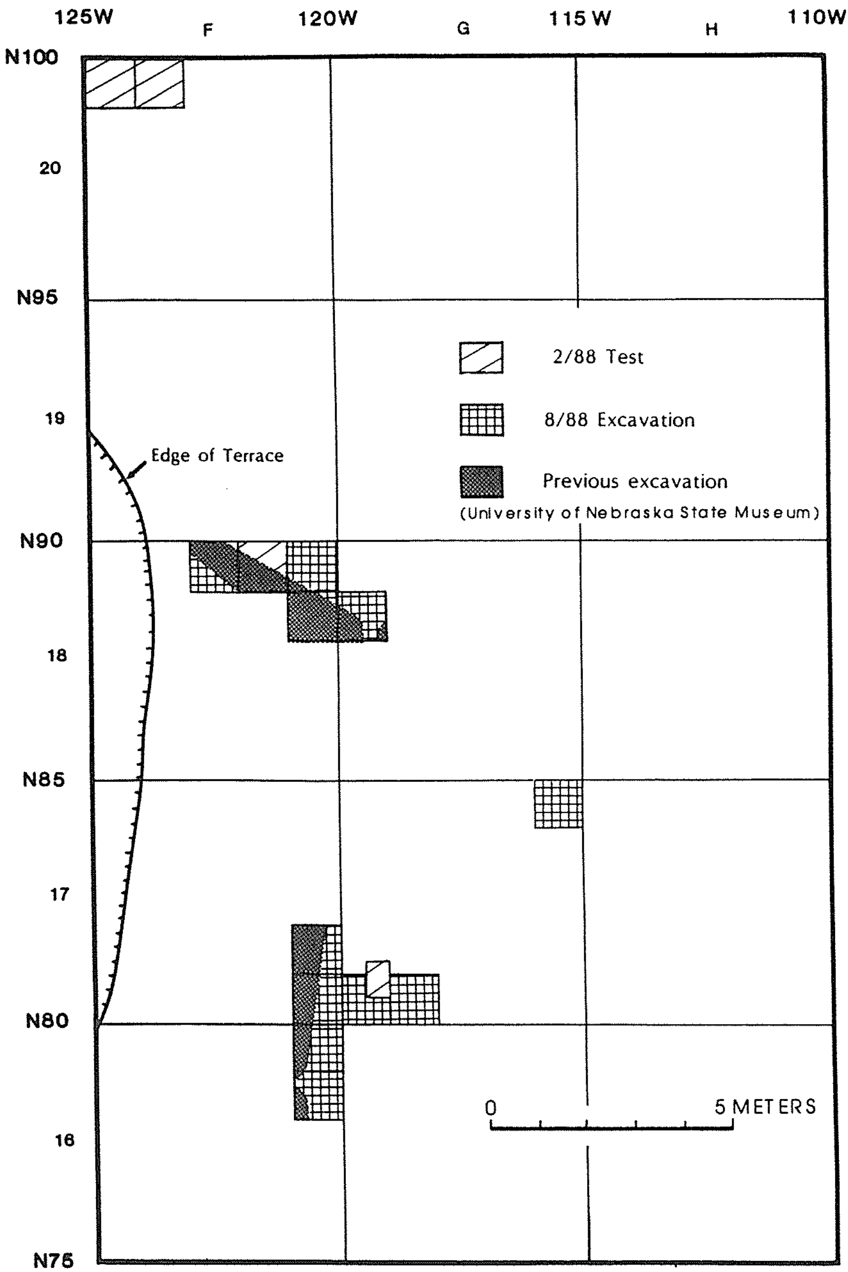

Figure 6. Plan of the 1988 excavations at Lipscomb showing the grid and the edge of the 1939 excavation.

Table 4 Summary of 1988 Excavation Units at Lipscomb Bison Quarry

Block Unit	Coordinates (SE Corner)	Dry or Water Recovery Screem Size	Final Depth Below Surface	Number of Levels	In Situ Deposits
		Inches	Centimeters		Percent
F20-4	N99-W123	1/4, dry	20	2	100
			50, NE 1/4	5	
F20-5	N99-W124	1/4, dry	20	2	100
			30, SW 1/4		
F18-1	N89-W120	1/16, water	40	4	100
F18-2	N89-W121	1/4, dry	40	4	50
F18-3	N89-W121	1/4, dry	40	4	40
F18-10	N88-W120	1/4, dry	50	5	10
		1/16, water	(NE Corner Only)		
G18-6	N88-W119	1/16, water	40	4	65
F17-20	N81-W120	1/4, dry	30 (E 1/3)	3	30
			80 (W 2/3)	8	
F17-21	N80-W120	1/4, dry (W 1/2)	60 (W 1/2)	6	50
		1/16, water (E)	55 (E 1/2)	6	
G17-1	N84-W115	1/16, water	40	4	100
G17-24	N80-W118	1/16, water	40	4	100
G17-25	N80-W119	1/16, water	50	5	100
G17-16	N81-W119	1/4, dry	25	1	100
		flotation	40	1	
F16-1	N79-W120	1/4, dry	20	2	70
F16-10	N78-W120	1/4, dry	20	2	90
		1/16, water	40	4	

the possibility of a communal hunt at Lipscomb was noted by Frison (1978). The large number of bison at Lipscomb makes any interpretation of an ambush kill unlikely, unless there was some form of containment such as a snow drift, brush corral, of arroyo. Considering the season, a snow drift is unlikely but not impossible, and there is not yet any documented evidence for a natural or man-made trap or enclosure.

Study of dental eruption and wear documents the time of year of the kill as late summer or early fall (Todd et al. 1988). This, of course, could represent the end of or just after the rutting season. This season has implications for the physical condition and composition of the bison herd and the weather conditions which are likely to have existed at the time of the kill. The mature male bison tend to be in their poorest condition at this time of year, just following the rut, and the daily temperature at the time of the kill and during subsequent processing may have been to high for the beneficial effects of natural refrigeration (Frison 1982). In early fall,

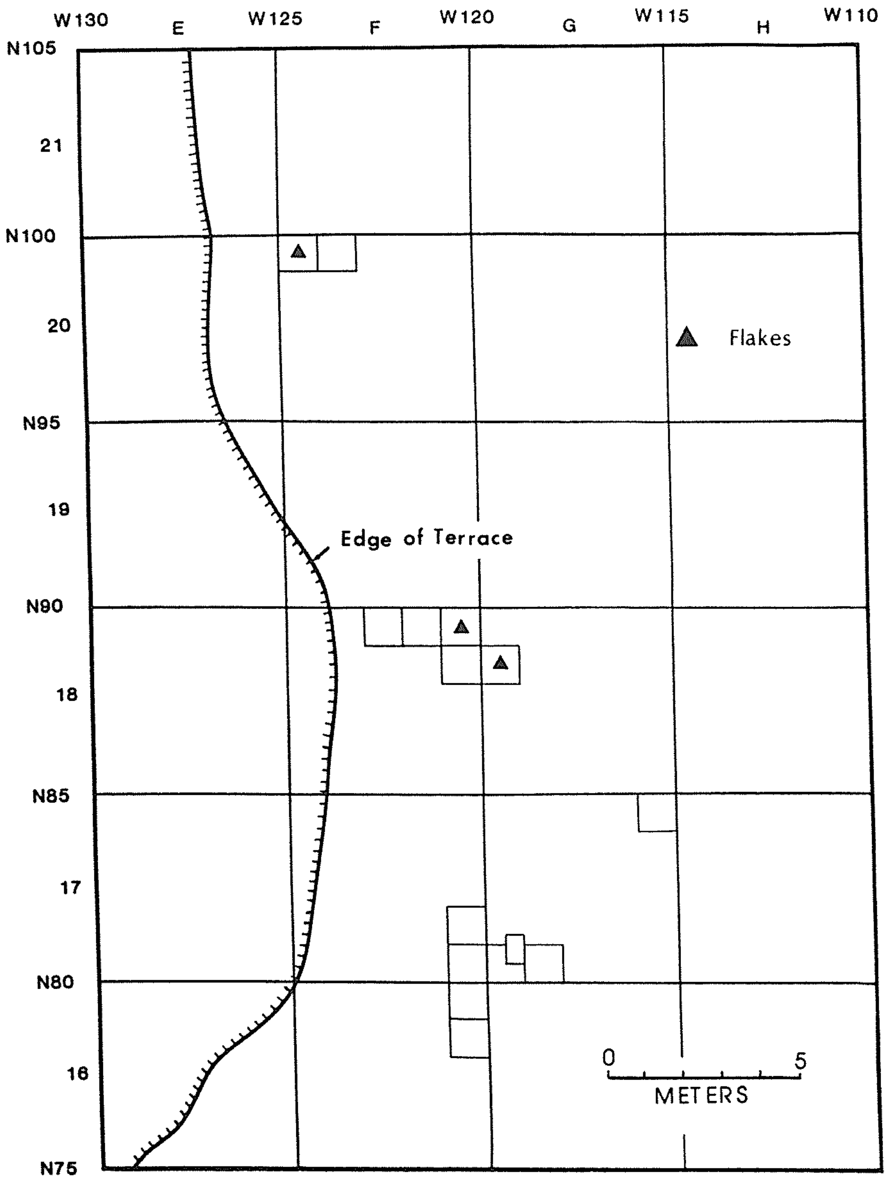

Figure 7. Plan showing distribution of flakes recovered from 1988 testing.

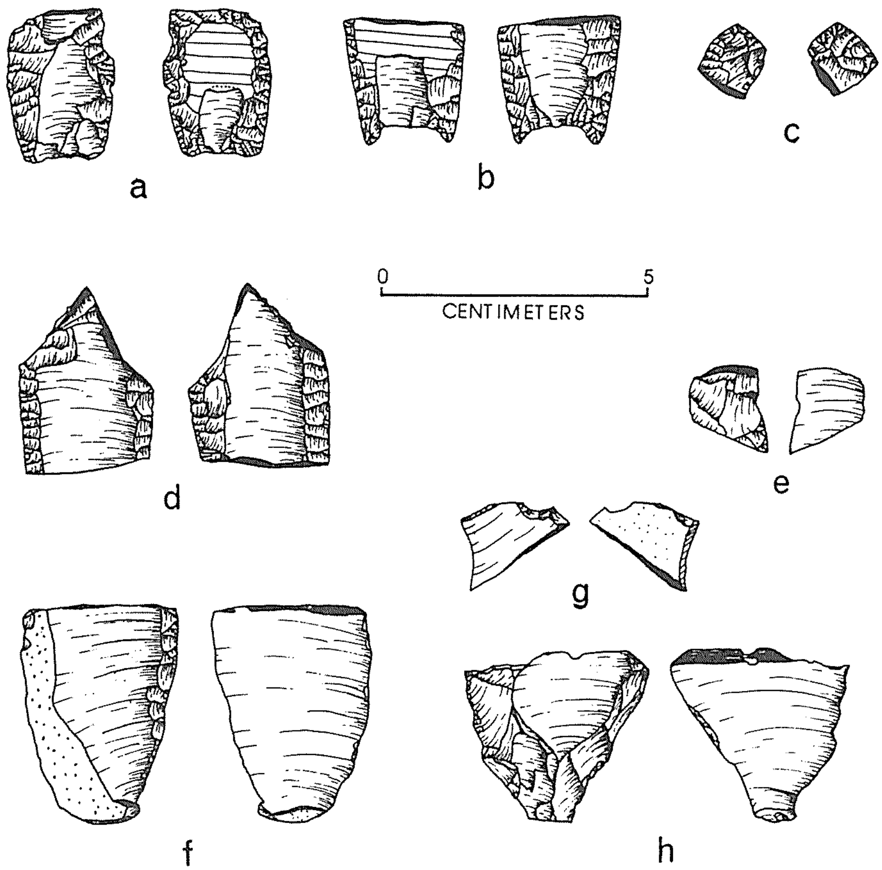

Figure 8. Folsom Artifacts from the Lipscomb Bison Quarry. a) Folsom point made from a flake blank of Edwards Chert with an impact damaged tip (41LP1/89-3, found 10-89); b) Folsom point base made on a flake blank of Alibates or Tecovas, (2740/158 Panhandle Plains Historical Museum, found 7-18-70); c) Folsom point tip of Alibates (41LP1/89-2, found 6-7-89); d) Folsom point midsection with impact damaged, burinated tip, made of Alibates (2705/294 Panhandle Plains Historical Museum, found 5-16-69); e) Folsom channel flake midsection made of Edwards Chert (41LP1/86-2, found 12-2-86); f) Unifacial backed flake tool of Edwards Chert (# 41LP1/86-1, found 12-2-86); g) Notch made on a brown quartzite flake fragment (41LP1/88-1, found 2-26-88); h) Unifacial flake tool with a graver spur manufactured from Alibates (41LP1/89-1, found 5-19-89).

neither the fat content nor the quality of the bone marrow of the bison skeletons would have been prime. This, together with the probable warm weather and limited immediate need for fats by the hunters, may account in part for the limited butchering and processing of the Lipscomb bison.

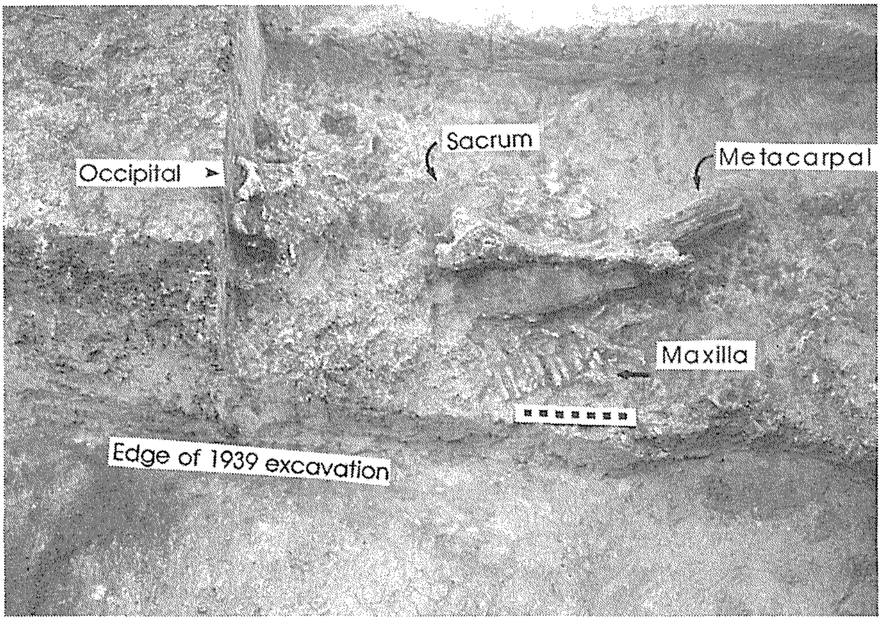

Figure 9. Photograph, looking east, showing bison elements in unit 80N-120W and the edge of the 1939 excavation.

DISCUSSION OF THE LIPSCOMB QUARRY AND OTHER FOLSOM SITES

The true significance of the Lipscomb Quarry becomes apparent upon comparison with other Folsom sites in the region, including Folsom, Lubbock Lake, Lake Theo, Adair-Steadman, Shifting Sands, and Blackwater Draw. Without exception, the bison fauna from Lipscomb is the premier Folsom bison assemblage in existence. Through Hillerud's (1970) research and continuing study, the Lipscomb bison can serve as a comparative baseline for investigation of terminal Pleistocene bison in the Southern Plains. Eruption and wear study of the Lipscomb bison dentition has allowed an accurate assessment of the season of the kill, which appears to have been late summer or early fall, and which indicates either a single event or several very closely spaced events (Todd et el. 1988). The importance of Paleoindian kills during this time of the year is discussed elsewhere. Taphonomic analysis documents the limited amount of carnivore attrition and probable rapid burial of the carcasses after the kill, thus supporting Schultz's original interpretation of the situation. Lipscomb was originally excavated primarily as a paleontological site, rather than an archeological one, and this resulted in extreme care being taken with the bison remains both in the field and during subsequent curation.

The lithic assemblage from Lipscomb is more extensive than those from the Folsom site and Lubbock Lake and is enhanced with better contextual information than exists for from Lubbock, Folsom, and most of the Folsom material from Blackwater Draw. Lipscomb provides a highly useful complement to campsites such as Frank's site (Stanford and Broilo 1981), also referred to as the Mitchell locality (Bouldurian et al. 1987), Shifting Sands (Amick et al. 1988), and Elida (Hester 1962). It is also complementary to the study of workshop/camp and tool production sites such as Adair-Steadman (Tunnell 1977).

Documentation of the resharpening of projectile points at Lipscomb indicated that the Edwards chert pieces are more commonly reworked than are the Alibates. It has been argued (Hofman 1988a) that this reflects prior usage and retooling of the Edwards chert projectiles before they were used at Lipscomb, whereas no such evidence exists for the Alibates artifacts. On this basis it is plausible, considering the sources for these materials, to postulate a south to north (or southeast to northwest, then northeast) movement of this particular Folsom band prior to the kill at Lipscomb. If it is assumed that the season of the kill is late summer or slightly later, the authors suggest that the group moved northward during the summer from central Texas (where the Edwards chert was acquired). Movement may have been along the eastern Caprock of the Llano Estacado, which would have provided easy hunting access to the short-grassed, playa dotted High Plains to the west and to the more protected well watered dissected rolling plains to the east. Sites such as Lake Theo, just east of the Caprock, and Blackwater Draw and Lubbock Lake on the Llano Estacado, attest to the use of these different Plains environments by Edwards chert-toting Folsom groups. The possibility of seasonal variation in the most intensive use of these distinct environments has been addressed (Hofman 1988b), and it is likely that the well-watered, more protected and wooded settings in the lower dissected plains would have been preferred in times of severe weather. The authors therefore postulate a pattern of movement for the Lipscomb group and perhaps other Folsom bands in the region, as follows:

1. The Lipscomb group spent the winter in the dissected Low Plains (of Central or North Central Texas?) where there were both adequate fuel and good lithic resources.
2. The Lipscomb group spent the spring and summer on the High Plains and along the Caprock Escarpment in pursuit of bison and in general foraging. They brought Edwards chert assemblages into the region during this part of the cycle, and they reworked used assemblages at sources such as the Tecovas Alibates outcrops.
3. In the Fall groups were oriented toward making substantial kills to garner the products of a prime bison herd in preparation for winter. By late fall, they probably moved toward the low dissected Plains, with their more adequate fuel supply and protected settings.
4. By midwinter, the groups, which might be significantly further south or east than they were during the late summer and fall, would be investing time in retooling equipment, as long as there was adequate food on reserve or to be foraged for in the vicinity.

This scenario, though oversimplified, is provided as a target for evaluation and discussion. The authors do not assume that Folsom people occupied stringently defined territories, within which they followed an entrenched seasonal subsistence cycle (Kelly and Todd 1988). It is evident, however, that Folsom groups who camped and hunted in western Oklahoma, western Texas, and eastern New Mexico relied heavily upon cherts from the Cretaceous Edwards Formation of Central Texas (Broilo 1974; Hester 1972; Hofman 1986; Stanford and Broilo 1981). Considering the substantial elevation and the topographic and vegetational variation in the Southern Plains between the Llano Estacado and the dissected Prairie Plains to the east, it is reasonable to predict that these regions may have been used with differing seasonal intensity. An important factor to consider, however, is that the extremes of seasonal temperatures may have been notably less severe during late Pleistocene times than they are today (Graham and Lundelius 1984).

In summation, evidence from Lipscomb indicates that a Folsom group made a kill of more than 50 bison in late summer or early fall. The group used implements made of both Edwards chert and Alibates agatized dolomite; there is evidence evidence of reworking before final breakage or loss of the Edwards, but not of the Alibates pieces. This suggests that the Edwards pieces had been in the tool kits longer and had been curated after use in previous kill-butchery episodes. The relation of the Lipscomb site to the geographic locations of Edwards and Alibates source areas supports the interpretation that the group had moved from the south or southeast before the time of the Lipscomb kill. Collection of Alibates dolomite may have involved movement of the whole group, or it may have been accomplished by a special task group. Where the group went from the Lipscomb site is unknown, but the incomplete butchering of the bison at Lipscomb may indicate that 1) the group had all the resources it needed or could use from the kill, 2) the group was too small to fully utilize the bison killed before they spoiled, or 3) they elected to follow and monitor another herd or the remainder of the Lipscomb herd, rather than lose touch with this key resource. The time of the kill, during or soon after the rutting season, has implications for the herd composition and condition of the animals. The limited evidence for marrow extraction and the apparent incomplete butchering may reflect gourmet butchering (Todd 1983, 1987), or simply warm weather conditions. It seems lighly likely that there were associated processing, hide working, and camp area(s). The nature of the kill and topographic setting in which it happened remains to be determined.

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Pestles for Boat-Shaped Mortars in Texas

R. E. Forrester

ABSTRACT

A previously unreported stone artifact—an elongated flat sandstone implement about 35 cm long with a sharpened broad, oval end—found in western Central Texas is identified as a pestle used in conjunction with the boat-shaped mortars that are also found in western Central Texas. Efforts to ascribe the pestles and mortars to a specific cultural group are unsuccessful, but a linkage with Zephyr projectile points is established.

INTRODUCTION

Boat-shaped mortars—elliptical mortar holes cut rather deeply into massive bedrock, usually of sandstone (Figure 1)—have been described in a large area of western Central Texas (Sayles 1935; Fox 1939). The name boat-shaped comes from the cross section, which resembles a canoe. As the mortars deepen, the length and width decrease, so near the bottom a horizontal cross section, though still canoe shaped, is smaller. E. B. Sayles (1935) plotted the distribution of deep circular mortars and boat-shaped mortars in Texas, demonstrating that distribution of the boat-shaped type is usually to the north and east of the round type, with little overlap (Figure 2). Several groups of boat-shaped mortars are known in Texas. Two groups are in southeastern Shackelford County and southwestern Stephens County, about 24 km (15 miles) apart; there is a third group in this region whose exact location has been lost since it was seen in 1939. Destruction has reduced the number of other boat-shaped mortars by half since 1939. A fourth group is near Brownwood in Brown County (the subject of a paper presented in Waco by Bransford Eubank at the 1968 annual meeting of the Texas Archeological Society). A fifth group of about ten heavily eroded mortars near Santo in Palo Pinto County was inspected and photographed, but not measured, by the author, and a sixth group of boat-shaped mortars has been reported in the Abilene region (Suhm 1960:73).

Boat-shaped mortars probably are diagnostic of an occupation by a specific but as yet unknown cultural group; that was the case according to Sayles in 1935 (Sayles 1935) and according to Suhm in 1960 (Suhm 1960), and it still appears to be the case today. Nonetheless, recognition of these elliptical mortars at a site should be an aid in determining the presence there at some time of this unknown cultural group. When the mortar holes are visible at all, they are extremely easy to identify, but when they are filled with soil and covered with grass, leaves, or other debris, they can go undetected indefinitely. Too, some deep mortars may have been completely removed by erosion, so it may be of some value to be able to demonstrate, by the

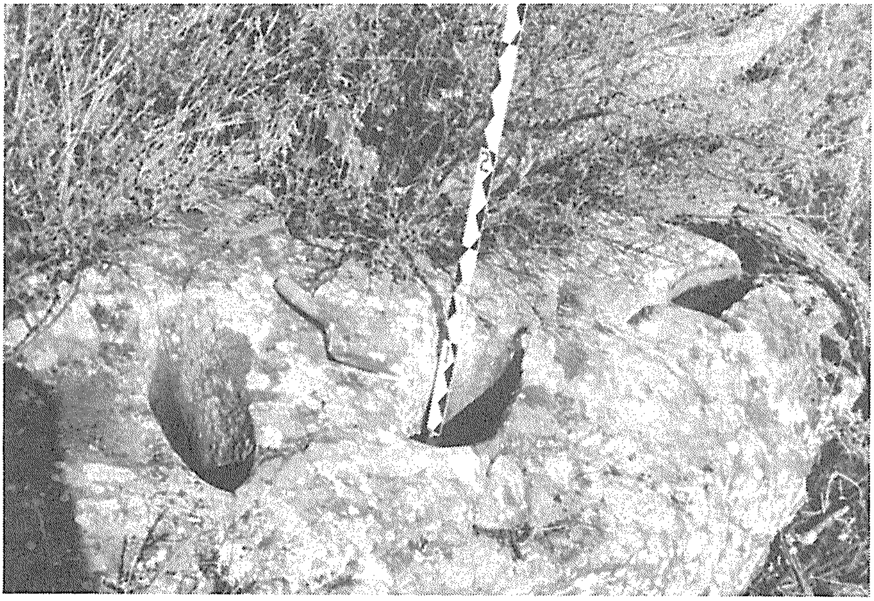

Figure 1. Photograph showing boat-shaped mortars in sandstone bedrock. Scale is in inches.

presence of the boat-shaped pestles, that the as yet unidentified cultural group was once in the area.

BOAT-SHAPED PESTLES

If it can be demonstrated that boat-shaped pestles—until now unrecognized in the literature—were made for use in boat-shaped mortars, the pestles would be indicators of the presence at some time of boat-shaped mortars that might not have been detected at the surface or that might have been lost through erosion. With the help of sufficient identifying factors, archeologists may be able to conclude that the pestles were indeed associated with boat-shaped mortars.

The author has found and recorded 15 boat-shaped pestles from the surface in the vicinity of Moran in southeastern Shackelford County between 1935 and 1941. He collected five of these to help document the type (Figure 3).

No pestles were found in situ in mortars, but all were found in campsites that had outcrops of massive sandstone in or very near them. Four were found in a campsite (Site 1, 41SE17) where 13 mortars had been counted in 1940 (Table 1). The author believes that in these campsites there are probably other undetected boat-shaped mortars.

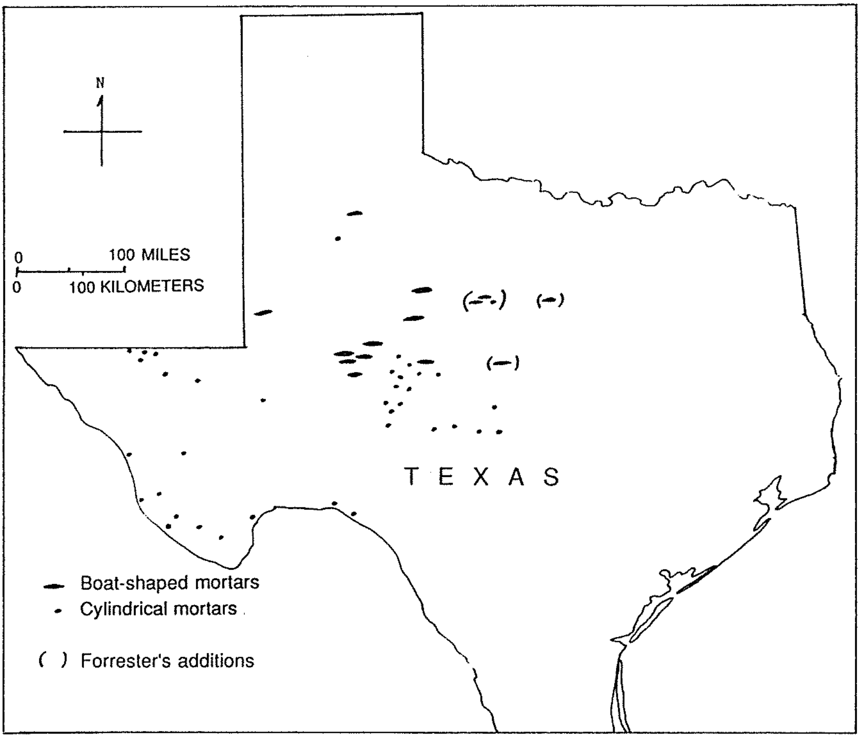

Figure 2. Map of Texas showing locations of round and boat-shaped mortars.

There is no proof that the tools described here as boat-shaped pestles are in fact pestles for use in the boat-shaped mortars. Their identification as such is made on the basis of their occurrence in areas where there are boat-shaped mortars and on their physical appearance and dimensions. Two groups of elliptical mortar holes about 24 km (15 miles) apart in southeastern Shackelford County and southwestern Stephens County were measured and recorded (Table 1). For the seven examples that could be studied, the maximum depth is 28 cm, maximum length at the surface is 38 cm, and maximum width is 13 cm. Erosion at the surface of the outcrop has reduced the dimensions of several of the examples.

Measurements made on the boat-shaped pestles show that they would fit nicely into the mortars (Table 2). The expanded ends are beveled from each side to form dull edges, and the tips would fit the sharp *V*-shaped bottoms of the mortars. Under low magnification, one specimen (Catalog No. AUM), which still has polish on the beveled area, has fine scoring on all polished areas. The scoring is oriented toward the point of the bevel on this thick specimen.

The smaller end of the artifact has been shaped by flaking or pecking to provide an area suitable in size, shape, and texture for a one- or two-handed grip (Figure 4),

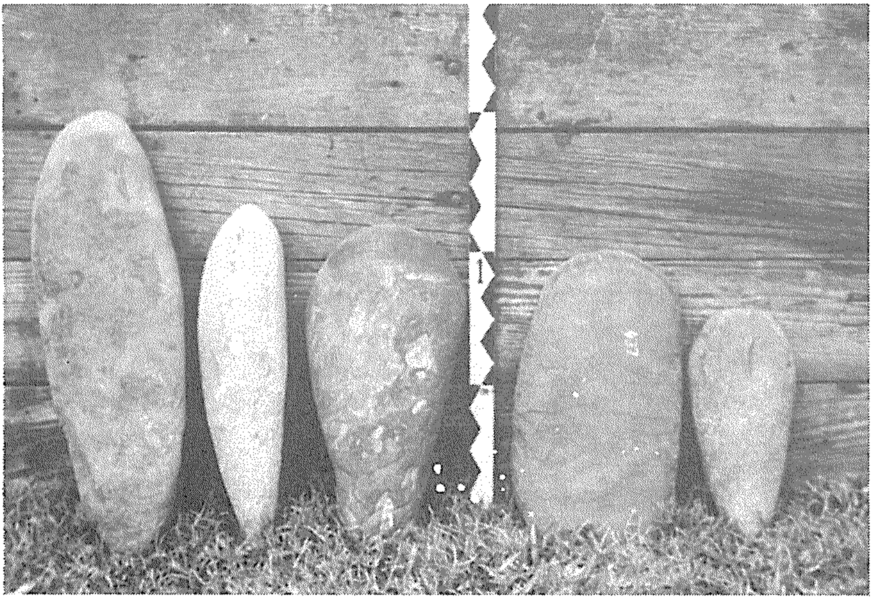

Figure 3. Photograph showing five pestles for boat-shaped mortars, sharp ends up. Scale is in inches.

and the total length is such that enough of the tool will protrude from the mortar hole to permit both hands to grip it without coming in contact with the bedrock. One of the five specimens (Catalog No. 437) is squared rather than tapered opposite the beveled end.

Obviously there must have been pestles for the boat-shaped mortars, and these tools are the only stone tools found in the area that could possibly have served that purpose. Barring the use of wooden pestles, these tools would logically be pestles made to fit the boat-shaped mortars. If a wood or stone pestle should be fashioned to fit a boat-shaped mortar, it would look exactly like the tools described here. Therefore, the author believes that these tools were in fact made specifically for the boat-shaped mortars.

CULTURAL ASSIGNMENT

In an attempt to assign the boat-shaped mortars and the pestles to a specific cultural group, data are presented here on artifacts collected from the surface of a very large site (Site S-Y; 41SE17 in the records of the Texas Archeological Research Laboratory), on which at one time at least 13 boat-shaped mortars were visible.

This site, which is in the southwest corner of Stephens County on both sides of Big Sandy Creek, covers more than a hundred hectares (several hundred acres) and

Table 1. Dimensions of Boat-shaped Mortars

No.	Maximum Length	Maximum Width	Maximum Depth
	Site 1 S-Y; 41SE17, Big Sandy Creek, southwestern Stephens County Seven mortars counted in 1971; 13 counted in 1940.		
1	36	11	15
2	38	13	25
3	36	13	28
4	38	13	18
5	30*	11*	10*
6	28*	10*	9*
	Site 2, Post Oak Creek, southeastern Shackelford County, R. L. Cannon farm, one mile north of Moran, Texas One mortar counted in 1971, three in 1940.		
	28	10	15
	Site 3, Unnamed tributary of Battle Creek, northeastern Callahan County No mortars counted in 1971; three or four in 1939.		
	Averages of Sites 1 and 2 (excluding eroded mortars)		
	35.2	12.0	20.2

NOTE: Measurements are in centimeters.
* Excluded from averaging.

Table 2. Dimensions of Pestles for Boat-shaped Mortars—Random Surface Finds Recovered Near Mortars Listed in Table 1.

No.	Forrester Catalog No.	Maximum Length	Maximum Width	Maximum Thickness
1	S-Z	48.9	15.2	4.4
2	AUM	38.1	9.5	5.7
3	M-M	36.2	17.8	3.8
4	437	32.4	18.4	2.5
5	367	25.4	12.0	1.9
Averages		36.2	14.6	3.7

NOTE: Measurements are in centimeters

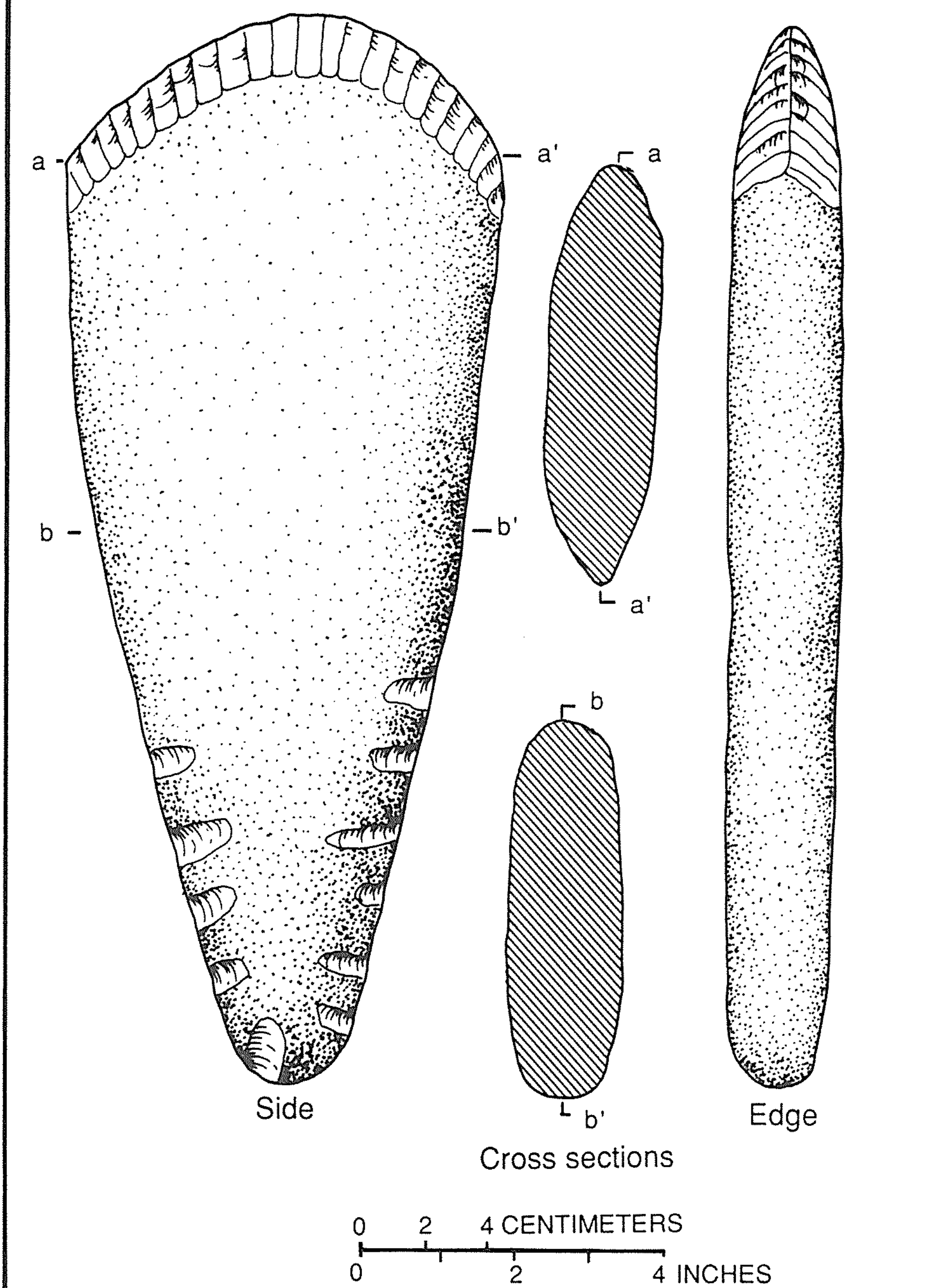

Figure 4. Idealized sketch of a pestle for a boat-shaped mortar.

is being exposed by erosion, but large areas are still covered by a thin layer of sandy soil. The sandstone bedrock into which the boat-shaped mortars have been excavated is at the south end of the site near a two-meter-high waterfall, which is itself unusual in the region.

When the author started collecting from the surface of site S-Y in 1940, at least one other collector had been working there for several years. There is reason to believe that his collecting had been selective, since hammerstones and scrapers were on the site in numbers that are excessive when compared to the number of projectile points found.

Together with his father, the author collected all tools from the site, broken or otherwise, but, unfortunately, they cataloged and labeled only those considered suitable for display. They did not catalog broken tools, but irretrievably mingled them with other broken and uncataloged tools from many sites in widely disparate areas, so the data from site S-Y cover only perfect or near-perfect specimens. Although the absence of the total artifact assemblage is lamentable, it is believed that the effect of this limitation on the data is mitigated by the fact that even without the discarded artifacts, the sample is still large. Also, since the site had already been collected, it must be considered that even had the writer retained all of the artifacts, he would not have had a true sample.

The collection from site S-Y no longer includes cores, manos, and one boat-shaped pestle, which were abandoned during removal of the writer's collection from Moran to Fort Worth in 1954.

Of the 759 items listed from site S-Y (Table 3), about 165 (22 percent) are of hematite. This number of hematite artifacts would be considered unusually high in most sites, but here it is not unusual since the site has an outcropping of nodular hematite readily available for use as hammerstones or for production of the ubiquitous flaked and ground celts. There was much hematite flaking debris on the site. Most of the celts recovered had not been ground and polished; many of these unground celts appear to be misshapen rejects. This site probably was a major manufacturing center for the ground hematite celts commonly attributed to people of the Neo-American Henrietta focus.

There was at least a minor occupation at site S-Y (41SE17) in the Historic Period (Table 3). The sheet copper or brass arrowpoint and the small snub-nosed end-scraper of clear glass (recovered from a small fire pit) are positive indicators of this period. Possible additional indicators are the unusually high percentage of Fresno arrowpoints (Table 4) in relation to the number of side-notched triangular arrowpoints (28 Fresno points:33 side-notched points). The Fresno type is considered by some to be a preform for side-notched triangular points and is regularly found associated with them. The writer's investigations of many rockshelter sites suggest that for each point type found there will be half as many of its discarded preforms. The 67 Scallorn points and 33 Granbury points (Scallorn preforms) found at the site also bear this out.

But the Fresno point, also a finished type, was not always a preform. The Fresno was the only significant stone arrowpoint found at the Gilbert site, a Historic

Table 3. Artifacts Recovered from Site S-Y (41SE17)

Description			Quantity
Arrowpoint, stone (3 hematite, 1 obsidian)			180
Arrowpoint, sheet copper/brass			1
Awl, bone (deer?)			2
Bead blanks, mussel shell			3
Biface, 4-bevel, double pointed			1
Clear Fork tool			1
Club spike (?), flint			1
Core, small.			24
Dart Point			90
Drill, scraper, knife combined			1
Edge grinder, sandstone			1
Graver			42
Hammerstone (not hematite)			70
Hematite objects (excluding 3 arrowpoints)			164
Celt, flaked		41	
Celt, polished		14	
Clear Fork tool		1	
Concretion bead		1	
Hammerstone		100	
Paint source		2	
Scraper:		5	
End	2		
Side	1		
Flake	1		
Side & end	1		
Knife, diagonal corner-tang.			1
Mano, one-handed			16
Paint pigment, copper ore			1
Perforator (drills, awls)			13
Short tip on dart base		4	
Small diameter shaft		4	
Large diameter shaft		5	
Pestles for boat-shaped mortars			4
Plains maul, ⅞ grooved			1
Scraper, mussel shell.			1
Scraper, snub-nosed, clear bottle glass			1
Scraper, stone			140
TOTAL ARTIFACTS			759

Norteño focus site (Jelks 1967) where only three side-notched triangular points were recovered. The excess percentages of Fresno points at site S-Y could be interpreted as coming from the Norteño focus, which could have produced the glass scraper and the copper or brass arrowpoint as well.

Table 4. Arrowpoints from Site S-Y (41SE17)

Type	Possible Focus	Possible Time Period	Quantity	Percent of Total
Metal (copper/brass	Norteño	Historic	1	6
Fresno	Henrietta		28	15.5
Reed	Henrietta		3	1.7
Washita	Henrietta		16	8.8
Harrell	Henrietta		1	0.6
Huffaker	Henrietta		13	7.2
Cliffton (Type II)	Henrietta		2	1.1
Alba	Henrietta		4	2.2
Perdiz	Toyah		1	0.6
Young		Late Prehistoric	4	2.2
Bonham		Late Prehistoric	1	0.6
Maud		Late Prehistoric	1	0.6
Scallorn	Austin		67	37.0
Granbury Parker, 21 Joshua, 8 Bono, 4	Austin		33	18.1
Untyped, stemmed	Unknown	Late Prehistoric	6	3.2
		TOTALS	181	100

On the other hand, this interpretation could be in error, since at the Harrell site (Krieger 1946), type site for the Henrietta focus and only 61 km (38 miles) northeast of site S-Y, the ratio of 77 side-notched triangular to 115 Fresno points (1:1.5) shows an even greater percentage of Fresno points than does site S-Y. The Norteño focus may not be represented at site S-Y at all; the glass and metal objects could have been left by the Comanche, known historically to have been in this area repeatedly, later than the Norteños. What is certain is that the site did have some Historic occupation, although the precise degree is unknown, and the source of that occupation is suspected to be the Norteños or the Comanche. The boat-shaped mortars could have been created by either of these two groups, but the mortar distribution pattern reported by Sayles (1935) and expanded here matches neither the Comanche nor the Norteño area of occupation as these are now understood. The Comanche are less likely than the Norteños to be the creators of the boat-shaped mortars, since the eroded mortars there could hardly have been eroded to their present degree in the hundred years since the Comanche occupied the area.

The next earlier cultural group that could be considered as the boat-shaped mortar builders is the people of the Henrietta focus, which is strongly represented at the site, since at least 21.5 percent and possibly as many as 37 percent of the arrowpoints there—depending on whether Fresno points are included in the count—are directly attributable to that focus. The ground hematite celts are diagnostic of the Henrietta focus, which also has a small component of Alba type points. Therefore, based on numbers alone, it is possible that the Henrietta focus people created the mortars. But on the other hand, the distribution of the mortars only partly matches the Henrietta focus area of occupation, so this connection should be considered tenuous.

Preceding the Henrietta focus was the Toyah focus of Central Texas, with its characteristic projectile point, the Perdiz arrowpoint. But only one Perdiz point was found in the collection from site S-Y, and no preforms (Type I Cliffton) were found. This single point is considered insignificant, so the Toyah focus is ruled out as a likely source of the boat-shaped mortars, since their creation must have been a labor-intensive enterprise requiring considerable time, during which a significant number of projectile points associated with the mortar makers should have been discarded or lost.

The next oldest arrowpoint-using group—and the first to use arrowpoints—was the Austin focus. Their arrowpoint was almost exclusively the Scallorn with its preform, the Granbury. These two types together account for 55.5 percent of all arrowpoints at site S-Y, so the Austin focus people have a strong potential to be the makers of the boat-shaped mortars. However, the mortars are found only at the northwesternmost edge of the Austin focus area.

Quite possibly Scallorn points were not produced by the Austin focus people at all, since Scallorn points were widespread in areas well beyond Central Texas, so in this instance the high percentage of Scallorn points at site S-Y might well be attributable to some other group.

Since it is apparent that none of the arrowpoint-using Neo-American groups are likely to have been the makers of the boat-shaped mortars, the possibility that these mortars relate to the earlier Archaic Period must be considered. The Archaic (Edwards Plateau aspect) was a long-lived period in Central Texas; from about 6500 B.C. to about A.D. 700 (Prewitt 1981). It embraced 11 phases, with a large number of dart point styles.

At least 41 of the 90 dart points from site S-Y can be safely attributed to the Central Texas Archaic (Table 5). The remaining 49 dart points are not ascribable. The fact that 47 percent of the dart points at the site are associated with the Central

Texas Archaic proves its influence on the site even though the site is in the extreme northern end of the Central Texas Archaic geographic range. However, since the mortars are not found in or near the core area of the Central Texas Archaic (Edwards Plateau aspect), it seems reasonable to conclude that they are not associated with that cultural group.

Inasmuch as the Historic, Neo-American, and the Central Texas Archaic each have been ruled out as the source of the boat-shaped mortars, the source of these mortars most likely lies among the residuals. Excluding the three Paleoindian and three untyped dart points, the 43 remaining points represent seven named types, none of which is firmly associated with a recognized cultural pattern.

What is outstanding in the list of dart points is the high proportion of the new Zephyr type (Figure 5, Table 6); it comprises 59 percent of the dart points that are not attributed to the Central Texas Archaic, and 32 percent of all dart points recovered from the site. The Zephyr type (Prewitt 1982) was originally included in the Darl type (Suhm et al. 1954), but for many years the Darl type has been thought to be too inclusive. Prewitt has dropped the name Darl and has split it into three newly named types, one of which is the Zephyr. He ascribes the Zephyr to an "undifferentiated Middle (?) Archaic, West Central and North Central Texas."

The author agrees completely with Prewitt's separation and also with his ascription of the Zephyr point to the west-central and north-central Texas areas. These two areas, when combined, also coincide very well with the distribution pattern of the boat-shaped mortars.

Prewitt's "undifferentiated Middle (?) Archaic" leaves the chronological and cultural affiliations of this point type in limbo, but does separate them from the Central Texas (Edwards Plateau) Archaic. Turner and Hester give a date of about A.D. 200 as "transitional Archaic" and a distribution of Central Texas, but this includes all forms of what was previously labeled Darl (Turner and Hester 1985:84). The author has not found Zephyr points in any excavated Central Texas burned rock middens, but they are common surface finds along the upper Brazos River and its tributaries, as well as on the upper reaches of the Leon and Colorado rivers.

No point that would now be classified as Zephyr was reported from the Ham Creek site, a stratified Edwards aspect site about 55 km (35 miles) upstream from the Horn Shelter Number 2 site (Forrester 1964). The north end of the Horn Shelter Number 2 has produced 1114 dart points to date, of which 16 (1.4 percent) have been classified as Zephyr (Forrester 1985). These specimens document an extension of the Zephyr distribution southward on the Brazos River to as many as 16 km (10 miles) downstream from the Lake Whitney dam.

The stratigraphy and associations in the Horn Shelter Number 2 offer some aid in placing the Zephyr type into a time frame. From the same levels that yielded the Zephyr points were also found Alba, Bonham, and Scallorn arrowpoints, and dart point types represented by more than one specimen are Palmillas (2), Godley (5), Marcos (3), Ellis (4), Mahomet (5), Yarbrough (7), and Ensor (3). The Palmillas, Godley, and Yarbrough points are not yet firmly placed in time, but the combination of Alba, Bonham, Scallorn, Marcos, Ellis, Mahomet, and Ensor points places the

Table 5. Dart Points from Site S-Y (41SE17)

Type	Phase	Time Period	Number of Points	Percent Of Edwards Plateau Aspect Dart Points	Percent of Total Dart Points
	Dart Points Ascribed to the Edwards Plateau Aspect (Central Texas Archaic)				
Mahomet	Driftwood	A.D. 550–A.D.700	3	7.3	3.3
Ensor	Twin Sisters	A.D. 200–A.D.550	7	17.1	7.8
Marcos	Uvalde	300 B.C.–A.D. 200	8	19.5	8.9
Frio	Uvalde	300 B.C.–A.D. 200	4	9.8	4.4
Castroville	Uvalde	300 B.C.–A.D. 200	3	7.3	3.3
Marshall	San Marcos	650 B.C.–300 B.C	2	4.9	2.2
Williams	San Marcos	650 B.C.–300 B.C.	5	12.2	5.6
Pedernales	Round Rock	1450 B.C.–650 B.C.	7	17.1	7.8
Baird/Taylor	Okalla	3050 B.C.–2650 B.C.	1	2.4	1.1
Hoxie	San Geronimo	5050 B.C.–4050 B.C.	1	2.4	1.1
Total Ascribed to the Edwards Plateau Aspect			**41**	**100.0**	**45.5**
	Dart Points Not Ascribed to the Edwards Plateau Aspect				
Zephyr		A.D. 200–A.D. 700	29	59.2	32.2
Godley		A.D. 300– ?	3	6.1	3.3
Ellis		2000 B.C –A.D. 700	4	8.2	4.4
Figueroa		200 B.C.–A.D. 600	2	4.1	2.2
Palmillas		2650 B.C.–A.D. 550	2	4.1	2.2
Kinney		2650 B.C.–300 B.C.	2	4.1	2.2
Pandale		4000 B.C.–2500 B.C..	1	2.0	1.1
Scottsbluff		7120 B.C.–6650 B.C.	1	2.0	1.1
Plainview		8150 B.C.–8010 B.C.	2	4.1	2.2
Untyped		Unknown	3	6.1	3.3
Total Not Ascribed to the Edwards Plateau Aspect			**49**	**100.0**	**54.2**

Note: Edwards Plateau/Central Texas Aspect dates are from Prewitt 1981; other dates are from Turner & Hester 1985

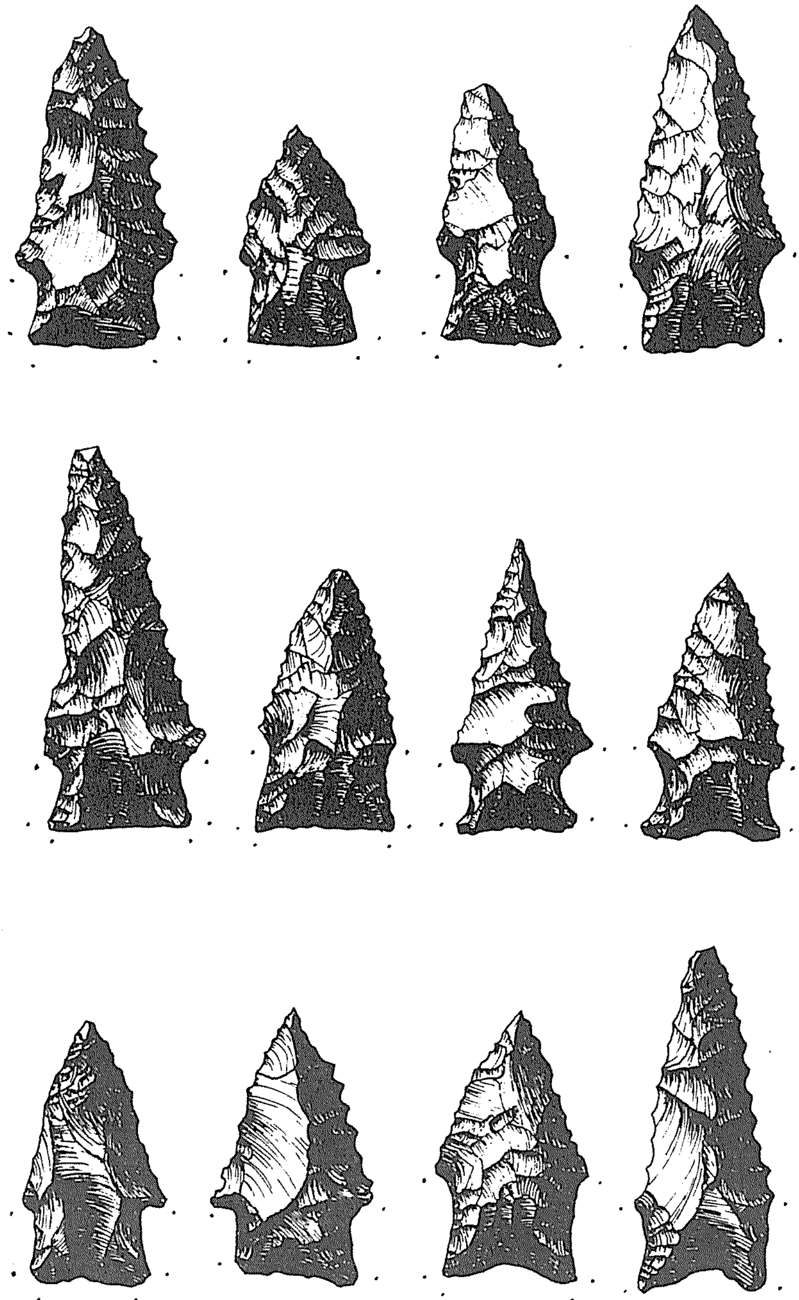

Figure 5. Zephyr Dart Points from Site S-Y (41SE17).

Table 6. Attributes of Zephyr Dart Points from Site S-Y (41SE17), Stephens County

Catalog No	Smooth Stem	Beveled Blade	Beveled Stem	Serrated	Thickness	Maximum Length	Blade Width	Base Width	Haft Length	Neck Width	Base Depth
R	+	+	–	+	06	37	18	11	16	16	+0
S-7	+	+	–	+	07	42	21	15	08	13	000
T-B	+	+	–	–	06	33	17	13	10	13	+01
T-Ra	+	+	–	–	07	37	20	17	14	16	+03
T-Rb	+	+	–	+	06	33	22	16	11	15	000
250a	+	+	–	+	06	36	21	16	10	14	000
250b	+	+	+	–	07	30	17	14	10	12	–01
250c	+	+	–	+	07	36	18	18	10	14	+01
337	+	+	–	+	07	59	17	16	13	15	+04
242a	–	+	–	–	07	32	16	15	08	13	+01
242b	–	+	–	–	08	31	19	19	08	16	+01
396a	+	+	–	+	07	38	22	17	10	15	+01
396b	+	+	–	+	07	49	17	17	08	15	000
409a	–	+	–	+	07	40	19	18	11	13	+03
409b	+	+	–	+	06	40	19	16	09	11	+01
499a	+	+	–	–	07	43	17	15	13	15	000
499b	+	+	–	–	05	36	19	16	11	14	000
509	+	+	–	+	07	47	21	17	09	16	000
617	+	+	–	–	07	32	20	18	11	15	–01
628	+	+	–	–	07	53	21	19	08	16	000
727a	+	+	–	+	06	43	21	17	09	15	–01
727b	+	+	–	–	06	37	16	15	10	11	000
727c	–	+	–	–	07	35	18	18	08	14	000
727d	+	+	–	–	06	41	19	15	10	14	+01
727e	+	+	–	–	07	35	18	17	08	14	+01
727f	–	+	–	+	06	37	16	15	08	14	000
727g	–	+	–	–	07	42	21	20	09	16	+01
747	+	+	–	+	06	49	18	17	13	17	+03
857	+	+	–	–	06	48	20	14	11	11	+01
Present	79%	100%	3%	48%							
Average					6.6	39.7	18.9	16.2	10.1	14.2	+.72
Minimum					5	30	16	14	8	11	–1
Maximum					8	59	22	20	16	17	+4

NOTE: Measurements are in millimeters
+ Present
– Absent.

associated Zephyr points somewhere between A.D. 200 and 700. This is somewhat later than Prewitt's estimate, but the firm associations from a well-stratified site such as Horn Shelter Number 2 give weight to the conclusion.

Krieger apparently reported Zephyr points in the Harrell site excavations, under Kelley's name Sabana Stemmed (Krieger 1946), but his illustrations and descriptions are not sufficiently clear for positive identification. These and all the other dart points in the Harrell site may have been collected by its inhabitants from the surrounding area for use as secondary tools or as a source of flint.

In the light of the data presented, by far the most likely projectile point associated with the boat-shaped mortars is the Zephyr dart point, with a probable date of about A.D. 200 to 700. Their areas of distribution essentially coincide, far more so than do those of any other point type, and the numbers found at site S-Y imply a reasonably long occupation there. Such a long-term occupation probably would have been necessary for excavation of the 13 boat-shaped mortars found there.

CONCLUSIONS

The author's personal observations and records indicate that the pestles for the boat-shaped mortars in Texas were flat, elongated sandstone tools, sharpened on the broad ends and dressed at the smaller ends for hand-holds. It is proposed that these tools were in fact the pestles for the boat-shaped mortars, and may be used as indicators of boat-shaped mortars at a site.

The evaluation of the lithic collection from site S-Y (41SE17) in southwestern Stephens County has led, by process of elimination, to the conclusion that the projectile point most likely associated with the makers of the boat-shaped mortars is the Zephyr point. This point has been dated by its association with better-known types to somewhere between A.D. 200 and 700, but its cultural affiliations have not yet been defined. Therefore, we are only a little further along in defining the cultural affiliations of the boat-shaped mortars than we were in 1935 or in 1960.

ACKNOWLEDGMENTS

The writer thanks Roy Padgett and the late Isabelle Lobdell Padgett for their review of the manuscript and suggestions concerning its organization, most of which were accepted. However, any errors of fact or interpretation are solely the responsibility of the author. In addition, Roy Padgett found the boat-shaped mortars near Santo, Texas and arranged for the author to visit them.

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The Byrd Mountain Lithic Cache (34GR149), A Find of Edwards Chert From Greer County, Southwestern Oklahoma

Van Tries Button

ABSTRACT

An isolated cache of 21 Edwards chert lithic specimens, found by construction workers at the toe of Byrd Mountain in southwestern Oklahoma, has a mix of attributes that other scholars cautiously suggest are indicators of age. The Byrd Mountain lithics were cached in a very distinctive place in regard to local landmarks. I suggest that exchange of the ownership of caches of exotic lithics may have played a role in prehistoric economies. Seeing cache ownership, not the lithics themselves, as the medium exchanged may provide a better explanation than owners' forgetfulness for the failure to retrieve such caches.

INTRODUCTION

The 21 lithic specimens reported here were discovered by Lugert-Altus Irrigation District workers in August 1987 during repair of a major break in the Altus Canal, part of the Bureau of Reclamation's W. C. Austin Project (Figure 1). The find was made with a backhoe while the bottom of the canal was being dug down to a deposit of natural gravels below, probably an ancient steam channel. The excavation was needed for replacement of the washed out canal embankment with one on a more solid footing.

THE CACHE

The materials were reported to have been recovered at about 1 meter below the precanal ground surface in a tight cluster, right in the path of a small unnamed drainage in a reach of the canal that was built by compacting fill over the existing ground as it skirts the toe of Byrd Mountain. The repair work apparently cut into a zone that had not been disturbed by the original construction. When the new embankment was in place, the coffer dam that had held back the water was removed, and the site of the cache was again submerged, making further examination of its context impossible. No other archeological artifacts have been seen in the area.

The recovered artifacts were found in a tight cluster, as if they had been placed in a small hole. They consisted of 21 pieces of blue-gray and mottled tan and gray Cretaceous chert from the Edwards formation of Central Texas, and, when they were all taken out, they half filled a five-gallon container. Three are ovate bifaces (Figure 2). Five of the flakes (Figures 3, 4, 5) are without cortex, and thirteen have

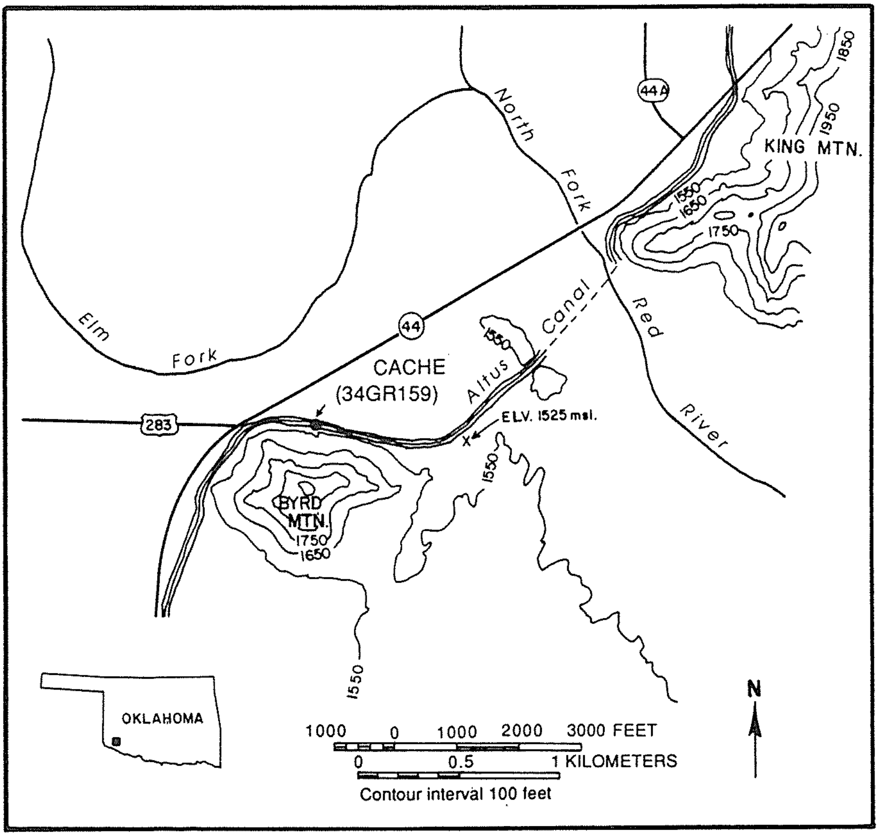

Figure 1. Topographic map of the Byrd Mountain area in southwestern Oklahoma showing the location of the Byrd Mountain cache. From U.S. Geological Survey 7.5 minute series, Blair, Oklahoma.Quadrangle.

some cortex preserved. An exhaustive attempt at refitting the flakes has not been made, but there are no obvious refits, although the range of material is visually homogeneous, and all the material could have come from just a few blocks of chert. The flakes have not been worked into any recognizable finished tools and show no uambiguous evidence of use. Some edges have some retouch that looks like trimming. The general ratio of width to length suggests a flake—not a blade—technology (Table 1).

The bifaces are fully worked by the removal of large multidirectional flakes. They are not finished points, nor are they bifacial cores; they are preforms.

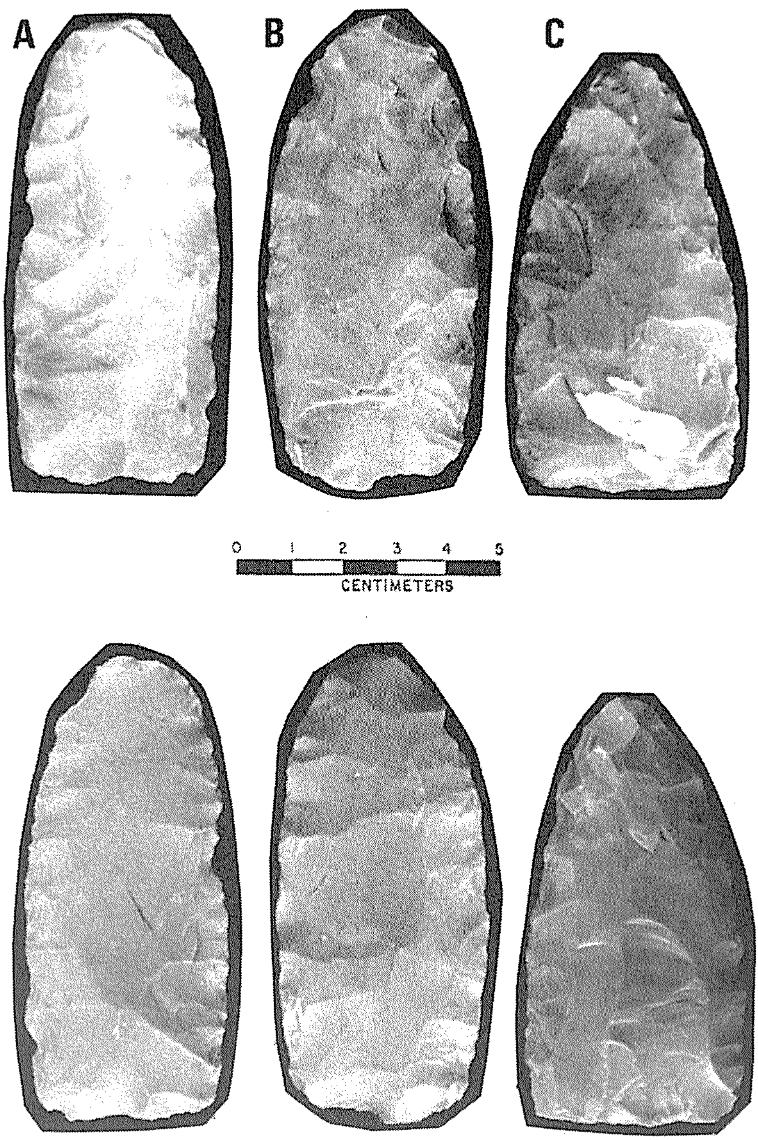

Figure 2. Photographs, both sides of bifaces A–C.

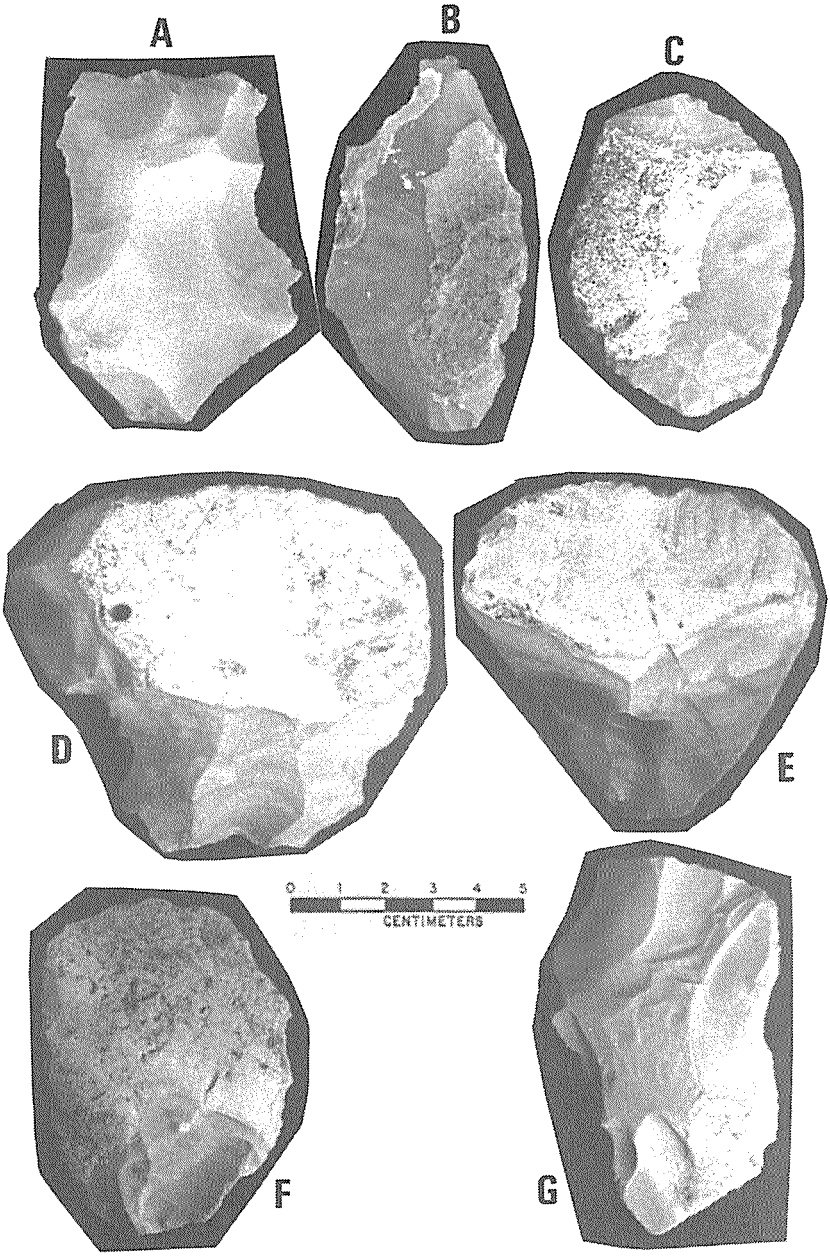

Figure 3. Photographs, cortex flakes A–G.

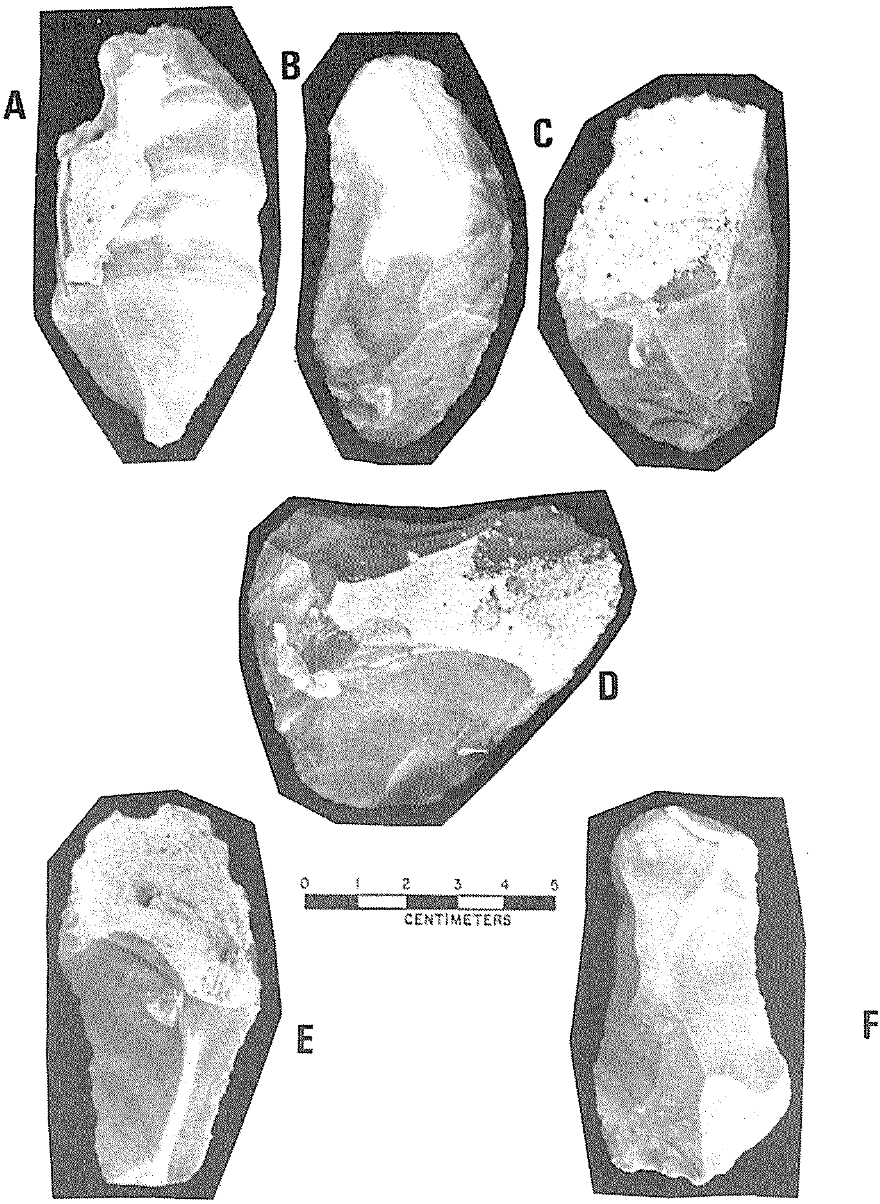

Figure 4. Photographs, cortex flakes A–F.

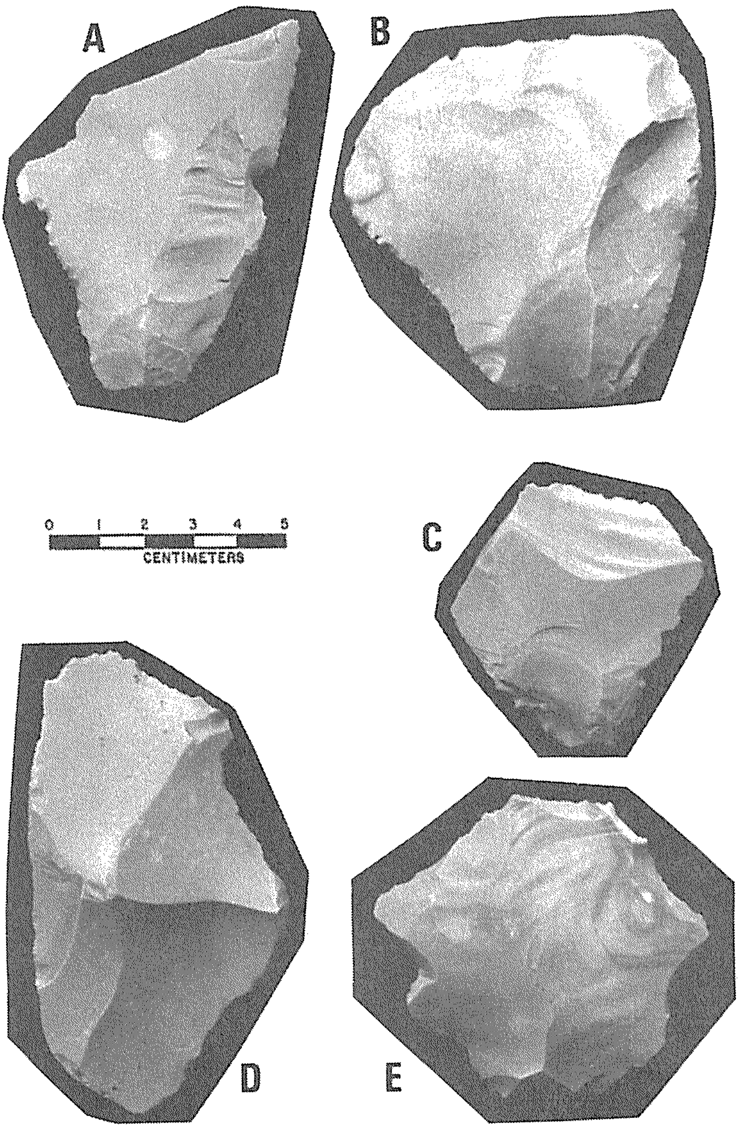

Figure 5. Photographs, interior flakes A–E.

Table 1. Attributes of Cached Artifacts

	Figure No.	Length cm	Width cm	Thickness cm
Bifaces				
	2, A	9.0	3.9	1.1
	2, B	9.1	4.0	1.2
	2, C	8.3	4.2	1.2
Flakes with cortex				
	3, A	7.9	5.3	0.8
	3, B	8.4	4.2	1.1
	3, C	7.1	5.1	0.9
	3, D	8.1	9.3	1.3
	3, E	7.6	7.7	1.2
	3, F	7.4	5.4	1.2
	3, G	7.5	4.9	1.0
	4, A	8.8	4.4	1.1
	4, B	8.2	4.0	1.1
	4, C	7.4	4.7	1.9
	4, D	5.9	7.5	1.9
	4, E	7.8	4.1	1.2
	4, F	7.4	4.0	1.5
Interior Flakes				
	5, A	7.9	5.6	0.8
	5, B	8.1	7.7	1.3
	5, C	5.8	5.6	0.7
	5, D	8.5	5.6	1.5
	5, E	6.7	6.7	0.9

SETTING

The cache was found at the toe of the northern face of Byrd Mountain, an isolated prominence that is the southwesternmost peak of the Wichita Mountains, just south of the junction of the Elm Fork and the North Fork of the Red River. The cache was among jumbled granite outcrops 10 meters above and 100 meters south of the flat floodplain of the Elm Fork, either close to or in the bank of an intermittent drainage that rather neatly halves the north face of the mountain, which rises precipitously above.

DISCUSSION

Lithic caches of the Southern Plains have been exhaustively addressed by Tunnell (1978), and Edwards caches, more particularly, by Wykoff (1984). Wykoff (ibid.:Tables 1 and 2) discusses five Edwards caches in Oklahoma and five in New

Mexico that have been documented. There are probably more undocumented Edwards caches (written communication, Robert Brooks, Norman, Oklahoma, September 18, 1987). Edwards caches quite far from the sources from which they were quarried are a regular, though certainly not a common, occurence.

Some of the attributes suggested (Tunnell 1978, Wykoff 1978) for distinguishing caches are (1) close to or distant from the quarry, (2) made up of bifaces or flakes, or both, and (3) isolated or associated with camp or village sites. The Byrd Mountain cache documents further the diversity of western Oklahoma caches, for like the two other isolated caches (Brush Creek and Patterson) known in the area, Byrd Mountain is a mix of flakes and bifaces. But unlike those two sites, the Byrd Mountain bifaces are ovate-acuminate (i. e., not ellipsoidal, but more triangular in outline). The site of the Byrd Mountain cache suggests another attribute that may be useful in evaluating isolated caches. This cache is in a very distinctive location, and it would be easy to provide directions to it. Ease of relocation is, indeed, an attribute that cannot be objectively defined, but even so, it is probably an important one.

A speculative thought, offered to explain isolated caches, is that those who deposited the caches may not have intended to retrieve them (Wykoff 1984:11, 12). They may have been making offerings like those made in the course of vision quests; at the risk of being too speculative, the author suggests that some caches that were buried where they could have been relocated easily may have been left in place on purpose. Caches of exotic lithic artifacts are plausible components of primitive exchange systems where the caches function like money; the ownership of the caches is exchanged, but the caches themselves are never unearthed. Like kula objects, Yap money, and gold in Fort Knox, the intrinsic value of the object (i. e., the worth of what it can do or make) is replaced by the greater value of what it has in the past been traded for. A cache, to function this way, would need to be hidden where it could be easily relocated. Once the cache has achieved a value greater than its intrinsic worth, there would be a strong reason for not recovering it.

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Crosby County Lunate Stone Burial

John Redding and Wayne Parker

ABSTRACT

A single slab-lined Archaic burial in southern Crosby County, Texas was excavated in April of 1986 by South Plains Archeological Society members Wayne Parker, of Crosby County, and John Redding, of Floyd County. Due to the extreme fragmentation and absence of some skeletal parts, it was impossible to determine the exact position of the body at interment. The burial was of an adult, probably male, who most likely lived sometime between 2000 B.C. and A.D. 1000 Artifacts recovered in direct association with the burial are one Ensor dart point, three Olivella shell beads, and one polished quarter-moon shaped stone with 24 notches cut into the convex edge. This artifact is called a *lunate stone* throughout this report.

SETTING

Crosby County covers the southeast edge of the Llano Estacado and the adjacent rolling plains. Atop the Llano is the geographical region called the Texas High Plains. Although appearing to be a flat plain, it in fact slopes gradually to the southeast at an average of 2.44 meters (8 feet) per 1.5 km (J. Hughes,, this volume). Many playa lakes on the plains vary in size from several to several hundred hectares. Occasional gullies meander southeastward to the escarpment of the Llano and eventually to the Brazos River. Near the escarpment, constant erosion has created deep, narrow canyons in these drainages. The largest canyon in Crosby County originates in Floyd County to the north and cuts several miles into the Llano Estacado.

Below the escarpment lies the region known as the Rolling Plains (J. Hughes, this volume) made up of low hills, many gullies, and occasional springs. A few flat-topped mesas, scattered along and usually near the escarpment, vary in size from mere flat-topped peaks to mesas a few hundred meters long.

The elevation of Crosby County ranges between 975 meters (3200 feet) atop the Llano in the north and 640 meters (2100 feet) below the escarpment in the south (Koos et al. 1966). Average temperatures range between 21.8°C (53.8°F) to — 6.7°C (25.3°F) in January and 62.1°C (94.1°F) to 34.3°C (66.3°F) in July. The annual rainfall averages 54 cm (21.42 inches), with a 206-day growing season.

Plant life consists of many grasses; buffalo and mesquite are the most common. Yucca, cactus, shin-oak, broomweed, wild sunflower, and mesquite are common. Below the escarpment, along the many drainages, cottonwood, hackberry, wild plum, cedar, and sagebrush flourish. Animal life consists of mouse, rat, rabbit, prairie dog, raccoon, porcupine, skunk, opossum, badger, bobcat, coyote, deer, and antelope. Native birds are quail, turkey, sparrow, mockingbird, bluejay, blackbird, field lark, and cardinal; the many migratory birds include duck, goose, dove, crow, hawk, buzzard, and an occasional eagle. Reptiles include horned toad and several other kinds of lizards, tortoise, snapping turtle, and snakes in abundance—most commonly rattlesnake, bullsnake, and prairie racer. Amphibians include many species of frog and toad. catfish, perch, minnows, and river clams are found in the few water holes along the drainages below the escarpment.

Archaic sites are plentiful along the escarpment, both near the upper rim and along the waterways below. Unfortunately, very few have been studied and documented, for most archeological attention in the region has been centered around the Paleoindian and Neoindian periods; most evidence of the Archaic is in surface-collected artifacts.

Within a few kilometers of the burial are many sites that have yielded an abundance of surface-collected Archaic material. The most prominent sites are in southern and southwestern Crosby County in the sandhills atop the Llano. Archaic artifacts can also be found around nearly all of the larger playa lakes of this region.

As the drainages of the High Plains approach the escarpment, they form deep, narrow canyons that create peninsulalike ridges of varying width and length. Several of these points, though only a few hundred yards wide, extend for more than a kilometer between the canyons. To geologists and to ordinary lovers of nature, the view from one of these points is, to say the least, spectacular as the eye scans the narrow gorges on each side and drifts southeastward across the Rolling Plains below to the Double Mountain Fork of the Brazos River some 80 km (50 miles) away. Undoubtedly this magnificent panorama must have played at least some part in the decision of Archaic people of the region to use these projections as places of interment. This lunate stone burial was on such a projection in south-central Crosby County (Figure 1).

DESCRIPTION OF SITE

The burial site was near the center of the projection and about 140 meters (150 yards) back from its point, atop a small knoll some 9 to 12 meters (30 to 40 feet) in diameter. Burned rock is scattered along the top of the escarpment, and an occasional hearth has been exposed by erosion. A few flint flakes and quartzite hammerstone fragments have been found nearby.

Below the escarpment along the banks of the many drainages there is limited evidence of prehistoric man; a few hearths are exposed: flint flakes of Edwards chert, Tecovas jasper, and Alibates dolomite have been found, but no major campsite has been discovered.

Many fragments of quartzite hammerstones and sandstone grinding tools have been found, but the only known artifact collected from the area directly surrounding the burial site is a sandstone mano about 18 cm (7 inches) in diameter, discovered near a dry stream bed below the escarpment.

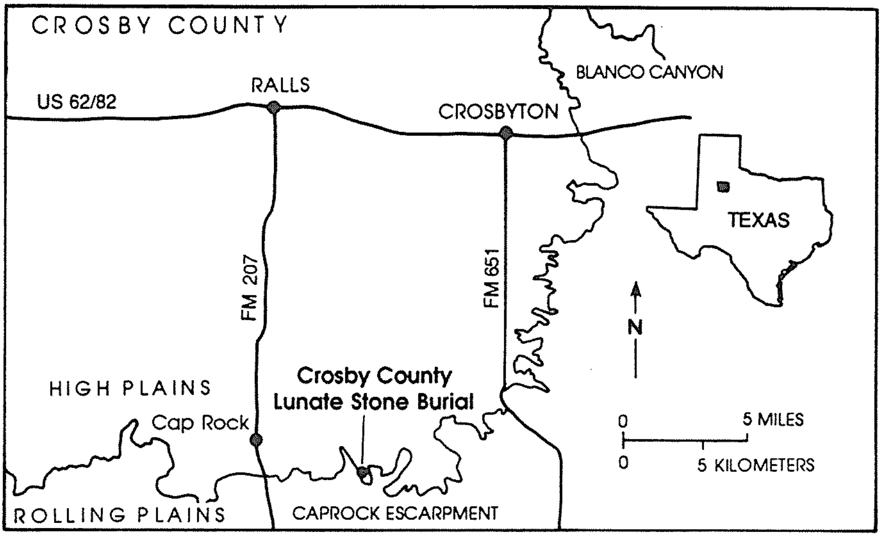

Figure 1. Map of part of Crosby County showing the location of the lunate stone burial.

EXCAVATION

Before excavation was begun, magnetic north was established, photographs were taken, and it was decided to make scale drawings and field notes as well as photographs at different levels during the excavation (Figure 2). Smaller loose surface cobbles and fill were removed by trowel and brush in order to pinpoint the exact location of the burial crypt, which was encountered at about 15 cm (6 inches). At this level larger slablike stones of the local escarpment rock—the only rock type used in the burial—were exposed (Figure 3). These slabs were from 28 to 48 cm (11 to 19 inches) long, 15 to 35 cm (6 to 14 inches) wide, and 5 to 13 cm (2 to 5 inches) thick.

At this depth most of the stones were laid horizontally, but five were vertical to near vertical. The five vertical slabs—only two of which were partly exposed at the surface—made a circular pattern with a diameter of about 120 cm (4 feet). Only small parts of two of these stones were exposed at the surface. These stones and fill were removed, and the excavation continued to a depth of about 35 cm (14 inches), where, near the center of the crypt, two large, flat, horizontal slabs were uncovered (Figure 4). These stones were about 61 cm (2 feet) long, 23 to 30 cm (9 to 12 inches) wide, and 5 to 8 cm (2 to 3 inches) thick.

After the two slabs were removed and troweling continued for about 3 cm (one inch) to a depth of 46 cm (18 inches), the first bones, identified as the femurs, tibias,

Figure 2. Map showing the surface of the site before excavation.

and fibulas, were exposed (Figure 5). The two femurs, about 47 cm (18 1/2 inches) long, above and nearly parallel to the lower leg bones, were lying in a northeast-southwest position with the pelvic area to the southwest. These bones were extensively fractured, and much of the pelvic region was absent, making precise measurements impossible; no foot bones were recovered. Directly north of the pelvic area were fragments of three vertebrae, and near the northern part of the burial pit were one humerus, ulna, radius, and parts of three ribs. The arm bones

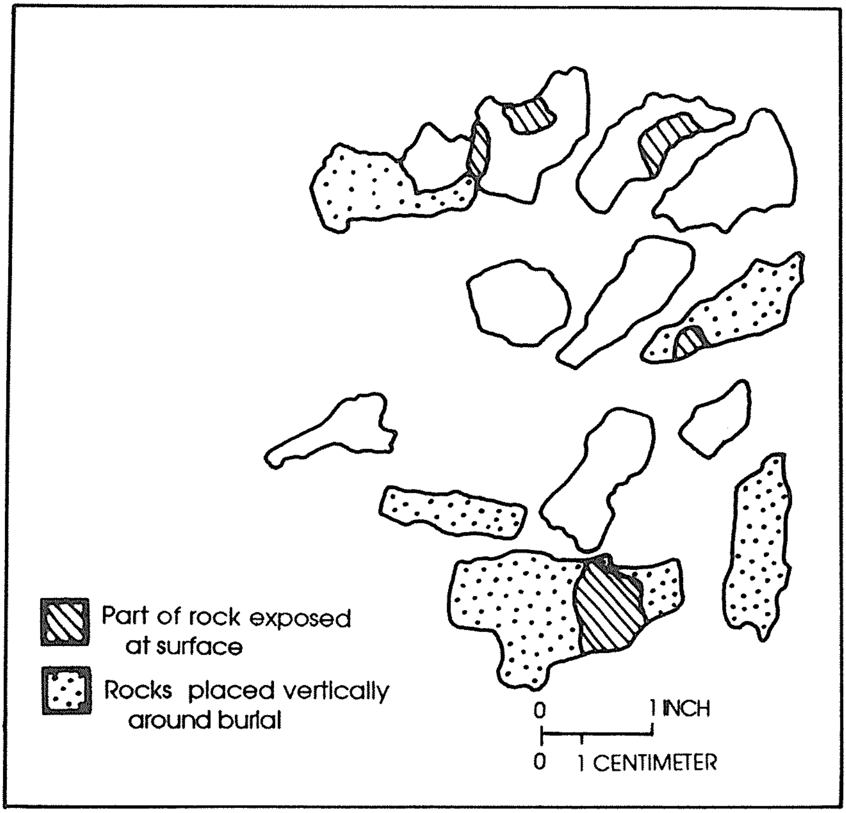

Figure 3. Plan showing placement of vertical rocks around the burial. 3.5x4.5

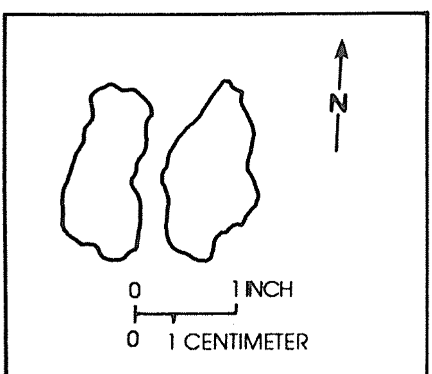

Figure 4. Drawing of the horizontal slab rocks covering the burial.

were folded, with the wrists to the west. North of the leg bones, near the edge of the burial pit, were two Olivella shell beads, and another was found north of the leg bones near the pelvic region (Figure 5). Two small fragments of the skull were excavated just northwest of and below the pelvic region at a depth of 61 cm (24 inches); one fragment included part of the left eye guard, with the exterior of the skull facing the bottom of the pit (Figure 5). No more skeletal remains were recovered from the burial.

An unusual artifact was discovered in the southwest sector of the pit about 7.5 cm (3 inches) from the pelvic region at 51 cm (20 inches). This artifact was a

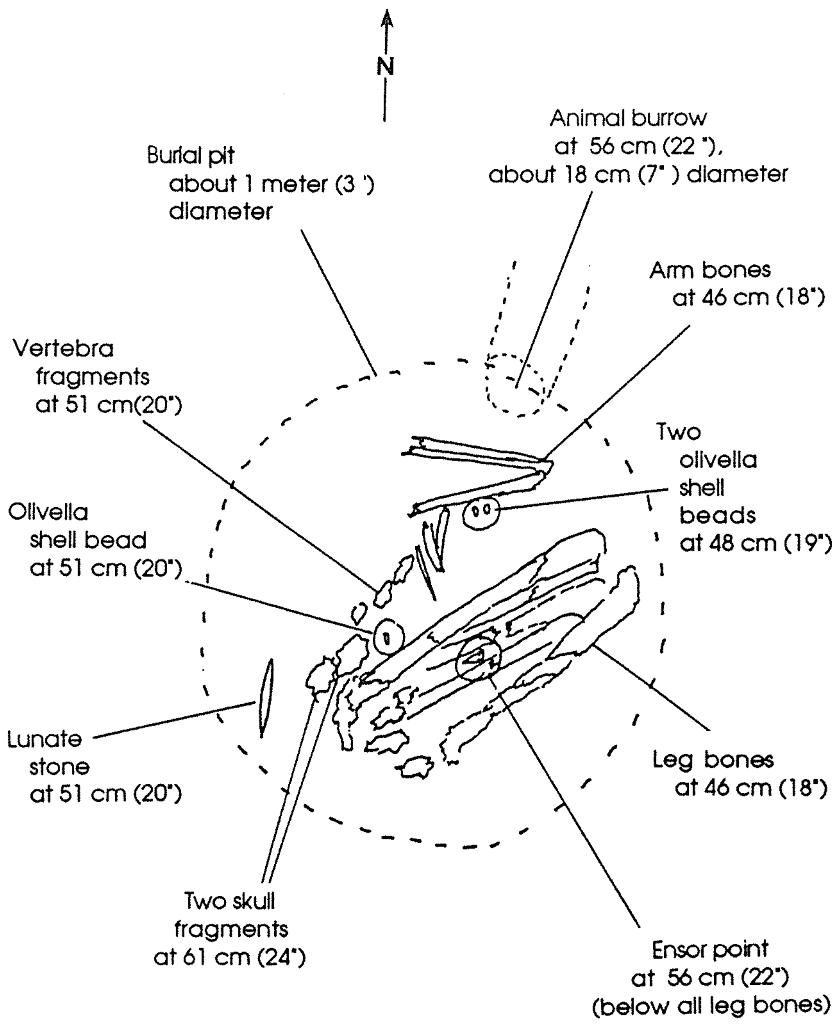

Figure 5. Drawing of the burial showing locations of skeletal remains and artifacts.

quarter-moon-shaped, highly polished stone of greyish green material that measured 16.5 by 5 by 1.5 cm (6 ½ by 1 ⅞ by 9/16 inches). The convex side had been ground to a nearly sharp edge, with 24 notches cut or ground into it from both sides, giving the convex side of the artifact a saw-toothed appearance. The artifact was oriented nearly north-south, with the flat side up and the notched convex side down. For a more thorough description of this stone, see the "artifacts" section.

At this point in the excavation, all bones were removed from the pit in order to trowel the remaining fill. Directly below and near the center of the leg bones at about 56 cm (22 inches) was an Ensor dart point of Edwards chert lying horizontally and pointing to the southwest (Figure 5). Final troweling yielded no more artifacts.

There are at least two possible explanations for the unnatural arrangement and absence of some skeletal parts. Death may have occurred at another location, and the body may have been abandoned for some reason. In this event, surely scavengers (birds and animals) would have devoured or carried away part of the remains. At a later date the balance of the remains might have been gathered for interment. Such bundle burials have been reported previously. Grant Hall (1981), in his extensive work at Allens Creek, excavated and described two bundle burials.

> Two other individuals, distinguished by virtue of the energy expended in preparing them for interment, were group 2 burials 65 and 93, representing about 1.4 percent of the known group 2 population. Both bundle burials, the flesh of these individuals was apparently removed and the bones disarticulated prior to interment. Several artifacts were placed amidst the bones of burial 93; one tubular shell bead was possibly associated with burial 65. It is interesting to note, that, unlike the four cremations, there were grave goods associated with the bundle burials. Whether defleshing of the bodies took place at the site of interment or at some other locality could not be determined from available evidence.

Another possible explanation is that an animal whose 18 cm (7 inch) burrow was discovered entering the northern part of the burial pit at about 56 cm (22 inches), could account for the disarray and absence of some skeletal parts.

ARTIFACTS

Olivella Shell Beads

Three small Olivella shell beads were recovered from the burial, each 1.5 cm (½ inch) long and .75 cm (¼ inch) in diameter. Under magnification, all of the beads show some erosion due to decay, and each has the apex and canal opening abraded off, but no other abrasion or engraving is evident (Figure 6)

Marine shells were obtained either by trade with inhabitants of the Gulf of Mexico, the Gulf of California, or the Pacific Coast, or by excursions to those areas. That such trade was extensive is evidenced by the number of shell artifacts

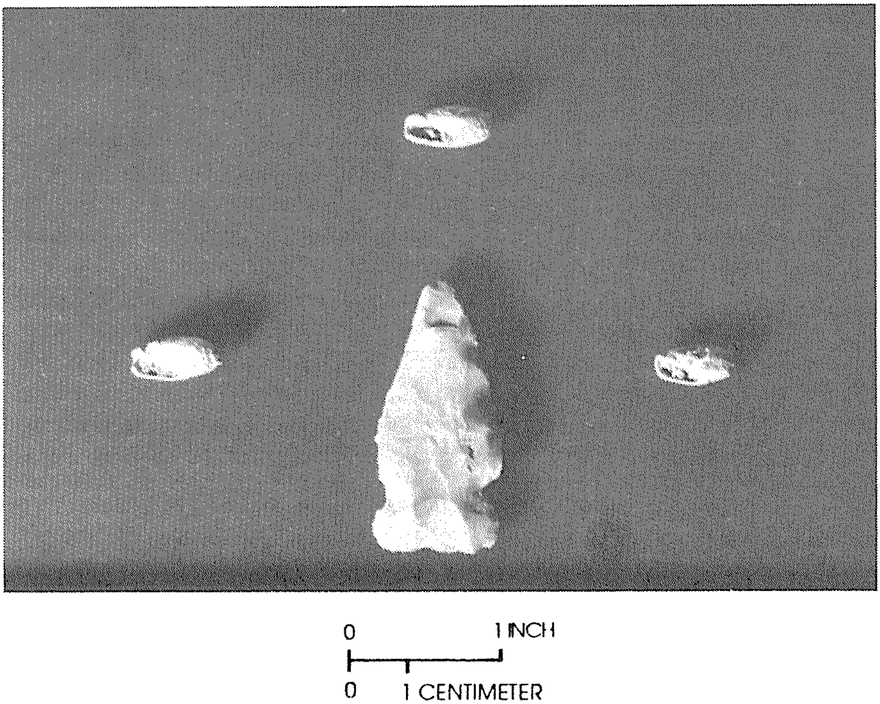

Figure 6. Artifacts from the Crosby County burial. A, Ensor dart point; B, C, D, Olivella shell beads; E, side view of lunate stone; F, bottom view of lunate stone; G, top view of lunate stone.

recovered from sites in the Southwest. Charles Amsden (1949), in his survey of the basketmaker period of the Southwest (A.D. 11 to 600), made the following reference to marine shell ornaments:

> If the basketmakers dressed sparingly, they adorned themselves with a great variety of simple jewels and trinkets. Beads are abundant in basketmaker caves. There are beads of stone in varying colors, carefully ground, polished, and perforated for stringing; beads of Olivella and abalone shell from the Pacific prove a widespread commerce in luxuries among people whose necessaries must often have been but slenderly provided.

Marine shell is also found in abundance at sites in East Texas. In his study of the Allens Creek sites, Hall (1981) concluded that

> marine shell ornaments in Archaic context are distributed across the eastern half of Texas in much the same way as are boatstones. The major exceptions are the shell artifacts found at sites around the three bays along the south central Texas coast. Because most of these shell artifacts are utilitarian rather than ornamental objects, it has been concluded that the Texas coast was probably not the origin of the shell ornaments found in Late Archaic components at Allens Creek and elsewhere in the state. Other than the Texas Coast, the next most likely source of the shell would be the Gulf Coast of Florida. The evidence now available suggests that the Florida Coast was indeed the source of shell artifacts circulating through the import-export system, both during Late Archaic and Late Prehistoric (Caddoan) times.

All shells had to be worked before they could be worn as ornaments or used as charms. Univalve shells were worked in several ways. The most common was abrading the apex of the Olivella spire to make a hole for stringing. Some Olivella shells were also abraded at the opening of the canal, producing cylindrical beads.

Ensor Point

One Ensor dart point was excavated from the burial. It is 4 cm (1 ⅝ inches) long, 1.5 cm (11⁄16 inches) wide, and .5 cm (3⁄16 inches) thick and was made from grey-tan Edwards Plateau chert (Figure 6). Under magnification, the point shows evidence of abrasion, possibly from boring, and the edges show evidence of resharpening. These two characteristics suggest that it might have been hafted and used as a small knife.

Suhm and Jelks (1962) describe the Ensor point as follows:

> Blade triangular and varying considerably in length and width; edges are often quite straight, otherwise slightly convex, occasionally finely serrated. Shoulders vary from slight to pronounced; barbs, if present, are short. Stems are very broad across neck, due to notches being shallow, and bases are commonly wider than shoulders so that basal corners are in line with blade edges. Occasionally the base is less wide than the shoulders but shallow notches and broad stem neck suggest Ensor type. Bases are most commonly straight but may be concave or convex.
>
> Distribution: Occurs most frequently in Central Texas and the Lower Pecos River area, decreasing southward toward the lower Guadalupe River and eastward to the upper Sabine River. Estimated Age: Possibly 1000 or 2000 B.C. to 500 to 1000 A.D.

Of the several distinct Archaic complexes that have been studied and documented in Texas, the one nearest to Crosby County is the Edwards Plateau (Central Texas Archaic). The authors believe that its northern extent should be extended to include the southern High Plains of Texas because of the large number of chipped stone artifacts that are common to this area and to the Edwards Plateau, especially in the late terminal period.

Prewitt, in his summary of this aspect (1974), divided the Archaic into four periods spanning 5900 years (Table 1). He dates the Ensor point to the end of the Archaic period.

Table 1. Prewitt's Division of the Archaic with their Corresponding Projectile Points

Period	Dates	Projectile Points
Early Archaic	4650 B.C. to 2050 B.C.	Bell, Travis, Nolan, Bulverde
Middle Archaic	2050 B.C. to 450 B.C.	Pedernales
Late Archaic	450 B.C. to A.D. 25	Castroville, Marcos, Montell
Terminal Archaic	A.D. 250 to A.D. 750	Darl, Fairland, Ensor

A significant number of the many Archaic sites in and around Crosby County have yielded Ensor points. The authors know of one site—about 16 km (10 miles) south of the burial site in extreme southern Crosby County—in which Ensor points predominate.

Lunate Stone

Due to the rarity of these artifacts, little is known of their origin, distribution, or purpose. One lunate stone measuring 16.5 by 5 by 1.5 cm (6 ½ by 1 ⅞ by 9/16 inches) was found among the burial artifacts (Figure 6); its workmanship is nothing short of artistic. The base of the stone has been ground nearly perfectly flat, giving the basal edges a sharp feel. The sides have been ground evenly toward the top and ends of the convex part of the artifact to a nearly sharp edge. The entire surface of the stone has been finely polished. Twenty-four distinct and precise notches have been made in the narrow convex edge, apparently cut into the stone—rather than ground by some abrasive material—probably with upward motion from each side rather than straight down from the convex edge. One notch near the center appears to be wider and deeper than the others, and close examination proves that there is higher polish through this notch, down the adjacent sides, and across the base, indicating friction wear (Figure 6). There is no evidence of wear polish in any of the other 23 notches or on any other part of the artifact. This indicates that the stone may have been bound to some other object, or may have been bound for suspension.

The lunate stone was examined by Vestal Yeats, retired Professor of Geosciences, of Lubbock. He identified the stone, concurring with the identification made by Jack T. Hughes, as igneous metamorphic rock, nearly slate, possibly greenstone. The nearest westward source for such rock is the Davis Mountains region; the most likely eastern source would be Arkansas, or possibly Alabama or Georgia.

OTHER LUNATE STONES

Descriptions and Comparisons

Only limited information is available about lunate stones. Chipped stone artifacts of similar outlines are known in the Great Basin, where they are called *crescents*, but these lunate stones are considered to be related more to projectile points than to ground stone objects (Mitchell, Rosa, Castagnetto, and Hester 1977). Speculation varies among archeologists as to the purpose of these artifacts; some of the most popular suggestions are atlatl weights (Parker 1981; Parker and Parsons 1979), bannerstones (Mitchell, Hester, and Parker 1980), pendants, and ceremonial axes. The authors will compare all of the information available about these stones from publications and from personal contacts in the hope that they can shed some light on, or at least inspire further study of these unique stones.

Mitchell County Site

In 1935, Cyrus N. Ray, while examining a series of mortar holes, discovered and excavated a burial near Colorado City in Mitchell County. Among the burial artifacts were two lunate stones. Some quotations from his account of this excavation, which was titled "Some Unusual Cremated Burials Found Near Colorado, Texas," *(Bulletin of the Texas Archeological and Paleontological Society* Vol. 8, September 1936), follow.

> When we examined the top of the mountain a rock structure of circular form, consisting of large stones set into the earth closely, was found. This rock structure was 14 feet in diameter and consisted of one layer of stones. Below the stones was 1 1/2 feet of hard, dry earth filled with small stones. Much to our disappointment after the hard labor of clearing the stones and earth away under a temperature of above 100 degrees we came to hard, flat bed rock, and apparently projecting out of the center of

this were some large rough stones which we supposed were part of the same ledge.

Reluctantly we came to the conclusion that we had wasted our efforts on a gas blowout or some other natural formation. However, the writer had always wondered about this site, after later digging up some long headed burials in stone lined graves which were buried 4 and 5 feet deep. In 1932 the writer dug up a similar structure situated about about 30 miles north of this site, and found a flexed long headed skeleton, buried below the earth and stone covering in a pit cut into the solid rock beneath it.

However, nothing was done about it until the summer of 1935, when the writer returned to the site with James G. Morrow, and we again dug out the refilled earth down to the projecting stones, and then found that we were able to pry them loose in the center.

There were six large stones wedged in tightly, and when these were removed, more black earth was found beneath them. The space the occupied was a round hole three feet across, which had been cut down into the solid bed rock for about a foot in depth. We found this filled earth to be full of small burned bone and shell fragments and soon the writer unearthed the largest stone pendant that he ever saw, an oval gray stone pendant, with an hour glass shaped hole at one end. It was nicely proportioned but was a rather large ornament for the small child that wore it. The fragments of bones were quite small and fire-blackened, and the finding of two very small milk teeth showed that the cremation was that of a very young child. This child must have been that of an important chief when one considers the number of artifacts of unusual nature found with the cremation. In addition to the large pendant there were four other oval stone pendants; one was 3 inches long and $^{7}/_{16}$ inches wide, rounded at the top and pointed at the bottom; one was 2 $^{1}/_{2}$ inches long and $^{14}/_{16}$ inches wide; one was 2 $^{1}/_{4}$ by $^{11}/_{16}$ inches; one was 2 inches by 1 inch. In addition, a smaller pendant of shell 1 $^{14}/_{16}$ inches long and a shell bead $^{7}/_{16}$ inches across were found. A curved stone object, 2 $^{2}/_{16}$ inches long on the inside of the curve, was found. A hole was drilled in each end and a groove connects the two end holes on the inside of the curve; the object is $^{1}/_{2}$ inch wide. The use probably was as a bandeau ornament, probably worn on the forehead to hold back bobbed hair. Its curve would be about right to fit the head of a small child. A large stone ring 1 $^{15}/_{16}$ inches in diameter was found. Two peculiar polished gray-green stones of the shape of about a third of a circle, or of about the shape of the visible part of the sun when a little more than a third has risen, were found. The rounded portions of both are notched or serrated. One is 5 $^{7}/_{16}$ inches long, and 2 $^{3}/_{16}$ inches wide in the middle and it has 18 serrations. The other one is 5 $^{10}/_{16}$ inches long and 1 $^{15}/_{16}$ inches wide in the center, and it has 19 serrations, but there is a small piece of the edge missing at one end where two more serrations probably were. There were a great number of small polished fire blackened

> quartz pebbles scattered all through the cremated materials; these varied from a third to a half inch in diameter, and probably were used inside dry land terrapin shells as rattles. Portions of broken polished bone tubes were found, and much burnt shell which was too fragmentary for one to determine from what it came. Three thick, roughly made, stemmed and shouldered, flint projectile points, probably spear of atlatl points, were found with the burial.
>
> Reconstructing the scene the best we can, we visualize the death of a small child of some important chieftain. The selection of a site on the point of a mountain overlooking all the wide valley below. The removal of the earth covering the bed rock and then the laborious cutting with flint tools of a hole in the hard rock three feet in diameter and a foot deep. Then filling this hole with fuel, laying the body thereon with all its toys, rattles, beads, and most valuable ornaments and then setting fire to the pyre, to the end that this fire, sacred agency of their sun god, would consume the remains, and the burial fixtures, and carry their spirits to their home in the sun. When the fire had cooled then six large stones were wedged tightly into the opening, earth heaped above, and then a wide circular pavement of stones set on top [Ray, 1936].

The Cyrus Ray artifacts are now in the Texas Tech University Museum, where, with the cooperation of the staff, the authors examined and photographed those that were associated with this burial (Figure 7). Of particular interest for this report are the Shumla, Marcos, and Fairland dart points and the two lunate stones.

> **Shumla Dart Points.** Distribution is centered about the area of the Pecos-Rio Grande confluence, becoming less frequent down the Rio Grande and Nueces rivers in southwestern Texas; may also extend into the Big Bend and Northern Coahuila, Mexico west of the mouth of the Pecos; estimated age is from an unknown time before Christ to A.D. 700 or 800 [Suhm, Kreiger, and Jelks 1954; Suhm and Jelks 1962].
>
> **Marcos Dart Point.** Distribution is from the lower Pecos River Valley across Central Texas to the middle Brazos River and from the Possum Kingdom Reservoir area on the Upper Brazos southward to the central part of the Texas coast; estimated age is from 2000 B.C. to A.D. 100, or most of that time span [Suhm, Kreiger, and Jelks 1954; Suhm and Jelks 1962].
>
> **Fairland Dart Point.** Distribution includes the entire Central Texas Region; probably not as long-lived as the more common types associated with the Edwards Plateau aspect; estimated age from 1000 B.C. to A.D. 500 or part of that time span [Suhm, Kreiger, and Jelks 1954; Suhm and Jelks 1962].

The two lunate stones had suffered extensive damage during cremation of the burial, but the authors believe that both were made of greenstone. Friction wear is evident in the main center notches of both artifacts. This wear polish is visible down one side of Lunate A. Although no wear can be seen down the sides of the center notch of Lunate B, wear is quite evident across the base in line with this notch. There is no indication of friction polish in any other notches of either lunate, but an interesting feature of both is the absence of notches near the ends of the artifacts. Either the makers decreased the size and depth of the serrations toward the ends of the stones or, possibly, the size and depth were decreased by abrasion. The five stone pendants were made from materials that are common in the region of the burial.

Garza County Site (41GA60)

In 1960, Dan Cockrum and John Bullard discovered four burials (site no. 41GA60) 24 km (15 miles) northeast of Post on a sandy ridge above McDonald Creek in Garza County (Cockrum 1963); the Garza Chapter of the South Plains Archeological Society helped excavate the burials. A keel-shaped polished stone

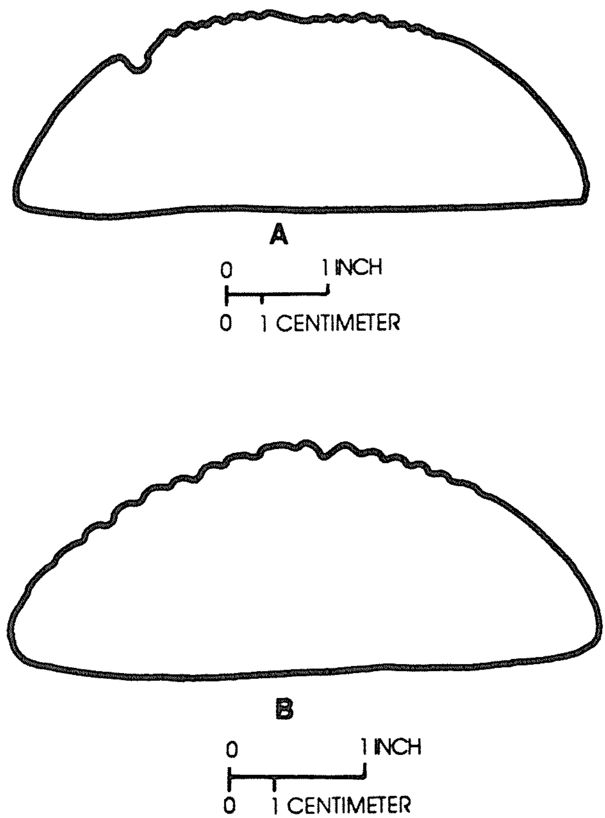

Figure 7. Lunate stones A and B from Mitchell County, Texas *(Courtesy of Texas Tech University Museum).*

artifact nearly 18 cm (7 inches) long, 5 cm (2 inches) wide, and 1.27 cm (half an inch) thick in cross section on the straight edge was discovered between the knees and against the rib cage of skeleton no. 3. The gray-green stone was polished on all surfaces (Figure 8). Earl Green, of Texas Tech University, identified the stone as a diorite material whose nearest source is New Mexico. No other artifacts were found in direct association with the burial.

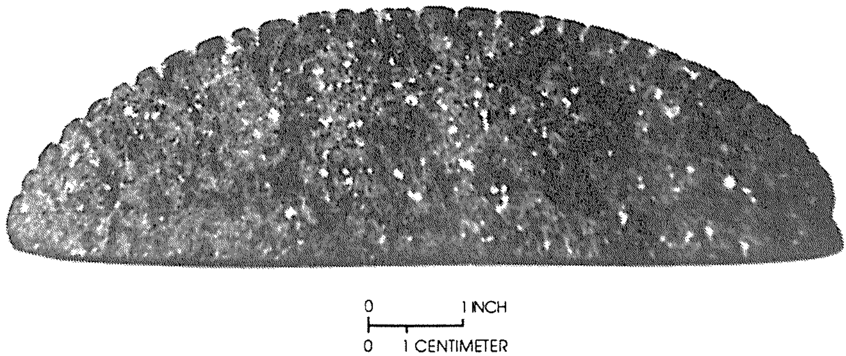

Figure 8. Lunate stone from site 41GA60, Crosby County, Texas.

Old Tom Burial

Ronnie Hill and Mike Martin, of Spur, Texas, excavated a lunate stone from a slab-lined burial near Mud Creek in Dickens County. The burial site, 41DK16, is on the high point of a hill on the McGinty Ranch (Parsons, Hill, and Parker 1979). Also excavated from the burial were three conch shell pendants (Figure 9). The pendants and lunate stone were laid on edge in the burial pit in the four directions around the skeletal remains; the lunate stone was at the south. Only partial skeletal remains were found in the slab-lined burial, which was similar to the Crosby County lunate stone burial. The dark green lunate, made from greenstone, measures about 19 by 5 by 1 cm ($\frac{7}{16}$ by 1 $\frac{15}{16}$ by $\frac{7}{16}$ inches). The highly polished artifact has 26 notches cut into the convex edge; one notch near the center is larger than the others. Upon close examination, the authors found that the lunate has wear polish through this larger notch, down the sides, and across the base. No other notches have this kind of wear. This artifact and the one from Crosby County lunate stone burial are so similar in size, workmanship, and material that they could have been made by the same person.

The shell pendants associated with this burial are remarkably similar to the Form 7 pendants excavated by Grant Hall at Allens Creek (Figure 10; see Hall 1981:203 Figure 47). One pendant from the Old Tom Burial and one from Allens Creek are especially similar in that both have parallel rows of small conical depressions drilled into the surface of the shell. These depressions form an inverted *T* when the shell is viewed with the apex up. This description by Grant Hall could apply to either pendant.

> The *T* is composed of four sets of dotted lines, two sets running across the posterior edge (bottom) of the pendant and the other two sets perpendicular to the first and following the long axis up the center, roughly half the length of the shell [Hall 1981].

At Allens Creek the shell pendants were associated with Ensor points in Late Archaic burials.

Other Sites

Fairy McWilliams, of Silverton, Texas found a lunate stone on the surface of a site near Silverton in Briscoe County. It measures about 11 by 1 cm (4 3/16 by 7/16 inches). It is made from a fine-grained siltstone composed of minute particles of quartz cemented by a quartz solution. The reddish brown artifact has 19 notches cut into the convex edge; the center notch is deepest and largest.

On close examination wear polish was noted in this center notch. Although it was not visible on one side of this artifact, the wear polish was very obvious down the other side and across the base. Both ends of the stone are damaged, as if it had been used for striking other objects (Figure 11); no wear is evident in any other of the other serrations.

Rick Walters, a member of the Southern Plains Archeological Society, formerly of Lubbock, found a small fragment of a lunate stone made of greenstone on the surface of a site in Lubbock County.

Another lunate stone, obtained from a collector in Gaines County (Figure 12), measures about 9.5 by 3 by 1 cm (3 ¾ by 1 ¼ by ⅝ inches). It was a surface find at a sandhill site about 8 km (5 miles) southeast of Seminole, Texas. The artifact is made from a grey igneous material speckled with black. There are seven evenly spaced grooves across the convex edge of the artifact. This particular lunate stone differs from all the others in that the convex edge is wide and flat rather than sharp. The seven serrations appear to have been abraded rather than cut into the artifact, probably because this stone is so much harder. The hardness of the stone may be the reason why there is no visible indication of strapping wear through the center groove, down either side, or across the base.

Jim Hogue, also a member of the Southern Plains Archeological Society, found about two-thirds of a lunate stone at a sandhill site in Hockley County (Figure 13) near Sundown, Texas. If the main notch was near the center, the artifact was about 11.5 cm (4 ½ inches) long, 4.5 cm (1 ¾ inches) wide, and 1.5 cm (⅝ inches) thick.

There are 8 notches between the large notch and the end, indicating that the artifact probably had a total of 17. This lunate is heavily weathered, but the material

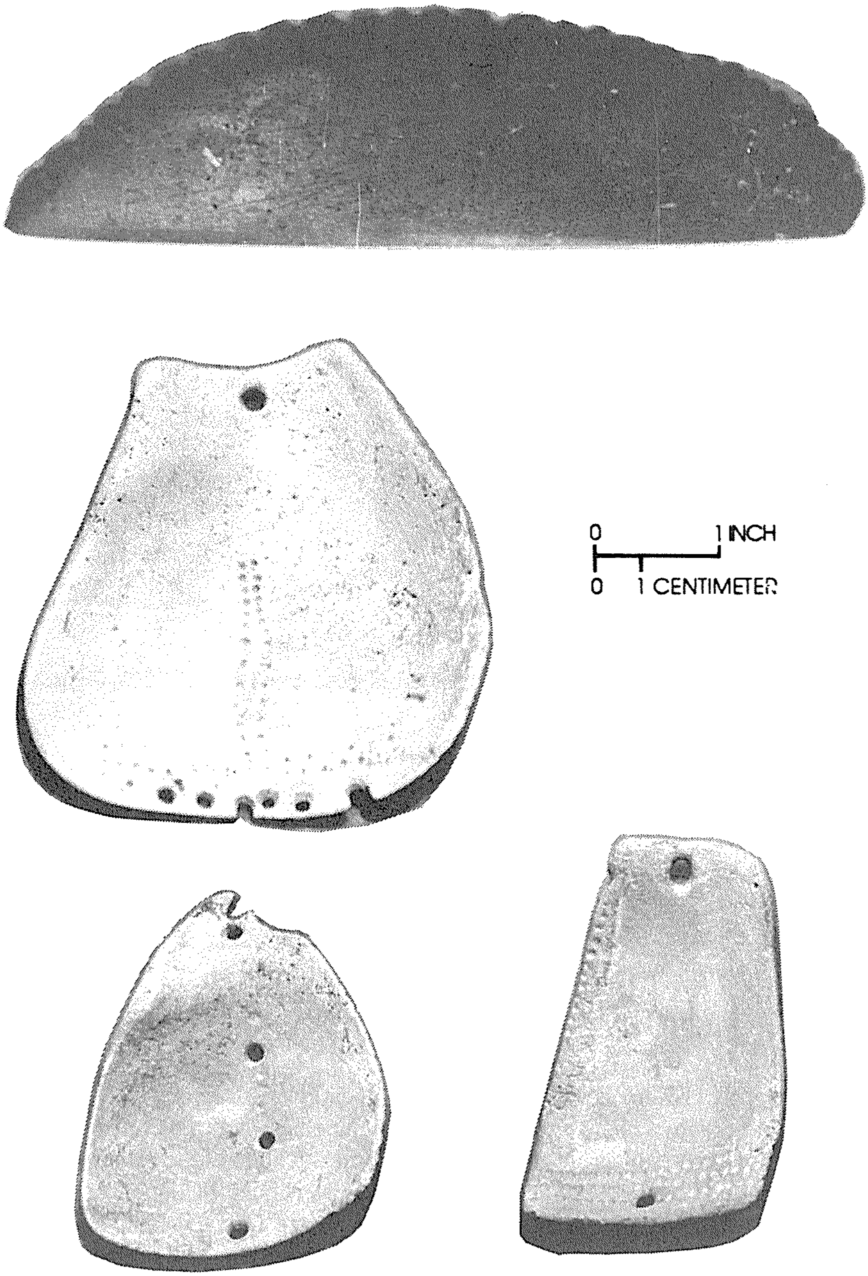

Figure 9. Lunate stone (A) and shell pendants (B, C, D) from the Old Tom burial, site 41DK16, Dickens County, Texas.

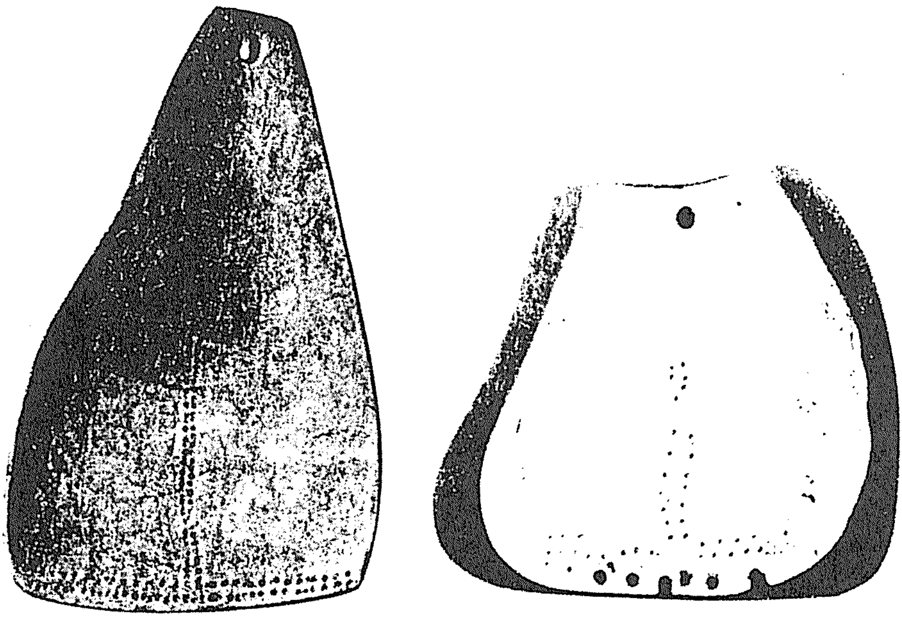

Figure 10. Shell Pendants from the Allens Creek site (From Hall 1981:203, Figure 47).

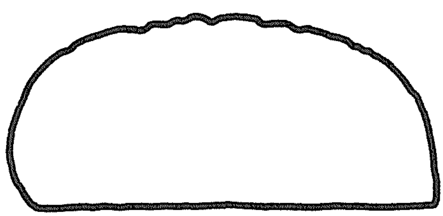

Figure 11. Siltstone lunate from Briscoe County, Texas.

is apparently greenstone. The only visible indication of strapping wear is through the center notch, which is worn deeper than the others into the convex edge.

Other lunate stones have been brought to the attention of the authors, but little information is available about them; one is from Mitchell County, one is from Hemphill County, and an undetermined number are from Dickens and Crosby counties. The one from Hemphill County is unique in that there are no serrations along the convex edge (possibly unfinished). Those from Dickens and Crosby counties were excavated from burials by a state game warden several years ago with no documentation. The origin of the Mitchell County artifact is unknown.

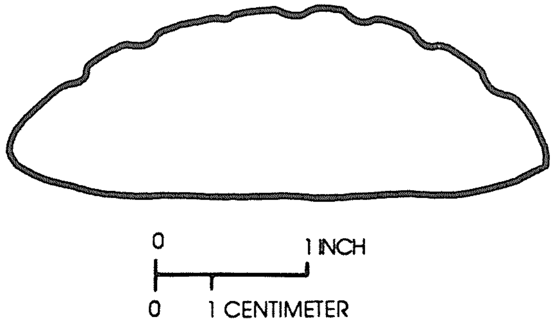

Figure 12. Lunate stone from the Sandhill site in Gaines County.

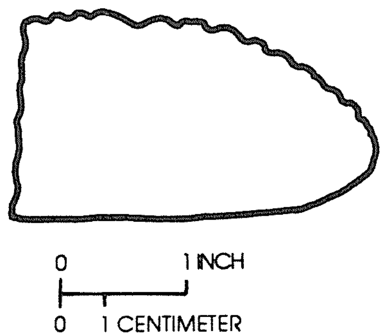

Figure 13. Fragment of a greenstone lunate from Hockley County.

SUMMARY

From the evidence obtained from the Crosby County burial and similar burials in this region, the following conclusions have been reached.

1. Based on the length and size of the femurs and the thickness of the skull fragments, the burial was of an adult male.
2. The estimated age of the burial is between 650 B.C. and A.D. 450, based on the following:
   A) The Ensor point recovered from the Crosby County burial and the Fairland point from the Mitchell County burial; both are common to the late-terminal Archaic of the Edwards Plateau aspect (Central Texas Archaic).

B) There are similarities between the shell pendants from the Dickens County lunate stone burial (Old Tom) and those from excavations at Allens Creek, which Grant Hall has dated to the late-terminal Archaic.

C) The absence of most of the smaller skeletal parts is an indication that the burial was in all probability a bundle burial .

These unusual artifacts apparently have been found along and near the escarpment of the Llano Estacado of the northwestern part of Texas (Figure 14). Perhaps with more time and research, the area of their distribution will increase. There appears to be no evidence of these stones before the Late Archaic.

Also important is consideration of the materials from which these stones were made, for none of the lunates described in this report are of local material. This, together with the fact that polished stone is not common in the region, suggests that the lunates have ceremonial significance.

Grant Hall (1981) suggested an extensive import-export network to the east from Texas during the Late Archaic, but there is little evidence of trade to the west during this period. This suggests that the materials for the lunate stones were either traded in from or obtained by eastward excursions; Arkansas is the nearest eastern source. Patterson, in his report on boatstones in 1937, concluded that boatstones were manufactured in southwestern Arkansas and were found in northern Louisiana, southeastern Oklahoma, and Central Texas, with their numbers decreasing with the distance from southwestern Arkansas. At this time, however, there is no direct evidence suggesting that lunate stones were made at some other location and traded into northwestern Texas.

For the present, the purpose served by these artifacts must be left to speculation. Many polished stone artifacts, especially throughout the eastern states, have been called atlatl weights. Patterson, in his study of boatstones in 1937, concluded that all boatsones are atlatl weights. Many tests have been conducted using atlatls with and without weights, with the conclusions being variously: increased effectiveness, decreased effectiveness, and no effect at all. That stone weights were sometimes used on atlatls is known because some atlatls have been recovered with small stones attached to them (Hester 1974).

The evidence set forth here does not seem to support the use of lunate stones as atlatl weights. Although it has been speculated that these artifacts were strapped to the bases of atlatls through the notches on their convex edges, the only evidence of strapping of these stones is through the main center notch, which would not create a very secure bond between the weight and the atlatl, and the wear polish on these artifacts itself indicates a looseness of strapping. The fact that this wear polish continues from the main notch down both sides and across the base seems to indicate that it was not strapped to another object unless perhaps it was strapped to that object along the flat base, as an axe or a bannerstone would be.

But there is another possible explanation of the wear pattern on these artifacts. The main notch of the Crosby County lunate stone is a little off center, and the wear polish down the sides from this "center" notch is not exactly perpendicular to the

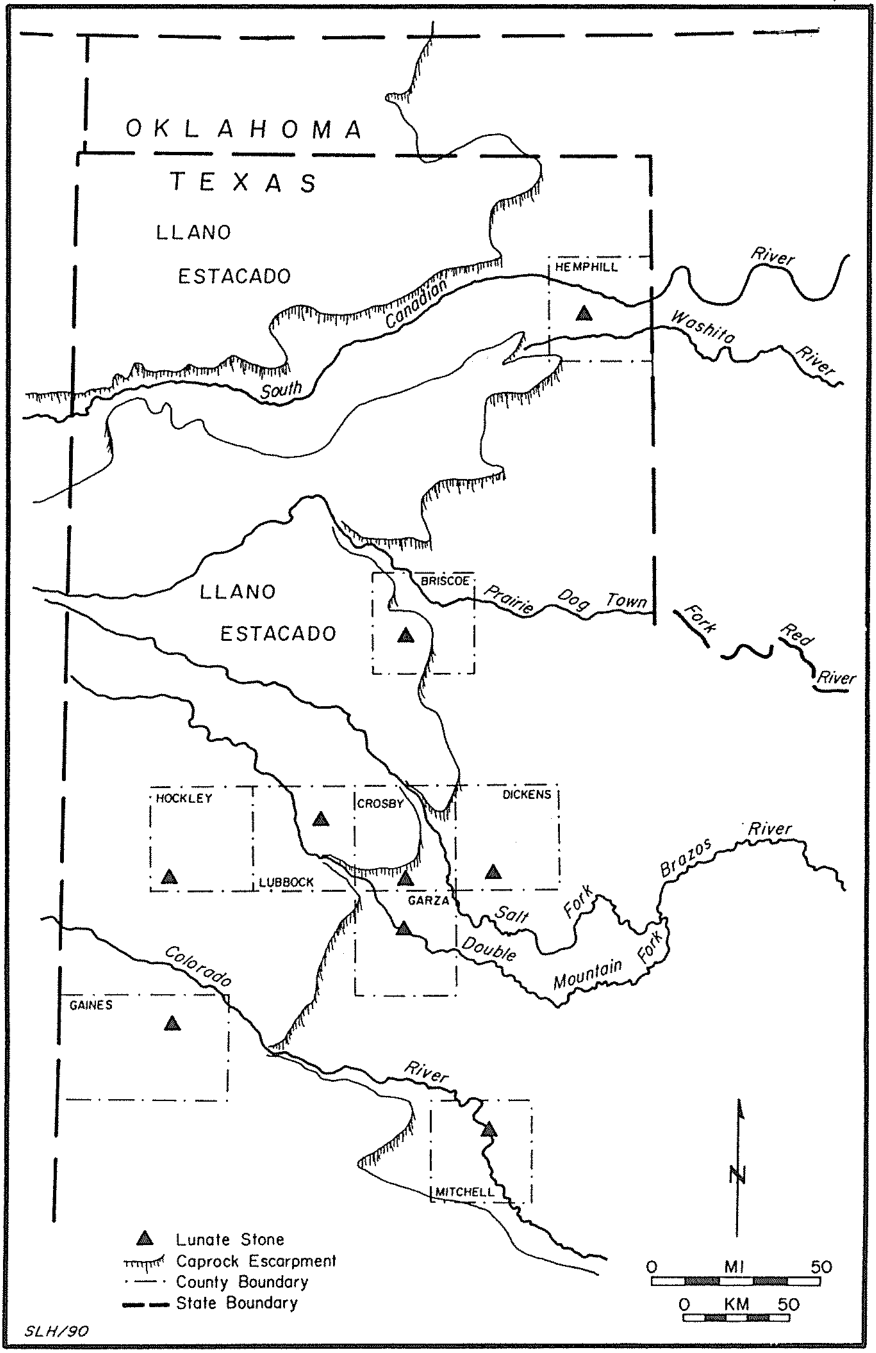

Figure 14. Map showing the distribution of lunate stones on and near the Caprock Escarpment in the Texas Panhandle *(Map drawn by Sandy Hannum; courtesy of J. Peter Thurmond).*

flat base but, in fact, angles slightly toward the end nearest the main notch. Perhaps this wear pattern came about from suspension of the artifact from the flat base, for in this case the longer end, being heavier, would hang down slightly causing the strapping to ride upward on the basal edge of the artifact, so it is possible that these artifacts may have been worn suspended around the neck. The lunate stone of the McDonald Creek burial was found between the flexed knees and the rib cage, where it would be if it had been suspended around the neck of the individual.

Bruce Dickson (1985) considered it highly unlikely that most polished stone artifacts were used as atlatl weights, especially the large, heavier ones. The authors must agree with this conclusion and suggest that most of these stones should remain in the category of problematical polished stone artifacts, pending further research.

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A Late Archaic/Woodland Lunate Stone Burial in Far Western Oklahoma

J. Peter Thurmond

ABSTRACT

A dorsally notched lunate stone, a corner-notched dart point, and two bifaces have been found associated with a prehistoric human burial at the Beaver Dam site (34 RM208) within the upland canyon of a Washita River tributary in far western Oklahoma. Lunate stones are quite rare but have been previously documented at nine sites in a narrow north-south band along the Caprock Escarpment in western Texas. These artifacts consistently are found in Late Archaic/Woodland contexts and probably date between 1000 B.C and A.D. 500. The geographic distribution of lunate stones in archeological sites along the eastern margin of the Llano Estacado may delimit the territory of a Late Archaic/Woodland hunter-forager macroband adapted to this ecotonal environment.

INTRODUCTION

In the fall of 1980, William and Edith Yowell, of Reydon, Oklahoma, discovered a human burial eroding out of the near-vertical wall of a gully on Brokenleg Creek in southern Roger Mills County, Oklahoma (Figure 1). The burial had been preserved up to that time in a narrow remnant of valley fill sandwiched between the gully and the main Brokenleg canyon. This site was recorded as 34RM208, the Beaver Dam site, in 1983. At the time the burial was discovered, most of the skeleton had fallen downslope and had been washed downstream. The gully forms a very narrow, deep defile, and the skeletal material, once displaced, would have fallen rapidly to the gully floor and been flushed out. The burial, near the top of the profile, was contained within a thick, darkly melanized epipedon (upper soil horizon) that has yielded a considerable quantity of Late Archaic/Woodland habitation debris. Part of this deposit was excavated by the Oklahoma Anthropological Society in 1988 (Thurmond 1988 a–c).

The burial was near the center of the vertical extent of this epipedon, about 75 cm below the modern surface. Only the right tibia, right humerus, and both scapulae were still in place. Cranial, vertebral, and rib fragments downslope on the talus were not collected. It was the Yowells' impression that the individual had been buried in a flexed position, facing east, on a north-south axis. Adjacent to the left scapula, a single corner-notched dart point and a lunate stone were recovered in situ. Two bifaces that were found on the talus directly below the burial in a litter of weathered bone fragments appeared to have come from the burial.

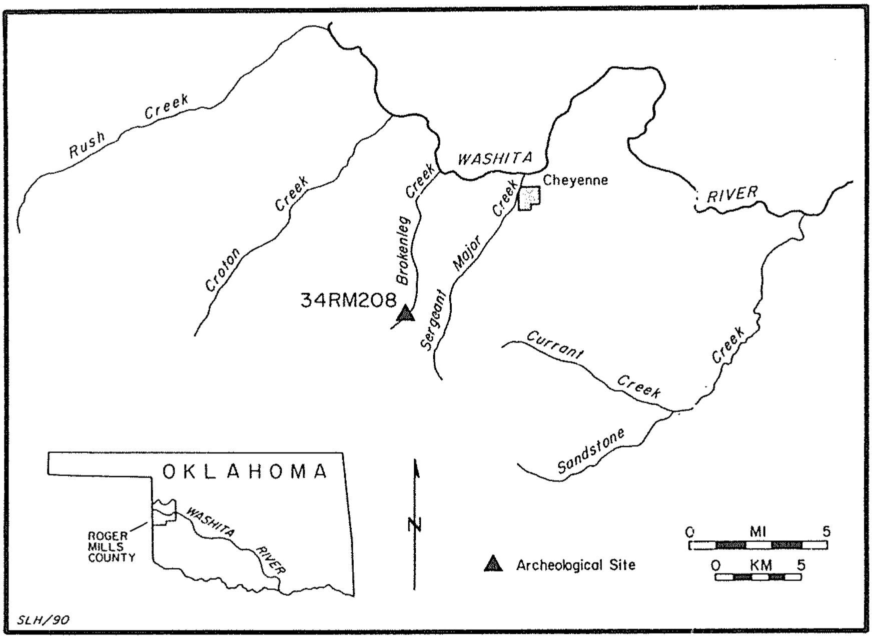

Figure 1. Map of the central part of Roger Mills County, Oklahoma, showing location of the Beaver Dam site, 34RM208. *(Drawn by Sandy Hannum.)*

DESCRIPTION OF THE COLLECTION

Skeletal Material

All skeletal element measurements follow Bass (1971).

34RM208–197

A human left scapula without the inferior two-thirds of the body, but with most of the axilliary and superior borders intact; form of scapular notch and vertebral border not determinable; epiphyses completely fused; no atrophic spots; moderate osteophytic lipping evident around the border of the glenoid fossa; maximum length about 16.0 cm; maximum breadth about 11.5 cm; spine length about 14.5 cm; scapular index 71.875.

34RM208–198

A human right scapula, lacking the inferior half of body and the greater part of the acromion, but with most of the axilliary and superior borders; form of scapular notch and vertebral border not determinable; no atrophic spots; moderate osteophytic lipping about the border of the glenoid fossa; maximum length about 16.0 cm; maximum breadth 11.5 cm; spine length about 14.5 cm; scapular index 70.968;

both this scapula and No. 324RM208–197 suggest an adult male between 35 and 45 years of age, suffering from a moderate case of degenerative arthritis.

34RM208–199

A complete human tibia; epiphyses are entirely fused; localized but fairly severe postmortem damage to the margins of the epiphyses; the medial malleolus is missing. It is impossible to determine if there was osteophytic lipping over most of the epiphyses, but small areas of pronounced arthritic lipping are preserved on the posterior side of the medial condyle and about the intercondyloid eminence. The locations of the postmortem damage around the margins of the epiphyses suggest weakening of the bone, probably also due to degenerative arthritis. There is substantial scarring of the bone tissue at all muscle attachment points, indicating robust musculature. Maximum length 37.4 cm; anterior-posterior diameter at the nutrient foramen 4.1 cm; transverse diameter at the nutrient foramen 2.6 cm; platycnemic index 63.42 (mesocnemic); data suggest an adult male over 18 but presenilic; estimated stature 191–197 cm (following Trotter and Gleser 1952, 1958).

34RM208–200

A complete human right humerus; epiphyses entirely fused; some minor postmortem damage about the margins of trochlea, olecranon fossa, and head; all muscle attachment points strongly pronounced, indicating very substantial musculature; moderate osteophytic lipping apparent about the margins of head, trochlea, and capitulum; septal aperture absent; maximum length 31.8 cm; epicondylar width 5.9 cm; maximum midshaft diameter 2.6 cm; minimum midshaft diameter 1.8 cm; maximum vertical head diameter 4.6 cm; transverse head diameter 4.4 cm; least diaphysis circumference 7.3 cm; robusticity index 22.956; specimen is definitely an adult, but its characteristics are equivocal as to sex. The dimensions of the head, maximum length, and epicondylar width are all intermediate between the male and female means; the absence of a septal aperture and the presence of pronounced muscle attachments argue for a male between 20 and 45; evidence of degenerative arthritis suggests the upper end of that range.

Chipped Stone Tools

34RM208–1026 (Figure 2)

A medium-sized corner-notched dart point, referrable to the Marcos type, knapped from a flake of brown-and-gray silicified wood of quite varied silification. The marginal quality of the material caused problems with the final thinning and shaping of the point. The blade is large and triangular, but asymmetrical, with strongly convex lateral edges and a fairly blunt tip. There is a pronounced barb on one shoulder but none on the other side. The stem is short, wide, and strongly expanding, with a convex base. One basal corner has been lost to postmanufacture

Figure 2. Corner-notched dart point associated with the burial at 34RM208.

damage. The specimen is biconvex in cross section. Overall length 56 mm; blade length 45 mm; stem length 11 mm, maximum stem width at basal corners 21mm (estimated); minimum stem width at blade/stem juncture 15 mm; maximum thickness 10 mm; tip angle 41 degrees; blade angle 66 degrees; haft angle 90 degrees; weight 11.8 g. All measurements follow Gunn and Prewitt (1974). The asymmetry of the blade gives the initial impression of a hafted knife, but there is no visible edge damage or wear on the blade edges.

34RM208–1027 (Figure 3, A)

A poorly thinned biface of medium gray Ogallala quartzite (sometimes called Potter chert by northwest Texans) of mediocre knappability. The specimen has an elongated, fairly symmetrical ovaloid outline, biconvex transverse cross section and gently curved longitudinal cross section. It was obviously made from a long, narrow flake. There are several unreduced nocks bordered by hinge fractures on both faces. The edges are rather sinuous and have no discernible damage or wear from use, but this is very hard material. Length 94 mm; maximum width 32 mm; maximum thickness 11 mm; weight 35.5 g.

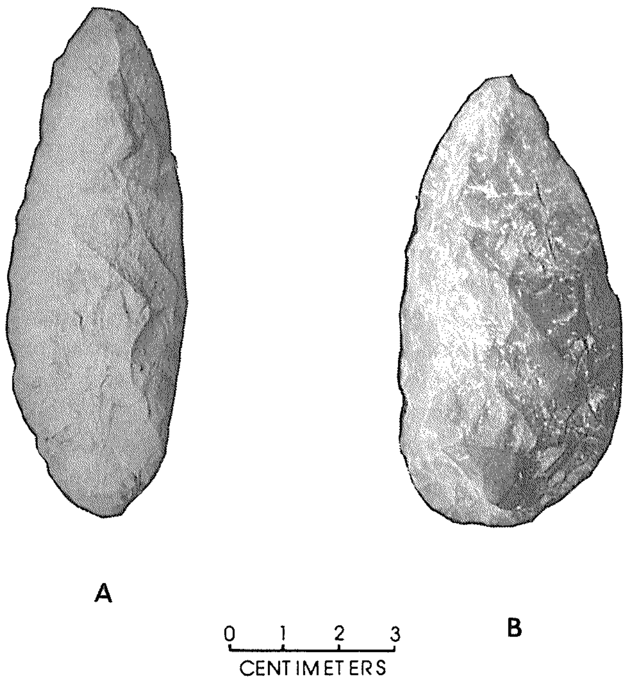

Figure 3. Bifaces associated with the burial at 34RM208. A, No. 1027; B, No. 1028.

34RM208–1028 (Figure 3, B)

Another poorly thinned biface, knapped from a cobble of dark brownish gray silicified wood of advanced silicification but poor homogeneity. Although recognizably ovaloid in outline, the shape is quite asymmetrical, with one lateral edge strongly convex and the other nearly straight. The asymmetry may have been unintentional, since the knapper had a lot of trouble with the straight edge, which is bordered by a continuous line of hinge fractures and a ridge of unreduced material. The biface is biconvex in cross section; the lateral edges are fairly straight, but there is no discernible wear or damage; length 86 mm; maximum width 42 mm; maximum thickness 15 mm; weight 53.0 g.

Lunate Stone

34RM208–1025 (Figure 4, A–C)

A polished stone object of the form that has alternatively been referred to as a "cariniform atlatl weight" (Parsons, Hill, and Parker 1979) and a "lunate stone" (Redding and Parker 1991). The latter term is preferred, due to its lack of any functional assumption and its more common usage. The specimen has an elongated planoconvex outline, with the base curving up slightly at each end. In cross section the base is flat, and both faces are symmetrically convex, curving up to a rounded top. Length 90 mm; maximum height 30 mm; maximum thickness 19 mm; weight 76.5 g.

Twenty-two notches have been cut into the dorsal (convex) edge. The notches are narrow and *V* shaped, and appear to have been cut into the surface by the sawing motion of a narrow cutting tool (flakes of Ogalalla quartzite would probably serve the purpose). The grooves average 2 mm in span at the top, narrow to a point at their floors, and average 1 mm in depth.

The notch at the apex of the convex edge is much larger than the others, some 4 mm across at the top, and has a more rounded *U*-shaped cross section. Deeper than the others, it is cut nearly 2 mm into the surface. A transverse groove 4 mm wide and 1 mm deep extends down both faces of the artifact from this notch to the base. Although the notch does not extend onto the base, there is a visible worn area some 5–6 mm wide running transversely across the center of the base. The entire exterior surface is well polished except for the floors of the notches cut into the dorsal edge. It is apparent that the transverse groove is polished and grades into the surfaces on both sides except at the apex of the dorsal edge, where its floor and sides are rough and unpolished.

Interestingly, this lunate stone was manufactured from the yellowish brown fossiliferous shale that is common in local lag gravels derived from the Ogalalla Formation. This shale was also used by Late Prehistoric groups in the vicinity to temper their pottery (Moore 1984:61). The ferruginous shale is packed with fragmented *Texigryphaea* fossils. Similar material is available on the surface within 100 meters of 34RM208.

DISCUSSION

The distribution of dorsally notched lunate stones like the one from the Beaver Dam site appears to be limited to the vicinity of the Caprock Escarpment on the east side of the Llano Estacado, south of the Canadian River and mostly north of the Colorado River (Figure 5). Although there was a dubious surface association of a Harrell arrowpoint with a lunate stone at the Old Tom Burial (41DK16) in Dickens County, Texas (Parsons, Hill and Parker 1979:72), lunate stones generally appear to be associated with corner- and side-notched dart points of the Marcos, Marshall, and Ensor types—especially the last—(ibid.:79; Redding and Parker 1991). Lunate stones usually are found in areas where sites with these dart points are predominant

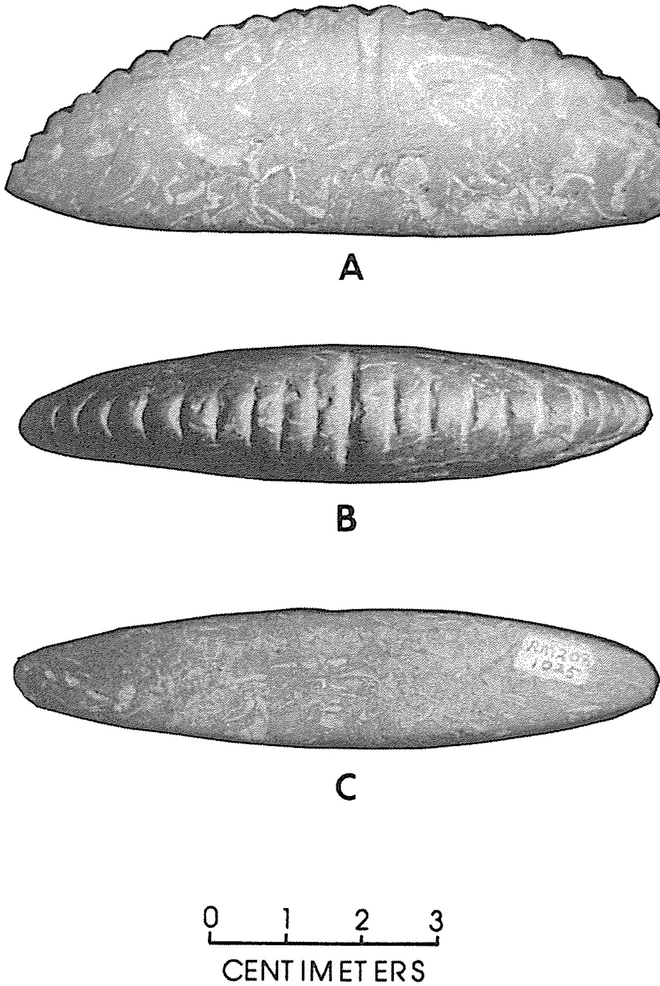

Figure 4. Lunate stone associated with the burial at 34RM108. A, side view; B, top view; C, bottom view.

(ibid.). This is certainly the case for 34RM208, since 55 percent of the components in its vicinity are Late Archaic/Woodland (Thurmond In press).

It is tempting to assume that sites in northwest Texas and far western Oklahoma that yield only Marcos, Marshall, and Ensor dart points in the absence of pottery and arrowpoints are of Late Archaic age (cf. D. Hughes 1977, 1984, 1989; J. Hughes 1988; Leonhardy 1966; Thurmond In press), but the radiocarbon dates from the region belie this assumption. Both sites yielding corner- and side-notched dart points and those yielding corner- and basally notched arrowpoints and early pottery seem to date to about the same time span (Tables 1, 2, 3). Establishment of a solid chronology for the region has barely begun. Nonetheless, it appears that sites yielding lunate stones are of Late Archaic/Woodland age (the author does not believe the two are clearly separable at present) and probably date somewhere between 1000 B.C. and A.D. 500.

The lunate stone from Beaver Dam differs from the northwest Texas examples in two respects. The Texas specimens are as a rule manufactured from exotic materials, particularly from a metamorphic greenstone of undetermined origin (Parsons, Hill, and Parker 1979; Redding and Parker 1991), but, by contrast, the lunate stone from 34RM208 was made from material that was available within crawling distance of the site. The Texas specimens that have been reported also tend to be quite narrow and distinctly triangular in cross section, whereas the lunate stone from Beaver Dam is much wider than the Texas specimens and has a more rounded cross section.

The author, in all honesty, has no clue as to what these artifacts were used for. Parsons, Hill, and Parker (1979) lean towards atlatl weights; Redding and Parker prefer to interpret them as decorative pendants (1991). In two replicative experiments Howard (1974) found atlatl weights functionally counterproductive, but Dickson (1985) believes the jury is out on whether the addition of weights could improve atlatl performance. We know weights were attached to atlatls by some Amerindian groups, since examples have been recovered from dry caves in the Southwest (Guernsey 1931; Fenenga and Wheat 1940; Hester 1974; Mildner 1974).

Whatever their specific use, lunate stones were clearly deemed important by their makers, since, in this environment where most artifacts are quite utilitarian, considerable time must have been invested in the production of these objects of beauty. Keeping in mind the very restricted geographic range of lunate stones, the author believes they may serve as a a useful cultural marker. It is quite possible that all lunate stones were made by a single sociocultural group adapted to the margin of the High Plains over a limited span of time. We badly need some radiocarbon dates from solid associations with lunate stones, and the author is considering sacrificing some of the skeletal material from 34RM208 to try for a bone date after first obtaining a chemical analysis of the bone to determine its degree of weathering in order to assess the reliability of any radiocarbon assay.

Lunate stones are interesting in their own right as both rare prehistoric artifacts and art objects. They may also have considerable interpretive value in our attempts to understand Late Archaic/Woodland chronology and social group boundaries.

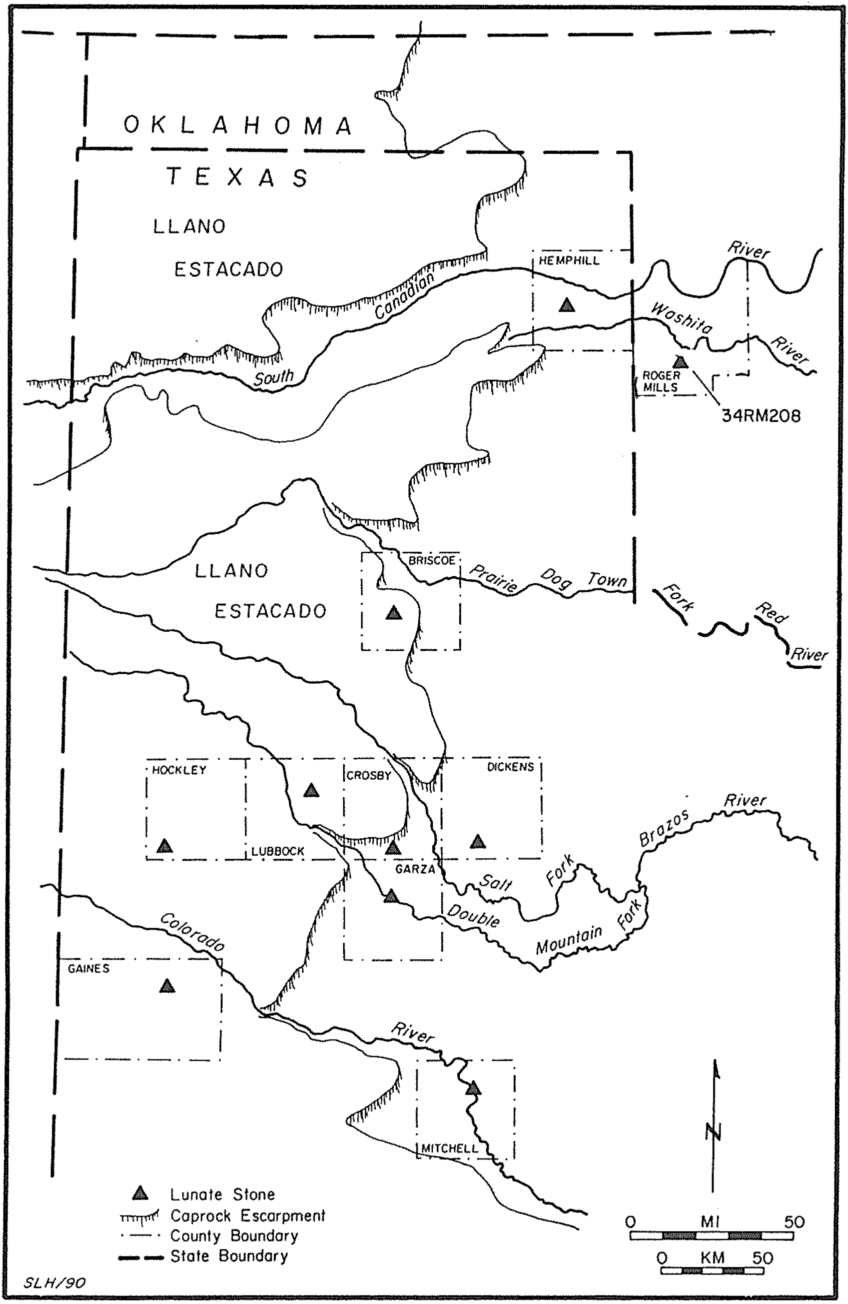

Figure 5. Map of the High Plains of Texas and part of western Oklahoma showing distribution of lunate stone sites along the Caprock Escarpment Texas site locations follow Redding and Parker, 1991. *(Drawn by Sandy Hannum.)*

Table 1. Late Archaic/Woodland Radiocarbon Dates From Northwest Texas and Far Western Oklahoma

Sample No.	Date B.P.	Material	Site	Reference	Associated Diagnostics
GaK-694	2770±150	Particulate charcoal	34GR12/Summers	Leonhardy 1966: 29–30	Ensor, Marshall, Lange
Beta-1929	1970±85	Bison bone fragments	41HL1/Twilla	Lintz et al.[b]	Marcos, Williams
RL-571	1930±110	Bison vertebra rib	41HL64/Collier	Hughes 1977:109	Ensor, Marcos
Beta-1927	1925±95	Bison bone fragments	41HL1/Twilla	Lintz et al.[b]	Marcos,Williams
NZA-1246	1901±88	Woody charcoal	34RM334C/T.R. 13C	Thurmond n.d.	Ensor, Palmillas
SI-1900	1830±60	Woody charcoal	41SW23-II Deadman shelter	Willey & Hughes 1978	Deadman, Scallorn Elam, Ellis, Lange, Brownware pottrty
Beta-18433	1820±100	Particulate charcoal	34RM501/ Swift Horse	Briscoe 1987	Williams
NZA-712	1789±81	Charred twigs	34RM334C/T.R.[c]13C	Thurmond 1989	Ensor, Marcos, Palmillas
SI-1899	1740±40	Woody charcoal	41SW23-II Deadman shelter	Willey & Hughes 1978	Deadman, Scallorn, Elam, Ellis, Lange, Brownware pottery
Beta-18429	1680±80	Particulate charcoal	34RM510/Swift Horse	Briscoe 1987	Corner-notched arrowpoint
Beta-18432	1650±70	Particulate charcoal	34RM510/Swift Horse	Briscoe 1987	Williams
Beta-18430	1610±90	Particulate charcoal	34RM510/Swift Horse	Briscoe 1987	Williams
Beta-18431	1590±70	Particulate charcoal	34RM510/Swift Horse	Briscoe 1987	Williams, cordmarked sherd
RL-573	1520±110	Bison vertebra & rib	41HL65/Bell	Hughes 1977:81–82	Marcos, Palmillas
NZA-1388	1514±79	Woody charcoal	34RM208A/Beaver Dam	Thurmond n.d.	Ensor, Palmillas
Beta-37430	1500±80	Burned pit fill	34RM334C/T.R.13C	Unpublished	Ennsor, Marcos, Palmillas
SI-1897	1485±70	Woody charcoal	41SW23-II/ Deadman shelter	Willey & Hughes 1978	Deadman, Scallorn, Brownware pottery
NZA-1247	1425±70	Woody charcoal	34RM334C/T.R. 13C	Thurmond n.d.	Ensor, Palmillas
Beta-28121	1400±70	Bison humerus	34BK46/Certain	J. L. Hofman, Pers. commun.	Marcos
Beta-1928	1290±95	Bison bone fragments	41HL1/Twilla	Lintz et al.[b]	Marcos, Williams
SI-1898	1240±65	Woody charcoal	41SW23-II/ Deadman shelter	Willey & Hughes 1978	Deadman, Scallorn, Brownware pottery
RL-570	1120±100	Bison vertebra & rib	41HL1/Twilla	Hughes 1977:60–61	Marcos, Williams
NZA-1248	990±190	Woody charcoal	34RM334C/T.R. 13C	Thurmond n.d.	Ensor, Palmillas
RL-572	980±100	Bison vertebra & rib	41CG31/Strong	Hughes 1977:96	None
SI-1901[a]	630±140	Woody charcoal	41SW23-II/ Deadman shelter	Willey & Hughes 1978	Deadman, Scallorn, Brownware pottery, Elam, Ellis Lange

[a] Almost certainly inaccurate; sample from same horizon as SI-1899 and SI-1900.
[b] Elsewhere in this volume.
[c] T. R.: Thurmond Ranch

Readers with any knowledge of the specific locational origin of lunate stones not yet recorded are encouraged to contact the author or Wayne Parker so these artifacts can be recorded to further our understanding of the people who made them.

Table 2. Fractionation Corrections of the Late Archaic/Woodland Radiocarbon Dates From Western Oklahoma

Sample No.	Assayed Date B.P.	Material	$^{13}C/^{12}C$ Ratio or ^{13}C Correction	Fractionation Corrected Date
GaK-694	2770±150	Charcoal	0±70	2770±220
Beta-1929*	1970±85	Bone	(16.58)	2110±85
RL-571	1930±110	Bone	80±35	2010±145
Beta-1927*	1925±95	Bone	(.07)	2335±100
NZA-1246*	1901±88	Charcoal	(24.31)	1901±88
SI-1900	1830±60	Charcoal	0±70	1830±130
Beta-18433	1820±100	Charcoal	0±70	1820±170
NZA-712*	1789±81	Charcoal	(24.85)	1789±81
SI-1899	1740±40	Charcoal	0±70	1740±110
Beta-18429	1680±80	Charcoal	0±70	1680±150
Beta-18432	1650±70	Charcoal	0±70	1650±140
Beta-18430	1610±90	Charcoal	0±70	1610±160
Beta-18431	1590±70	Charcoal	0±70	1590±140
RL-573	1520±110	Bone	80±35	1600±145
NZA-1388	1514±79	Charcoal	(24.53)	1514±79
Beta-37430	1500±80	Charcoal	0±70	1500±150
SI-1897	1485±70	Charcoal	0±70	1485±140
NZA-1247*	1425±70	Charcoal	(25.47)	1425±70
Beta-28121	1400±70	Bone	80±35	1480±105
Beta-1928*	1290±95	Bone	(8.98)	1550±100
SI-1898	1240±65	Charcoal	0±70	1240±135
RL-570	1120±100	Bone	80±35	1200±135
NZA-1248*	990±190	Charcoal	(20.30)	990±190
RL-572	980±100	Bone	80±35	1060±135
SI-1901*	630±140	Charcoal	0±7	630±210

*$^{13}C/^{12}C$ ratio assessed when sample assayed. All others corrected following Stuiver & Polach 1977:Figure 1,Table 2.

ACKNOWLEDGEMENTS

My thanks to William and Edith Yowell, of Reydon, Oklahoma, for their discovery of this site and the preservation of the burial. The Yowells very graciously lent the four skeletal elements and four lithic specimens for analysis and so made this report possible.

Table 3. Summary of Dendrochronological Calibrations of the Late Archaic/Woodland Radiocarbon Dates from the Texas Panhandle and Western Oklahoma, Using University of Washington Quaternary Isotope Laboratory Radiocarbon Calibration Program of 1986.

Sample No.	Fractionation Corrected Age B.P.	Type	Calibrated Age B.P. Confidence 68%	95%	Calibrated Calendric Age Confidence 68%	95%
GaK-694	2770±200	1	3209–2739	3459–2349	1260 B.C.–790 B.C.	1510 B.C.–400 B.C.
Beta-1927	2335±100	2	2469–2216	2729–2129	520 B.C.–267 B.C.	780 B.C.–180 B.C.
Beta-1929	2110±85	2	2301–1988	2339–1880	352 B.C.–39 B.C.	390 B.C.–A.D. 70
RL-571	2010±145	2	2139–1820	2339–1617	190 B.C.–A.D. 130	390 B.C.–A.D. 333
NZA-1246	1901±88	1	1939-1731	2054-1618	A.D. 11-A.D. 219	104 B.C. -A.D. 332
SI-1900	1830±130	1	1922–1610	2059–1500	A.D. 28–A.D. 340	110 B.C. –A.D. 450
Beta-18433	1820±170	1	1940–1540	2149–1350	A.D. 10–A.D. 410	200 B.C.–A.D. 600
NZA-712	1789±81	1	1822–1615	1885–1536	A.D. 128–A.D. 335	A.D. 65–A.D. 414
SI-1899	1740±110	1	1820–1530	1920–1400	A.D. 130–A.D. 420	A.D. 30–A.D. 550
Beta-18429	1680±150	1	1804–1410	1940–1300	A.D. 146–A.D. 540	A.D. 10–A.D. 650
Beta-18432	1650±140	1	1720–1400	1880–1290	A.D. 230–A.D. 550	A.D. 70–A.D. 660
Beta-18430	1610±160	1	1710–1340	1880–1260	A.D. 240–A.D. 610	A.D. 70–A.D. 690
RL-573	1600±145	2	1695–1340	1840–1270	A.D. 255–A.D. 610	A.D. 110–A.D. 680
Beta-18431	1590±140	1	1689–1340	1830–1270	A.D. 261–A.D. 610	A.D. 120–A.D. 680
Beta-1928	1550±100	2	1550–1340	1697–1290	A.D. 400–A.D. 610	A.D. 253–A.D. 660
NZA-1388	1514±79	1	1518-1321	1560-1290	A.D. 432-A.D. 629	A.D. 390-A. D. 660
Beta-37430	1500±150	1	1550–1290	1720–1097	A.D. 400–A.D. 660	A.D. 230–A.D. 853
SI-1897	1485±140	1	1530–1290	1700–1150	A.D. 420–A.D. 660	A.D. 250–A.D. 800
Beta-28121	1480±105	2	1510–1290	1600–1191	A.D. 440–A.D. 660	A.D. 350–A.D. 759
NZA-1247	1425±70	1	1392-1285	1507-1236	A.D. 558-A.D. 665	A.D. 443-A. D. 714
SI-1898	1240±135	1	1290–990	1400–920	A.D. 660–A.D. 960	A.D. 550–A.D. 1030
RL-570	1200±135	2	1280–970	1350–837	A.D. 678–A.D. 980	A.D. 600–A.D. 1113
RL-572	1060±135	2	1130–798	1280–700	A.D. 820–A.D. 1152	A.D. 670–A.D. 1250
NZA-1248	990±190	1	1068-712	1285-652	A.D.882-A.D. 1328	A.D. 665-A.D. 1298
SI-1901[3]	630±210	1	730–500	960–290	A.D. 1220–A.D. 1450	A.D. 990–A.D. 1660

1 Charcoal Date.
2 Bone Date.
3 Date inconsistent with other dates from same deposit, and probably inaccurate.
NOTE:
The 68% confidence intervals (1Σ) of the dendrochronologically calibrated calendric spans average AD200–496.
The 95% confidence intervals (2Σ) of the dendrochronologically calibrated calendric spans average AD58–611.
(These averages exclude Sample No. SI-1901.)
References for datasets and intervals used: Pearson and Stuiver 1986, Stuiver and Pearson 1986.

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Additional Radiocarbon Dates from the Twilla Bison Kill Site, Hall County, Texas

Christopher Lintz, John D. Speth, David T. Hughes, and Jeffery A. Huebner

ABSTRACT

Three radiocarbon dates from the Twilla Site (41HL1) in Hall County, Texas are reported and compared to previous dates from Twilla and three other bison kill sites in the upper Red River-Pease River drainage of the Texas Panhandle. Some inconsistencies suggest that these new dates must be used with caution. Nonetheless, the dates now available from the Red and Pease River drainage bison kill sites suggest that dart points were used for bison kills during the Late Archaic and early centuries of the Woodland/Neoindian (Late Prehistoric) periods in the lower Texas Panhandle.

INTRODUCTION: PREVIOUS INVESTIGATIONS

Since 1977 a single radiocarbon date has been available from each of the Twilla, Collier, Bell and Strong bison kill sites in the Texas Panhandle (Hughes 1977). This report announces three more radiocarbon dates from the Twilla site. The Twilla site (41HL1 in the Texas Archeological Research Laboratory site files; A-73 in the Panhandle-Plains Historical Museum site files) is almost 5 km (3 miles) east of Turkey, Texas, and about 1.5 km (1 mile) above the mouth of a dry arroyo that drains into Mockingbird Draw and Cottonwood Creek, a tributary of the North Pease River (Figure 1). The bone bed was reported by I. R. Twilla to Curtis Tunnell who visited the site several times during 1953. Two Lange points were collected from the surface of this site (Tunnell and Hughes 1955), and on March 29, Curtis Tunnell and Jack T. Hughes recovered two retouched flakes and two "percussion flaked fragments" from the surface near the 6-meter-long (20 foot) exposure of the bone bed. From a single test pit, one large unifacial retouched flake of Ogallala chert was recovered directly associated with the bones. Additional points were collected from the surface on unknown dates before 1968 (Collins 1968). Samples of bone from the 30-cm-(1 foot)-thick bone bed were collected but were not submitted for radiocarbon dating immediately.

Test excavations were conducted at the Twilla site between August 10 and September 5, 1968, under the supervision of Billy R. Harrison. The testing of Twilla and several other bison sites in the rolling red-bed plains of the lower Panhandle was supported by funds provided by the Office of the State Archeologist, which was then part of the Texas Building Commission, to West Texas State University. At Twilla, a grid of eight 5x5 ft. squares was laid over the western two-thirds of the site. The

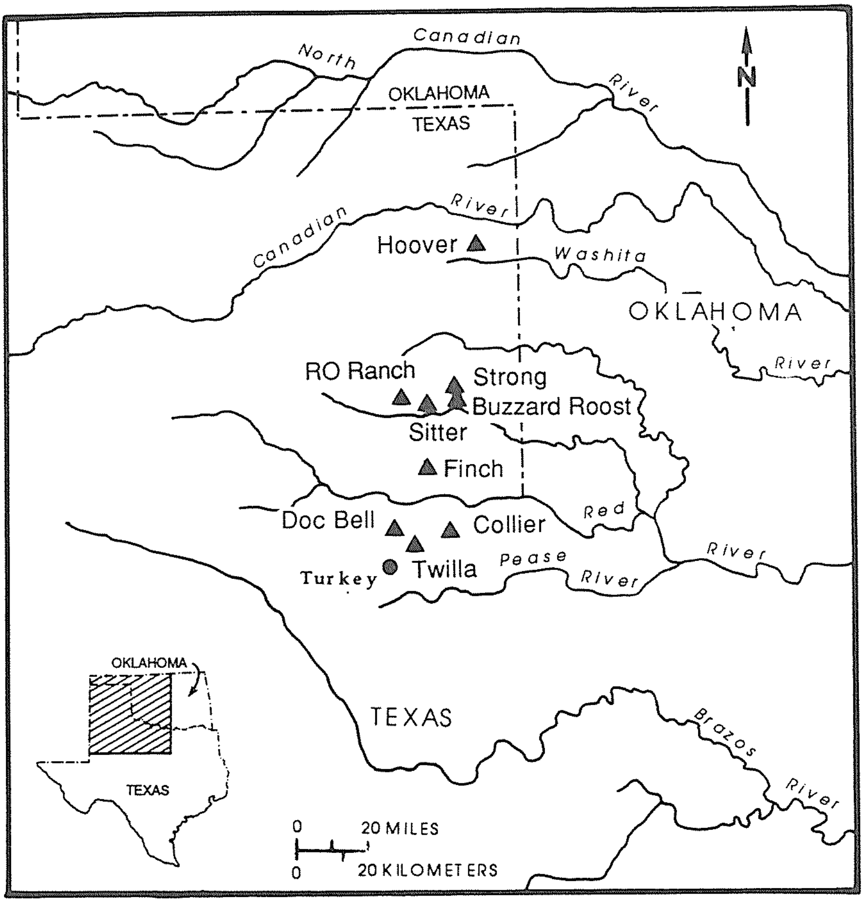

Figure 1. Map of part of the Texas Panhandle and western Oklahoma showing sites for which there are radiocarbon dates.

overburden was removed to within one foot of the bones as an undifferentiated unit; small hand tools were used to expose elements, and measured drawings were maintained for all exposed bones (Hughes 1977:4). Field records indicate the possible presence of two bone beds separated by a thin horizon of sterile silt (Hughes 1989:187).

David and Jack Hughes revisited in the site in 1977 to record the site location accurately for the Panhandle-Plains site files, to obtain soil samples, and to examine the geologic setting of the site in preparation for analysis and drafting of a report. Detailed analyses of excavated remains from the Twilla (41HL1), Doc Bell (41HL65), Strong (41CG31) and Collier (41HL64) sites together with surface materials from Hoover (41HH12), Sitter (41DY18), Finch (41DY19), R. O. Ranch (41DY20), and Buzzard's Roost (41CG30) sites were the basis of an M.A. thesis on bison kills in the lower Texas Panhandle (Hughes 1977). Except for the maintenance of separate field maps, the bison elements and cultural materials from the possible two layers at Twilla were not segregated by layer during the 1968 excavation or during subsequent storage, processing, analysis, or reporting.

The excavations at Twilla yielded 1,647 partially articulated and disarticulated identifiable bison elements. Left mandible counts indicate that these remains represent at least 23 individuals; dentition wear indicated that the bison herd was composed of animals ranging between 1 and 12 years of age. Postcranial elements suggested that at least three immature/juveniles, 19 early mature and mature cows, and one bull were represented (Hughes 1977:49). Reanalysis of the Twilla site mandibles by Fawcett (1987:402, 417, Appendix D and F) resulted in evidence of at least 50 individuals and, on the basis of tooth eruption and wear data, placed the time of death in the fall of the year.

Cultural materials recovered from the excavations were 15 complete and fragmentary projectile points, one unifacially retouched flake, six unmodified "chips/spalls/flakes," and two "chunks"; surface materials were three cobble fragments, one flaked cobble, two bifacially retouched cobbles, two possible flake cores, one naturally backed tool, one utilized flake, three unifacially retouched flakes, one bifacially retouched flake, 13 unmodified "chips/spalls/flakes," and three "chunks" (Hughes 1977:Table 1; 1989:Table 1).

There is some variability among the projectile points, but they are dominated by large, thin, weakly barbed, corner-notched dart points with relatively short, straight-to-slightly-expanding stems, pointed-to-rounded barbs, and straight-to-markedly-convex bases. Hughes (1977, 1989) recognizes three dominant varieties of projectile points (Figures 2, 3). Variety I is a large, broad point with a sharp tip, convex blade edges, prominent-to-weakly-barbed shoulders, broad but shallow corner notches that leave short, straight-to-slightly-expanding stems, prominent basal tangs, and straight-to-slightly-concave bases. Hughes (1989:188) sees a similarity between Variety I points and the Marcos or Ellis types. Variety II points are shorter than either Variety I or III forms, but they are nevertheless dart forms with broad blades. The tips are usually rounded, blade edges are convex, with prominent-to-weakly barbed shoulders that are not as pronounced as the Variety I points, corner-to-side notches are broad but shallow, stems are slightly-to-moderately expanding, tangs are rounded, and bases are straight-to-recurve/concave. Hughes (1989:189) suggests that these specimens resemble Palmillas or Williams types. Variety III points are large, broad blade points with relatively straight blade edges, prominent-to-weakly-barbed shoulders, broad but shallow corner notches, rounded tangs, and convex bases. No comparisons to known types are suggested. Elsewhere, although Hughes (1977) is wary of classifying these points, he does acknowledge some similarities with the Marcos, Williams, Ellis, Ensor, Trinity, and Palmillas types, which traditionally date between 1000 B.C. and A.D. 1000.

Locally available gravels dominate the lithic materials: Potter chert (n=36; 66 percent), Tecovas jasper (n=4; 7 percent), petrified wood (n=2; 4 percent), chalcedony (n=1; 2 percent), quartzite (n=4; 7 percent) and unidentified cherty materials (n=2; 4 percent). The presence of Alibates (n=3; 6 percent) and Kay County or

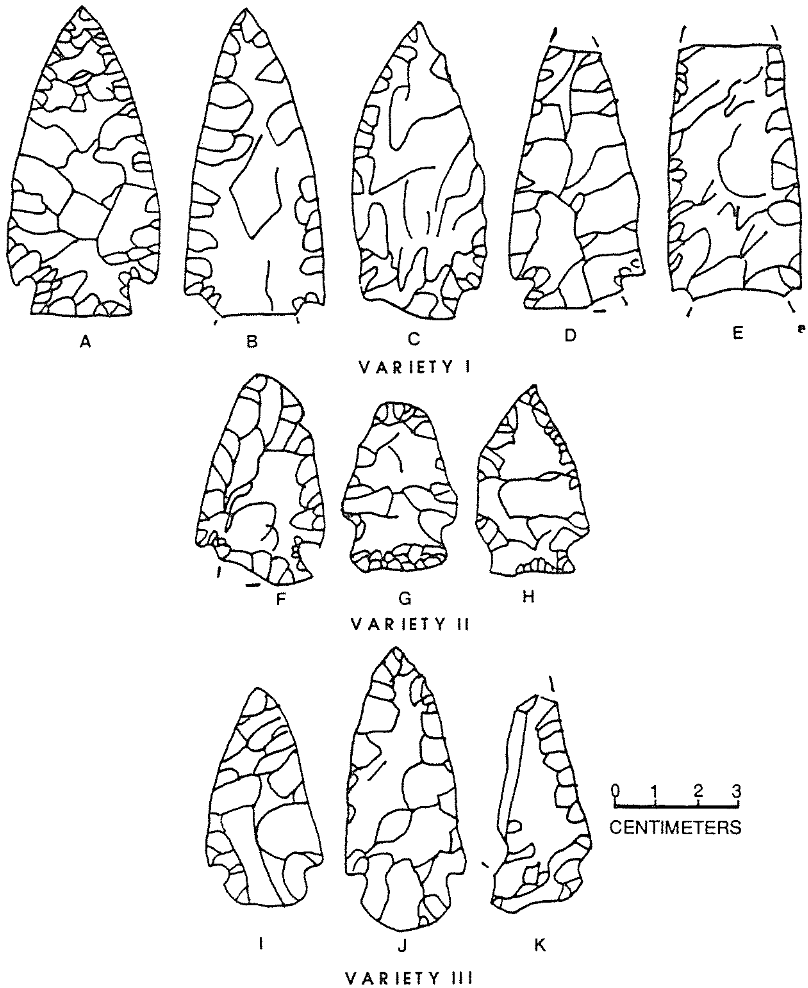

Figure 2. Drawings of Variety I, II, and III projectile points from the Twilla site.

Florence chert (n=1; 2 percent) possibly indicate movement through or interaction with groups in the north and northeast.

In 1977, samples of ribs and vertebrae from Twilla, which had been stored in paper, plastic, and waxed-paper bags for almost a decade, were submitted, together with bone samples from other bison kill sites, to Radiocarbon, Ltd. for dating (Hughes 1977, 1989). The uncorrected results of these four samples ranged between A.D. 20±110 (RL-571) at the Collier site and A.D. 970±100 (RL-572) at the Strong site (Table 1). The uncorrected radiocarbon date from Twilla was A.D. 830 ± 100 (Hughes 1977:131, 1989:201). The radiocarbon dating of large Archaic Period dart

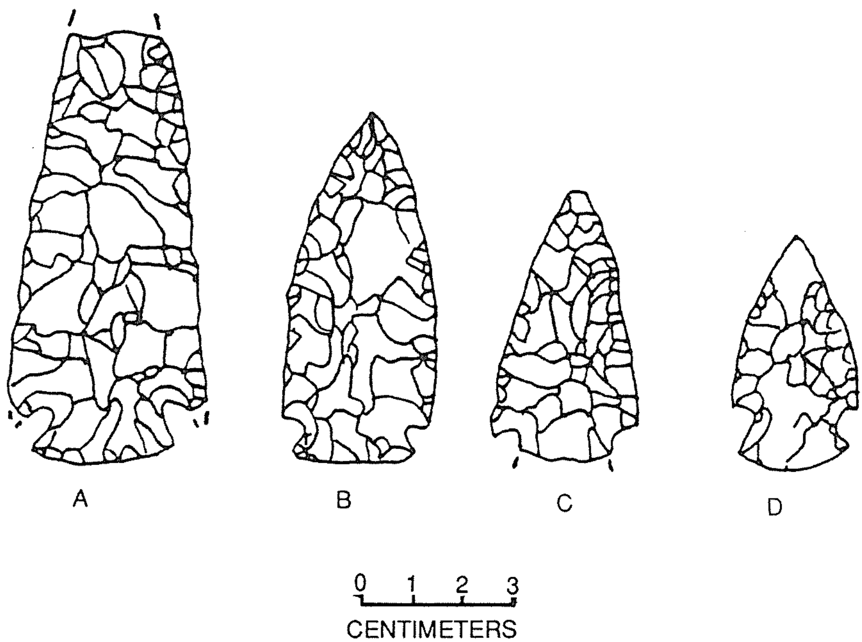

Figure 3. Drawings of projectile points collected earlier by Tunnel and Collins from the Twilla site.

points to times traditionally assigned to the Woodland period suggested to Hughes that the radiocarbon samples might have been contaminated during storage. However, Hughes notes that the occurrence of bone beds at the bottoms of filled gullies suggests that the kills took place at the end of a climatic episode that caused the gully cutting and that the wetter climatic conditions of the first half of the first millennium A.D. could account for the gully filling.

In an attempt to resolve the apparent chronological contradiction, and to remove the factor of possible contamination of samples by the storage bags, additional bone samples were collected from the Twilla site on September 15, 1980, by John D. Speth and Billy R. Harrison. During this visit, however, the bison bone bed was found to have been almost totally destroyed by vandals; fresh pick marks and footprints were still visible. Most of the identifiable bone fragments found on a large spoil pile were collected in plastic bags. From these unprovenienced remains, three composite samples consisting of half a dozen articular and shaft fragments, each weighing between 700 and 800 grams, were selected and submitted within three weeks of collection to Beta Analytic, Inc. for dating and $^{13}C/^{12}C$ analysis. Although the results of these analyses have been available for several years, they have been reported only in a doctoral dissertation (Fawcett 1987:370, Appendix B).

THE RADIOCARBON DATES

The three additional radiocarbon dates from Twilla are based on bone collagen and range between 20±85 B.C. and A.D. 660±95 (Table 1). Ratios obtained from $^{13}C/^{12}C$ analyses of the three samples showed no consistency. The values, varying from -0.07 per mil to –8.98 per mil to –16.58 per mil, are difficult to interpret. The variation in stable isotope ratios in bison bone is a product of their diet, which comprises predominately grass species. These plants fix carbon from atmospheric carbon dioxide by one of two photosynthetic pathways, which produce distinctly different stable isotope ratios. When the plants are consumed by herbivores, the carbon is incorporated into their bone collagen, and the amount of each type eaten can be calculated (DeNiro and Epstein 1978). Most grasses (e.g., *Stipa sp.*) use the C_3 Calvin-Benson pathway, which has an average isotopic fraction of –26.5 per mil; C_4 grasses (e.g., *Buchloe dactyloides, Bouteloua sp.*), which use the Hatch-Slack pathway, average –12.5 per mil (Smith and Epstein 1971). When these plants are consumed by animals, they undergo a fractionation of approximately +5 per mil (van der Merwe 1982). This enrichment caused by metabolic processes would give the bones of a pure C_4 plant consumer a stable isotope ratio of –7.5 per mil; a pure C_3 plant diet would produce a ratio of –21.5 per mil. The percentage of C_3 and C_4 species in a herbivore's diet can be figured from a simple linear interpolation (Chisholm, 1989). If a consistent chronometric trend was reflected in the $^{13}C/^{12}C$ ratio values, this might indicate that the dated materials came from separate bison bone beds derived from kills that bridged the postulated climatic change towards more mesic conditions during the early part of the first millennium A.D. (Hall 1982; 1989). Unfortunately, no consistent pattern emerges when the $^{13}C/^{12}C$ values are organized chronometrically; the lowest $^{13}C/^{12}C$ value is from the middle date. The cause of the variability is therefore uncertain.

The Beta Analytic laboratory mentioned that the wide variability of the $^{13}C/^{12}C$ values "would be indicative of possible in situ contamination" (written communication, M. Tamers to J. Speth, December 11, 1980). The source and extent of contamination are unknown, as are the effects of the contamination on the chronometric age (cf. Stafford et al. 1987). For these reasons it is inappropriate to apply the various correction and calibration procedures to these dates.

SUMMARY AND DISCUSSION

The chronologically inconsistent pattern of the $^{13}C/^{12}C$ results from the three new dates from the Twilla bison kill site suggests that there may have been some in situ contamination. Therefore, these dates must be used cautiously.

The three new Twilla site dates, nevertheless, contribute to the chronology of bison kill sites on the Southern Plains. The seven available uncorrected radiocarbon dates from the bison kills in the Red River drainage span a period from 20±85 B.C. to A.D. 970±100 (Table 1). The one-standard-deviation intervals for three of the dates from the Twilla and Collier sites overlap the period from 90 B.C. to A.D.120; no dates fall between A.D. 120 and 320. Single-standard-deviation intervals span

Table 1. Radiocarbon Dates From Selected Bison Kill Sites in the Texas Panhandle

Lab Number	Material	^{14}C Age B.P. ± 1 s. d.	$^{13}C/^{12}C$ Per Mil	Fractionation Corrected ^{14}C Age
Twilla Site (41HL1, A73)				
Beta-1927	Bone	1925±95 B.P	−0.07	2335±100 B.P.
	Collagen	A.D. 25±95		385±100 B.C.
Beta-1928	Bone	1290±95 B.P	−8.98	1550±100 B.P.
	Collagen	A.D. 660±95		A.D. 400±100
Beta-1929	Bone	1970±85 B.P	−16.58	2110±85 B.P.
	Collagen	20±85 B.C		160±85 B.C.
RL-570	Bone	1120±100 B.P.		
	Collagen	A.D. 830±100		
Collier Site (41HL64, A373)				
RL-571	Bone	1930±110 B.P.		
	Collagen	A.D. 20±110		
Strong Site (41CG31, A694)				
RL-572	Bone	980±100 B.P.		
	Collagen	A.D. 970±100		
Bell site (41HL65, A696)				
RL-573	Bone	1520±110 B.P.		
	Collagen	A.D. 430±110		

NOTE: No dendrochronological calibrations have been used in this study.

the period from A.D. 320 to 540 and A.D. 560 to 1070, with slight one-standard-deviation overlaps at A.D. 730 to 760 and A.D. 870 and 930. Although the diagnostic artifact assemblage consists exclusively of large Archaic-style dart points, the radiocarbon dates tenuously suggest a transitional Late Archaic to early Neo-Archaic/Woodland (Late Prehistoric) period affiliation. This pattern has been recognized recently for other sites in western Oklahoma (Thurmond 1989); a radiocarbon sample from a nonkill site, 34RM334, which contained Ensor, Marcos, and Palmillas points, yielded a mass spectrometer radiocarbon date of A.D. 16±81 (NZA712).

Indigenous complexes (e.g., Lake Creek and Palo Duro) in the Texas Panhandle include arrowpoints as early as A.D. 170; however, it seems probable that atlatl technology persisted. The large points probably represent a specialized atlatl/lance weaponry, or hafted knives used for butchering bison, during the first millennium A.D. Although subsequent Plains Village (Late Prehistoric) groups (Antelope Creek, Custer, Washita River, etc.) perfected a bow-and-arrow technology primarily for killing solitary bison, it seems reasonable to believe that the bow would not immediately replace the atlatl. Since considerable body motion is required for launching projectiles with atlatls, they may have been used for the dispatch of bison in small herds in situations that were topographically favorable for stampedes or drives. In contrast, bows and arrows, which require little body movement, could have been used contemporaneously with atlatls in the stalking of single animals, without alarming entire herds. Similar nonstampeding hunting stratagies were used effectively by Anglo bison hunters in the 1870–1880s, who used powerful rifles to eliminate bison herds on the Southern Plains (Baker and Harrison 1986).

The contemporaneity of atlatl and bow hunting technologies in the Texas Panhandle is not an isolated occurrence. Recent obsidian hydration dates on large dart points found in high altitude sites in the Southwest indicate that they were used by Puebloan hunters into the 1200s, even though the bow-and-arrow technology had appeared in the Southwest nearly a millennium earlier (Bertram et al. 1989). In the Southwest, their size and velocity may have made atlatl darts very effective in the immediate felling of large game such as elk when they were used in meadow margin hunting strategies from concealed forest-edge blinds (tracking of wounded animals through thick forest underbrush increases the risk of failure). There is no inconsistency in the logic of recognizing the retention of atlatl dart hunting strategies as a complement to bow hunting. After all, archers persist in this modern age of ballistical hunters.

ACKNOWLEDGMENTS

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Sin Nombre and El Fortín: Pecos River Style Pictographs in Northern Mexico

Solveig A. Turpin

ABSTRACT

The Archaic-age Pecos River style polychrome pictographs are a defining characteristic of the Lower Pecos River region of Texas. The recognition of four examples of this distinctive art style in two localities on the southern periphery of the Serranías del Burro extends the range of this cultural area at least 145 km (90 miles) south of the Rio Grande into northern Mexico.

INTRODUCTION

The boundaries of the Lower Pecos cultural area, surrounding the confluences of the Pecos and Devils rivers with the Rio Grande, are usually defined by the distribution of the most ancient of the regionally defined pictographs—those of the Pecos River style—and by the commonality of the cultural materials found in dry rockshelter deposits (H. Taylor 1948; Kirkland and Newcomb 1967; Shafer 1977; Brown et al. 1982). The recent recognition of four Pecos River style pictograph panels south of the Serranías del Burro in northern Coahuila necessitates redefinition of the extent of this cultural area and affords a broader view of the movement of people and ideas in prehistory (Figure 1).

THE LOWER PECOS CULTURAL AREA

The concept of cultural areas can be criticized as a simplistic attempt to cram complex multidimensional data into a unidimensional form. It is clear, however, that boundaries exist (Barth 1969), and one traditional means of defining them is through the analysis of style (Conkey 1983). The transience of cultural boundaries mandates that cultural areas be fixed in time as well as space. Presumably, in the case of the Lower Pecos River region, the characterstics that define the cultural area reflect the behavior of a related group of people (Shafer 1977) during a specific period in history. Here, the discussion is limited to the Archaic period, probably between 3000 and 4000 years ago, when relatively homogeneous groups of hunters and gatherers, well adapted to the arid environment of southwestern Texas and northern Mexico, evidenced their increasing social complexity by painting elaborate mural art (Turpin 1990). Thus, during this time period, the Lower Pecos cultural area can be equated to (1) a regional Archaic study unit (Brown et al. 1982), (2) the territory of a related group (Shafer 1977), (3) a unified belief system (Turpin 1990),

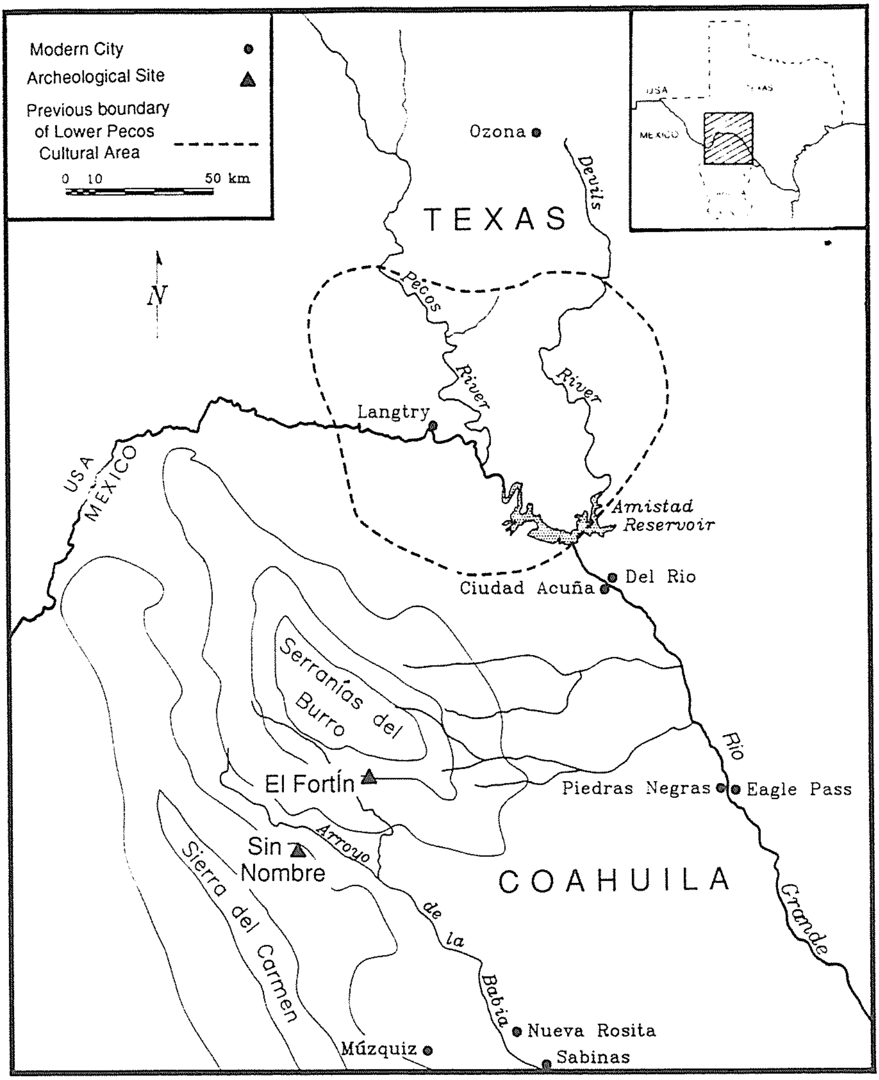

Figure 1. Map of the Lower Pecos Region of Texas and Mexico showing sites in the northern part of Coahuila, Mexico.

(4) a sociocultural unit, and 5) an ethnic unit, defined as having a community of physical and mental traits produced by common heredity and cultural tradition.

The Lower Pecos region is the smallest of the designated cultural areas of Texas (Brown et al. 1982) and is generally considered to extend along the Rio Grande from below the mouth of the Devils River, now beneath Lake Amistad near the modern cities of Del Rio and Ciudad Acuña, to west of the historic hamlet of Langtry (Figure

1). On a north-south axis, the outer perimeter crosses the Pecos River about 100 km (60 miles) north of the Rio Grande. Differences in estimates of the southern limits have long been attributed to the dearth of archeological data from northern Coahuila, but the Rio Grande certainly presented no physiographic barrier to the exchange of people, material goods, or ideas.

Now arid rangeland, the region topographically comprises broad rolling upland plains dissected by tributaries of three major rivers, the Rio Grande and the Pecos and Devils rivers. Rockshelters hollowed from the limestone walls of the entrenched canyons were home to Archaic inhabitants from the end of the Pleistocene until about A. D. 1000. Preserved in these dry rock shelters are accumulations of domestic debris deposited over several millenia and the remarkable pictograph sequence for which the region is famous.

The most ancient of the rock art styles, the polychrome Pecos River style, is considered the manifestation of a shamanic religious tradition (Kirkland and Newcomb 1967). The central figures are elaborately dressed faceless anthropomorphs equipped with, or surrounded by, set repertoires of accessories. Newcomb suggested that the main characters were shamans or members of medicine societies dressed in their ritual garb and, elaborating upon an idea first presented by Campbell (1958), that the pictographs were visions, conceived by artists in trance states and made permanent on the walls of the shelters (Kirkland and Newcomb 1967). The frequent illustration of the atlatl and the absence of the bow and arrow place the Pecos River style within the long Archaic period, from 9000 to 1000 years ago in this region. Turpin (1990) recently presented arguments for a Middle Archaic age for the Pecos River style, suggesting that it flourished during the San Felipe period in the local chronology, between 3000 and 4000 years ago (Turpin 1988:Figure 4).

Previous Pictograph Research in Northern Coahuila

In 1948, Herbert Taylor (1948) located five pictograph sites during his reconnaissance of the south bank of the Rio Grande between Langtry and the mouth of the Pecos. He described two sites as remnant paintings, but one, El Seís, was still clearly Pecos River style. The two Pecos River style sites that overlook the river, El Elephante and San Martín, have been almost totally destroyed, and the deep cultural deposits at a third, Coahuilan Shumla shelter, have been severely vandalized by relic hunters.

Ten years later, Taylor (1958:88; Taylor and Rul 1960:159) reported that the typical Pecos River style of rock painting was virtually absent in the area surveyed for the Mexican part of the Amistad Reservoir. The description of their only pictograph site matches that of a Red Monochrome panel, INAH 203, now inundated by the reservoir (Turpin 1986). However, an INAH number, 180, was assigned to Coahuilan Shumla shelter where H. Taylor described the few surviving paintings as cowheads. In fact, in INAH 180, locally known as Cueva Chumbla, there are three identical Pecos River style shaman figures, one solid red, one outlined in red, and one infilled with white. Only the upper half or torso is shown, a not uncommon convention (see Kirkland and Newcomb 1967:Plates 7, 16, 33);

their upraised arms give these human figures passing resemblance to stylized longhorns.

In 1989, a sixth Pecos River style pictograph, Abrigo Diego, was located in Coahuila by Turpin and Zintgraff about 1.5 miles above the confluence of an unnamed tributary with the Rio Grande. Once a gallery of paintings more than 60 meters long, Abrigo Diego now has only a few decipherable segments, but the surviving figures are as intricate and elaborate as the well-known classic Pecos River style panels at Panther Cave and Rattlesnake Canyon. Taken in composite, Abrigo Diego, El Elephante, and San Martin demonstrate an intensity of ritual activity equal or superior to that evidenced on the north bank.

All the known examples of the Pecos River style recorded in northern Coahuila are within a few miles of the Rio Grande, where similarities between the north and south banks are expected. The two pictograph localities described below expand the range of the Pecos River style more than 145 km (90 miles) into northern Mexico and raise broad questions about the nature and direction of the interaction that produced them.

The Sin Nombre Pictographs

The Sin Nombre pictograph locality is south of the Serranías del Burro in the Sierra del Carmen on a north-flowing tributary of the Arroyo de la Babia above its confluence with the Valle El Infante (Figure 1). As the crow flies, the site is 145 km (90 miles) south-southwest of the mouth of the Pecos River, but the intervening Serranías del Burro may have doubled the distance for pedestrian travelers.

The similarities between the Sin Nombre pictographs and those of the Pecos River style were first noted in 1974 in an undergraduate term paper in an anthropology course at The University of Texas at Austin. Fifteen years later, rock art photographer Jim Zintgraff and archeologist Tom Guderjan visited the sites and documented the paintings.

Most of the pictographs are in a large northeast-facing rockshelter. The site has two ledges, or shelves; pictographs were painted from both. Most of the paintings are spread across the 50-meter-long top shelf; only a few figures are found along the lower ledge. Water seeping through the porous limestone has obliterated or damaged several pictographs, and collapse of the ledges has left others isolated high above the present floor. Higher in elevation in the same canyon, a small shelter now contains only the remnants of pictographs painted in the same style and with the same pigments. These paintings have deteriorated too much to make reconstruction of the original figures and groupings possible.

From their quantity and variety, the pictographs at Sin Nombre suggest several episodes of painting. One panel of geometric designs, composed of dots and lines, resembles art styles found farther south near Monterrey more than any Lower Pecos styles. Most of the anthropomorphs, animals, and sinuous geometric motifs, however, reflect themes and stylistic conventions common to the Archaic art concentrated along the Rio Grande and the Pecos and Devils rivers.

The most prominent figure in the largest panel is modeled after a specific type of shaman most commonly found around the mouth of the Pecos River and illustrates the ability of the shaman to transmogrify (to adopt the form of an animal familiar), combining feline and human characteristics (Turpin 1990). The Sin Nombre version has the characteristic ear headdress, frontal posture with upstretched arms, and blank face, but lacks the hand-held objects such as atlatls, darts, and fending sticks, wielded by the shamanic prototype in Panther Cave (Figures 2, 3; see also Kirkland and Newcomb 1967:Plate 25).

In another typical Pecos River style motif that appears at Sin Nombre, described by Newcomb (1976:184; see Kirkland and Newcomb 1967: Plates 13, 29, 33),

> an antlered headdress is associated with an odd variation of the shaman figure. Wide, squared-off "wings" extend outward from either side of the body at shoulder level in this variation, and hands and arms project upward from them. They have a curious resemblence to the old Ford tri-motored airplane and long since have had this appellation attached to them.

Conceptually, these winged figures (Figure 4) illustrate one of the tenets of shamanic religions, that shamans can fly. This belief is mirrored in another panel at Sin Nombre and in other sites in the Lower Pecos where horizontal anthropomorphs apparently soar through clouds of dashed lines or dots. Another convention consistent with Pecos River iconography is the recurrence of frontally posed anthropomorphs with undulating streamers (Figure 5) flowing down from their upstretched arms (Newcomb 1976:185). In addition, parallel wavy lines or streamers, another attribute common to the Pecos River style, appear repeatedly at Sin Nombre. Although most of the Sin Nombre figures are empty handed, unlike the classic Pecos River shamans with their elaborate paraphernalia, one anthropomorph holds a three-pronged rod, a motif found on the Devils River and at Rattlesnake Canyon on the Rio Grande, where it has been mistaken for a sword (see Kirkland and Newcomb 1967:Plate 2).

El Fortín Pictographs

In 1966, two pictograph sites in the Cañon El Fortín, a tributary of the Valle El Infante above its juncture with Arroyo de la Babia, were visited by Lorraine Heartfield and Ronald Ralph (Figure 1). Heartfield and Ralph were part of Jeremiah Epstein's Northeastern Mexico Archeological Project funded by the National Science Foundation, and their objective was to evaluate the excavation potential of El Fortín, a large rockshelter on the Rancho Las Margaritas. Coincidentally, they toured two nearby pictograph sites, where they took black-and-white Polaroid photographs (Figures 6 and 7).

Cañon El Fortín penetrates the southern rim of the Serranías del Burro about 30 km (20 miles) northeast of Sin Nombre and 110 km (70) miles south-southwest of the mouth of the Pecos (Figure 1). However, a small mountain range, the Sierra

Figure 2. Photograph, feline shaman of Sin Nombre. The figure is about 1.25 meters tall. *(Courtesy of Jimmy Zintgraff.)*

Figure 3. Photograph, feline shaman of Panther Cave. The figure is about 1.5 meters tall. *(Courtesy of Jimmy Zintgraff.)*

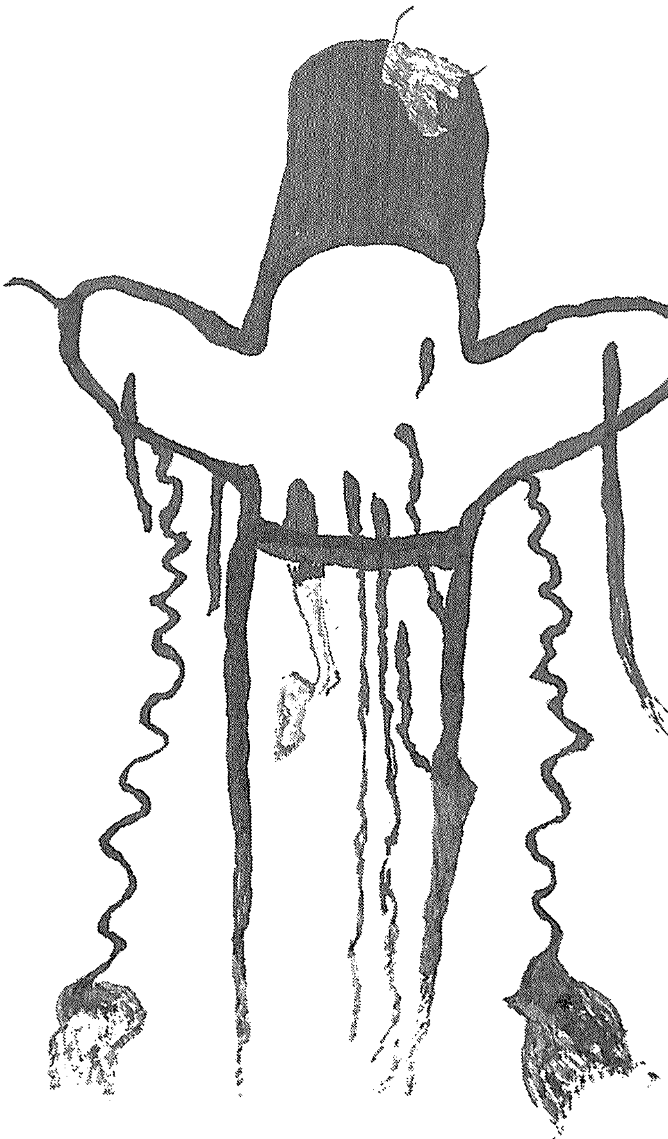

Figure 4. Drawing of winged figure at Sin Nombre. *(Drawn by David G. Robinson.)*

Figure 5. Photograph, shaman with streamers at Sin Nombre. *(Courtesy of Jimmy Zintgraff.)*

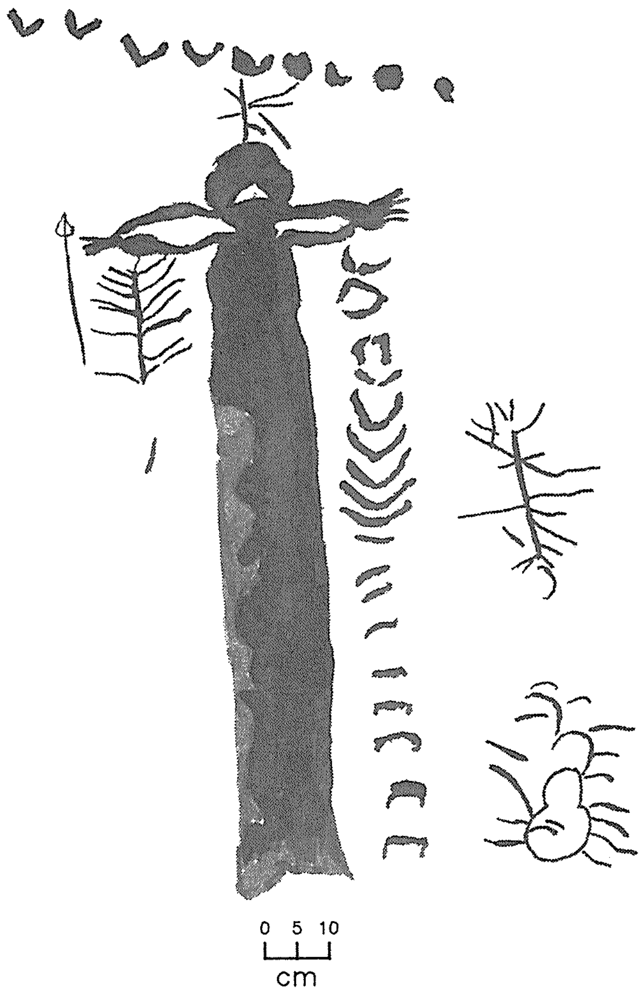

Figure 6. Pecos River style figure at C-18, El Fortín. This example of Pecos River style art, is reconstructed from faded and deteriorated photographs taken in 1966, augmented by a few color and black-and-white prints found later at the Texas Archeological Research Laboratory (TARL) under the name San Jose de las Piedras and dated 1962. The scale is approximate, and the relationships between the figures are largely unknown. *(Drawn by David G. Robinson.)*

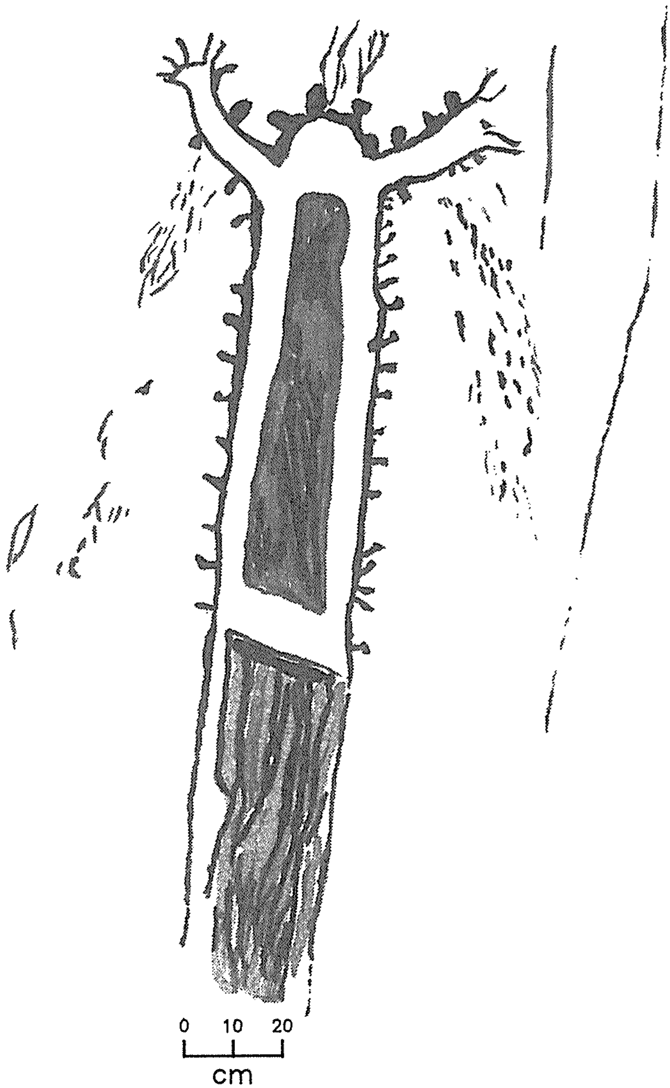

Figure 7. Pecos River style figure at C-139, El Fortín, reconstructed from a faded and deteriorated photograph taken in 1966. The scale is approximate, and its relationship to the figure in Figure 6 is unknown. *(Drawn by David G. Robinson.)*

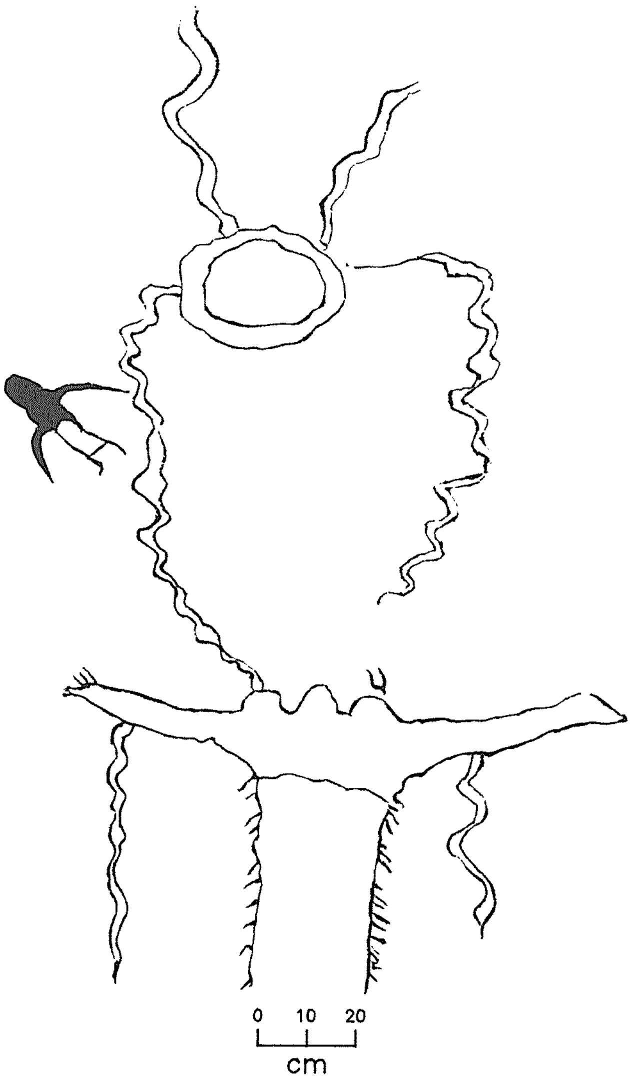

Figure 8. Outlined feline shaman from C-139, El Fortín, reconstructed from a faded and deteriorated photograph taken in 1966. The scale is approximte. *(Drawn by David G. Robinson.)*

del Cedral, intervenes between Sin Nombre and El Fortín, and the Serranías del Burro rise directly to the north.

C-138 is a rockshelter 20 meters long and 6 meters deep, situated more than 100 meters above the valley floor on the west side of a canyon north of the headquarters of the Rancho Las Margaritas. The pictographs were described as primarily red, with some black, and very badly deteriorated. Color prints without negatives on file at TARL show both red and black figures, but it is impossible to determine their exact provenience, since at least three sites are apparently included under the name San Jose de las Piedras. Definite Pecos River style designs in C-138 include shaman figures (Figure 6), insects, and winged figures with branching appendages that fit within the variant "trimotor" design cited above (Figure 4).

C-139 is a smaller shelter, 6 meters wide and 2.5 meters deep, with shallow cultural deposits, also high above the valley floor in a canyon west of the Cañon El Fortín. The red and yellow pictographs include two fringed shaman figures (Figure 7), one associated with a series of circles and streamers (Figure 8). The latter is a variation of the were-feline motif also recognized at Sin Nombre, this time drawn in outline. In addition, one small birdlike shaman is detectable in the Polaroid prints. Apparently, none of the C-139 pictographs were included in the photographic collection at TARL.

The rock art in C-138 and C-139 is very similar to that of Sin Nombre and, in composite, the two localities demonstrate that this southernmost expression of the Pecos River style is not an isolated occurence. In fact, these small enclaves suggest that many more sites await recording in the rugged terrain between the Arroyo de la Babia and the Rio Grande.

IMPLICATIONS

The pictographs of Sin Nombre and El Fortín demonstrate that, during at least one period of prehistory, the Lower Pecos cultural area extended at least 145 km (90 miles) south of the Rio Grande, encircling or encompassing the Serranías del Burro. All four sites are near Arroyo de la Babia, one of the historically documented travel routes between Musquiz (then Santa Rosa) and the Rio Grande (Weddle 1976:413). Although different constraints applied to prehorse populations, the mountain ranges of northern Coahuila always would have affected broad movements of people, channeling travel and exchange routes into valleys, passes, or the near-desert rangeland that fringes the mountains.

At first glance, these few pictographs appear to be outliers, remote from the heartland of the style (Figure 1), but this impression is more a function of the intensity and orientation of archeological research in northern Coahuila than of cultural reality. Studies either concentrated along the banks of the Rio Grande (H. Taylor 1948; Taylor and Rul 1961) or, like Epstein's Northeastern Mexico Project, sampled areas farther south and east, leaving a zone of ambiguity in between. The commonality between Lower Pecos and Coahuilan archeological remains has long been noted (H. Taylor 1948; W. Taylor 1966). Specifically, shared fiber (Andrews and Adovasio 1980) and lithic industries (Johnson 1964), burial practices (Turpin and Bement 1988), and art (H. Taylor 1948; Kelley 1974) bespeak a unity of culture that spanned the Rio Grande at various times in prehistory. However, the nature and direction of these relationships remain speculative until archeological survey is undertaken around and including the Serranías del Burro.

ACKNOWLEDGMENTS

Manuel Diego, owner of the Rancho Santa Rosa, granted permission to visit Abrigo Diego, and Jorge Ramon, Bob Perry, and Garner Fuller helped us get there. Robert Goldsbury first drew the Pecos River style pictographs in the Sierra del Carmen to my attention. Jim Zintgraff photographed the Diego and Sin Nombre sites and provided copies for reproduction and for this analysis. Tom Guderjan commented on a draft of this paper, lending knowledge based on his personal experiences at Sin Nombre. Lorraine Heartfield and Ron Ralph shared their experiences at El Fortín and helped track down the photographs and notes. Dr. Jeremiah F. Epstein freely granted permission to use the information gathered during the Northeastern Mexico Archeological Project. Herbert Taylor discussed his maiden expedition into Coahuila in 1948 with the author. Dan Julien constructed the site location map, and all of the line drawings are the work of David G. Robinson, who used both old and recent photographs in their preparation.

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Perdiz Point Damage Analysis

Kim A. Cox and Herman A. Smith

ABSTRACT

Experimental damage of Perdiz points resulted in two major types of breakage patterns—snaps and impact fractures. Analysis of wear and breakage patterns on Perdiz points from several archeological sites in South Texas revealed that some points were probably being salvaged for use as hafted cutting tools. Whole points were discarded after use as cutting tools, probably due to edge dulling. Evidence of variations in breakage patterns among sites and the possible implications of the patterns of variation are discussed.

INTRODUCTION

Recently, the Coastal Bend Archeological Society conducted an archeological investigation of the McGloin House site (41SP135) in western San Patricio County, Texas, along the lower Nueces River (Figure 1). It is a multicomponent site with at least three Late Prehistoric components, characterized by Perdiz arrowpoints. Only one other arrowpoint type is represented in the assemblage; a Starr point was recovered from the upper component (Table 1).

The three levels have been radiocarbon dated at 210 BP±100 (TX5394), 340 BP±70 (TX5395), and 540 BP±60 (TX5393), which equate to uncorrected A.D. dates of 1740, 1610, and 1410. Since their standard deviations do not overlap, these dates suggest three discrete components, apparently confirming the stratigraphic evidence of three distinct layers of occupational debris.

All three components are characterized primarily by Perdiz arrowpoints, which are found in the Rockport complex (Campbell 1960) along the central and lower Gulf Coast of Texas (Suhm, Kreiger, and Jelks 1954; Story 1968; Smith 1984a). Since there are no significant differences in the other artifacts in the three levels, 41SP135 seems to be a site that was repeatedly occupied by the same cultural group (or at least groups sharing a common material culture) at three different times in slightly more than 300 years.

The sample of more than 100 Perdiz projectile points is large enough for valid statistical analysis, so this site provides us with an exceptional opportunity to assess possible variability in Perdiz arrowpoints over an extended time period. The Perdiz specimens were classified according to manufacturing technique (bifacial versus unifacial) and degree of completeness (Table 1). More than 75 percent of the Perdiz specimens for all three components are predominantly unifacial, and this is consistent across levels (mean =78.66, range ±2.66). The percentage of resharpened specimens is small and inconsistent. The proportion of whole specimens,

Table 1. Arrowpoints from 41SP135 by Level

	Variable/Level or Component		
	Upper (1740AD)	**Middle** (1610AD)	**Lower** (1410AD)
	Number of Arrowpoints		
Perdiz	17	56	32
Expanding Stem	0	0	0
Fresno	0	0	0
Starr	1	0	0
Tip fragments	4	9	1
Base fragments	0	0	0
	Attributes of Perdiz Points		
Unifacial	76%	79%	81%
Bifacial	24%	21%	19%
Essentially whole	18%	30%	47%
Resharpened	12%	2%	19%
Average Length	3.13mm	3.20mm	2.64mm
(based on n =)	(8)	(28)	(23)
	Condition of Perdiz Points (Percent of total sample)		
Tip damage	29	38	28
Base damage	53	30	19
	Condition of Damaged Perdiz (Percent of broken points)		
Tip damage	36	54	53
Base damage	64	44	35

however, varies dramatically in the three components, and the trend appears to be a systematic reduction of complete Perdiz points across time (47 percent complete in the lower level to only 18 percent complete in the upper level). This intriguing result deserves further analysis.

Of particular interest is the amount and type of damage such arrowpoints evidence. Since the number of points in each level varies markedly, comparisons can be made most realistically by calculating the percentage of the total number in each level by category or condition (Table 1). Note that the proportion of Perdiz points with damage to the tip remains constant across levels. Damage to bases, however, systematically and substantially increases across time, whether expressed as a percentage of all specimens or as a percentage of just the broken points.

This variability in wear and breakage patterns of Perdiz points across time implies some change in their use during this timespan. Further analysis and perhaps some experimental verification are needed, but before this analysis was done it was necessary to determine whether this variability was a general trend at other sites in the region, or was unique to 41SP135. To this end, the same kinds of data from comparably dated Perdiz components at other sites in the region were examined.

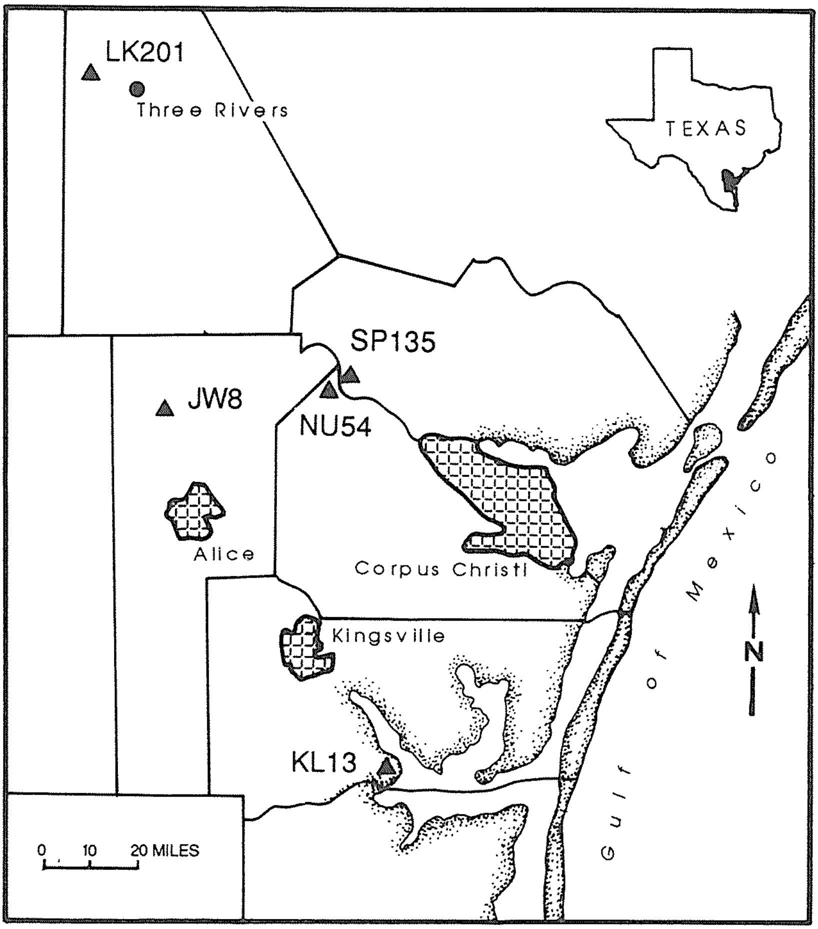

Figure 1. Map of the Central Coastal Bend area showing sites discussed.

Only a few such sites have been documented; the three sites with sufficient data for comparison are the Rockport complex site 41KL13 (Smith 1984b) and two inland sites—41LK201 (Highley 1986) and 41JW8 (Black 1986), which are relatively close to 41SP135 (Figure 1, Table 2).

The dates of these components generally parallel the three levels at 41SP135, but, of course, they are not exact matches. The other sites are dated in various ways; the date for 41KL13 is a guess based on the presence of historic artifacts at the site, and dates from the other two sites are averages of the published radiocarbon dates (corrected). Since the objective here is to compare contemporaneous components, these three sites are excellent choices for comparison and analysis.

None of the comparison sites is as much a pure Perdiz site as 41SP135 appears to be. At 41SP135, more than 99 percent of the arrowpoints identified are Perdiz, at 41KL13 only 59 percent are Perdiz; at 41LK201, 91 percent are Perdiz; and at

Table 2. Comparison of Arrowpoints from Sites 41KL13, 41KL201, and 41JW8

	Variable/Level or Component		
	41KL13 (AD1750)*	**41LK201** (AD1530)*	**41JW8** (AD1370)*
	Number of Arrowpoints		
Perdiz	61	43	111
Expanding Stem	2	4	6
Fresno	22	0	0
Starr	19	0	4
Tip fragments	15	2	22
Base fragments	5	0	18
	Attributes of Perdiz Points		
Unifacial	54%	70%	36%
Bifacial	46%	30%	64%
Essentially whole	43%	58%	34%
Resharpened	16%	5%	10%
Average Length	2.49mm	3.07mm	2.46mm
(based on n =)	(37)	(27)	(45)
	Condition of Perdiz Points (% of total sample)		
Tip damage	39	35	45
Base damage	18	9	36
	Condition of Damaged Perdiz (% of broken points)		
Tip damage	69	83	68
Base damage	31	22	55

*For dating information, see Smith (1984b), Highley (1986), and Black (1986).

41JW8, 92 percent are Perdiz, so, in this respect, 41SP135 is more similar to 41LK201 and 41JW8 than it is to 41KL13.

There are also differences among the comparison sites in the proportions of unifacial and bifacial Perdiz arrowpoints. At 41JW8, 64 percent of the Perdiz are bifacially worked; at 41KL13, there are almost equal percentages of bifacial and unifacial points. Only at 41LK201 is the percentage (70 percent) roughly comparable to 41SP135.

As at 41SP135, the percentage of resharpened points at 41LK201 is relatively small, and there appears to be no trend across time. Neither does the pattern of decreasing percentages of whole points at 41SP135 hold for the other three sites. There also appears to be no general trend in average length, and only at 41LK201 is the average length of points comparable to the average length at 41SP135.

At 41SP135 there is a trend of increasing percentages of Perdiz points with basal damage across later time periods, but this trend also is not confirmed at the other Perdiz sites. Rather, the data are very mixed or, in some cases, seem to support opposite trends. Since there is no confirming evidence of the trends seen at 41SP135 in these other comparably dated Perdiz sites, another hypothesis must be sought to explain the damage to Perdiz arrowpoints at the McGloin House site.

EXPERIMENTS

If the damage to the Perdiz points is not a general cultural phenomenon, it may be the result of some other changing factor, such as the use made of these artifacts at different times and at different sites, as suggested by Ahler (1971), Ahler and McMillan (1976), and Roper (1979). To evaluate this possibility, a series of experiments were conducted, using Perdiz arrowpoints in a variety of ways and then assessing the physical evidence of wear and damage.

The design of the first experiment was patterned after Flenniken and Raymond (1986). Arrows were modeled on historical descriptions of Karankawa arrows (Kilman 1959; Kuykendall 1903; Gatschet 1891); they had reed shafts and foreshafts and were tipped with unprovenienced Perdiz points acquired from local collectors.

Due to the abundance of white-tailed deer remains at all four of the sites studied, and the association of Perdiz points with those remains (Smith and Cox 1987; Highley 1986; Black 1986; Smith 1984b), a recently killed white-tailed deer carcass was the target. A 45 lb compound bow was then used to shoot 18 arrows into the deer carcass from a distance of three meters.

Of the 18 arrowpoints that struck the deer, all or parts of 17 were recovered (Figure 2). Four suffered very minor damage, and among the others were at least six distal breaks, four proximal breaks, and nine barb breaks. The greatest damage was sustained by arrowpoints shot into shoulders; those shot into the neck and ribs suffered less damage.

In the second experiment, five foreshafted Perdiz arrowpoints were used to skin and butcher white-tailed deer. Wear was examined at intervals of continued use.

In the third experiment, three Perdiz arrowpoints affixed to modern wooden arrow shafts were repeatedly shot into a series of 10 white-tailed deer hides mounted on a plywood backing. A 15 lb compound bow was used in this experiment to prevent the arrow's penetrating all 10 hides and destroying the points. Use wear was ascertained and documented after each shot.

RESULTS AND DISCUSSION

Construction of Arrows

In the first experiment, arrow shafts were made, according to aboriginal standards, of native reed (cane) and were fitted with reed foreshafts (Figure 3). A notched wooden peg was inserted in one end of the main shaft and a stone-tipped foreshaft in the other. All connections between the shafts and foreshafts were tapered and bound. As results were noted, some modifications were made; in the last

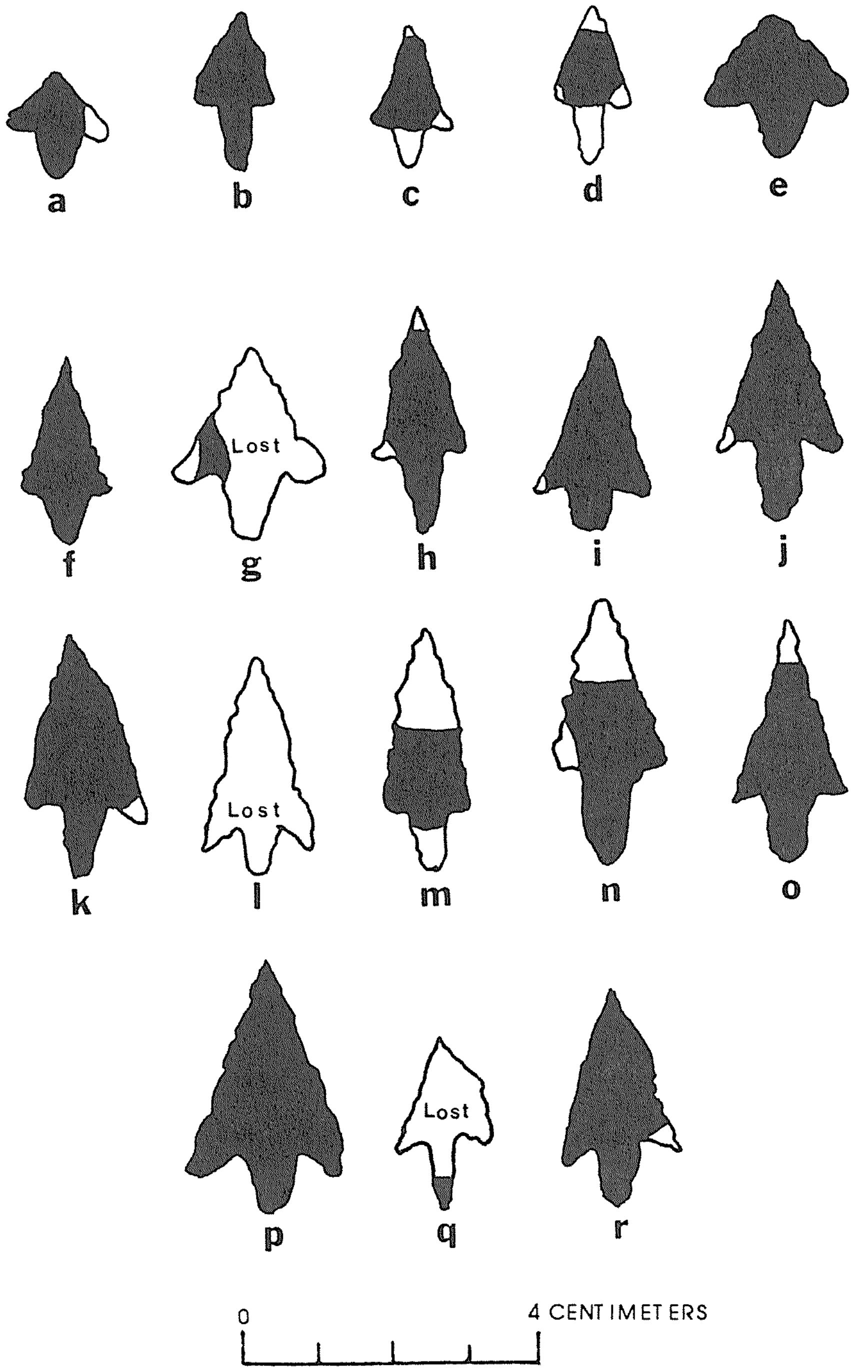

Figure 2. Perdiz arrowpoints from the first experiment showing damage from use.

eight foreshafts, the connection between the point and the foreshaft was also bound, an improvement that prevented splintering of the foreshafts.

A wide variety of shafts, foreshafts, and points were tried out, and minor improvements were made in efficiency during the experiment. It was discovered that small foreshafts penetrate much easier than larger ones, but they are unable to withstand as much battering. The ideal design was a relatively large arrow shaft (approximately 1.2 cm in diameter) with a long, slender foreshaft (.5 to .7 cm in diameter) narrowing to the stone point; the best results were achieved with this design. A single, unforeshafted reed arrow shaft ranging between .6 and .8 cm in diameter penetrated well at first, but disintegrated completely in the process.

The greatest advantage of the foreshafted reed arrow is the ease with which another foreshaft can be attached, making it possible for the hunters to carry only a few arrow shafts together with any number of foreshafts. The only problem with this design was some wedging of the foreshaft into the main shaft on impact. This became less of a problem when the foreshafts were butted to the last joint in the reed (cane) main shaft so the joints absorbed the recoil.

The strength of the main shaft was never a problem. Even when the arrows missed the target, sudden and violent impact left the main shafts relatively unscathed.

Hafting

The main advantage of the contracting-stem Perdiz arrowpoint is that it can be socketed in a reed or cane foreshaft with relative ease, and whole points can be interchanged for broken ones in a matter of seconds. In the first experiment, four Perdiz points were socketed, without the use of an adhesive substance, without any loss of effectiveness. It is quite probable, however, considering the multitude of sources for adhesive substances available to aboriginal hunters, that some sort of adhesive was used. Several of the Perdiz points recovered at 41SP120 and 41AS3 had traces of asphalt on the stems.

Snaps Versus Impact Fractures

In the analysis of point damage from the four sites studied, two distinct types of breakage—transverse and irregular—were initially noted. Breakage patterns were similar to those described by Ahler and McMillan (1976) and Roper (1979). Transverse breaks are referred to as snaps, and most others, including Roper's angular, oblique, and crenated breaks, for reasons to be discussed later, are assigned to the generic category, impact fractures (Ahler and McMillan 1976).

Most snaps are caused by tensile forces perpendicular to the longitudinal axis of the point. In the assemblages examined, there were two principal locations of snaps—on the distal part of the stems and on the upper half of the body of the projectile points (Figure 4). Snaps almost always leave a sharp disjuncture on one side and either slight crushing or a minor hinge disjuncture on the opposite side. Breaks almost invariably are transverse, running perpendicular to the longitudinal

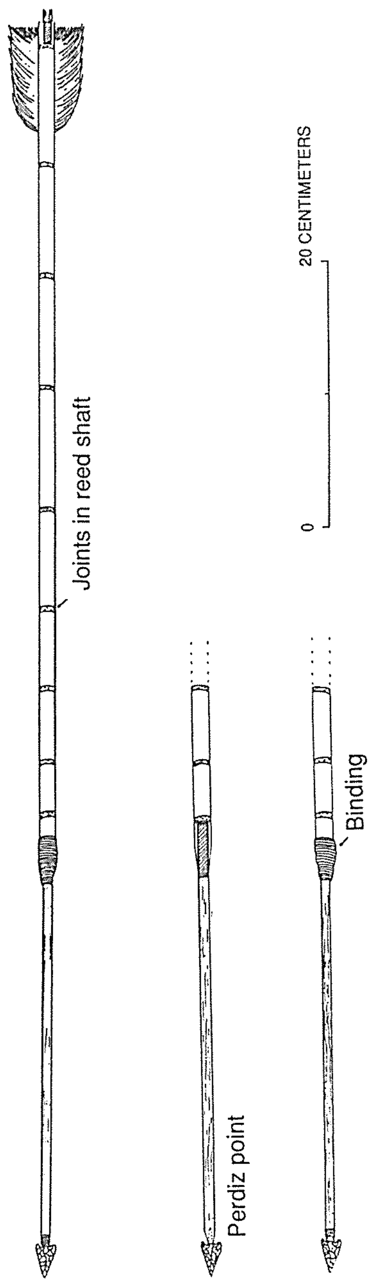

Figure 3. Reed arrow shafts with compound foreshaft construction.

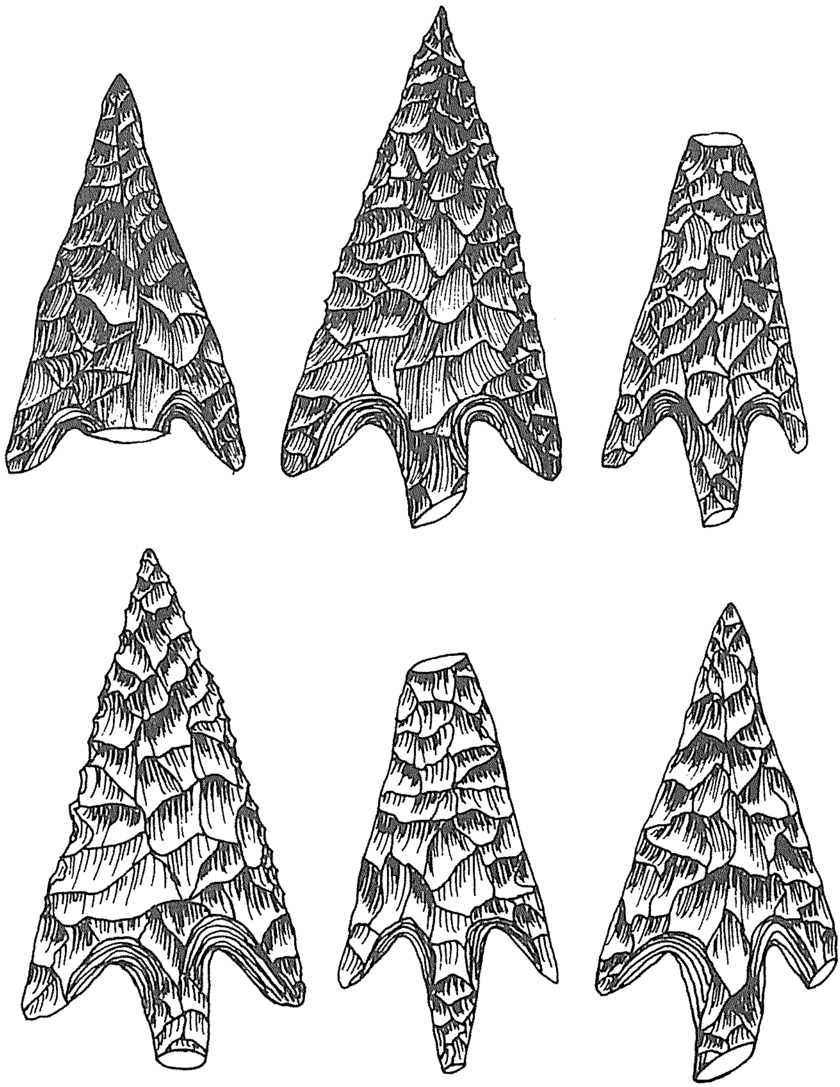

Figure 4. Drawings of Perdiz points showing snaps. (Points are three times actual size.)

axis of the point (although in recent excavations at 41AS3, the only broken Perdiz arrowpoint has a sharply oblique snap showing damage as a result of torque rather than perpendicular tensile force).

Impact fractures, on the other hand, usually evidence a high degree of crushing and irregular breaking on both lateral edges of the disjuncture (Figure 5). Also, impact will sometimes result in cone fracturing on the surface of the disjuncture.

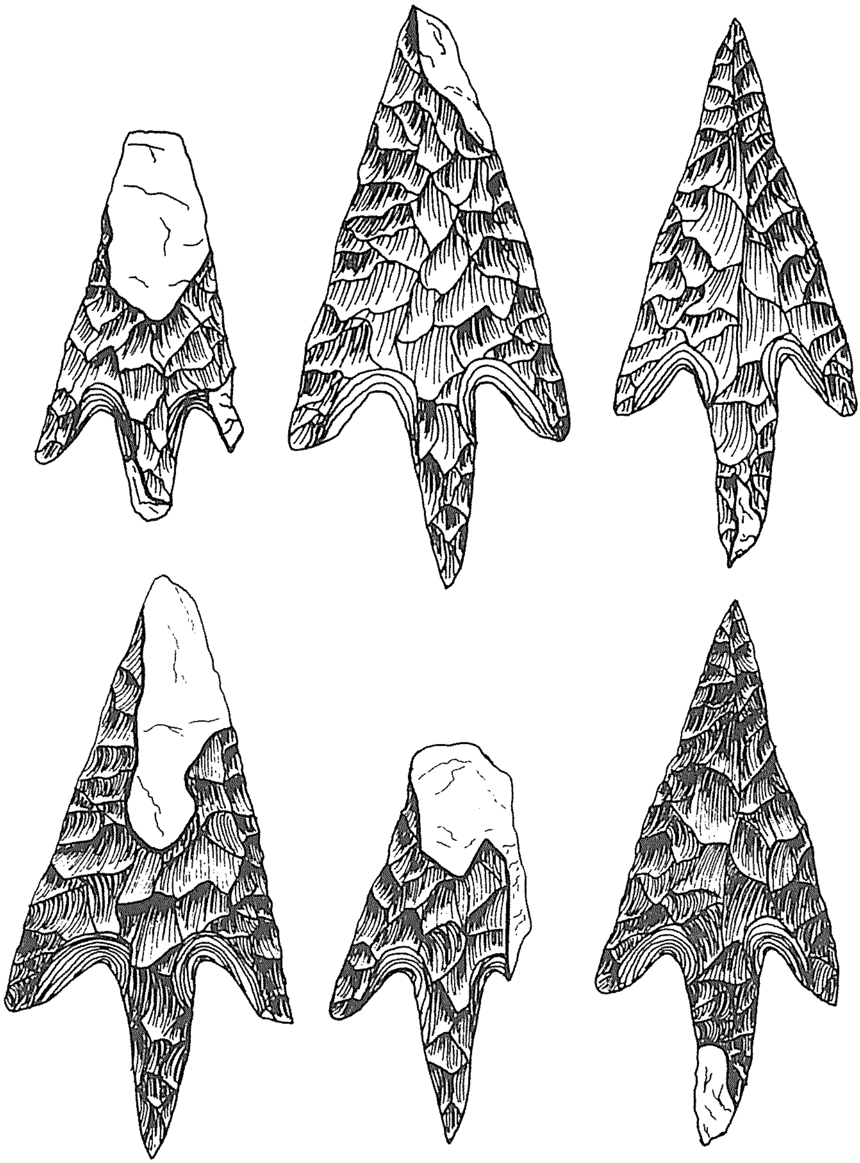

Figure 5. Drawings of Perdiz points showing impact damage. (Points are three times actual size.)

It is nevertheless quite often difficult to distinguish basal snaps from basal impact fractures. Snaps and impact fractures on the body of the point are much easier to distinguish since body impact fractures are almost always obvious. Impact breaks are the result of parallel force vectors to the longitudinal axis of the points.

Such breaks often end in a type of feather termination (Crabtree 1972:64) and less frequently in hinge or step termination (Ahler 1979). Facial and, usually, bilateral asymmetry are characteristic of body impact fractures and cannot be duplicated by pressure from use as a tool.

Both types of breaks are quite prevalent on specimens from all four sites. One of the purposes of our experimental studies was to see if arrowpoints create both snaps and impact fractures upon penetration, as implied by Roper (1979) and Brown, Potter, Hall, and Black (1982). They do not; in fact, our results were the opposite of those suggested. All eleven proximal and distal breaks created in the first experiment and three of the distal breaks in the third experiment were obvious impact fractures. Snaps are not caused by impact. Ahler and McMillan indicate the same findings for dart points, saying "moderate to large size and transverse blade fractures are direct indicators of points that were used for purposes other than as tips for projectiles" (1976:167).

This finding is interesting, but the practical application is not readily apparent—there are other easy explanations for snaps on projectile points. The significance, however, does not lie with the presence of the snaps, but rather with the presence of the impact fractures. All projectile point types must evidence impact fractures.

This idea gives rise to a method of analysis for reexamining what are being identified as projectile point types. For instance, since the inception of modern projectile point typology, archeologists have called the small, thin, triangular, bifacial stone artifacts found almost all over Texas, Fresno arrowpoints (eg. Turner and Hester 1985; Suhm and Jelks 1962). They are found in Late Prehistoric sites and in surface collections from the Coastal region (Hudgins 1984; Steele and Mokry 1983; Corbin 1974), including site 41KL13 (Smith 1984b). Ignoring the fact that an inordinate percentage of these Fresno points from the South Texas coast are whole, the important issue is that all of the breaks in the more-than-200 specimens examined are snaps; there are no impact fractures.

On the other hand, a very high percentage of impact fractures are noted among the similarly hafted Starr arrowpoint, often found in association with Fresno points in South Texas (Smith 1984b). When considered in the overall context of arrowpoint damage analysis, this evidence certainly suggests that the so-called Fresno arrowpoints of the Texas coastal zone were probably never intended or used as tips for arrows.

Typology

The dramatic disparity in results achieved in the impact experiment led to the inescapable choice of the ideal stone point—it was long and thin and sharp. Shot from a 45-lb bow at a distance of 3 meters, a wide blunt point (Figure 2, e) bounced off a deer, whereas a thin sharp point (Figure 2, f) passed through neck vertebrae virtually undamaged.

Modern bow hunters prefer the razor-sharp, thin steel arrowheads that can now be purchased in many sporting goods stores. Their advantage, of course, is in their killing ability—the arrow does its damage by causing hemorrhaging and the farther it goes into the deer, the better the results. Most bow hunters are finicky about their arrowheads, for if they are dulled by carelessness or use, they lose their maximum penetrating power, and although they still look sharp to the uninitiated, such points are not favored by experienced bow hunters. To those whose freedom from hunger depended on their arrow's killing ability, this fact could not be ignored. It is simply not possible that all of the many broad, dull artifacts with the configuration of Perdiz arrowpoints are, in fact, projectile points.

Projectile Points Versus Tools

For many years, people have noted a disturbingly high ratio of whole projectile points to broken ones. L. W. Patterson (1980), for instance, comments that in excavations of Archaic sites, there is about one whole dart point found for every two and a half broken ones.

In the first experiment, only one entire point was lost; presumably it is still in the deer. It is assumed that even this point could have been recovered. Had the authors been Late Prehistoric hunters, modern archeologists would have found parts of nine projectiles, none of which would be reusable. Had a hundred projectiles been fired into the animal, there still would be no whole or reusable points to be found; they would have been salvaged.

This underscores an intriguing fact about virtually all Late Prehistoric sites—there is a preplexingly large number of whole and apparently reusable points found. At 41SP135, for instance, there were 35 essentially whole points found out of a total of 105 Perdiz specimens.

Two possibilities present themselves for the prevalence of these whole and reusable points—they were intentionally discarded or they were lost. Neither of these possibilities is appealing; it is highly unlikely that, through carelessness, they lost or failed to retrieve whole points in such high percentages and so universally, particularly in a region where good lithic resources are scarce. On the other hand, religious taboos and poison immediately come to mind as possible reasons for intentionally discarding points, but neither shows up in the historical record.

But what if what we are calling projectile points are not really points? Would their use as other tools affect the Late Prehistoric hunter's inclination to discard them?

Ahler and McMillan (1976), in their analysis of the Rodgers Shelter artifacts, identified what they believed were foreshafted projectile points that were also used as hafted cutting tools. In addition, they identified a previously described point type, which they believed served strictly as a hafted cutting tool and not as a projectile point. This latter group showed greater wear, a much lower percentage of impact fractures, and a much higher percentage of transverse breaks. Wear analysis demonstrated that the hafted cutting tools were used for slicing, cleaving, sawing, and scraping, among other things.

Edge wear on the points from the four Perdiz sites studied was microscopically indistinguishable from wear created by skinning and butchering, but was inconsistent with use as scraping tools. In all other respects, however, wear analysis was consistent with Ahler and McMillan's findings. Several observations are of note.

First, of the 124 essentially whole points from the four sites, all but three tiny points from 41JW8, when viewed microscopically, showed wear resulting from longitudinal cutting. In addition, the whole points tended to show heavier wear, and more points actually showed wear than either the ones with snaps or the ones with impact fractures.

Second, points bearing major impact fractures from 41SP135, 41KL13, and 41LK201 showed little wear, and most showed virtually no wear at all. The minor wear that was present could easily be attributed to impact and penetration. Some points with minor distal impact fractures had apparently been used as tools subsequent to their use as projectiles, which caused longitudinal wear patterns on the fresh edges created by impact. At 41SP135, several points with minor distal impact fractures also had proximal snaps.

Third, virtually all of the points with snaps showed some degree of longitudinal wear. In the skinning and butchering experiment, the points with flared barbs were not useful for skinning (which is easier done by hand) but were very useful for cutting meat from bones. For this task, the barbs were used most heavily. It is interesting that many points, whole and with snaps, evidence heavy wear, principally on their barbs.

Apparently, some foreshafted Perdiz arrowpoints were multipurpose tools which were used for butchering, among other purposes. As anyone who has processed a deer knows, a knife dulls rapidly and, once dulled, makes the job much more difficult. At 41SP135, what were initially believed to be Perdiz arrowpoints probably were, in fact, simply hafted cutting tools that had been discarded by their users.

Whole Points and Broken Points

Three other facts are relevant to an understanding of the relation of whole to broken points. First, as previously mentioned, the points with major impact fractures from 41SP135 showed either no wear or very small amounts of wear. When considered vis-a-vis the wear patterns on whole points, this fact would indicate that there was a propensity against reusing points with even moderate wear patterns. If they had been reused as projectile points, they would have shown up in the group with major impact fractures. On its face, this is reasonable, because nobody would deliberately use a dull point when a sharp one was available. However, in some instances, there is no way to tell by sight or feel that the points have been used—a fact which raises the interesting prospect that a Perdiz point, once used, was never reused as a projectile point.

Second, in the first experiment, barb damage was caused to a surprising number of points. On closer evaluation of all four collections, many of the points that were labelled as essentially whole (Tables 1 and 2) did in fact suffer very minor barb damage. This raises the possibility that essentially whole points were being salvaged at the kill sites to be used later as knives. The barb damage could not be replicated by using the points as butchering tools, but all the other purposes for which these tools may have been used are not known.

Third, points tend to be shorter in areas like 41JW8 and 41KL13, where flint is not naturally available (Highly 1986; Smith 1984b), and there are more resharpened points from these sites (Table 2). Apparently, points were being resharpened when it was absolutely necessary, but not as a preferred strategy. Considering the savings in time and effort, the fact that the aboriginal hunters preferred not to salvage broken points raises questions about the structural integrity of used points.

Impact Damage on Repeated Use

In the third experiment, three Perdiz points without wear were shot repeatedly through a stack of deer hides. Performance decreased noticeably upon continued use due to dulling, and all points eventually suffered structural failure. No point survived more than four shots, and damage generally occurred to the tips. Each shot produced additional wear, and once tip damage became noticeable, the projectile point decreased markedly in performance. It appears that even minimal repeated impact adversely affects the structural integrity of a point, resulting in its ultimate structural failure.

A Final Analysis

The experiments were undertaken with the primary purpose of explaining the statistical variations in breakage patterns among the four sites studied, but to that end they were not wholly successful. However, several comments can be made about the Perdiz point collections from these and neighboring sites.

First, the lack of basal parts from three of the four sites is significant (Table 1, Table 2). Large numbers of basal breaks were found at all three sites, but the broken parts were not found. The presence of basal parts at the fourth site, 41JW8, suggests reloading (fitting a new arrowpoint on the arrow shaft), but why are the results from this site different from those at the other three sites?

The answer may lie in the hafting technique. Basal parts attached to foreshafts were probably discarded on the run, whereas basal parts attached to unforeshafted wooden arrows had to be taken to a spot where arrows were meticulously reworked. So at least some of the hunters at 41JW8, where cane was perhaps not readily available, may have used wooden arrow shafts (perhaps cane was not readily available) whereas those at 41LK201, 41KL13, and 41SP135 used cane foreshafts.

This suggestion is further strengthened by the high percentage of basal impact fractures at 41JW8 and the low percentages of basal breaks—most of which are snaps—at the other sites. When a point is hafted to wood, the stem absorbs the shock of impact, but when it is hafted to cane socketing, the body of the point absorbs the shock.

At 41NU54, a recently excavated site, Perdiz points that were found in association with historic artifacts had a high percentage of impact fractures. Of the

16 Perdiz arrowpoints recovered from this site, one is unfinished, two are whole except for slight barb and tip damage, and all the rest have impact fractures; there are none with snaps. According to historical accounts, at least some local Indian groups, such as the Lipan Apache, used wooden arrow shafts (Banta 1977).

A Perdiz arrowpoint attached to a short cane foreshaft makes a much more impractical hafted cutting tool than a Perdiz arrowpoint attached to a wooden shaft. This fact could account for the lack of Perdiz points with snaps at 41NU54, but, more importantly, it underscores the fact that cultural differences probably influence breakage patterns. In addition, the collection from 41NU54 suggests that Perdiz arrowpoints do not suffer snap damage after impact to the extent previously believed (cf. Brown, Potter, Hall, and Black 1982:42–43).

Third, no valid statistical analysis of projectile points can be made without first eliminating stone artifacts that were never intended to be used as projectiles. Stone artifacts that were apparently used as Perdiz arrowpoints are usually long and thin—ranging from 2.5 to as much as 5 times in length (not counting the stem) to width half way up the point, though this does not hold true for the smaller points.

Fourth, the length of whole points may or may not be significant. As would be expected, the farther away from flint resources one goes, the shorter the points become due to conservation of material. It is also quite possible that size of projectile points is affected by targets. Most points from 41SP135 found in association with bison were more than 3 cm long. Corresponding information from 41JW8 and 41LK201 is not available.

Fifth, a caveat about basal snaps. The Corpus Christi Museum has an undocumented collection of mostly Starr and Perdiz arrowpoints, believed to be from Sarita in northern Kenedy County. Eighteen of the 23 Perdiz points have basal snaps—in the same place at the top of the stem—as their only damage.

If the people who used Starr points were taking Perdiz points and snapping the bases from them to facilitate hafting in a fashion that resembles the stemless Starr point, this would be another explanation for basal snaps that, in South Texas at least, would have to be taken into consideration.

CONCLUSIONS

Although there are many variables, wear and damage analysis contributes significant information to an archeological investigation and site analysis:

1. There are many reasons for projectile points appearing in the archeological record (see Roper 1979), but the four Perdiz point sites studied reveal only four reasons for their appearance at those sites:

a. Points with major impact damage were not salvaged and were, as no longer viable, either discarded or simply not retrieved.

b. Some arrowpoints with minor impact damage appear to have been salvaged to be used later as cutting tools. Most of these exhibit minor distal, proximal, and barb impact damage but subsequent use has caused wear on the edges created by earlier impact fractures. In this regard, points with distal impact fractures may have proximal snaps. These were discarded principally due to breakage or dulling, but perhaps also due to the unreliability of points that have suffered the stresses of impact.

c. Some points with major snaps show heavy wear and some do not, depending upon at what stage of use they broke. They were discarded as no longer viable.

d. Most whole points and many of those with only minor snaps revealed at least moderate wear and were discarded probably due to dulling.

2. The study of varying percentages of types of breaks and location of breaks between types has tremendous potential as an analytic tool and warrants further research. All four Perdiz point sites studied evidenced multifunctional uses of points for both killing and longitudinal cutting. However, at 41SP135, the lower zone contained a high percentage of essentially whole points (Table 1).

Faunal analysis at this site showed a schlepp effect (Perkins and Daly 1968) in that lower leg bones and mandibles were very much in evidence, but other bones were totally absent or present in insignificant numbers (Smith and Cox 1987). It is believed that this accounts for a rarity of impact damaged points from that level, since they were lost in other parts of the carcasses which were not brought to camp.

Conversely, in the upper levels at 41SP135, bison were being butchered at the location (Smith and Cox 1987). Most impact-damaged points from these levels are probably the results of shooting bison, which may also account for the statistical differences between these points and those from the other sites. Ideas of this kind can be very useful in site analysis, but their true tests await further excavations.

3. Finally, there is a strong possibility that certain cultural groups produced their own damage patterns. An understanding of these patterns not only will reveal cultural affiliations, but also will help to identify distinctive traits within cultures.

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An Archeological Footnote to History

Kathleen Gilmore

with the collaboration of H. Gill-King

ABSTRACT

Historical, archeological, and skeletal evidence shows that a male adult burial that had two round lead projectiles in the rib cage area, excavated by A. T. Jackson in 1932 at a Caddo Indian site, has the high probability of being that of Sieur de Marle, a member of LaSalle's colony that was established on the Gulf Coast of Texas in 1685. However, exploration of the combined evidence does not conclusively answer the question of murder raised by Jackson.

INTRODUCTION

In 1932, A. T. Jackson (1932) excavated seven burials from a low rise at the Eli Moores site (41BW2) in Bowie County, Texas. Six of these burials were of children nine years old or less; the other was an adult male with two lead balls in the area just below the rib cage. Jackson speculated that the lead balls were "the missiles that inflicted death." The burial was lying on the right side with arms flexed and the hands near the face. Jackson noted that this was an unusual position for an East Texas burial; most Late Prehistoric Caddoan burials in the general area are extended on their backs. Except for the lead balls, no historic artifacts were found in any of Jackson's excavations at the site.

Who was this man—a lone adult among children—and was he murdered? There is a high probability that this was one Mr. Marle, a Frenchman and a member of LaSalle's colony established in 1685 on Garcitas Creek near Matagorda Bay. The historical, archeological, and skeletal evidence for his identity (the last presented by H. Gill-King, forensic anthropologist) may settle the question of murder.

THE HISTORICAL EVIDENCE

On March 20, 1687—300 years ago—Robert Cavelier, Sieur de LaSalle, was ambushed and murdered (probably somewhere near the Trinity River in Texas) with a bullet shot to his head. Three days before, LaSalle's nephew Moranget and two of LaSalle's servants, Nica and Saget, had been murdered by axe blows to their heads. The scenario leading to the murders is described in the diary of Henri Joutel, a member of LaSalle's colony (Joutel 1962; Margry 1886, V. 3).

Seventeen persons had left the destitute French colony near Matagorda Bay on January 12, 1687, intending to go for help to France by way of Canada. Sixteen of these individuals were LaSalle, Abbe Cavelier (LaSalle's brother), Father

Anastasious, LaSalle's nephews Moranget and young Cavelier, Duhaut, L'Archeveque, Heins, Liotot, young Talon, Nica (the Indian hunter), Saget (LaSalle's footman), Tessier (the pilot), Marle, Bartholomew (a youth from Paris), and Joutel. The seventeenth person was not identified.

After two months of arduous trekking through dense woods in rain and cold, food was becoming scarce, so a camp was made on March 15 to retrieve food that had been cached by LaSalle on a previous journey. To their dismay, the food was spoiled, but on March 16, about 3 to 5 miles from the main camp, Liotot, Duhaut, Heins, Nica, and Saget were smoking two bison that Nica had killed. Word was sent to LaSalle of their activities, and LaSalle sent Moranget and Marle to obtain some of the meat. As was usual, the men who made the kill had laid aside the choice marrow bones that were their reward to eat after they had been roasted. When Moranget arrived at the place where the men were smoking the bison, he flew into a rage and seized all the meat, saying the hunters had too much and that "he would manage it some other way" (Joutel 1962).

Because of this treatment and other real and perhaps imagined complaints against Moranget, the group decided to kill him, Nica, and Saget—the last two because of their loyalty to LaSalle. That night, while Duhaut, Heins, Tessier, and L'Archeveque stood guard, Liotot took an axe to the three men with "many strokes to the head" (Joutel 1962). Moranget did not die instantly; he sat up but could not speak, and "the assassins obliged the Sieur de Marle to make an end of him, tho' he was not in the conspiracy" (Joutel 1962).

Two days passed, and LaSalle set out with Father Anastasious for the hunting camp to see why the men had not returned. As they approached the camp, LaSalle was shot by Duhaut and died instantly. Gathering back at the main camp, Joutel and those who were friends of LaSalle "guarded themselves to sustain their lives" (Joutel 1962). Joutel and young Cavelier, LaSalle's nephew, wanted revenge against the murderers, but Abbe Cavelier (LaSalle's brother) always opposed it and restrained them.

It was not until June 13, 1687—three months later—that Joutel and his companions, Abbe Cavelier, young Cavelier (about 17 years old), Father Anastasious, the Sieur de Marle, Tessier, and Bartholomew, could extricate themselves from the assassins and their companions and start the journey toward Canada, about 2000 miles away, mainly through unknown and trackless wilderness.

Two weeks later, on June 26, they arrived near a village of the Cadohadacho. On the instructions of the chief of the nearby village, who had been informed of their arrival, the group waited on the bank of a river for other Indians to come and welcome them. All the Frenchmen were carried on the backs of the Indians for more than a quarter of a league (about 3500 feet) to a place near the chief's "cottage." It took three men to carry Joutel, who was a large man and was carrying, among other things, a firelock (probably a flintlock), a case of pistols, and a kettle; two held up his legs.

On the next day, June 24, as Joutel relates it,

> Monsieur de la Marle, one of the prime men in our company, having breakfasted, would needs go bathe himself in the river we had passed the day before, and not knowing how to swim he went too far and stepped into a hole, whence he could not recover himself and was unfortunately drowned. Young Monsieur Cavelier, having been told that Monsieur de Marle was going to bathe himself, ran after him, and coming to the river, saw he was drowning, he ran back to acquaint us [Margry 1886 V. 3:407].

The Frenchmen and some Indians rushed to his rescue, but it was too late. According to Joutel, after the last "duties" were performed, Marle was buried in a "little field behind the house." Joutel noted that every day the chief's wife placed a little basket of corn on Marle's grave.

Father Anastasious had a slightly different story of the tragedy. He did not keep a journal on the trip, and his story was written some years after his return to France. According to the good father, who was known to elaborate on occasion to enhance his image in performing priestly duties (Delanglez 1938),

> the Sieur de Marne [sic], in spite of all we could say, went to bathe on the evening of the 24th; the younger Sieur Cavelier accompanied him to the river side, quite near the village. De Marne sprang into the water and immediately disappeared . . . . A few hours afterward his body was recovered and brought to the chief's cabin . . . . The chief's wife herself wound him in a beautiful cloth while the young men dug the grave. . . . Our friend was interred on an eminence near the village and his tomb surrounded by a palisade, surmounted by a large cross... [Cox 1968 V. 1:250f].

The small, sad, and bedraggled party, now comprising only six persons, left on June 30 to continue their homeward journey to France. On October 9, 1688, they finally arrived back at Rochelle, where they had embarked in July 1684, looking for a brave new world.

Three years later, in November 1691, Domingo Teran was sent by the Spanish government to investigate the Cadohadacho country for the presence of Frenchmen (Hatcher 1932). He visited a Cadohadacho village and drew a map of the settlement (Figure 1). Mildred Wedel (1978:10) has shown convincingly that Teran visited the same village as the Joutel party and that this village is represented by the archeological sites of Hatchel, Mitchell and Moores in Bowie County (Figure 2). Therefore, the Teran map, drawn only four years after the visit of Joutel and his group, should show the layout of the settlement much as it was when the Frenchmen visited and Marle was buried.

The word *templo* is shown on the map near the mound, and *Cadi*, a short distance to the southeast. Teran noted that this distance was half a league or 1.33 miles, which is the distance between the Hatchel Mound site and the Eli Moores site. Near the place marked *Cadi*, there is a cross on a low rise; this is probably the cross placed at the Cadi's house by Father Massenet, who accompanied the Teran expedition. No mention was made of a cross being there when the Teran expedition arrived, making it doubtful that a cross had been placed on Marle's grave.

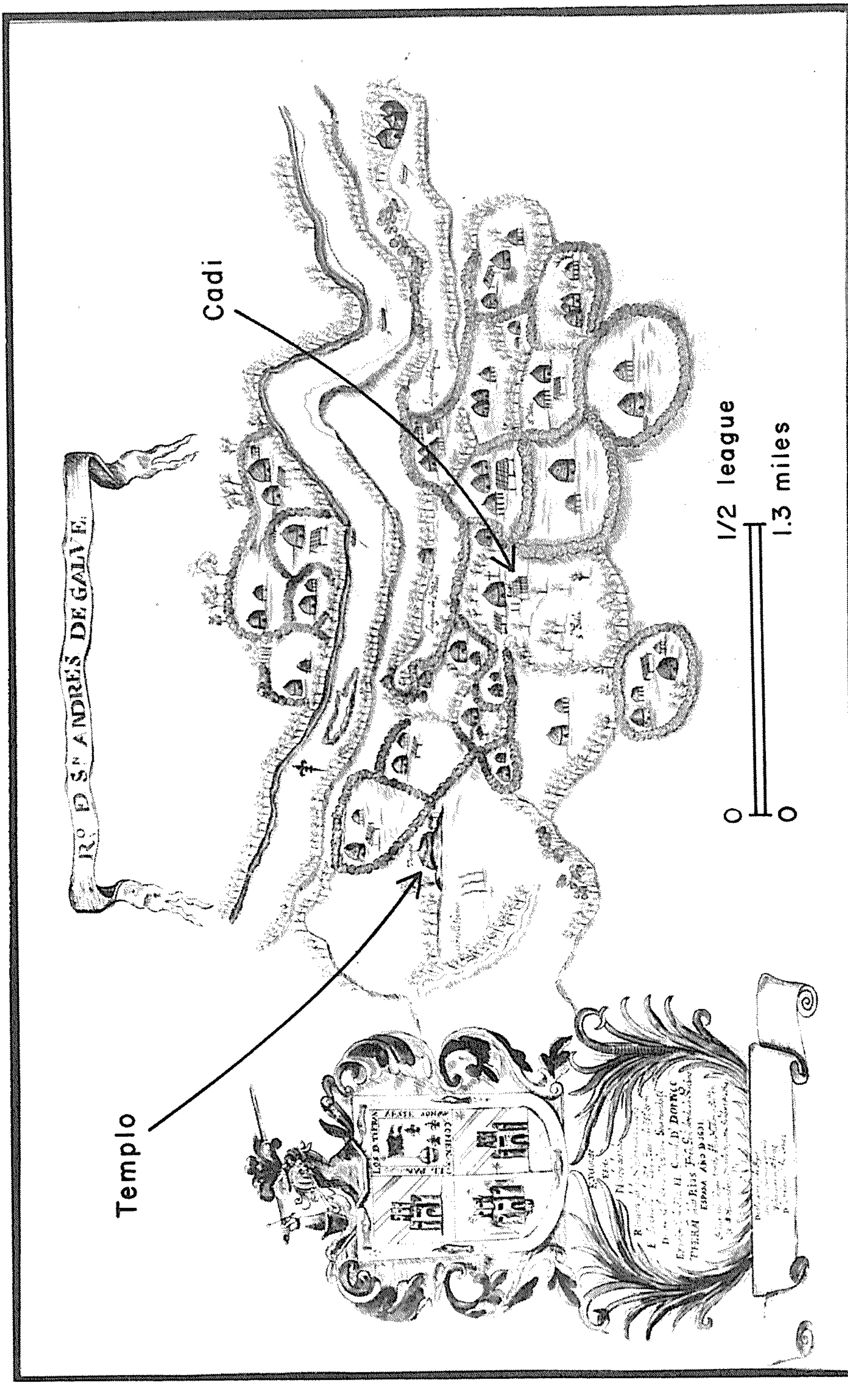

Figure 1. The Teran Expedition Map, 1691. Arrows point to the Templo and Cadi.

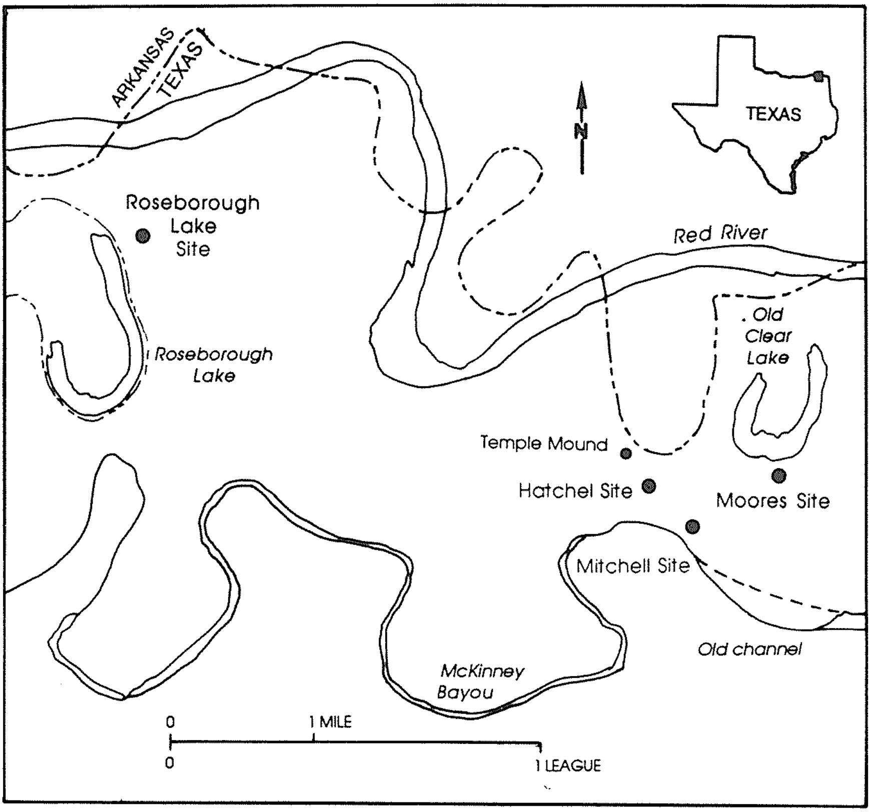

Figure 2. Map of part of Texas and Arkansas showing archeological sites in the area. Modified from U.S Geological Survey, Barkman quadrangle (U.S. Geological Survey 1950a) and Ogden quadrangle (U.S. Geological Survey 1950b).

On the Teran map, the southern boundary of the site is curved, as if it follows a creek or small river. The distance from the river where the Frenchmen waited for their hosts to carry them piggyback to a place in the village near the chief's cottage, according to Joutel, was more than a quarter of a league (more than 3500 feet). Using the approximate scale of the Teran map (half a league from the templo to the Cadi's house), it is about a quarter of a league from the river bank to the Cadi's house on the Teran map. Modern maps (U.S. Geological Survey 1950) show that it is about 4000 feet from the Eli Moores site (the location of the Cadi's house) to an old channel of McKinney Bayou (Figure 2). The stream where Joutel and his party waited for the Indians therefore must be McKinney Bayou. The Bayou must also be the stream they "passed the day before," so it is the stream where Mr. Marle went to bathe and met his demise.

Both Joutel and young Cavelier, as already noted, wanted to avenge the murders of LaSalle and the others, and they had many opportunities to do so, but

LaSalle's brother Abbe Cavelier vetoed the action. It has also been noted that Marle was forced by the assassins "to make an end" to Mornaget's life. Could young Cavelier, who was at the river with Marle, have harbored such resentment of Marle's act that he shot him, causing his death? Furthermore, could it be more than coincidence that Book 10 of Joutel's original diary, which describes this part of the experience, was lost? Delanglez (1938:18), discussing the vicissitudes that befell Joutel's diary, notes that three notebooks, among them Book 10, were lost, and other sections were mutilated. He attributes most of this destruction to the Renandot Coterie, a political group whose hero was LaSalle. A greatly abridged and edited version of Joutel's diary was published by Michel (Joutel 1962), who reconstructed Book 10 from the diary as later published by Margry (1886 V. 3) and from notes made from the original diary by DeLisle, the mapmaker. The translation of the Michel edition has been used for this investigation, as well as the account in Margry V. 3. For this purpose, they differ little, but was something omitted from these abridged accounts that would have cast a bad light on the Cavelier family?

THE ARCHEOLOGICAL EVIDENCE

The burial of the adult male (J-3, Figure 3) with two lead balls just below the left rib cage, was found by Jackson on a low rise or mound at the Eli Moores site about 20 feet southeast of a posthole pattern that he interpreted as a hut (Figure 3), but the pattern is irregular and may represent more than one house or more than one building episode. The burial is on a low rise, so it fits the descriptions of both Joutel and Father Anastasious, especially if the posthole pattern does indeed represent the Cadi's house. The case for this burial being that of Marle is strengthened further by the fact that the Teran map shows a low rise near the Cadi's house.

As already stated, the body was buried on the right side with the hands near the face; the position of the lower limbs is uncertain because they had been disturbed. The burials of all the six children were extended supine (Jackson 1932). Jackson noted that since the flexed position of the adult was unusual, a thick midden-and-ash deposit covered the grave, and there were none of the offerings usually found in aboriginal burials, the burial must date from Late Prehistoric times. A turkey bone and a crude Young point found with the burial in all probability were inclusions in fill dirt. All but one of the other six graves excavated by Jackson had burial goods.

The lead balls found with the burial were examined by Alan Jones, firearms examiner, and Patrick Besant Matthews, M.D., medical examiner, both of the Criminal Investigation Laboratory in Dallas, and Jay C. Blaine, an authority on guns, also from Dallas.

The balls weigh 194.5 g and 165 g and are about half an inch in diameter. The smaller ball is ramrod marked, and both are scarred. Jones (1986) notes that although they are small for late seventeenth or early eighteenth century muskets, they are not of the Civil War era. Blaine (1986) agrees with Jones, but adds that the size is all right for pistols of the late seventeenth or early eighteenth century. The fact that the two balls were found close together in the body cavity argues for shots

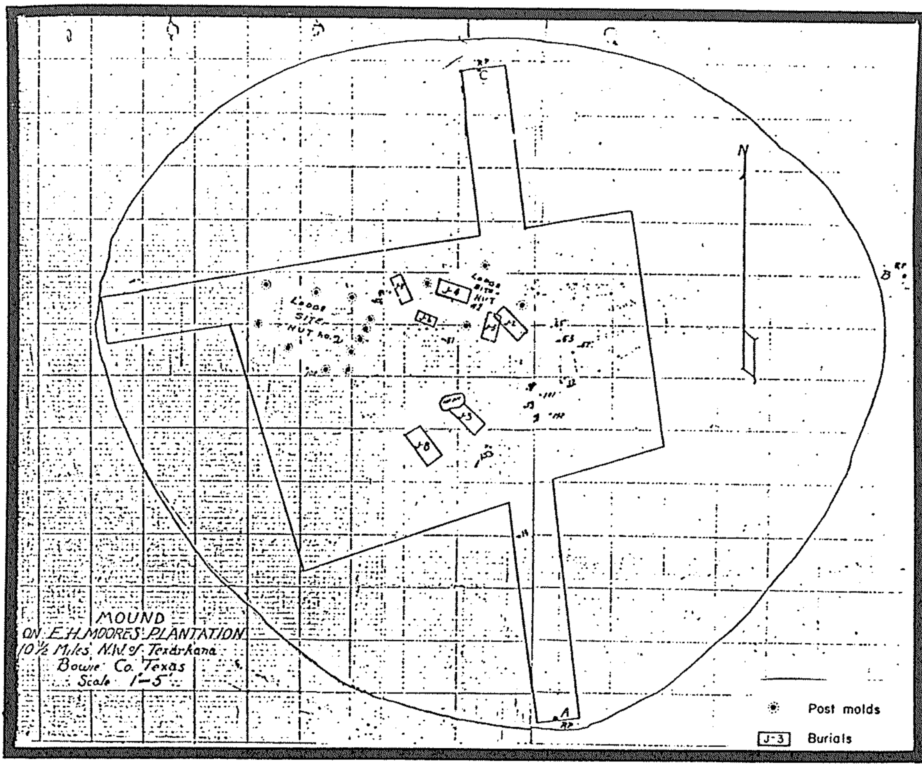

Figure 3. Modified field drawing by A. T. Jackson, showing post molds and burials; J-3 is the grave of an adult male. *(Courtesy of the Texas Archeological Research Laboratory (TARL), The University of Texas at Austin.)*

fired at fairly close range, probably from two pistols at the same time. Two balls were seldom loaded into one gun, and, according to Jay Blaine, double-barrelled guns were in only limited use at that time; nevertheless, although it is still possible, it is unlikely, in view of the positions of the balls, that the shots were fired by two persons at different times.

Being shot with these balls would not necessarily cause instant death. A person could survive for two weeks or more (Besant-Matthews 1986) if vital organs were not injured. According to Bell, Jelks, and Newcomb (1965:269), for example, one Antonio Treviño was still alive and apparently well six months after he received four bullet and two lance wounds in an attack by Indians in 1765.

Was it murder? This question can't be answered with the present evidence. Assuming that the remains are indeed those of Marle, it is true that he was shot twice, but when and where the shooting took place is unknown. Most likely he was shot by a Frenchman who was perhaps holding a pistol in each hand, since at this time of early contact, few Indians had guns, and the few Indians who had guns seldom used pistols. Marle could have been shot at the French village near Matagorda Bay before the group set out for Canada; no mention is made of such a shooting by the diarists, but, on the other hand, the diarists seldom mentioned fights or violent quarrels. Or, to indulge in wild and romantic speculation, had Marle, being a *gentleman*, (as evidenced by the title *Sieur*) survived a duel or duels in France that precipitated his joining the LaSalle Expedition? The shooting could have occurred as much as three and a half months before his death when the assassins "obliged" him "to make an end to Moranget's life." Would the murderers have resorted to such drastic means? And would Marle have been so reluctant that only by shooting him could they force him to do the deed? The murderers were a bloodthirsty lot indeed, but was Marle that courageous?

Finally, was it drowning in the river near the Indian village that caused Marle's death? Joutel had a case of pistols, but it seems most unlikely that he would have risked the success of the rescue mission he was part of (getting help for the beleaguered colony) by shooting one of its prime members. It is also unlikely that young Cavelier shot Marle; however, youths are impetuous and seldom consider consequences. But is it mere coincidence that the original of Joutel's diary for this part of the trip is missing? The question of murder remains unanswered. This time the body was found, but the crime was missing.

In summary, the following evidence indicates that the skeletal remains containing two lead balls excavated in 1932 by A. T. Jackson have a high probability of being the remains of Sieur de Marle, a member of LaSalle's colony established in 1685 near Matagorda Bay, Texas.

1. Marle was among the Frenchmen of the LaSalle Expedition who were headed to France by the way of Canada.

2. Marle died on June 24, 1687 and was buried at a village on a small rise near the Cadi's house.

3. A map of this village drawn four years later by the Teran Expedition shows the Cadi's house and a rise nearby.

4. This village survives as the Hatchel, Mitchell, and Moores archeological sites in Bowie County, Texas; the temple was on the Hatchel Mound and the Cadi's house was on the Moores site.

5. The distance from the temple to the Cadi's house on the Teran map coincides with the distance from the Hatchel Mound to the Eli Moores site (US Geological Survey 1:24,000, Barkman and Ogden 7.5 minute quadrangles).

6. The distance from the Cadi's house to the stream where Marle went to bathe coincides with the distance from the Eli Moores site to McKinney Bayou (US Geological Survey 1:24,000, Barkman and Ogden quadrangles).

7. Skeletal remains of an adult male were found on a low rise near a posthole pattern at the Eli Moores site.

8. The lead balls found with the remains could date to the late seventeenth century, which is contemporaneous with LaSalle's colony.

9. Skeletal evidence indicates that the remains have a very low probability of being Indian. The analysis of the remains that leads to this conclusion follows.

Skeletal Analysis of Individual 571-A, (J-3)

H. Gill-King

A positive identification made from skeletal remains ordinarily requires that known unique features, or unique combinations of features from a suspected match be noted in the sample at hand. The challenge in this instance lies partly in the fact that no details except for gender and implied good health or robustness are available for the Sieur de Marle. Evidence that the burial feature known as J-3 (Goldstein 1940) is indeed that of Mr. Marle must be considered circumstantial, and this circumstantial evidence is marred by the curious fates of the various diaries that describe the events laid forth by Gilmore above. If it can be demonstrated beyond reasonable doubt that the remains known as individual 571-A are those of an adult male European, the likelihood that this person was in fact Mr. Marle increases considerably.

A limitation imposed upon the investigation is the absence of the cranium and mandible from the set of remains conserved at The Texas Archeological Research Laboratory (TARL), The University of Texas at Austin. Available for analysis were (1) three half-scale photographs taken in standard anatomical views (Figures 4, 5, 6); (2) two cranial data forms prepared by Marcus S. Goldstein in 1940 and revised and expanded by William R. Maples in 1962 (Figure 7), and (3) the fragmentary postcranial remains of individual 571-A (conserved at TARL).

Goldstein's and Maples's observations of cranium 571-A include 26 standard measurements, five indices, annotations on the dentition and pathology, and comments on the three standard views of the skull. Fortunately, detailed craniometric analysis was a prominent feature of the physical anthropology of the era, and Goldstein, and later Maples, were two of the best practitioners.

DETERMINATION OF SEX

Goldstein assigns the remains to the male sex on the basis of "large mastoid processes, robustness and angulation of the jaw, and notable occipital crest." To this might be added the observation that the zygomatic arch or cheek bone inserts into the skull well behind the ear hole. Although Goldstein's notes on the postcranial materials, if they exist, have not been discovered, his diagnosis of sex can be supported by an iliac crest fragment with prominent gluteal muscle insertions. The proximal phalanx of the right thumb shows roughened adductor muscle insertions signifying a strong grip, and all four of the proximal phalanges recovered have prominent crests where flexor muscles insert. A large and roughened xiphiod process extends from the sternum (breast bone). This pattern of robustness generally persists throughout the postcranial remains (Stewart 1979:88).

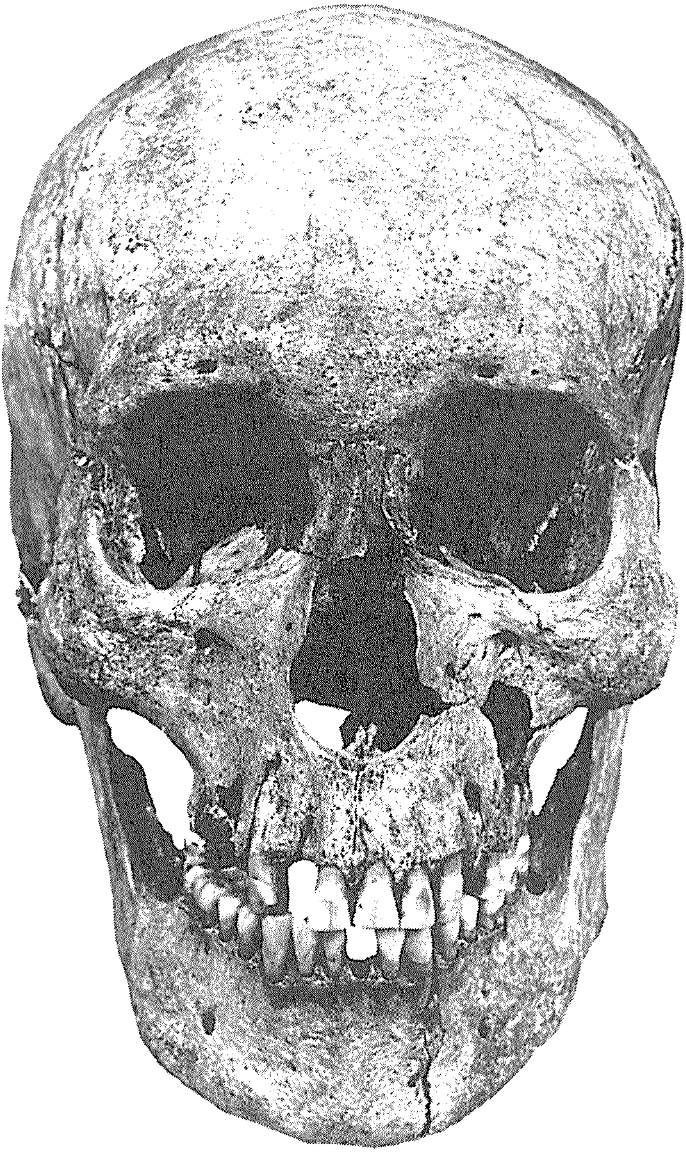

Figure 4. Front view of the cranium of burial 571 (J-3). Reproduction of half-scale photograph made in 1940 by Marcus S. Goldstein. *(Courtesy of (TARL, The University of Texas at Austin.)*

Figure 5. Side view of the cranium of burial 571 (J-3). Reproduction of half-scale photograph made in 1940 by Marcus S. Goldstein. *(Courtesy of TARL ,The University of Texas at Austin.)*

Figure 6. Top view of the cranium of burial 571 (J-3). Reproduction of half-scale photograph made in 1940 by Marcus S. Goldstein. *(Courtesy of TARL The University of Texas at Austin.)*

AGE AT DEATH

The overall picture is of a muscular male of middle years, perhaps between 40 and 50 at death. Goldstein assigned an age of "circa 40 yrs" (Figure 7), based upon the degree of dental wear and obliterated "basilar" skull structure (spheno-occipital synchondrosis), which is an indication of age beyond about 35 years in modern populations (Krogman and Iscan 1986:111). Maples later revised this estimate to 45 years (Figure 7); the second estimate may be a more realistic one, but it is impossible to specify age so closely without making many assumptions about the history of the subjects's life activity.

Osteoarthritic lipping and severe wear that extend into the cervical (neck) vertebrae, suggest an age of somewhat beyond 40 years (Stewart 1958:140–156). The left humerus (upper arm) is broken open proximally, revealing a medullary cone that has advanced almost to the surgical neck, suggesting an age of perhaps 50 years (Acsadi and Nemeskeri 1970:124–125).

RACE: THE CENTRAL ISSUE

American Indians are considerably more generalized Mongoloids than are modern Asians, and consequently may share several craniofacial characteristics with European Caucasians (Newman 1953:311–13). During the original excavation of this skeleton, A.T. Jackson had no reason to question the racial affinity of individual 571-A (then known as Burial J-3), and Goldstein, in his detailed cranial observations, made no comment on the race of this individual. Perhaps it is significant that the space on the cranial data sheet labelled *tribe* was left blank. Did Goldstein muse upon the dolichocranic (long headed) proportions of this skull with the knowledge that most Caddo were mesocranic (round headed)? Whatever doubts he may have had, another 22 years passed before the development of discriminant function techniques that could resolve such issues with reasonable reliability. Our *downstream* position in time now affords us the opportunity to apply these techniques to the remains in question.

Two techniques are commonly used for the statistical discrimination of Anglo vs. American Indian crania; the technique of Giles and Elliot (1962) and another developed by Gill (1979) that is particularly useful in the northwestern Plains of the United States. Because Gill's method requires measurements that were not recorded for the now missing skull, only the Giles-Elliot (G-E) technique could be applied to this individual. It is likely that this method would have proved more useful in any event because of greater similarity of the Caddo to the archeological population (Indian Knoll) upon which the technique was developed; Stewart assigns an accuracy of 93–95 percent to this technique. A lower estimate of usefulness, 86 percent, has been given by Birkby (1966:22). Using Goldstein's original measurements and Maples's revisions, the Giles-Elliot discriminant function was calculated to be 18.1, which falls within the Anglo range (i. e., less that 22.3).

Anthropology Museum—The University of Texas

CRANIAL MEASUREMENTS AND INDICES

Catalogue No. 571 Locality Moore Farm, nr. Texarkana, Bowie Co. Stored Maples

Sex ♂ Tribe .... Observer M. Goldstein Date June 18, 1940

Condition of Skull Good Age 45

Deformation: yes Occipital .... Frontal sl Lamboid n: mod: Front-occipt .... Other ....

1. Cranial Capacity	(190)	26. Palate Height	1C 7 9.8	51. Head Condyle	20 r.
2. Maximum Length	140	27. Auriculo-Nasion	122 110	52. Mand. Ht. M1-M2	35 34 r.
3. Maximum Breadth	143	28. Auriculo-Prosthion	136 113	53. "	35 34 l.
4. Basion-Bregma Ht.	120	29. Auriculo-Infradentale	108 103	54. Width Nasals upper	11
5. Auricular Head Ht. Porion	2-6	30. Auriculo-Subnasale	139 126	55. Porion-F.H. Ht.	122
6. Left Parietal Thickness	94	31. Auriculo-Menton	42	56. Nasion Gonion	131
7. Minimum Frontal	~~120~~	32. Height of Symphysis	84 94	57. (B-B) — (P-B)	23
8. Bizygomatic	126	33. Gonion-Menton: R	84 96	58.	
9. Bicondylar		34. L	101 ~~63~~	59.	
10. Nasion-Menton	83	35. Bigonial	59 63	60.	
11. Nasion-Prosthion	59	36. Ht. Ascending Ramus: L	r. 35 l. 35	61.	
12. Nose: Height	24	37. Minim. Ramus Width	r. 316 l. 316	62.	
13. Width	r. 20	38. Mandible Thick bet. M1-2	l. 131 r. 131	63.	
14. Interorbital Breadth		39. Angle of Lower Jaw		64.	
15. ~~Depth of Nasal Root~~		40. Facial Angle		65.	
16. ~~Ht. Nasal~~ Bridge	106	41. Alveolar Angle	(73.7)	66.	
17. Basion-Prosthion	97	42. Cranial Index	(86.6)	67.	
18. Basion-Subnasale	110	43. mean ~~Length~~-Height Index	157.7	68.	
19. Basion-Nasion	36	44. Cranial Module		Comments:	
20. Orbital Height: L	—	45. Total Face Index			
21. R	43	46. Upper Face Index	40.7		
22. Orbital Width: L	—	47. Nasal Index	83.7		
23. R	—	48. Orbital Index (r + l)			
24. Palate Breadth	—	49. Palate Index			
25. Palate Length		50.			

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CRANIAL OBSERVATIONS

Catalogue No. 571

NOTATION: The standard of comparison is the typical adult North European male cranium. Use the following notations: ? = not observable; 0 = absent; + = present; 1 = trace, very small, very poor, very few, very slight, etc.; 2 = small, poor, few, slight, etc.; 3 = medium, fair, several; 4 = large, many, good, pronounced; 5 = very large, very many, excellent, very pronounced. Qualitative designations (*e.g.*, oblong, flat, etc.) are to be underlined. In combinations of number and size, number comes first, then size.

NORMA VERTICALIS

Cranial Contour:
ellipse, ovoid, pent. sphen., rhomb., sphere
Coronal Suture:
serration simple
synostosis sl
wormian bones 0
Sagittal Suture:
serration —
synostosis comp
wormian bones 0
Metopism 1
complete, nas.-glab.
Parietal Bosses sl
Parietal Elevat.

NORMA LATERALIS

Pterion Form:
right: H, K, X, I mod
left: H, K, X, I mod
Malars med
Nasal Spine
Auditory Exostoses:
right 0
left 0
Prognathism sl

NORMA FACIALIS

Glabella med
Supraorbital Region:
mesial ½ orbit med
mesial ⅔ orbit
complete torus
Nose:
root depression mod
bridge arch mod
Nasal Aperture:
ovoid, orbic., triang. 0
Nasal Sills
Nasal Spine
Supraorbital: r. F. + N.
notch, foramen l. F. + N.
Vault: flat, keeled, ridged sl
Orbits: square, oblong, ellipse, rhomb., round
Suborbital Fossae sl

NORMA BASILARIS

Basilar Suture:
synostosis comp
Petrous Depress.
Foramen Lac.
Med. —
Palate Torus —

NORMA BASLARIS (c't'd)

Palate Form:
parab., hyperbol., elliptical, U-shape —
Glenoid Fossae:
depth deep
art. eminent Prom.
p. g. process —
Styloid, size —
Mastoids, size Large

NORMA OCCIPITALIS

Lambdoid Suture:
serration mod
synostosis sl
wormian bones 00
Inca
complete, incomplete
Inion 1

MANDIBLE

Gonion:
everted, neutral, inverted
Chin round
Genial Spines mod
Mylo-hyoid ridge sl
Size Large

OTHER OBSERVATIONS

Parietal Foramina
r. one, Pp.
l. one, Pp.
Tympanic thick
" Dehis. —
" Perf. —
Orbit Border — dull
Zygomas " — sharp
Nasals Form — 3
Palate Depth — med.
Forehead Slope — mod.
" Ht. —
Occipit Crest — n. mod
" Form — convex
Temporal — med.
Sigmoid — med.
Ment. Prom. — med.
Orbit Inclin. — mod.
Mand. Torus — 0
Max. " — 0

Pathology: 0

Muscularity: mod

Comments: U For. large, r + l. Very large mental foramina

DENTITION

Dental Age IV
Occlusion (see code) nas. neg. — sl. overbite
Retained Deciduous 0

Molar Wear med
Shovel-shaped Incisors R — — — — L

Tooth:
Lost in life = X
Not erupted = N
Congenital absence = C
Carious: a = apical
g = gingival
I = interdent

[5] distal, large
[6] large
[7] abscess, buccal
[8] mesial, mod.

Molar Cusps: No. and Pattern

R — — — | — — — L
— +4 — | — — —

[1] distal, small
[2] large; also abscess buccal.
[3] mod.
[4] whole crown gone; abscess buccal

R	+	+	X[7]	I[8]	a[5]	a[6]	X	+	+	+	I[1]	a[4]	+	I[5]	+	+	L
	0	a[3]	+	+	+	+	+	+	0	+	+	+	I[1]	+	+	a[2]	

Figure 7. Cranial data forms prepared by Goldstein in 1940 and revised by Maples in 1962 *(Courtesy of TARL, The University of Texas at Austin.)*

Also revealing are three indices computed from intact limb segments and the left clavicle; the brachial, platymetric, and claviculo-humeral indices, together with the Giles-Elliot result, were completed for individual 571-A and various historic Europeans populations (Table 1).

Table 1. Measurements and Indices Used to Distinguish American Indian and European Skeletons.

Measurement/Index	571-A	Control	Amerindian
Giles-Elliot	18.1	W<22.4	A>22.4
Brachial [1]	74.6	75.5 [a]	78.2 [b]
Platymeric [2]	88.3	85.0 [c]	74.0 [d]
Claviculo-humeral [3]	44.1	47.0	49.0 [b]

[1] Radius length/humerus length
[2] Subtrochanteric anterior diameter/transverse diameter for femur
[3] Clavicle length/humerus length on same side
[a, b] Krogman and Iscan 1986:294-95
[c] Brothwell 1965:91
[d] Bass 1986:214

Goldstein noted a 95 percent incidence of shovelled incisors and a 4.5 percent incidence of trace shovelling in the central incisors of Texas Indians of this period and region (Goldstein 1948:71–82). This observation stands in sharp contrast against the data for 571-A, which explicitly indicates no shovelling or trace shovelling (Figure 7); Maples did not change or add to this observation in 1962.

Since dental and craniofacial structures are genetically independent in their development (Ranly 1980:112–113), the statistical likelihood of discovering a particular Giles-Elliot value in combination with shovelling (or nonshovelling) in the same individual is equal to the product of the independent chances of having either. From the null-hypothesis perspective, one might ask "what are the chances of a Caddo having a Giles-Elliot value below 22.4 and no shovelling?" Since the minimum reliability of the G-E function is 86 percent, and the likelihood of a Caddo having shovelling is about 95 percent, the issue may be restated as follows: The chance of a Caddo having a G-E value above 22.4 is *about* 14 percent, and the chance of a Caddo being *without* shovelling is about 5 percent. Therefore, the chance of a Caddo having this combination of characteristics is 5 percent times 14 percent, or 0.7 percent (or less if trace shovelling is counted). Goldstein also notes a slight overbite in his analysis of 571-A, a departure from the typical edge-to-edge bite expected in American Indians of the region.

A separate line of reasoning based upon presumed dietary differences between seventeenth century Europeans and their Caddo contemporaries was also pursued.

Katzenberg and Krouse (1987:156) demonstrated the use of stable isotope ratios of ^{12}C and ^{13}C and ^{15}N and ^{14}N to identify population membership in forensic contexts. Because stable isotope data for late prehistoric and early historic Caddo of the northeast Texas area were available, it seemed useful to compare these data with isotopic data on individual 571-A (Figure 8). These data indicate that individual 571-A differs appreciably from the Caddo samples by having had a diet that was not only more varied but also richer in condensed (animal/marine) protein sources (Kruger and Sullivan 1984:219–220).

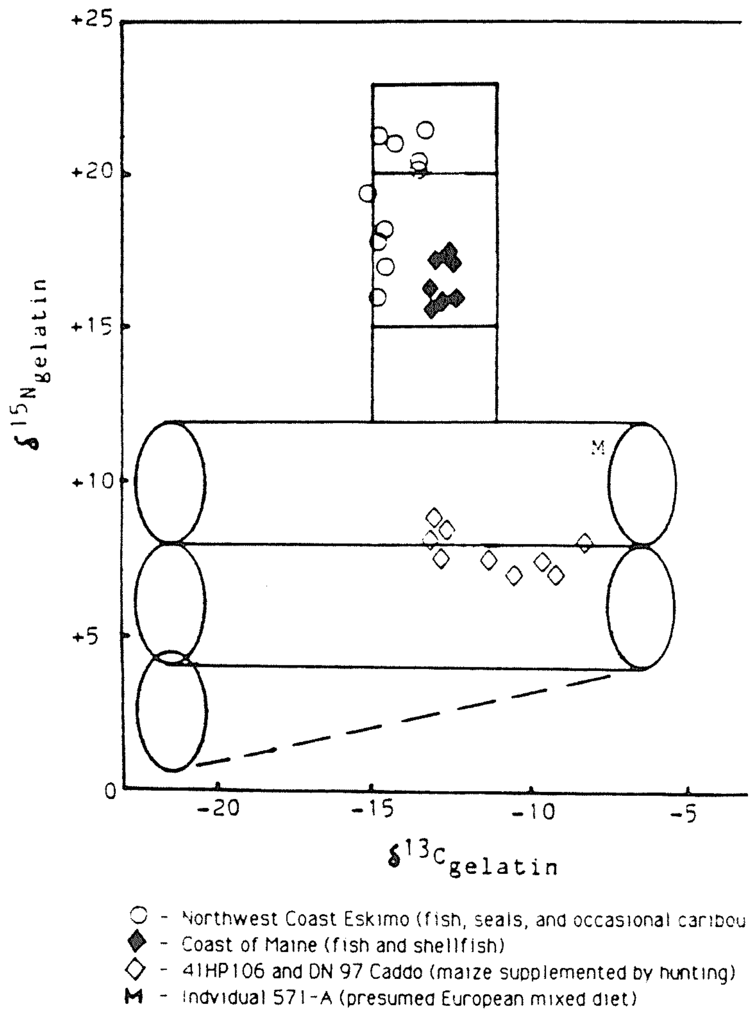

Figure 8. Isotopic profile of individual 571-A compared to profiles of groups with known diets.

Such findings are by themselves inconclusive, but they round out the picture developed from dental, morphological, and metric observation.

THE LIVING APPEARANCE OF THE INDIVIDUAL

Standard procedure in determining individual identity from skeletal remains begs an attempt to describe how the person might have looked near the time of death. This involves assessment of sex, age, race, stature, some estimate of general physique, and, where feasible, any probable abnormality of posture or gait and any pathology that might have been noticeable in life. In this case, the observations are summarized in the hope that a more thorough description of the suspected match, de Marle, from personal accounts, diaries of others, ship's rosters, or other historiographic sources that may become available to researchers in the future. These observations are divided into (1) characteristics that would have been evident in the appearance or possibly in mechanical functioning of the living subject and (2) cryptic traits revealed only in the skeleton (Table 2).

Table 2. Observations of Skeleton 571-A

Traits Possibly Noticeable in Life	Cryptic (Skeletal) Traits
1.Inflammatory bone reaction left fronto-temporal	1.Fracture of proximal left. humerus
2.Pronounced left deviation of xiphod process\ (visible in posture).	2.Schmorl's nodes T-21>L1[a]
3.Missing right upper second incisor	3. Left sided compression of two thoracic vertebrae
4.Stature, (from left humerus) is 17 1.5 cm $\neq$ 3.9cm (Trotter and Gleser 1977:355–56)	4.Herniated centrum (T-4?)
	5.Prominent insertions on flexor surfaces

[a] Ortner and Putschar 1986:331

Although it is impossible to know with certainty, it is likely that the extensive osteoarthritic condition of the spine, together with the compressions and herniation noted, imposed some limitations on the flexibility of the upper body and suggests some degree of right-sided scoliosis. These observations merge into an impression of a robust male European of late middle years whose skeleton belies a history of rigorous upper body effort of a bending/lifting nature. The fracture noted on the proximal left humerus and the inflammatory bone reaction on the temporal region of the same side may have occured as part of a single, massive traumatic event.

CAUSE AND MANNER OF DEATH

The central position of the two lead projectiles in the region of the diaphragm suggests that gunshot was the cause of death. Neither of the soft lead pellets is damaged beyond indentations that represent primer signatures, whereas, had either pellet struck a rib or a vertebra, it is likely that more damage to these soft lead projectiles would be evident. About 40 to 50 percent of the linear surface of the ribs was recovered, and these fragments give no indication of ballistic damage. The foregoing suggests that the projectiles entered through the soft tissues of the anterior abdomen.

The events and circumstances immediately surrounding the demise of a person are know as the *manner* of death. Here, few inferences are possible. As already stated, it is reasonable to conclude that two pistols were used to shoot the subject, since neither ball had the *contact* or *impact facet* often seen when pistols of that day were loaded with more than one pellet. Yet, if we are to assume that two pistols were used, we must decide whether one or two assailants were involved. The close placement of the two shots could be interpreted equally well as good marksmanship by two parties or by one. In either case, the victim was in all likelihood shot at close range and from the front. Does all this mean that individual 571-A allowed his murderer to move within close range, and, if so, what can be made of it? Here the issue of manner of death must remain unclear.

SUMMARY

The remains analyzed here were brought to the writer's attention by Gilmore because of their unusual disposition and by the high probability that the grave from which they came was that of one Sieur de Marle. The skeleton in question is, with little doubt, that of a European male of late midlife. Why was this adult individual laid out in a flexed position, which was inconsistent with the local practice, in a children's burial plot? Was the interment a deliberate attempt to obscure the circumstances of death or a practical solution dictated by circumstances? Whether the findings described represent vengeful premeditation or rage at a moment of opportunity may never be known. Yet it is hoped that this analysis provides a basis for comparison against whatever biographical or historic data concerning Mr. Marle may emerge in time.

ACKNOWLEDGMENTS

We thank all who have been interested in this problem, those who reviewed the manuscript and offered suggestions, and especially those who had a solution to the "crime"—all too numerous to list. We are also grateful for the detailed records left by all who have examined the osteological remains and for the cooperation of the Texas Archeological Research Laboratory of The University of Texas at Austin and the Southwestern Institute of Forensic Sciences in Dallas.

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An Examination and Appraisal of Malakoff Heads No. 1 and No. 3

Thomas H. Guderjan

ABSTRACT

The three boulders known as the Malakoff Heads, found more than 50 years ago in gravel quarries, were thought by several professional people to be the work of Pleistocene man, but intensive archeological work has turned up no new evidence of related materials. Indeed, careful and detailed examination of the heads by the author leads to the conclusion that none of the three heads is the work of early man.

INTRODUCTION

The Malakoff Heads, also called Malakoff Man, have been enigmatic since their discovery more than 50 years ago. These three boulders were found in gravel quarries near Malakoff, in Henderson County, Texas, along Cedar Creek in the Trinity River Basin. Interpretations of the carved anthropomorphic images have ranged from evidence of pre-Clovis man to outright frauds. Though the finds could well have faded into the obscurity of a small footnote to archeology, claims that they are authentic persist in nonprofessional journals (Agogino 1987) and in Texas newspapers (Greene 1986).

History and Context of the Finds

The first of the three Malakoff Heads was found on November 2, 1929, by workers in Pit No. 1 of the Texas Clay Products Co.'s quarries 8 km (5 miles) from Malakoff. On November 4, 1929, Head No. 1 was moved to the company's offices in Malakoff. Five days later it was reported to E. H. Sellards at the University of Texas, who visited the site on November 26, 1929 (*Athens Daily Review* 1967). Sellards was apparently convinced of the authenticity of the find and prepared an article for *American Antiquity* that he later withdrew, expecting that more and better evidence would soon surface (Sellards 1941). Sellards determined that Head No. 1 had come from an Eocene formation underlying the 50,000-to-100,000-year-old Trinity gravels (*Athens Weekly Review* 1930). Since the head was friable, a gum arabic solution was used to arrest its decay on January 4, 1930.

Malakoff Head No. 1 is a calcareous, ferruginous sandstone concretion measuring 41 by 36 cm and weighing 44.5 kg (Sellards 1941). Head No. 1 is the most distinct of the three, with the eyes, ears, mouth, nose, and eyebrows of a human carved in the stone (Figure 1).

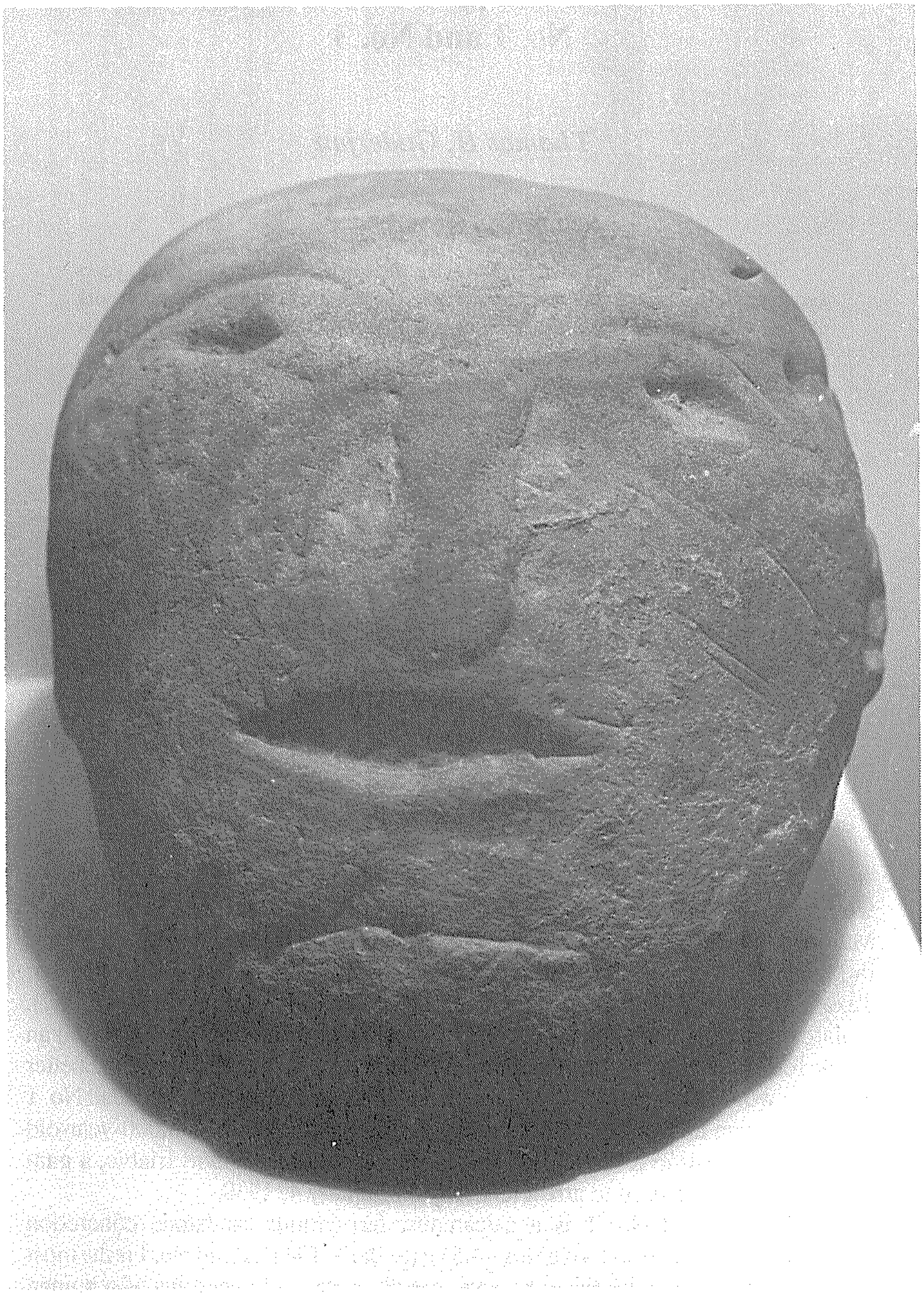

Figure 1. Malakoff Head No. 1. *(Courtesy of the Texas Memorial Museum.)*

As Sellards expected, a second head was found in September 1935 in Texas Clay Products Pit No. 2, very near the first find. Head No. 2 measures 38 by 31 cm and weighs 28 kg. This image is not as distinct, since it has only carved eyes and mouth (Figure 2). Head No. 2 was also found by workmen and reported to Sellards, who believed it too was authentic.

Excavations of the Works Progress Administration (WPA) were then undertaken by Glen Evans, of the University of Texas, from April to August 1938 and by George Shafer from May 1939 to July 1940. In November 1939 Head No. 3 was found in situ at Texas Clay Products Pit No. 1 at a depth of 6.5 meters. This boulder has a 51-cm diameter and weighs 61 kg (Figure 3). However, no cultural remains were found either in association with or in the vicinity of the boulder. Despite the extremely crude appearance of Head No. 3, Sellards was still again convinced that it was the work of prehistoric man (1941).

Contrary to newspaper reports, Sellards did not specify a date for the finds. However, based upon his analysis of the terraces and fauna from the excavations, he placed the gravels in the Pleistocene (1941). The redating of the Trinity River terraces to the Late Pleistocene or Quaternary (Slaughter 1962), has led some archeologists to consider that a Paleoindian date for the heads is feasible (Parker Nunley, personal communication).

Other Similar Finds

Since 1935, no new evidence for related materials has come from the Malakoff region, despite intensive archeological work (Story 1965; Richner and Lee 1977; Richner and Bagot 1978; Guderjan 1981). However, a smaller carved stone effigy is in the possession of Mary Ann Perryman, of Athens, Texas (personal communication). It has not been examined, but judging from her oral descriptions, this head is no more than an ecofact. Although no other confirming evidence has been found in the region, several similar finds have been reported from other areas.

In 1987, a human effigy was brought to the attention of Larry Pete at San Jacinto College South by Bebe Morgan; it had been found near Cross Plains in Callahan County and was purportedly given to her uncle by an "old Indian" who originally found it. This sandstone sculpture is much smaller than the Malakoff Heads. It measures 30 by 18 cm and weighs 10 kg (Larry Pete and Bebe Morgan, personal communications). The Morgan Head has Negroid features that are much more distinct than those of the Malakoff Heads.

Although both are carved human effigies, no relationship is assumed between the Morgan and Malakoff heads. However, A. C. Greene reported that "in 1928 what was termed 'a finely sculptured sandstone head, wearing a conical shaped cap' was found near a gravel pit south of Cross Plains in Callahan County, the head having similarly shaped eyes [to a Xipe-Toltec figurine] and a patina indicating 'some age'" (Greene 1986). Both of the Callahan County heads seem to bear a general relationship to Olmec heads from Veracruz.

Figure 2. Malakoff Head No. 2. *(Courtesy of the Texas Memorial Museum.)*

Figure 3. Malakoff Head No. 3. *(Courtesy of the Texas Memorial Museum.)*

George Agogino reports that two other carved effigies have been found in South Texas and northern Mexico. One, which he states is quite similar to Malakoff Head No. 1—weighing 41 kg, and measuring 31 cm across—was found during dredging of the Rio Grande floodplain in 1963 (Agogino 1987). Another was found in 1965, 30 km south of Juarez, Mexico, from a "deep earth deposit" (Agogino 1987). This one was smaller, only 36 by 33 cm and weighed 14 kg.

Supporters and Detractors

Opinions regarding the validity of Malakoff Man vary greatly. Sellards believed them to be evidence of Pleistocene Man (1941), but it must be remembered how different from now the view of early Americans was at that time. Only recently had the Folsom site been authenticated, and the concept of great antiquity for American Indians was being validated. Yet, Slaughter's restudy of the Trinity terraces has led some to believe that Malakoff Man may be related to early Paleoindians. Agogino considers the heads "pale copies" of the Olmec heads and places them in the Archaic period (1987). Glen Evans, who interviewed the discoverers of Heads No. 1 and 2, was convinced of the authenticity and antiquity (Story 1960:176).

Recent investigators in the Cedar Creek-Trinity River region have been less positive. Jeff Richner chose simply to avoid discussing the topic (Richner and Lee 1977; Richner and Bargot 1978), and this author once termed Malakoff Man " a likely fraud," though he had not yet examined the actual heads (Guderjan 1981). Dee Ann Story has recently taken the most diplomatic of all approaches, saying that it "remains a matter of opinion" (MS, 5-52), but she clearly doubts that Head No. 3 is man-made (MS, 5-51).

AN EXAMINATION AND APPRAISAL OF HEADS NO. 1 and.3

The issues raised in evaluating the authenticity of Malakoff Man are clear. First, are the heads man-made? Second, if so, then by whom and when? Finally, if they are authentic, then what meaning do they have? There is a consensus that Heads No. 1 and 2 are indeed man-made, so the first concern in these cases may be considered to be satisfied. Head No. 3, however, is not nearly as well accepted.

In May 1989, this author was able to examine the Malakoff Heads No. 1 and 3 at the Texas Memorial Museum. Head No. 2 is stored in Corsicana, Texas and was not examined.

Head No. 1

Malakoff Head No. 1 was examined to determine whether evidence existed regarding the technology used in its manufacture. Several facts indicate that it was quite recently made with modern metal tools. First, the nose was formed by abrading the areas on both sides. The nose is much more heavily oxidized than are either of the sides, where very little oxidation has occurred. This lack of oxidation is an indication that the abrading was done fairly recently.

The eyes, mouth, and ears of Head No. 1 were made by chiseling into the sandstone with a very thin, sharp, hard object that was then twisted to remove material from the stone, but it is unlikely that a stone or bone tool could have been used repeatedly as a gouge in this manner without shattering. In the left eye there are two marks of a pointed gouge used this way, in the mouth there are 10 to 13, in the right eye there is one, and, more importantly, there is also a rectangular gouge mark in the left eye that measures nine thirty-seconds by five thirty-seconds of an inch (Figure 4), only one thirty-second of an inch larger than a common quarter-inch steel chisel. Furthermore, the left eye has been stained darker than the surrounding oxidized surface in an apparent attempt to disguise the work of the modern maker. The only conclusion that can be reasonably drawn from this examination is that Head No. 1 was made with metal tools, probably at the time of its discovery. This author can only conclude that Head No. 1 is a forgery.

Figure 4. Macrophotograph of left eye of Head No. 1, showing gouge marks from a metal tool.

Head No. 3

There are several indications that Head No. 3 is not man-made. In fact, only two areas of Head No. 3—the mouth and right eye—are potentially man-made. In the mouth area there are vague marks that may have been made by a back-and-forth cutting action, but calcareous material has formed in the eye, and, further, sedimentary quartzite crystals or some type of similar deposits have formed in a crack in the eye and are large enough that they protrude into the eye. Since Head No. 3 was found in a gravel deposit rather than its original geologic context, it is highly improbable that these crystalline deposits formed since any reasonable (Quaternary) time of possible human manufacture. Further, a clear shovel mark has produced a spall, which has not oxidized, but extends to the eye. All of this indicates that Head No. 3 is not chemically active in its present state and that there is little likelihood of rapid crystalline formation in the past. It is more likely that the quartzite crystals formed within the rock in its original geological context (some bed of cemented ferruginous sandstone) and that the "eye" is the result of natural erosion around the crystals.

In the light of the extreme crudeness of this specimen, it is quite unlikely that it ever would have been considered man-made had it not been for the tantalizing possibilities offered by the first two specimens. The almost irrefutable evidence—presented by the crystalline deposit—of the very great antiquity of the mark that has been called an eye, Head No. 3 can be assessed only as an ecofact without any archeological meaning.

SUMMARY

Despite subsequent finds similar to the Malakoff Heads, no other confirming evidence for their authenticity has been found in the Cedar Creek-Trinity River area where they were found. The only possible exception is the Perryman specimen, which has not been examined. The case for authenticity of the Heads has rested upon their clearly man-made nature and faith in the information given by the "discoverers" of the Heads No. 1 and 2.

The case for the provenience of Head No. 3 is strong, considering the well-controlled circumstances of its discovery. However, it is almost certainly an ecofact without archaeological significance. The case against the great antiquity that has been claimed for Head No. 1 is as strong. The use of metal tools in the English system of measurement indicates small likelihood that Head No. 1 predates November 1929.

ACKNOWLEDGMENTS

Elaine Sullivan, of the Texas Memorial Museum, facilitated and joined in the examination and photography of Malakoff Heads No. 1 and 3. A. C. Greene, Roberta McGregor, Bebe Morgan, Mary Ann Perryman, Larry Pete, and Dee Ann Story graciously shared information with the author.

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Book Review

FROM MOUNTAIN PEAKS TO ALLIGATOR STOMACHS: A Review of Lithic Sources in the Trans-Mississippi South, the Southern Plains, and Adjacent Southwest. By Larry D. Banks. Oklahoma Anthropological Society, Memoir 4. Norman, Oklahoma. vi + 179 pp., 84 figures, and 13 plates. $25.00.

This memoir is the long-awaited compendium of Larry Banks's widely recognized knowledge about the kinds and sources of raw material for stone tools in the south-central United States. It was originally intended to be published as part of the 14-volume series of overviews covering the cultural resources in the districts comprising the Southwestern Division of the Corps of Engineers (all of Oklahoma, Texas, and New Mexico, and most of Arkansas and Louisiana, as well as bits of Missouri, Kansas, and Colorado); however, funding constraints stalled that effort. The Oklahoma Anthropological Society deserves considerable credit for undertaking its publication.

This reviewer approached the volume with the anticipation of a flint knapper sizing up an exceptionally fine nodule of chert. Unfortunately, like a hapless knapper, as I began to chip away at it, I was disappointed to find many flaws and feared that the piece might not be salvageable; however, as I persevered, the flaws paled and the merits were revealed.

The reader will find many distracting but not insurmountable defects, primarily of an editorial nature, such as "quarries generally do not usually contain diagnostic artifacts" (p. 5), and "analytical analyses are not available" (p. 31). Lack of verb and subject agreement is common, and there are some spelling errors; For example, *d*iapheneity is misspelled in the glossary (p. 150). Most disheartening is the quality of the color plates that are intended to overcome the severe limitations of words in describing the subtle mixes of color, color pattern, luster, and texture that distinguish one chert from another. Well-known cherts are barely recognizable in some of the plates; for example, the Alibates chert in Plates 9 and 10 looks dull and lacks almost completely the reds and purples that are so characteristic of the Alibates material. But my advice is to pass over the flaws and read on—there is much to be gained.

Banks's discussion covers chert and other chippable stones as well as selected rocks and minerals used aboriginally in the manufacture of pecked/ground/polished artifacts. In all cases, rocks and minerals and their occurrences are treated, as they should be by using principles, definitions, and concepts from the geological sciences. If heeded, Banks's advice (page 3) that archeologists should avail themselves of the accomplishments of geologists would improve the prospects for lithic source studies.

The presentation is organized geographically, with a chapter on each of five areas (Ozark-Arkansas-Ouachita; Coastal Plains of Texas, Arkansas, and Louisiana; Central Texas; Basin and Range; and Great Plains). Banks discusses the lithic sources of each area according to the mapped geologic units in which they occur. This approach is greatly preferable to the too common discussion of lithic sources in folk geographic terms, often by specific quarries—what Koldehoff (1987:160) appropriately dubbed the "lithic landscape." I hope Banks's lead will be followed and that future studies of lithic sources will be soundly based on geologic mapping. I suspect that most readers will be surprised at the diversity of lithic sources—especially of chippable stone—in the areas with which they are not familiar.

An important strength of this monograph is in the recurrent discussions of the full range of occurrences manifested by each kind of lithic material: bedrock outcrops, stream gravels, lag gravels in soils, and other complexities usually glossed over in source area studies. With the same thoroughness, Banks covers such easily overlooked lithic sources as the Antlers Formation, a sandstone that crops out in patches over a wide expanse of western Texas. In some places in the Antlers there are pebbles and cobbles of chippable stone, including chert.

It is inevitable that the coverage in any attempt to synthesize information over a wide and diverse area will be uneven, and that those who are intimately familiar with local conditions will want to quibble over details. My quibble is over the coverage of Texas where, although he produces the best synthesis to date, Banks oversimplifies the nature of the occurrence of chippable stone. The discussion of chippable stone sources in the Coastal Plains Province (Chapter 2) is accurate when it makes the points that (1) the most abundant and important occurrences are in the form of gravels, and (2) that gravel sources pose severe difficulties for archeological lithic source studies. However, the discussion fails to convey adequately the fact that some of these sources are abundant, that the stone is often of very high quality, and that specimens from some localities have attributes (primarily cortical) that are fairly distinctive; for example, cherts from the Willis and Goliad formations. In a wide band from near La Joya in Hidalgo County on the Rio Grande to the lower Sabine Valley, nearly parallel to the coast, there is enough chippable stone in gravels to support most aboriginal needs. Banks gives more legitimacy to Uvalde Gravels than strict adherence to the rules of stratigraphic nomenclature would permit, but he does accurately characterize the difficulty that such widespread lag gravels pose for lithic sourcing. In the chapter on Central Texas (3), Banks does not discuss the extensive limestone region of West Central Texas, in spite of the presence there of many outcrops of high quality cherts. The inclusion of chert sources identified by Jack Hedrick, of El Paso, would have added important information to the account of the Basin and Range sector of Texas (Chapter 4), particularly in the vicinity of Van Horn. There are similar relatively minor omissions in the section on the Great Plains (Chapter 5).

The agonizing truth, as Banks repeatedly stresses, is that in spite of efforts to date, we really know rather little about lithic sources, their characteristics, and especially their complexities. The message of this monograph is clear—that look-alikes are probably more common that we care to believe, and we are all probably guilty of impressionistic identifications based on piecemeal experience rather than on rigorous systematic comparisons with samples from documented geologic sources. Visual comparisons of unknowns with knowns will remain the most important means for most lithic source identifications, in spite of increasing use of chemical and physical tests. This means that our identifications must be made as carefully and with as much knowledge and experience as possible. Banks's treatise is the place to begin organizing that knowledge. A much-needed first step is to build more comprehensive reference collections. Each of us should be systematically collecting and exchanging samples widely from the geologic sources that are available to us. Should this be done for the full range of sources Banks presents and should his approach be applied to additional sources, a comparative data base of sources would be established, and, with such a data base, we might begin to comprehend the complex human behaviors related to these sources and their counterparts in the past.

Do not expect to use this monograph as a key to the identification of lithic specimens. It is not intended for that purpose and, even if it were, the difficulty of communicating sufficient information for reliable identification would have been immense. Instead, the volume guides you to the materials that, on the basis of side-by-side comparison or chemico-physical tests, might match your specimens. It also provides a basic reference to be cited in support of your lithic identifications and their geologic origins.

The alligator stomachs? You'll just have to read the monograph and find out for yourself.

Michael B. Collins
Texas Archeological Research Laboratory
The University of Texas at Austin

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AUTHORS

Van Tries Button is a staff archeologist with the U.S. Bureau of Reclamation, formerly with its Southwest Region office in Amarillo, Texas, and now in New Orleans, Louisiana. He has been with Reclamation since 1978 and, in administrative aspects, assisted the archeological investigations at the agency's most recently built Texas reservoirs: Choke Canyon (Live Oak and McMullen counties) and Palmetto Bend (Jackson County). He has also done archeological research in Colorado, Oklahoma, New Mexico, and Israel. He received his B.A. in Anthropology from Reed College and his M.A., also in Anthropology, from the University of Arizona in 1976.

Michael B. Collins is a Research Fellow of the Texas Archeological Research Laboratory, The University of Texas at Austin. He specializes in the prehistoric archeology of Texas and has maintained a long-standing interest in lithic technology. Address: Texas Archeological Research Laboratory, Balcones Research Center, Austin, TX 78712-1100.

Kim A. Cox is an attorney in Corpus Christi, Texas and a member of the Coastal Bend Archeological Society, The Southern Texas Archaeological Association, and the TAS. He has participated in fieldwork in Texas, New Mexico, and Belize. Address: 500 North Water, Corpus Christi, TX 78471.

Robert E. Forrester is a semiretired chemist and an active avocational archeologist with many years of field experience in Central and North Central Texas, and in western New Mexico. He has been a member of the Texas Archeological Society since 1939, is a founding member of the Tarrant County Archeological Society, and also belongs to the Dallas Archeological Society, the Southern Texas Archaeological Association, the Oklahoma Anthropological Society, the Plains Anthropological Society, the Arizona Archaeological and Historical Society, and the Archaeological Society of New Mexico. He has published several articles and many reports. Address: 6229 Malvey Ave., Fort Worth, TX 76116.

Kathleen Gilmore, a Past President of the Texas Archeological Society and the Society for Historical Archaeology, received her doctorate in anthropology from Southern Methodist University in 1973. She has been a Research Associate at the University of North Texas, Institute of Applied Sciences, until her recent retirement.

H. Gill-King received his Ph.D. from Southern Methodist University in Physical Anthropology (1974) and conducted postdoctoral work at the Southwest Institute of Forensic Sciences in Dallas. He currently serves as Director of the Laboratory of Forensic Anthropology and is Associate Professor of Biological Sciences at the University of North Texas. He is also a consultant to the medical examiners of Dallas, Tarrant, and Collin counties.

Thomas H. Guderjan is a Senior Research Associate at The University of Texas Institute of Texan Cultures and the Director of the Maya Research Program in San Antonio. He received his graduate degrees from Southern Methodist University and is currently engaged in long-term research in the Medina Valley of Texas and the Rio Bravo area of northwestern Belize. Address: University of Texas Institute of Texan Cultures, P.O. Box 1226, San Antonio, TX 78294.

William Hendy Address: 2904 N. Britton Rd., Irving, TX 75062.

Jack T. Hofman is a native of Oklahoma who received his training at the University of Oklahoma (B.A. 1976), the University of Wyoming, and the University of Tennessee (Ph.D. 1986). He is currently a staff archeologist in the Oklahoma Archeological Survey and has also served as Adjunct Assistant Professor at the University of Oklahoma. His research has focused on the regional investigation of prehistoric hunter-gatherers, with emphasis on the Pleistocene-Holocene transition period on the Southern Plains. He has published several works on his Folsom research, including a recent report in the *Plains Anthropologist* on the Shifting Sands site in West Texas. He has published in *Current Research in the Pleistocene* and *Current Anthropology* and has also written (1988) a chapter in *Ice-Age Hunters of the Rockies*, edited by D. J. Stanford and J. S. Day. Address: Oklahoma Archaeological Survey.

Jeffery A. Huebner was born in Pennsylvania and came to Texas while in the U.S. Army. *He* developed a keen interest in Texas archeology and in 1985 completed his B.A. in anthropology at The University of Texas at San Antonio (UTSA). He subsequently completed gaduate work at UTSA and is now a doctoral candidate at The University of Texas at Austin. Jeff is well known in South Texas for his work at the Burris site in Victoria County, as well as his analysis of burials from the Rudy Hadiak site in Karnes County. He and his wife Elizabeth live with several cats in North Austin. Address: Texas Archeological Research Laboratory, Balcones Research Center, Austin, TX 78712-1100.

David T. Hughes was raised in Canyon, Texas and became involved with Panhandle archeology at about age five. His baccalaureate in geology was obtained from West Texas State University, and, on threat of having to earn a living, he went on to the University of Arkansas for his M.A. and to the University of Oklahoma for his Ph.D., both in anthropology. He has done archeological work from the Yukon River to the Rio Grande and from the Pecos to the Mississippi. Today he teaches anthropology and directs a contract archeology program for The Wichita State University, Wichita, KS.

Jack T. Hughes received his undergraduate training in anthropology at The University of Texas and his Ph.D. in anthropology from Columbia University in 1968. He taught anthropology and geology at West Texas State University from 1951 until his retirement as Professor of Anthropology in 1985. His specialty is the archeology of the Southern Plains, but he has also done field research in the Caddo area of Northeast Texas and on the Central and Northern Plains. Address: 1903 3rd Ave., Canyon, TX 79015.

Christopher Lintz is the cultural resource program director for the Austin, Texas branch office of Mariah Associates, Inc. He received his Ph.D. in anthropology from the University of Oklahoma in 1984 for his investigations of Antelope Creek adaptations in the Texas Panhandle. He is the author of many reports on archeological investigations on the Southern High Plains and Caddoan areas. In Texas, he directed the 1984 fieldwork at Landergin Mesa for the Office of the State Archeologist and serves at the Principal investigator for the 1989–1990 testing and data recovery fieldwork at the O. H. Ivie Reservoir near San Angelo and the data recovery fieldwork on the Palo Duro Reservoir project near Spearman. He can be reached at 8312 Adirondack Trail, Austin, TX 78759.

Wayne Parker is an avocational archeologist and a member of the Crosby County Museum Association, the TAS, the Southern Texas Archaeological Association, and other groups promoting archeology and cultural heritage. He is a relative of the famous Comanche chief Quanah Parker and has a particular interest in the ethnohistory and archeology of Late Prehistoric and Historic Indian groups of the Southern Plains. Wayne has previously published reports in the *Bulletin of the Texas Archeological Society, La Tierra, Central States Archaeological Journal,* and *Artifacts.* He is the author of a major report on the Bridwell Site, which was published by the Crosby County Museum Association (1982). Wayne ranches in Crosby County near Ralls, Texas.

John Redding is a member of the South Plains Archeological Society and has collected Indian artifacts in various parts of West Texas for many years. In recent years he has collaborated with Wayne Parker in a variety of projects, such as the one documented in their report in this volume. Mr. Redding and his family live in rural Floyd County, Texas.

C. Bertrand Schultz, retired Professor of Geology and Director of the University of Nebraska State Museum, has conducted research for many decades on the Tertiary and Quaternary geology and vertebrate paleontology of the Central and Southern Plains and on late Paleoindian sites in those areas. Address: Nebraska Academy of Sciences, Morrill Hall, University of Nebraska, Lincoln, NE 68588.

Herman A. Smith is the museum archeologist at the Corpus Christi Museum in Corpus Christi, Texas. He holds a Ph.D. in anthropology from the Southern Methodist University, where his dissertation focused on the archeology of the Baffin Bay area. He has conducted fieldwork in Texas, Honduras, Mexico, and Belize, studying coastal adaptations and maritime trade.

John D. Speth received his Ph.D. in anthropology from the University of Michigan in 1971. His research interests include hunter-gatherer adaptations, human nutrition, and North American archeology. He has conducted extensive research on late prehistoric bison kill and camp sites near Roswell, New Mexico and has recently been involved in Paleolithic investigations in Israel. He holds the joint title of Professor of Anthropology and Curator of North American Archaeology at the Museum of Anthropology at the University of Michigan, Ann Arbor, MI 48109.

J. Peter (Pete) Thurmond is the President and Chairman of the the First National Bank of Leedy, Leedy Bancorporation, Inc., and Thurmond Ranch, Inc., and a director of the First National Bank and Trust Co. of Elk City, all in western Oklahoma. He serves on the Northeast Texas Advisory Council for the Texas Historical Commission, and is the Secretary-Treasurer of the Oklahoma Anthropological Society. Pete received his B.A. in anthropology and M.A. in anthropology/archeology from The University of Texas at Austin in 1976 and 1981. He has been a member of the Texas Archeological Society for 11 years. His particular research interests are the Late Paleoindian and Late Archaic/Woodland periods of the Southern Plains, and the Caddoan area of Northeast Texas. He has recently published several articles—one a Memoir issue—in the *Plains Anthropologist*. Address: P.O. Box 374, Leedy, OK 73654.

Lawrence C. Todd, Department of Archaeology, Boston University, 675 Commonwealth Ave., Boston, MA 02215.

Solveig A. Turpin received her doctoral degree from The University of Texas at Austin, where she is the Associate Director of the Texas Archeological Research Laboratory. Her special interests include hunter-gatherer adaptations to arid lands, the art of preliterate societies, and the archeology of the Lower Pecos River Region of Texas and northern Mexico. Address: Texas Archeological Research Laboratory, Balcones Research Center, 10100 Burnet Rd., Austin, TX 78712-1100.

James H. Word, retired from the insurance business in Floydada, is a Fellow and Past President of the Texas Archeological Society and has also been active for many years as an avocational archeologist and member of the Panhandle and Southern Plains Archeological societies. Two of his many publications are *Excavations at Baker Cave, Val Verde County, Texas* (with Charles L. Douglas; Texas Memorial Museum Bulletin 16, 1970) and "The Dunlap Complex in Western Central Crockett County" (TAS Bulletin 42:271-318, 1971). Address: P.O. Box 755, Floydada, TX 79235.

Errata, BTAS 21 and 11

Dr. Virginia D. Watson, now Affiliate Curator with the Thomas Burke Memorial Washington State Museum in Seattle, Washington recently wrote to correct an error in her 1950 article, "The Optima Focus of the Panhandle Aspect: Description and Analysis" (***Bulletin of the Texas Archeological Society*** 21:7–68). References in this article and in the bibliography to **C. Stuart Johnson** as excavator of the Stamper site should be corrected to read **C. Stuart Johnston.** Dr. Watson reports, "Kent Buehler of the Oklahoma Archaeological Survey has checked the field notes and in Stuart's own handwriting it is JOHNSTON" (Letter, Virginia D. Watson to the ***BTAS*** Editor, September 12, 1989).

This error resulted from typographical errors in Volume 11 (1939), where Mr. Johnston is listed as "C. Stuart Johnson" on the title page of his article, "A Report on the Antelope Creek Ruin" (***Bulletin of the Texas Archeological and Paleontological Society*** 11:190–202). He is listed erroneously as "C. Stewart Johnston" in the Table of Contents of that volume, but is correctly cited in a footnote noting his recent death on the first page of the article (p. 190) and on its final page (p. 202). At the time he submitted his article, Mr. Johnston was a member of the Department of Anthropology, West Texas State College, Canyon, Texas.

INFORMATION FOR CONTRIBUTORS

The *Bulletin of the Texas Archeological Society* (ISSN 0082-2930) publishes original papers in the field of American archeology. Emphasis is placed on Texas and adjoining areas in the United States and Mexico; papers on other ares also are considered. Articles concerning archeological technique, method, or theory are accepted. Preference is given to members of the Society.

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Courtesy of the Southern Texas Archaeological Association