Bulletin of the TEXAS ARCHEOLOGICAL SOCIETY

Volume 61/1990

Published by the Society at Austin
1993 (for 1990)

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.

Membership and Publications

Membership in the Society is for the calendar year. Dues (current 1989) are as follows: Individual (regular), $15; Family, $20; Student, $10; Contributing, $30; Chartered Societies and Institutional, $15; Life, $300. All members of the Society receive the *Bulletin*, published annually, and *Texas Archeology*, a newsletter issued four times a year. A monograph series, *Special Publications,* also is published by the Society. Back issues of the *Bulletin* are available, and price lists can be obtained from the Secretary.

Address orders for publications and membership applications to Secretary, Texas Archeological Society, Center for Archaeological Research, The University of Texas at San Antonio, San Antonio, TX 78249.

ISSN 0082-2930 CODEN: BTASDX

Printed in the United States of America.

Bulletin of the TEXAS ARCHEOLOGICAL SOCIETY

Volume 61/1990

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

Published by the Society at Austin
1993 (for 1990)

CONTENTS

The 1989 TAS Field School: Devils River State Natural Area

Solveig A. Turpin and Michael W. Davis

ABSTRACT

The 1989 Field School of the Texas Archeological Society concentrated on broad area survey of the newly acquired Devils River State Natural Area, a 8900-ha (22,000 acre) property of the Texas Parks and Wildlife Department on the east bank of the Devils River in Val Verde County. The field school identified 239 cultural properties in the 6,880 ha (17,000 acres) they surveyed; of these 239 properties they tested two rockshelters, two shaft caves, and two open campsites. The newly formed TAS rock art recording crew documented eight pictograph sites, developing procedures appropriate for a much broader effort planned for coming years. The data gathered by the field school contributed to comparative site locational studies that helped in identifying environmental and cultural factors that have affected settlement patterns across space and through time in the Lower Pecos region.

INTRODUCTION

The 1989 Field School of the Texas Archeological Society (TAS) was held in Val Verde County at the Devils River State Natural Area (DRSNA), then newly acquired by the Texas Parks and Wildlife Department (TPWD) as a nature preserve. The natural area encompasses about 8,900 ha (22,000 acres) of the old Fawcett Ranch, extending north and east of the Devils River from Dolan Springs (Figure 1), the well spring that is the source of much of the river's flow.

Previous archeological research demonstrated that the DRSNA has been occupied throughout prehistory by hunters and gatherers who exploited the wide range of habitats in the dissected landscape (Marmaduke and Whitsett 1975). The TPWD, anticipating the need to inventory the cultural resources of the preserve, cosponsored the field school, providing an opportunity for members of the TAS to get experience in the Lower Pecos region. The work was authorized by Texas Antiquities Permit 758, issued to the TAS and TPWD, and all materials recovered by the field school are curated at the Texas Archeological Research Laboratory (TARL), The University of Texas at Austin.

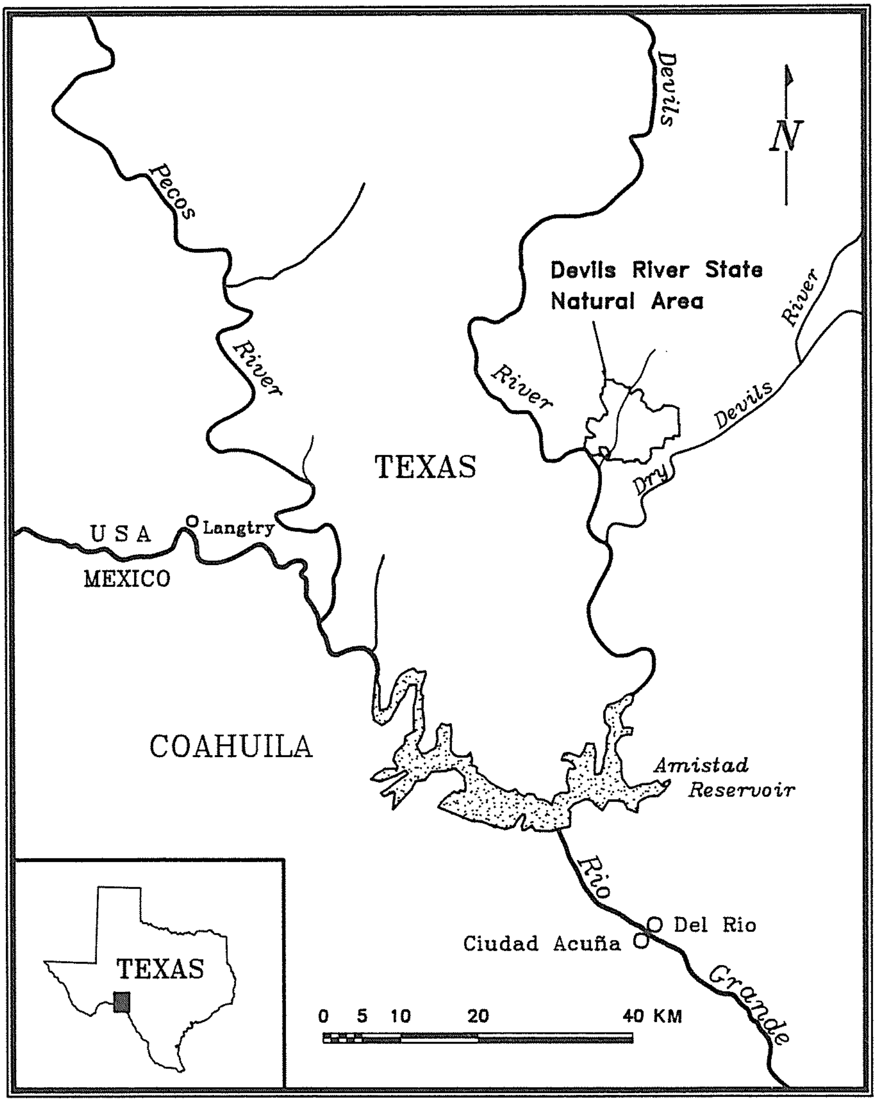


Figure 1. Map of the Amistad region showing the Devils River State Natural Area.

LOWER PECOS ENVIRONMENTAL AND CULTURAL BACKGROUND

Several authors (Story and Bryant 1966; Bryant 1969; Williams-Dean 1978) have described the Lower Pecos environment, so it will be only briefly summarized here in reference to the DRSNA and where it is pertinent to the archeological and historic record. The report of the Devils River-Dolan Creek Natural Area Survey, published in 1975 by The University of Texas at Austin (Marmaduke and Whitsett 1975), specifically deals with the DRSNA and its environs.

The thick bedded limestone of the Devils River Formation is exposed over the greater part of the DRSNA. The bedrock along much of the Devils River—limestones of the Devils River Formation—is less resistant than limestones of the same formation along the Pecos River and the Rio Grande. In some parts of the DRSNA, most specifically along Dolan Creek, the limestones contain more dolomite, which makes them more susceptible to weathering. This contributes to the inability of the bedrock to sustain deep overhangs, prevents the formation of large rockshelters, and contributes to the rapid deterioration of rock art painted on their surfaces (Caran 1989). Thin clay remnants of the Del Rio Formation that cap the upland flats provide suitable surfaces for open campsites. The low, domed residues of Buda Limestone that are common along the Pecos River and the Rio Grande have been eroded completely away in the Devils River area above the northern limits of Lake Amistad.

Topographically, the DRSNA is a flat tableland dissected by entrenched tributaries that eventually reach the Devils River on the western periphery of the natural area. Local relief is 100 to 120 meters (330 to 390 feet), with some unbroken cliffs such as Yellow Bluff towering to as much as 66 meters (220 feet) (Deal 1975). Bisecting the DRSNA is Dolan Creek, a broad gravel-strewn intermittent stream bed that becomes perennial below Dolan Springs, just about 1.5 km above its confluence with the Devils River. The DRSNA includes short, steep canyons such as Turkey Track and Escondido, longer, more gently inclining drainageways such as East and Speed canyons, and long, deeply entrenched rugged canyons such as Rough Spring. Vertical relief has had an important effect on the prehistoric use of the landscape.

Most of the flow of the Devils River comes from springs, beginning with a large *ojo de agua*, Pecan Springs, on the Hudspeth River Ranch north of the DRSNA. Above that, the river flows, floods, and dries in accordance with the runoff in its watershed. It has been estimated that 75 percent of the flow of the Devils River at Dolan Falls is contributed by Dolan and smaller springs nearby (Deal 1975:27). Even in the desperate drought of the 1950s, when the springs above the DRSNA failed for the first time in recorded history, Dolan and its companion springs on the Devils River sustained only diminished output.

Spring water was a major factor affecting the density and duration of prehistoric occupation along the Devils River. Precipitation, which averages about 45 cm (18 inches) a year, usually falls as heavy showers and thunderstorms between April and October, when evaporation rates are high. Surface evaporation from Lake Amistad is four times the annual precipitation (Deal 1975:17). Undoubtedly, in prehistory, deeper soils and denser vegetation contributed to a higher effective precipitation rate. According to local lore, Dolan Creek once flowed between grassy banks, not along the mobile gravel bed that now absorbs much of the runoff before it reaches the river (Deal 1975:28). Massive floods in 1935 and 1948 stripped away dense stands of sycamore, oak, and pecan trees from the river and creek banks. E. K.

Fawcett, original settler in the DRSNA, claimed he could walk the entire length of his ranch along the Devils River and never step out of the shade; now only two groves remain in isolated pockets along the exposed limestone banks; both have prehistoric sites. Snake Springs, a small tributary of Dolan Springs, once harbored rainbow trout, but the stream now emerges only to disappear under mobile gravel beds. The detrimental effect of overgrazing extends to the uplands, where flowing springs, once centers of prehistoric occupation, are now evidenced only by travertine remnants or the density of cultural material in the vicinity.

The modern floral and faunal assemblages of the DRSNA are products of the environmentally disruptive activities of domestic livestock. On the upland flats and slopes, thorny brush has taken hold at the expense of native browse and grasses. Road traffic has kept the canyon bottoms passable, but dense thicket covers the lower slopes throughout much of the preserve. All the desert succulents that made up the bulk of the prehistoric diet were available in the DRSNA. Hardwood trees once lined the river, providing seasonal nut harvests and ample firewood, and deer and small game were exploited throughout prehistory. Riverine resources, such as fish, mussels, and turtles, gave the DRSNA residents a ready supply of protein. The addition of bison to the regional fauna during Late Archaic times is demonstrated by remains recovered from Skyline Shelter, on the west bank of the Devils River (Turpin 1990a) and Castle Canyon, a site now inundated by Lake Amistad (Greer 1976). Ethnohistoric reports (Turpin 1987a) and rock art depictions at Yellow Bluff, directly adjacent to the DRSNA (Turpin 1989), also place bison in the study area during early historic times.

Study of pollen counts (Bryant 1969), faunal remains (Dibble and Lorrain 1968), flood deposits (Patton and Dibble 1982), and ethnohistoric accounts (Turpin 1987a), has permitted reconstruction of the paleoenvironment of the Lower Pecos region. This sequence began with the cool, moist climate at the end of the last Ice Age and ended in the hot, dry regime of today. An overall trend toward aridity was broken some 3000 to 2500 years ago and again in protohistoric times by mesic interludes. One reciprocal swing of the climatic pendulum is locally identified as the Ozona Erosional period (Bryant 1969), which transpired about 5000 years ago.

PREHISTORIC CONTEXT

Fifty years of archeological research have produced a cultural chronology that spans more than 12,000 years of Lower Pecos prehistory and early history (Turpin 1991a). The traditional division into Paleoindian, Archaic, Late Prehistoric, and Historic periods has been further refined into 12 subperiods defined by radiocarbon dates and temporally diagnostic tool types (Table 1). Detailed commentaries on this cultural sequence have been published recently by Hester (1989), Shafer (1986), and Turpin (1991a), and are not repeated here.

Considerable effort has been devoted to research in settlement patterns (Marmaduke 1978; Turpin 1982), human health and diet (Alexander 1974; Williams-Dean 1978; Stock 1983; Sobolik 1991), adaptive technologies and strategies

Table 1. Periods in the Chronology of the Lower Pecos Region

Period	Subperiod	Radiocarbon Years
Paleoindian		**<12,000–9,800**
	Aurora	14,500–11,900
	Bonfire	10,700–9,800
Late Paleoindian		**9,400–9,000**
	Oriente	9,400–8,800
Early Archaic		**9,000–6,000**
	Viejo	8,900–5,500
Middle Archaic		**6,000–3,000**
	Eagle Nest	5,500–4,100
	San Felipe	4,100–3,200
Late Archaic		**3,000–1,000**
	Cibola	3,150–2,300
	Flanders	2,300–?
	Blue Hills	2,300–1,300
Late Prehistoric		**1,000–350**
	Flecha	1,320–450
	Infierno	450–250
Historic		**350–0**

(Dibble and Lorrain 1968; Shafer 1981, 1986), perishable industries (Andrews and Adovasio 1980; McGregor 1989; Brown in press), mortuary practices (Turpin, Henneberg, and Riskind 1986; Turpin 1988, 1991b), rock art (Jackson 1938; Gebhard 1965; Kirkland and Newcomb 1967; Turpin 1990c), movable art (Shafer and Speck 1974; Parsons 1986), and climatic reconstructions (Bryant 1969; Bryant and Shafer 1977; Dibble and Lorrain 1968). Individual surveys and excavations are too numerous to list here, but of direct relevance to the field school is Marmaduke and Whitsett's (1975) Natural Area reconnaissance, the only published account of archeological research in the DRSNA. North of the study area, excavations at Baker Cave (Word and Douglas 1970; Hester 1983; Chadderdon 1983; Brown 1991) demonstrated an occupational sequence spanning 10,000 years. Publications to date emphasize the Early Archaic component of Baker Cave, but future research will explore a multitude of problems regarding regional adaptation (Brown 1991). On the west bank of the Devils River, just below the DRSNA, the deep deposits of Skyline Shelter have contributed data on economic strategies (Turpin 1990), mortuary practices (Turpin 1991b), human health and diet (Powell 1991), and lithic traditions (Turpin and Bement 1991), although analyses are far from complete. Skyline Shelter is one of the few rockshelters in this region where seasonality, in this case winter occupation, can be demonstrated. The people who lived in the DRSNA probably followed much the same subsistence strategies as did the occupants of Skyline Shelter, who relied heavily on fish, mussels, and turtles, which were available nearby in the Devils River.

HISTORICAL BACKGROUND

The first Europeans to set foot in what came to be called the Devils country were members of Gaspar Castaño de Sosa's *entrada* in 1590 (Schroeder and Matson 1965). Although several Spanish expeditions penetrated north of the Rio Grande in the 250 years of their hegemony, none produced the ethnographic detail found in sources on neighboring regions, such as Cabeza de Vaca (Campbell 1979). At first, the Jumanos and Cibolas were the most common peoples mentioned in Spanish documents. After the Pueblo Revolt of 1680–1690, the Apache apparently took control of the region, but they were soon succeeded by Comanche and Kiowa raiders who travelled south from their bases on the Red River to harvest booty from northern Mexico. Foes of the Plains Indians and Texans alike, in the nineteenth century the Kickapoos raided northward across the Rio Grande from their homes near the colonial settlement of Santa Rosa, now the modern town of Musquiz, in Coahuila.

Spanish forays into the Lower Pecos River region were often hurriedly launched pursuits of raiding Indians rather than colonizing expeditions. The area was not thoroughly explored or mapped until after the Treaty of Guadalupe Hidalgo between the United States and Mexico in 1849. Immediately after this peace accord was signed, American surveyors and engineers went into the field to map the border between Mexico and the United States and to seek a route to Santa Fe and on to California. The leader of one of the first American expeditions, famed Texas Ranger Jack Hays, gave the Devils River its English name—the Spaniards had called it the Rio de las Lajas (Schroeder and Matson 1965)—and later the San Pedro (Hayes commented that it more likely belonged to the Devil [Greer 1952]). Despite Hayes's unfavorable opinion of this route, they forged ahead with a road leading northward from San Felipe Springs (Del Rio), along the Devils River, then westward to the Pecos and on to El Paso. The San Antonio–San Diego mail route was established in 1853 (Austerman 1985). Military activity increased in an attempt to protect travelers and settlers, and, in 1853, Fort Clark was established squarely athwart the Comanche Trace; in 1857, Camp Hudson was built overlooking Bakers Crossing, a major ford of the Devils River. Local tradition has it that Dolan Springs and Dolan Creek were named for an army lieutenant, but his role in their discovery or exploitation is unclear (Finegan, 1989 personal communication). When the Civil War intervened, the redirection of military force opened the way for the intrusive Plains Indians, who regularly travelled through the Devils River country to raid the settled villages and ranches of Coahuila. The war behind it, the U.S. Army turned to the task of pacifying the west, and several notable battles were fought on the Devils River, but their locations are only conjectural. One confrontation between the Second Cavalry and Comanches took place in 1857 on a bluff overlooking the Devils River (Fehrenbach 1983:426–427); military buttons and other accoutrements found in Snake Springs Canyon at the base of Yellow Bluff near Dolan Springs are attributed to that battle, but the area was swept clean in the flood of 1975, so proof is not forthcoming (Finegan, 1989 personal communication). In 1881, the Southern Pacific Railroad opened the way for settlement, bringing goods and providing the means for getting products to market.

In 1883, a young herder, Erasmus Keyes Fawcett, arrived on the Devils River, pushing a herd of sheep and earning $15 a month (Turpin 1987b, 1990b). He took up residence in a rockshelter overlooking the river while he built a cabin and began to accumulate land (Turpin 1990b). When he married Frances Baker, of Baker's Crossing, in 1902, they moved the ranch headquarters to its present location on Dolan Creek, north of the current boundary of the DRSNA. There, all the headquarters functions of a small hamlet and large ranching operation were fulfilled by a cluster of workers' houses, school, cemetery, commissary, truck garden, smithy, shearing pens, dip tank, pig, cattle, and wool barns, and myriad specialized work areas. When the 24,290 ha (60,000 acre) spread was divided among the descendants of Frances and E. K. Fawcett, the portions now included in the DRSNA were inherited by son Lee and daughter Brancie Finegan, with about 160 ha (400 acres) directly surrounding Dolan Springs held in irrevocable trust for the entire family. The Finegans operated their Dolan Creek Ranch as a ranch and hunting preserve for many years prior to its acquisition by TPWD.

Although the Fawcett Ranch was one of the first large sheep operations on the Devils River, all of the early structures are just outside the perimeter of the DRSNA. The rockshelter where E. K. Fawcett, patriarch of the family, first lived and the log cabin he built, which subsequently burned (Turpin 1987b), are south of Dolan Springs and north of the confluence of Dolan Creek and the Devils River. The ranch headquarters, which presents an almost complete picture of the development of the west Texas sheep industry, is beside the main road just a few hundred meters north of the DRSNA gate.

GOALS OF THE FIELD SCHOOL

The primary goal of the field school was to identify the nature and distribution of prehistoric and historic use of the rugged terrain of the DRSNA. To accomplish this goal, TAS carried out limited testing at two rockshelters, a creek terrace site, an upland site, a vertical shaft cave, and, after the field school, a horizontal shaft cave, to determine their age, function, and roles in the community patterning of the region. A newly organized TAS rock art recording crew documented eight pictograph sites, developing methods and skills for later application at other endangered pictograph sites.

Survey

The survey of the DRSNA was of particular scientific importance because the area consists of 8,900 ha (22,000 acres) that sample a wide variety of microenvironments, ranging from the riverine zone paralleling the Devils River to the uplands, remote from any source of permanent water. This diversity results from the dissected nature of the terrain, which provides different habitats in close vertical proximity. Access to diverse resource zones is a major factor influencing the location of sites in this region (Turpin 1982) so, for the purposes of this survey, the DRSNA was divided into riverine, canyon bottom, canyon rim, and upland zones. Variability within these broad categories is effected by the unpredictable influence of springs, *tinajas* (pot holes), steep bluffs, and chert outcrops, all of which affected the configuration of prehistoric exploitation patterns.

The DRSNA offered the first opportunity to compare the results of a broad area survey in the Devils drainage with the settlement pattern previously established by similar efforts in the Rio Grande and Pecos drainages. Toward that end, a site typology was created so the nomenclature used on the field school survey forms would agree with what had been used in Seminole Canyon (Turpin 1982) and other areas along the Rio Grande and the Pecos River. The results of the survey have been divided into seven categories: rock art (pictographs and petroglyphs), rockshelters (including caves), burned rock features (middens and hearths), stone alignments (cairns and rings), lithic procurement (quarries and chipping stations), lithic scatters, and historic sites.

The TAS field school divided the DRSNA into 12 roughly equal areas, designated *A* through *L* and defined by pasture fences. To compensate for travel time, the roughly equal areas diminished in size with distance from the field school headquarters. A windmill in each area served as a landmark and a meeting place in the event of crew dispersal during the day. Designated crew chiefs were responsible for coordinating activities and reporting their day's findings to the survey supervisor, Michael W. Davis. Workers in the field laboratory, set up in the former Finegan Ranch hunting lodge, processed each day's site forms and artifacts and plotted acreage surveyed and site locations on a master map.

Due to restrictions imposed by TPWD biologists that placed the nesting habitat of the black-capped vireo off-limits to archeologists, the crews surveyed only about 6,880 of the total 8,900 ha (17,000 of the total 22,000 acres) in the DRSNA. The areas omitted were generally gentle, somewhat bushy slopes near the central campground with the result that this area may be underrepresented in the site inventory; known sites in this habitat were not revisited.

When the field school began, 54 sites had been recorded within the boundaries of the DRSNA, 24 of them by Marmaduke and Whitsett (1975), who reconnoitered the area as part of the Devils River Natural Area Survey. The largest block of sites (28) was recorded during visits to the Fawcett Ranch by Turpin and Bement in the late 1980s. The field school recorded an additional 187 sites, bringing the DRSNA total to 239, of which six are Euro-American and 233 are Native American in origin.

Rock Art Sites

41VV207, 209, 527, 888, 889, 915, 921, 922, 1082, 1087, 1088, 1105, 1145

Three rockshelters containing some form of art, a shaft cave replete with incised lines, and one unusual figure abraded into a canyon wall were recorded by the field school surveyors, bringing the total within the DRSNA to 13. The first two pictograph sites, 41VV207 and 41VV209, as well as other sites in the vicinity, were recorded by Jim Barkes in 1973 (see also Marmaduke and Whitsett 1975). Both are rockshelters with deteriorated Middle Archaic-age Pecos River style panels, including large red panthers (Figure 2) and various shaman figures; both overlook major tributaries of the Devils River. The next pictograph site to be documented was 41VV527, found by Marmaduke and Whitsett (1975: 88–89) during their natural area survey in 1975. This site was in the heart of the nesting habitat of the black-capped vireo, so the rock art recording crew documented the remnant art on a later volunteer trip to the DRSNA. It too is a deteriorated Pecos River style panel in a shelter that evidences long-term occupation (Marmaduke and Whitsett 1975).

Lee Bement and Solveig Turpin recorded rock art sites 41VV888, 41VV889, 41VV915, 41VV921, and 41VV922 in 1985. All have Pecos River style pictographs, and all but one are badly deteriorated. The exception, 41VV888, has four extremely clear shaman figures (Figure 3), some miscellaneous compositions, and a rare Red Linear hunting scene (Robinson 1989), reconstructable because of its similarity to more intact vignettes at 41VV612, downstream on the Devils River. Despite the obvious intensity of ritual activity in these locations, 41VV888 and its sister site, 41VV889, are remote from the areas expected to have had high population density. They overlook a dry tributary of Rough Spring Canyon, far from its confluence with the river.

Another pair of related rock art sites, 41VV921 and 41VV922, are high in a bluff overlooking the broad floodplain of Dolan Creek, on the same stream course but above the similarly situated sites 41VV209 and 41VV527. Farther east, on another dry tributary, 41VV915 is unusual in that the many figures lining the shelter wall have been scratched almost to obliteration, probably in antiquity, making most of them unintelligible. One possible blanket design in 41VV915 is the only example of the Late Prehistoric Bold Line Geometric style found in the DRSNA (Turpin 1986).

The five sites recorded during the field school introduce considerable variety into the regional rock art inventory. Only two—41VV1082 and 41VV1105—are typical Pecos River style panels. Miniature red deer and remnant dots of red paint are all that remain in 41VV1082, but 41VV1105 has six to eight anthropomorphic figures. One can be identified as a rabbit-eared shaman, a motif found in abundance along the Rio Grande at Rattlesnake Canyon and Abrigo Diego, and far to the south in the Sierra del Carmen at Sin Nombre (Turpin 1991c). Neither site had much cultural material.

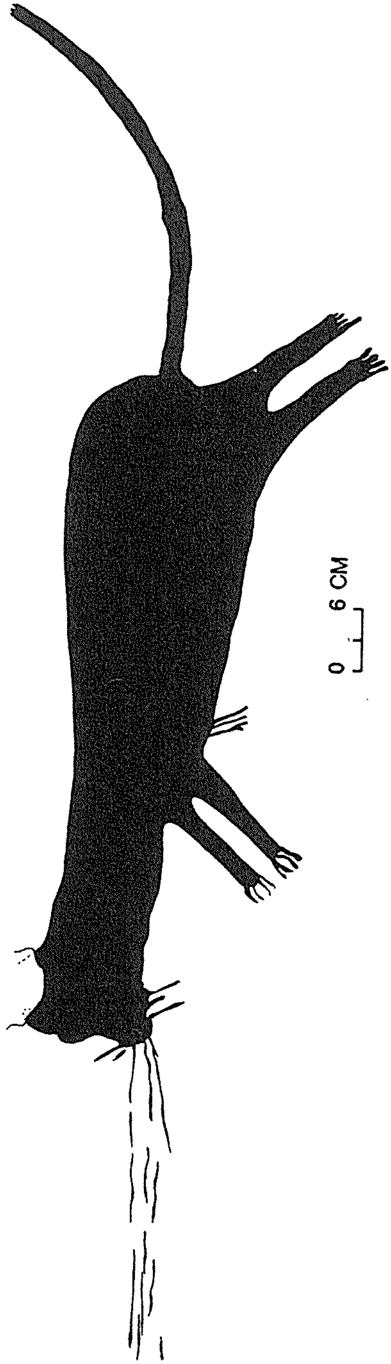


Figure 2. Drawing of a panther pictograph from site 41VV209, an example of the work accomplished by the TAS rock art recording crew.

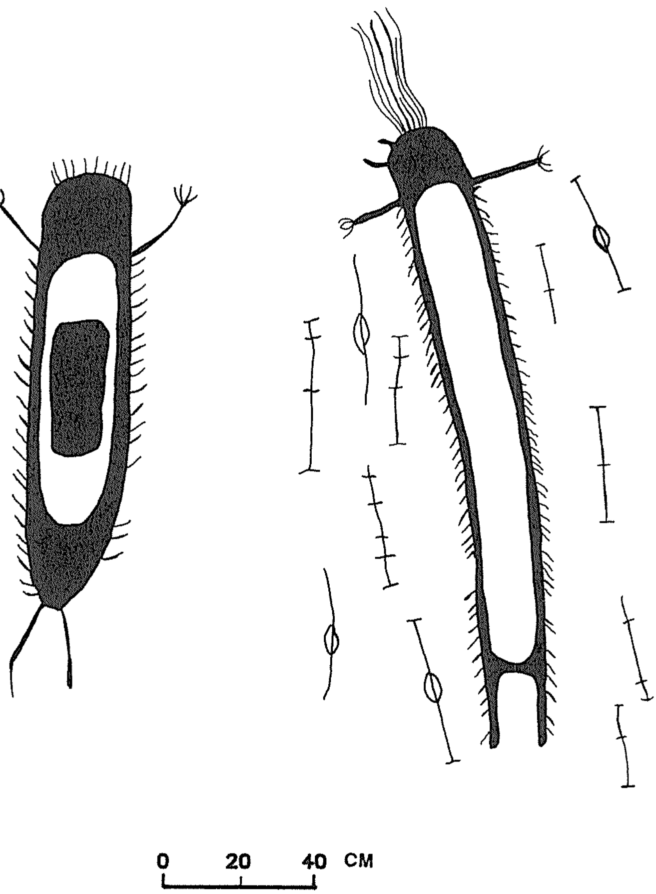


Figure 3. Two shaman pictographs from 41VV888, drawn by the TAS rock art recording crew.

The remaining three newly recorded rock art sites are unusual. Shield Shelter, 41VV1088, has only one composition—a circle encompassing 27 to 30 crescents and surrounded by a wavy line (Figure 4). The design is unlike any other pictograph in this region and conforms to none of the defined styles. Symbolically, the semicircular elements may represent horseshoes contained within a circular corral or moons enclosed within the sun (Turpin 1991d). The Plains-like theme and the metaphorical range of this panel suggest that it is historic or protohistoric in age, produced by an artist from one of the intrusive groups that travelled through the Lower Pecos region between 1700 and 1885.

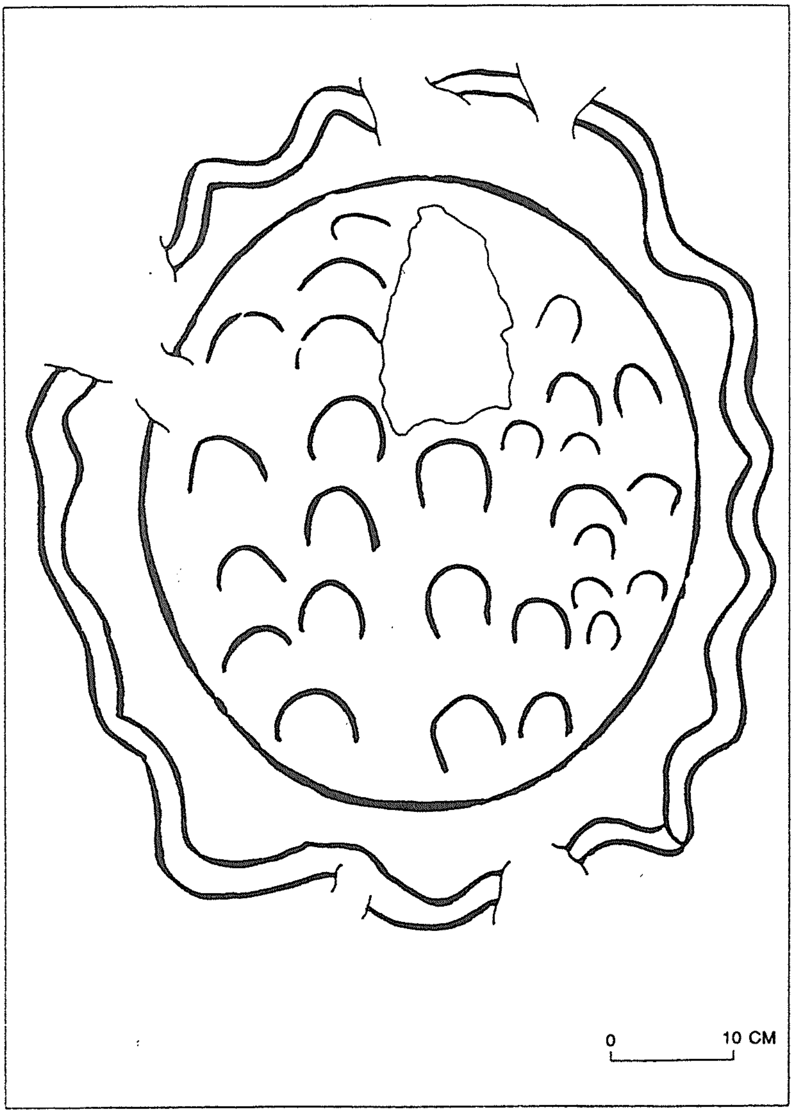


Figure 4. Newly recorded shield pictograph at 41VV1088 (Shield Shelter), drawn by Ed Aiken.

Another site that may well be of historic age is 41VV1087, where a human figure was created by scraping the dark manganese stain from an exposed section of canyon wall on a minor tributary far from the river. This site cannot be dated by stylistic or other means, but it is so unlike any other Lower Pecos rock art that it may well be the product of an idle hunter or sheepherder rather than the intentional construct of a prehistoric artist.

The last newly recorded site is classified as a rock art site, although its design elements are more often considered functional or random. Site 41VV1145 is a horizontal shaft cave 120 cm (4 feet) in diameter that extends into the bedrock low in the wall of Rough Spring Canyon, a major dry tributary of the Devils River. The entrance is replete with cut marks often construed as sharpening grooves, dulling grooves, or hide-working scars or, more imaginatively, as Ogam writing. The cave was at first thought uninhabitable for any length of time due to its small size and potential for flooding, but test excavations in the mouth of the cave, carried out after the field school by Michael W. Davis and TAS volunteers, produced lithic debris and dart points characteristic of the Middle and Late Archaic periods. A probe dug into the interior of the shaft recovered only one bone fragment of undetermined species and origin. The site has been classified here as rock art because the cut marks extending onto the ceiling and sides of the shaft must have been executed from a reclining or crouching position, an unlikely posture for utilitarian activities. Other shaft caves such as this have proven to be burial vaults where bundled corpses were placed to decompose naturally (Collins 1969; Turpin 1991b). The cut marks in 41VV1145 fulfill one criterion for classification as ritual art—redundancy—and suggest that this shaft had cultural or psychological significance in the ideological system of prehistoric people who inhabited the DRSNA (Turpin 1991b).

Rockshelters

41VV207, 209, 470, 491–492, 526–527, 870–871, 887, 889, 915–922, 965, 976, 1055, 1058–1059, 1070–1071, 1077, 1082, 1088, 1093–1095, 1105, 1111, 1114–1116, 1119, 1132, 1134, 1137–1138, 1157–1158, 1166, 1175–1176, 1178–1180, 1187–1188, 1240

Fifty-three rockshelters (including nine of the rock art sites discussed above) have been recorded within the boundaries of the DRSNA, 33 of them by the TAS (Figure 5). Most are small shelters whose very sparse cultural materials are often restricted to the talus cones that spill down the canyon in front of the openings. Steep bluff faces overlooking Dolan Creek are pocked with cavities produced by erosion and collapse along bedding planes. This series of shelters was occupied with varying degrees of intensity depending largely on size. Densely occupied sites such as 41VV922 are often flanked by smaller rockshelters with extremely sparse cultural deposits.

Another factor affecting the use of available shelters is proximity to water. Sites such as 41VV871, near the permanent spring in Rough Spring Canyon, manifest much more diversity and duration of use than is evident in shelters of similar size that are far from reliable water sources. This obvious correlation suggests that sites

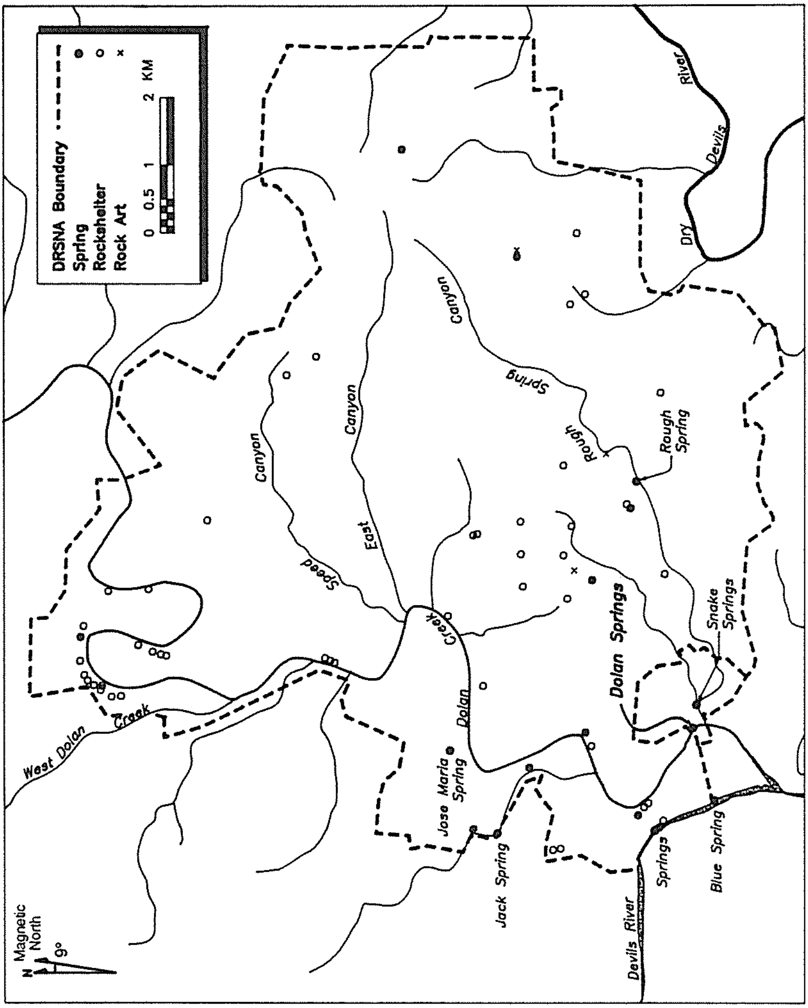


Figure 5. Map of the Devils River State Natural Area showing distribution of rock art and rockshelters.

such as 41VV889 and 41VV915, where there was an apparent concentration of both occupation and ritual activity, were once supplied by water sources that are now lost to increasing regional aridity.

The temporally diagnostic artifacts recovered during the survey of the rockshelter sites do little to define their periods of occupancy. Only 10 dart points and arrowpoints of recognizable type and age were collected; this sample includes Middle Archaic Pedernales, Pandale (two), and Langtry (two) dart points; Late Archaic Ensor (two) (Figure 6), Castroville, and Montell dart points; and a Perdiz arrowpoint. It should be remembered here that commercial artifact collecting was one of the advertised attractions of the Dolan Creek Ranch before it was acquired by TPWD. Rockshelters, with their obvious potential for cultural deposits, would have attracted the attention of hunters who, in their idle moments, sought relics as well as trophies. The rock art styles in these sites are also Middle Archaic to Historic in age, reflecting the same broad time periods as the projectile points. Excavation of two sites, 41VV209 and 41VV889, added Late Paleoindian artifacts to the rockshelter inventory.

During the course of DRSNA development, TPWD should be aware that three of the small, sparsely occupied shelters were considered possible burial locales by the TAS surveyors. This potential could be verified only by testing sites 41VV920, 41VV1111, and 41VV1132, which is not recommended at this time. However, although none of these sites outwardly appears attractive to relic hunters, they should be protected against vandalism. Some vandalism has occurred at all of the larger rockshelters with potentially stratified deposits, but the information in the remaining deposits at 41VV209, 41VV870, 41VV889, 41VV915, and 41VV922 mandates their special consideration.

Caves

Only two true caves have been recorded in the DRSNA. The largest underground cavern, Fawcett's Cave, has been known to spelunkers for decades and was mapped as part of Deal and Fiesler's (1975:30) Devils River Natural Area Survey . The Texas Speleological Society returned to Fawcett's Cave to refine their map and to inventory the bat population just before the land was purchased by the TPWD. Testing of the talus cone during the 1989 field school yielded human and animal skeletal material and a Frio dart point, confirming its status as an archeological site, 41VV999. The testing is reported in more detail below.

A horizontal shaft cave, 41VV1145, was discovered during the field school low in the wall of upper Rough Spring Canyon. The most obvious evidence of prehistoric use of this site is the myriad cut marks that surround the 120 cm (4 foot) diameter opening. After the field school, a volunteer crew headed by Michael W. Davis made several visits to the DRSNA to clear up a few unfinished details and to test the site. The results are reported below (see heading 441V1145, Horizontal Shaft Cave, Rough Spring Canyon).

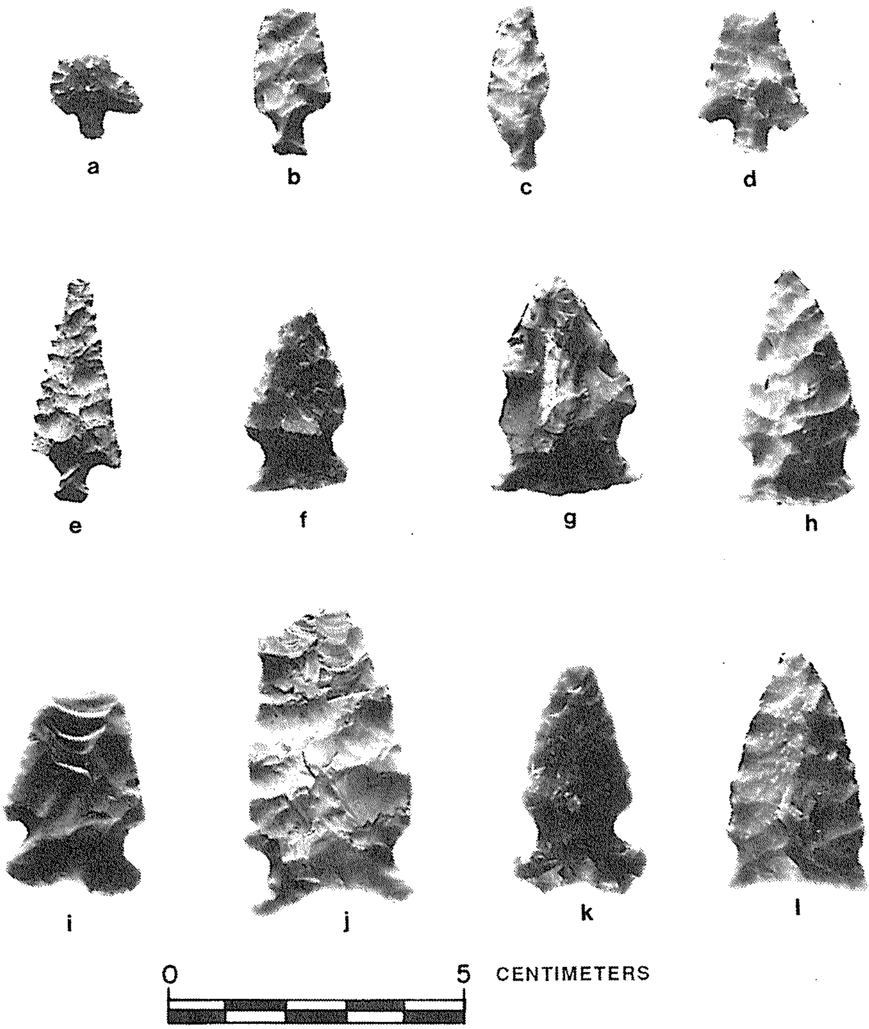
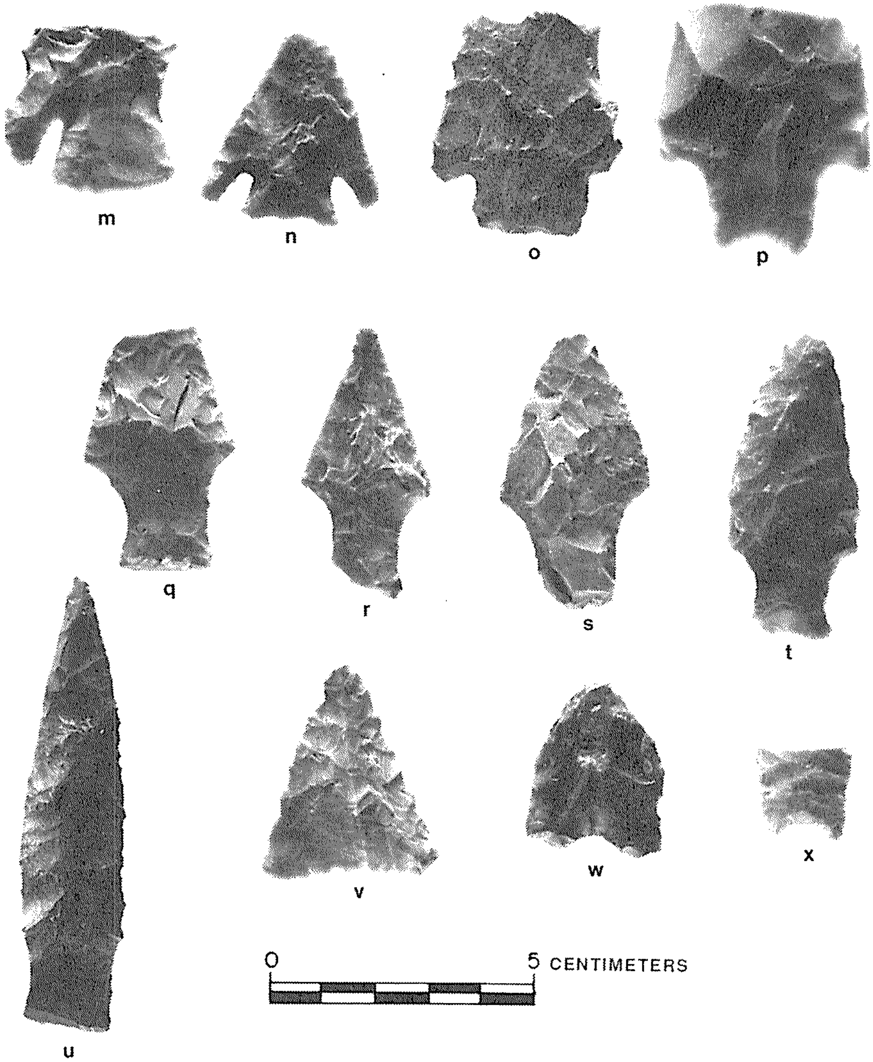


Figure 6. Examples of typical projectile point styles in the Lower Pecos region collected during survey of the DRSNA: a–e) Late Prehistoric arrowpoints; f–l) Late Archaic Ensor, Fairland, and Frio dart points; m–o) Late Archaic Castroville, Marcos, and Marshall dart



points; p–u) Middle Archaic Langtry and Pandale dart points; v) Early Triangular dart point; w) Golondrina dart point; x) Plainview-like base.

Burned Rock Middens, Hearths and Open Campsites:

Burned Rock Middens: 41VV510, 511, 512, 514, 516, 521, 523, 524, 872, 879–886, 898, 964, 966, 974, 977, 978, 983, 985–987, 990, 991, 994–996, 1054, 1065, 1075–1078, 1084, 1085, 1089, 1090, 1092, 1096, 1099, 1102, 1103, 1109, 1117, 1118, 1120, 1121, 1136, 1138, 1139, 1143, 1149, 1163, 1165, 1169–1171, 1181, 1184, 1186, 1193, 1196–1199, 1235;

Hearths: 41VV471, 493, 525, 923, 1072, 1110, 1128, 1129, 1131, 1152, 1189, 1191, 1230;

Burned Rock Scatters: 41VV494, 501, 502, 507, 513, 515, 975, 988, 1081, 1097 , 1098, 1123, 1133, 1147, 1160, 1162, 1168, 1194, 1231–1233, 1237, 1238, 1241–1245

These 112 sites, 21 of which had been previously recorded, were classified primarily according to the nature of the burned rock that defined them. Of these, 71 have one or more burned rock middens, some with accompanying hearths and all with additional burned rock scatter. An additional 13 sites are characterized by individual hearths, rather than by middens. In another 28 sites, burned rock is scattered across the site, but its original configuration can no longer be determined due to postdepositional disturbances.

The burned rock middens are occasionally associated with rockshelters, tipi rings, or quarries, but, overall, they are found in three topographic settings—the banks of intermittent streams, canyon bottoms, and upland divides. This pattern reflects prehistoric preferences for flat, relatively open cooking areas with easy access to specific resource zones (Figure 7). Middens and hearths line the banks of intermittent streams such as Rough Spring Canyon or Dolan Creek and its longer, less precipitous tributaries, Speed, Jesus, and East canyons. Forty-two burned rock middens, 12 isolated hearths, and nine burned rock scatters were recorded in the canyon bottoms. Within this zone, confluences and limestone benches that have retained enough sediment to provide soft, grass-covered surfaces are favored. The sites in this setting are often badly disturbed by overbank flooding and by roads that follow the creeks along these landforms.

The Devils River forms only a small segment of the western perimeter of the DRSNA, so the TAS survey crew found only two riverine sites, one of which (41VV974) was tested. However, further surveys along the river made before and after the field school recorded extremely large camps on both banks of the river at the mouths of virtually every tributary. The sites often support large oak groves, and, not surprisingly, modern fishing camps have been built in many of these shady spots. Most of the sites have also been affected by episodic flooding of the river, but enough remains of them to confirm that this setting was optimal for long-term and repetitive habitation throughout prehistory.

An unanticipated finding of the DRSNA survey was the number of large, complex midden sites found on the high, flat upland divides, remote from the more obvious sources of permanent water (Figure 7). Twenty-nine burned rock middens,

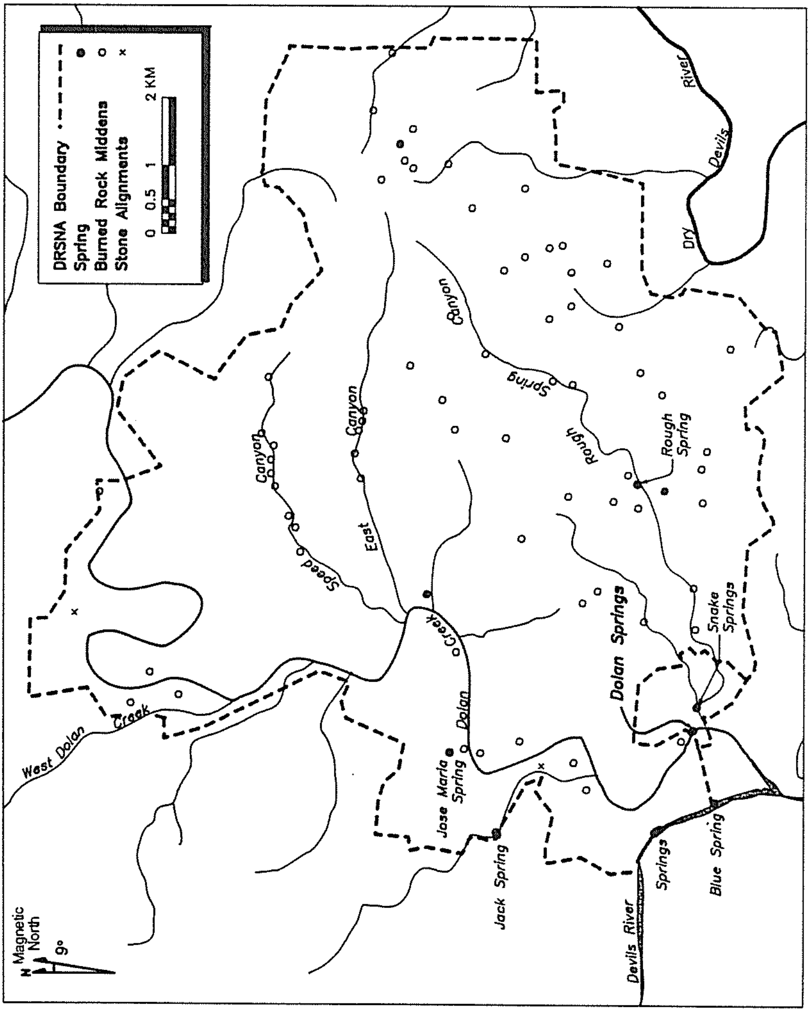


Figure 7. Map of the DRSNA showing distribution of burned rock sites and stone alignments.

one isolated hearth, and 18 dispersed scatters were recorded in the upland zone where only minor topographic influences on their locations were discernible. In four cases, the middens are directly above small rockshelters, but no direct relationship can be demonstrated. In another six instances, the middens are adjacent to or on chert outcrops that provided ready access to raw material for the manufacture of stone tools. The larger and more complex midden sites may have been so situated as to take advantage of water in natural potholes (locally called *tinajas*, pots), depressions that trap water and air-borne sediments that silted them in and obscured their obvious role in settlement patterns. This source of fill, which has long been used for raising or repairing ranch roads and the railroad, has resulted in the borrowing and transport of burned rock to incongruous places. A good example is 41VV964, where the silted-in tinajas were emptied to build the nearby airstrip. A similar proximity to upland water sources, albeit temporary, was noted at 41VV1075 and 41VV1076 in the DRSNA.

From the information gathered by the survey, it was found that 49 of the 112 burned rock sites yielded temporally diagnostic tools, which, in turn defined 62 components (Figure 6). Late Archaic styles dominate the projectile point inventory, identifying 31 sites with components attributable to that time period: 21 from the Blue Hills subperiod, three from the Flanders subperiod, and seven from the Cibola subperiod. Four sites had Early Archaic occupations, the Middle Archaic is represented by 15 San Felipe and two Eagle Nest period components, and there are five Late Prehistoric components. The assignment of another six sites only to the general Archaic is based on the recovery of dart point fragments. No preference for upland or lowland topographic settings during any specific time period was apparent, other than the obvious association between long-term use and readily available water, whether it was from springs, rivers, or tinajas. However, the dominance of Late Archaic Blue Hills types, followed in frequency by Middle Archaic San Felipe period styles, mirrors the general regional trend demonstrated by excavations of rockshelters (Turpin 1990c:Figure 10.12) and earlier settlement pattern studies (Marmaduke 1978; Turpin 1990c:Figure 10.11).

Quarries, Lithic Procurement, and Lithic Reduction Sites

Lithic Procurement Sites: 41VV980, 984, 993, 997, 1066, 1067, 1068, 1069, 1083, 1086, 1091, 1101, 1108, 1112, 1113, 1126, 1127, 1141, 1142, 1144, 1146, 1148, 1150, 1151, 1153, 1155, 1173, 1174, 1182, 1183, 1185, 1239

Lithic Reduction: 41VV506, 522, 979, 1061, 1062, 1063, 1079, 1107, 1159

Sites with Middens: 41VV872, 986, 1065, 1109, 1149, 1163

Abundant raw material for the manufacture of stone tools is readily obtainable from three sources in the Lower Pecos River region: ancient gravel beds now exposed by erosion, redeposited river gravels, and chert inclusions that are weathering out of the bedrock. In the DRSNA, cobbles and pieces of tabular chert litter the ground along specific contour lines in Rough Spring Canyon, along Dolan

Creek, and in the northeastern pastures where short tributaries rapidly descend to the Dry Devils River (Figure 8)

Procurement of these raw materials was the sole activity at 32 of the recorded sites; 10 additional sites evidenced lithic reduction directly related to an adjacent outcrop; six are more complex sites primarily classified as large burned rock middens related to raw material sources. The distribution map shows that many of these sites are simply areas of more intense utilization—perhaps of pockets of fine-grained material—in the midst of extensive, linear erosional exposures of chert. The lithic reduction took place on level benches that provided convenient work areas near the source material. The typical artifact assemblage includes tested cobbles, cores, primary flakes, and an occasional crude biface. Temporally diagnostic tools are lacking, but it can be assumed that these sources were exploited throughout prehistory.

These 47 sites, and the material recorded at open campsites and rockshelters, testify to the prolific production of stone implements from the caramel brown local tabular cherts. The outcrops and the gravels lining the banks of the Devils River abundantly supplied the inhabitants of the DRSNA with good quality raw material, eliminating any need for them to curate artifacts or trade for stone.

Rock Alignments

41VV880, 1057, 1124, 1131, 1196

Patterned alignments of limestone boulders were the dominant features at four sites and a minor component at one (Figure 7). The first, 41VV880, was recorded in 1987 by Turpin and Bement. Two abutting circles of limestone blocks, a burned rock midden, and a lithic scatter are directly above Rough Spring atop a high ridge on the narrow divide between Rough Spring Canyon and an unnamed tributary. An arrowpoint fragment dates one component of the site to the Late Prehistoric period.

Three more stone alignment sites were found during the field school survey. Site 41VV1057 consists of four rock cairns, two of them aligned north-south and two aligned east-west, amid a lithic scatter on a promontory next to Jack Branch, above its confluence with Dolan Creek. A chert outcrop and debitage extend up the hill, and a sparse burned rock scatter trails down the slope toward the creek. Two burned and battered Ensor dart points date one occupation of the site to the Late Archaic period.

On the interfluvial divide between headers of Oliver and Jesus canyons, an oval course of rocks 25 to 30 cm high was recorded as 41VV1124. The feature is 2.7 meters long from north to south, and 1.4 meters wide, suggesting that it was once a cairn that has been disturbed by modern activity. Directly across a ranch road, site 41VV1104 consists of a lithic scatter that may have been connected to the stone alignment.

A rock oval and an isolated hearth north of the Dolan Creek floodplain in the mouth of a small south-flowing tributary were recorded as 41VV1131. This location deviates from the normal pattern wherein stone alignments are on high promontories.

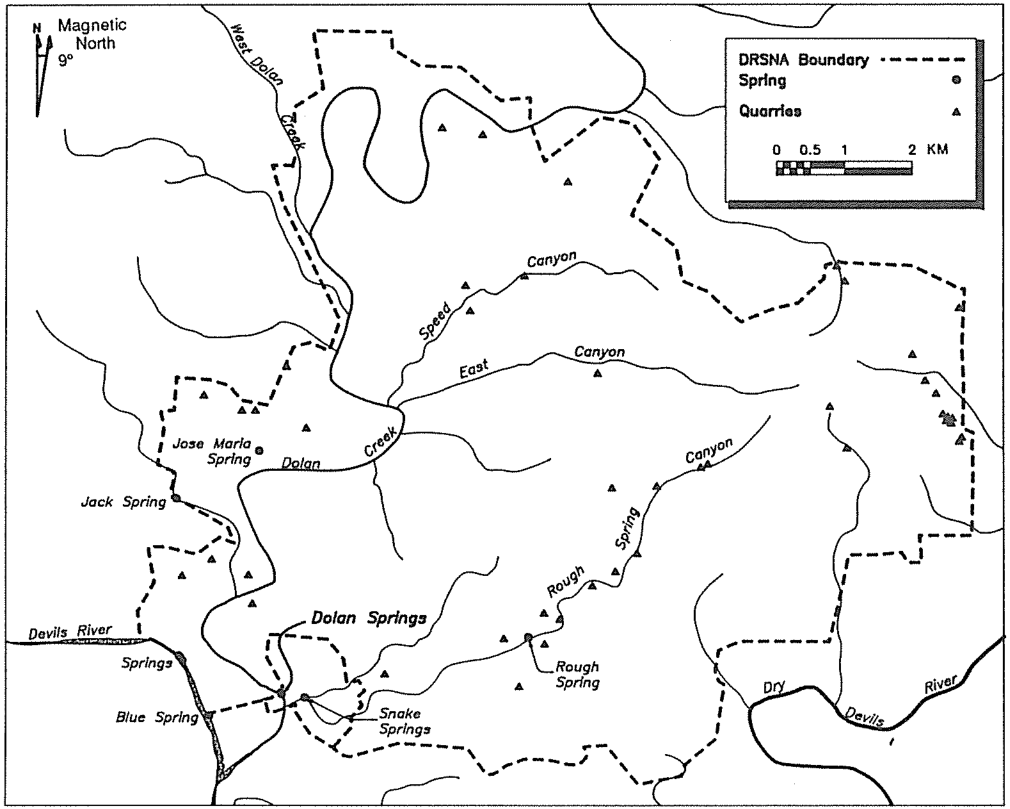


Figure 8. Map of the DRSNA showing the distribution of lithic procurement sites.

Other sites similar to this in setting and configuration are considered sheepherders camps because of the presence of historic trash—evidence that is lacking at 41VV1131.

In addition, one possible cairn was noted at 41VV1196, a large open campsite adjacent to Dolan Creek at the mouth of Escondido Canyon. Its function and age are unknown.

Stone alignments in the Lower Pecos region as a whole can be divided into two categories: 1) structural remains, including tipi rings, where paired blocks of limestone supported tent poles or arcs of blocks served to weigh down the superstructure, and 2) cairns, oblong piles of rocks, that cover or contain burials. Of course, not all rock piles of prehistoric age can be functionally interpreted, so many miscellaneous features of unknown use have been recorded. The DRSNA examples are generally disturbed, and their original configurations can no longer be accurately reconstructed, but they appear to belong in the first category—structural remains of temporary dwellings. With the exception of 41VV1131 and 41VV1196, the preference for high promontories expressed in the larger sample from the Lower Pecos as a whole is seen also in the DRSNA, especially at 41VV880.

Lithic Scatters

41VV501, 981, 982, 992, 998, 1056, 1064, 1104, 1122, 1125, 1161, 1236, 1246

By definition, all the burned rock middens, hearths, and scatters and lithic procurement sites were also designated lithic scatters. After those functional types are removed, only 13 sites remain in this category. All but one, 41VV1056, are in the uplands, and only that exception, 41VV1056, is a multicomponent site. This lithic scatter along East Canyon produced three projectile points, each representing one of the three Archaic subperiods. Three of the remaining sites were assigned to the general Archaic period, one to the Early Archaic, and one to the Middle Archaic, based on dart points recovered during the survey.

Historic Sites

Historic Indian Period

Rock art provides the only evidence of historic Native American occupation of the DRSNA. The iconography of site 41VV1088, described above, is not typical of any of the defined prehistoric styles and seems more appropriate to a historic context. Support for this age assignment can be found in two other pictograph panels just outside the boundaries of the DRSNA. At 41VV343, a Spanish colonial scene, complete with church and mustachioed caballero, overlooks a freshet that pours into Dolan Creek just below the major springs (Marmaduke and Whitsett 1975:Figure 3; Turpin 1989:Figure 18-3). Directly above Dolan Springs, at 41VV485, three scenes pair bison and human figures (Turpin 1989:Figure 18-11). In one vignette, the bison is upright and has human feet, suggesting that it is a dancer. In another, the human is armed with a flintlock, proving its recent date; the third scene is blurred beyond possible decipherment. In the same vicinity, on the banks of Dolan Creek facing the colonial pictograph, a metal arrowpoint was collected by the landowner. Although no such evidence has been found in the DRSNA, these sites do demonstrate a strong historic Native American presence in the area.

Anglo-American Period

Historic water control structures: 41VV1100, 1106, 1135, 1080, 1234.

Ranch complex: 41VV1154.

As described in more detail in the section on the historic background, the Fawcett Ranch exemplifies the westward settlement of Texas, but most of the early structures were intentionally left outside the DRSNA at the time of purchase by the State. The six historic sites recorded in the DRSNA are all directly related to stock raising. Four are check dams at the heads of small tributaries, built in the 1930s as part of a county-wide program of the Soil Conservation Service. According to John Finegan, a small limestone block structure next to the dam at 41VV1106 was used to store salt. A fifth water-control site, 41VV1080, is a masonry stock tank.

The central ranch complex, including sheep shearing barn, stock pens, loading chute, wells, windmill towers, and a scatter of historic artifacts, was recorded as 41VV1154. The site illustrates the husbandry aspect of the production of wool and mohair, including the well-preserved ranch water system.

In summary, the historic sites are not significant entities in themselves, but, as a whole, they illustrate the ranching system put into place by E. K. Fawcett. The focus on water control underscores the difficulties of ranching in such an arid environment, but stories told by E. K. Fawcett to his grandchildren describe a country much different from what we see today (Turpin 1990b). The sheepherders had to drag a log between two horses to flatten the grass that grew so high the sheep balked. He described Dolan Creek as a meandering stream that ran between grassy banks, not the scoured and bleached gravel bed seen today. Floods did not threaten the headquarters on Dolan Creek until well into the 1950s, after denudation of the landscape by domestic livestock and an increasingly arid climate.

A human interest thread that ties the features recorded by the field school to the Fawcett Ranch headquarters is the masonry and concrete work accomplished by Jesus Diaz, who came to work as a ranch hand about 1912 (Finegan, 1989 personal communication). He built all the concrete structures, including the massive barns, the workers houses, the raised garden plots at the headquarters, and the dams recorded during this survey. After E. K.'s death, when Frances Fawcett left the ranch and moved to a home in Del Rio, Jesus Diaz retired from ranch work, but he stayed with the family until his death. His name is perpetuated by Jesus Canyon, a tributary of Dolan Creek that heads partially inside the DRSNA and flows past the Fawcett ranch headquarters.

TEST EXCAVATIONS

The test excavations undertaken at two rockshelters, two open sites, and two shaft caves during and after the field school are summarily reported here. Much of the material recovered is still being analyzed, but overall site assessments are offered as an aid to TPWD's area development plans.

41VV209

Limited test excavations were conducted at 41VV209, a large rockshelter that had been extensively disturbed by pothunters, especially along the rear wall where burials are often found (Figure 9). TPWD was interested in determining whether intact cultural deposits remained in the shelter before they backfilled the potholes in order to discourage further looting. The site was originally recorded by Jim Barkes and first reported by Marmaduke and Whitsett (1975). Kenneth M. Brown supervised the field school testing and prepared a preliminary report on the investigations. The following material is excerpted from his report and includes a geological assessment prepared by S. Chris Caran (Brown 1989).

The site, which consists of three separate overhangs or *galleries* on the right side of Dolan Creek, faces east from a vantage point 33 to 36 meters above the streambed, 1.4 km upstream from Dolan Springs. The northern gallery is about 35 meters long, with an overhang of 2 to 5.4 meters and level floor space extending about 9 meters from the rear wall. The middle gallery is roughly 41 meters long with

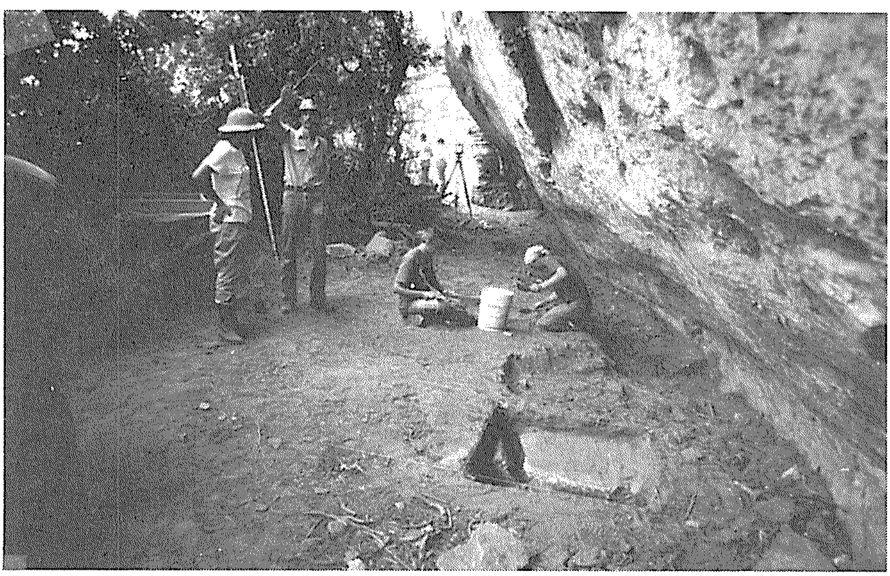


Figure 9. Rock art recording crew at work in 41VV209.

an overhang of 3.7 to 5 meters and floor space perhaps 6 meters deep. The southern gallery is about 29 meters long, with an overhang of 2 to 4.5 meters and a floor space 7.5 meters deep. An unsheltered pour-off between the north and middle galleries extends for about 10 meters, bringing the total length of the complex to 131 meters. Although the protected area in each gallery is shallow, the level floors extend well outside the drip line, creating an expanded living and activity area. The test excavations were confined to the northern gallery, where a fiber deposit—visible in a looter's trench—indicated that dry deposits were present (Figure 9). The investigations focused on these plant remains with a goal of determining their extent and assessing the integrity of the associated cultural deposits.

Geologic Setting

The lower part of the rear wall of the shelter complex is formed by a dark gray irregularly bedded stratum of dolostone (rock consisting chiefly of dolomite) perhaps 80 cm thick that erodes relatively easily, interbedded with more resistant limestone beds. The top of the gray dolostone bed is marked by a conspicuous dark red contact line (about 1 to 2 cm thick), which is a thin zone of iron or manganese enrichment; similar but discontinuous sinuous lines can be seen in the dolostone bed itself. In the southern gallery, the dolostone bed has a nodular-weathering sugary texture, forming a low apron with rows of small mortar holes. Above the dolostone stratum is a receding weathered zone, 60 to 70 cm thick, of spalling limestone that exfoliates readily into thin roof spalls. Spalling of this zone may be due in part to differential stress at the contact with the weaker dolostone. Above the spalled limestone is a zone of massive limestone about 5.3 m thick that forms an inward-sloping face, and above that, about 5 meters of limestone interbedded with beds of thin nodular chert, forming shallow steplike overhangs. Accessible parts of these chert beds (especially along the trail to the north) apparently have been tested or quarried prehistorically, but the chert veins overhead have also contributed a certain amount of naturally fractured chert breakdown to the deposits at the site. This was especially noticeable in the lower levels excavated. A few small pieces of poor quality petrified wood also were found in screening. These may also be natural inclusions in the shelter fill; Deal (1975:26) notes that petrified wood occurs in the Segovia Formation in the Dolan Creek area.

At several places in the north gallery, large slabs of rock have broken away from the shelter wall in the prehistoric past. These are perhaps more properly termed wall slabs than roof blocks, for they have separated from the rear wall and cut across the bedding planes in the bedrock. In particular, one large slab has broken away from the rear wall behind the excavation area, and sections of the slab, mostly lying flat, were found in the excavations about 10 cm below the surface. Whether there was any rock art on the shelter wall before the slab broke away is unknown, but the possibility certainly exists that rock surfaces of different ages may have been available during the occupation. Part of the slab exposed in Unit N200/E100 had what might have been a small spot of red paint on the upper surface. Two of the flat-lying slabs had extensive deposits of fine, pure white crystals on the upper surface, forming a crust as much as 5 mm thick. Smaller deposits of a pure white talc-like powder were also found nearby. These deposits formed after the slabs fell and probably after they were buried by shelter fill.

An unusual feature of the south gallery is a localized partial silification of the dolostone stratum, which has strengthened it and made it more resistant to erosion, creating a zone some 30 cm thick that is weathering into angular blocks and prisms.

Field Methods

With a transit, an arbitrary baseline was established in the shelter. Three 1-meter squares were triangulated onto the floor from this baseline. A 100-meter vertical datum point was established by driving a nail into the wall of the shelter, and vertical control was maintained with a transit and stadia rod (when not hindered by the shelter wall) or line level. All excavated matrix was passed through quarter-inch and sixteenth-inch mesh screens. With the exception of burned rock, which was weighed and discarded together with roof spall, all materials retained on the screens, such as chert, stream-worn pebbles, plant matter (including twigs, leaves, and charcoal), bone, shell, and insect material, were returned to the laboratory (Table 2). Excavation of the test pits followed natural stratigraphy, and three strata were identified.

Stratum 1, the highest stratum, which varied in thickness from 3 to 10 cm in the three units, consisted of gray limestone dust. The matrix was loose, possibly from disturbance by recent human and animal traffic. Cultural materials recovered in this upper lens consisted of debitage, core fragments, edge-modified flakes, distal and proximal biface fragments, charcoal, bone, mussel shell, and fire-cracked rock.

Stratum 2, the fiber bed, varied in thickness from 5 to 14 cm in the areas excavated. The soil was browner and more compact than in Stratum 1 and contained a wide variety of economic and noneconomic plant remains. In one test pit, a thin lens of fiber appeared to be slightly lower than the main deposit of vegetal remains. Lithic artifacts from this level included large quantities of debitage, a variety of bifaces, and edge-modified flakes. A limited amount of bone, charcoal, and mussel shell was also recovered.

Stratum 3 consisted primarily of limestone dust and roof spall. Depending on the density of the cultural material, the color of the matrix varied from gray to brown to beige, with a shift from pinkish beige downward to a reddish tinge. Stratum 3 was distinguished from Stratum 2 by the presence of more charcoal and wood ash. The full thickness of Stratum 3 was not established, but it is at least 65 cm deep, necessitating that it be excavated in 10 cm arbitrary levels. The stratum did not appear to contain any fiber, but chipping debris was abundant, as were edge-modified flakes and biface fragments, especially distal parts. Two mano fragments, four metate fragments, a scraper, and a bone tool fragment were also recovered from Stratum 3.

A small pit was identified in Stratum 3 from a concentration of charcoal lumps and quantities of wood ash. The limits of the pit could not be defined because they

Table 2. Lithic Artifacts from Site 41VV209 on Dolan Creek

Unit	Stratum	Flakes	Flake Fragments	Chips	Utilized Flakes	Unifaces	Bifaces	Cores	Tools	Projectile Points
	Surface					1	1 2 (F)			1 Gower, 1 (F) dart point
N200/E100										
	1	380	209	150	2			2 (F)	2 (F)	
	2	700	303	212	6		2			1 (F) arrowpoint, 1 (F) Bandy
	3	830		624	2		6 (F) 1 7 (F)			
N197/E101										
	1	736		558	2		4 (F)			
	2-3	2899		2810	38		12 (F)	1 (F)	1 (F) metate	2 (F) Langtry
N200/E101										
	1	158		294			1 (F)			
	2	728		851	11		6 (F)		1 (F) bone awl	1 Baker
	3	1752		1955	19	1 (F)	12 (F)		2 (F) mano 3 (F) metate 1 scraper, 1 (F) bone tool	1 (F) Angostura, 1 (F) Langtry 1 (F) Pandale, 1 Unident. triangular point

NOTE: F = Fragment(s)

were covered by a large roof-fall block estimated to be about 50 by 70 cm, roughly oval in plan, and slightly basin shaped at the bottom. The feature was interpreted as a trash pit that had been filled with hearth debris from other parts of the site. Two radiocarbon samples were taken from the pit. Two other ash deposits were identified—one in Stratum 2 and one in Stratum 3—but were not assigned feature numbers.

Based on the field findings, Brown (1989) offers the following observations. Significant archeological deposits remain in place in the northern gallery where cultural debris extends to a depth of 74 cm. The fiber zone and other deposits have been removed from a zone about 1 to 2 meters wide along the rear wall, but intact fiber deposits extend at least another 2 meters toward the front of the shelter, although the front limits of their preservation were not defined by the test excavations. It appears that only one fiber zone, about 5 to 14 cm thick, remains, 5 to 7 cm below the surface. Although preservation of plant remains is fairly good in Stratum 2, no perishable artifacts, cordage, matting, or modified sticks, were noted. Wood charcoal was abundant, and samples were taken for radiocarbon dating.

The diversity of plant species is very low. Sotol and lecheguilla were not baked in pits in the shelter, but the manos and mortar holes suggest that some seed processing was done. The density of chipping debris is high, roughly comparable to that in Baker Cave. Except for one possible arrowpoint fragment, all diagnostic artifacts were Late Paleoindian to Middle Archaic in age (Figure 10). The low diversity of plant species and the artifact assemblage suggests that 41VV209 was a limited activity site.

An apparent decrease in the ratio of silt and clay to limestone dust with decreasing depth may indicate a diminishing eolian component during the accumulation of deposits throughout the Holocene. Pronounced reddish tints at depth may also be related to these eolian processes. An increase in small fish bones and snail shells was also noted deep in one unit.

If more work is done at 41VV209, it should include extending the testing in the northern gallery to find the eastern limits of the fiber zone, testing in the middle and southern galleries, and collection of a pollen profile and bulk soil samples for particle-size analysis. Testing has demonstrated that there is significant information about prehistory in the DRSNA locked in the deposits that remain at 41VV209 and that protection of these deposits is warranted.

41VV889, Small Shelter

High on a tributary of Rough Spring Canyon, this small rockshelter was once one of the most extensive pictograph sites in the DRSNA, but few of the multicolored figures are still decipherable. Amid the blur of pigment that covers the entire rear wall are elements characteristic of Pecos River style pictographs, the oldest of Lower Pecos pictographs. Less than 50 meters away, on the same small drainage, 41VV888 is the best-preserved pictograph site in the project area. There, four Pecos River style shaman figures, a Red Linear scene, and other

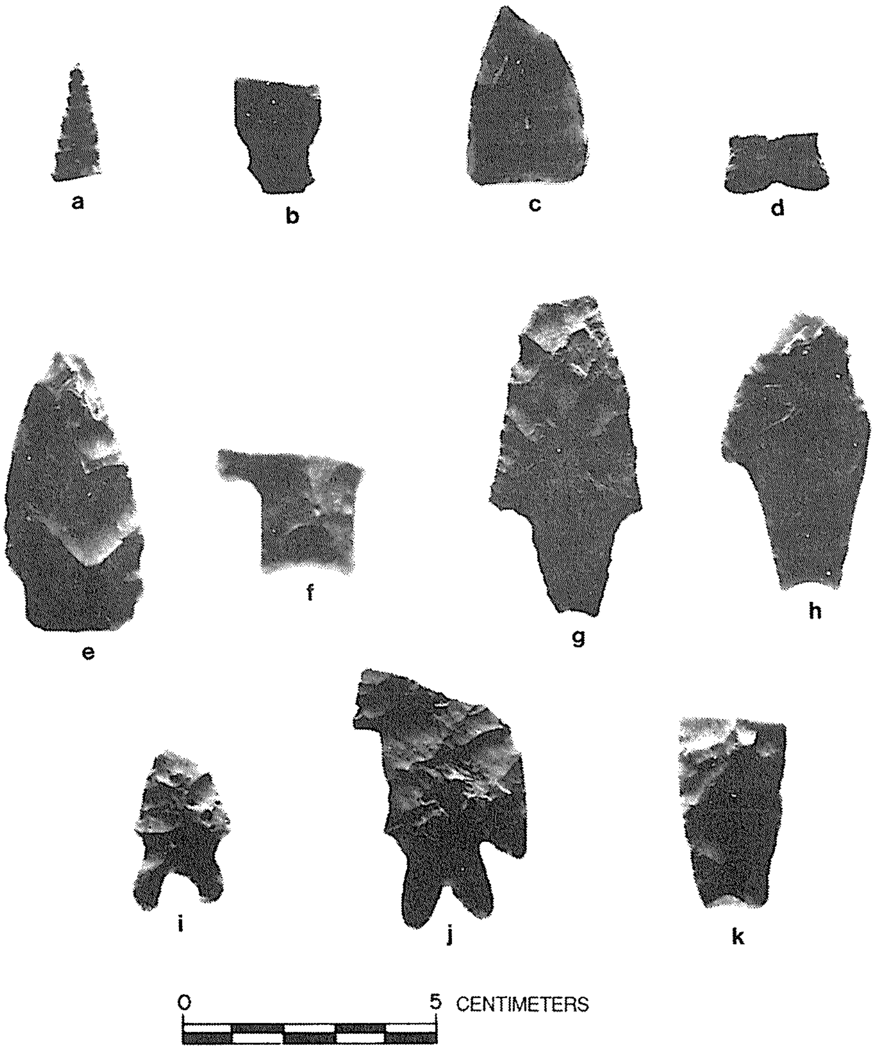


Figure 10. Projectile points from 41VV209: a) arrowpoint distal fragment; b) untyped basal fragment; c) triangular dart point; d) Bandy dart point; e) preform; f) untyped basal fragment; g–h) Langtry dart points; i) Gower dart point; j) Baker dart point; k) Angostura dart point.

curvilinear designs were painted on a bleached expanse of the canyon wall under a shallow overhang. No cultural deposits remain in 41VV888, but the pictographs were probably painted by the same people who lived at one time in 41VV889. The obvious intensity of prehistoric use of these sites led to extensive documentation by the rock art recording crew and testing under the direction of Jim Word and May Schmidt as part of the 1989 field school.

Both 41VV888 and 41VV889 formed under the rim of a small tributary in the dense, hard-surfaced Devils River limestones common to the DRSNA. Local variation in the composition of the bedrock is apparent in the configuration of rockshelters and in weathering patterns here and at sites such as 41VV209 and 41VV921 along Dolan Creek. Although natural rock decay is always a threat to rock art, the blocky exfoliation and weak structure of the Dolan Creek sites is much less apparent at 41VV888, 41VV889, and nearby 41VV915. In addition, these sites are rounded hollows rather than the shallow linear galleries that dominate the streamside shelters in the DRSNA. Thus, geology plays a major role in the differential preservation of rock art and in the size and configuration of the occupied shelters.

When 41VV889 was recorded in 1988, evidence of past relic hunting there consisted of two depressions, a screen, and a broken shovel, but most of the deposits appeared to be intact. The field school crew excavated four 1-by-1-meter units in 10 cm arbitrary levels (Figure 11); the matrix was screened through quarter-inch mesh innovatively provided by suspending the pothunter's reconstructed screen by rope from above the entrance to the shelter. The site was also mapped and surface-collected, and the excavations and pictographs were photographed.

Temporally diagnostic projectile points, ranging in age from a Plainview-like base to arrowpoints (Figure 12, Table 3), confirm the long-term occupation of the site. Unfortunately, the vertical sequence could not be separated into components, probably because of the shallowness of the deposits, the sequential but intermittent occupation of the site, and the later activities of relic hunters. The shallowness of the deposits also provided a poor preservational environment for normally perishable items, so lithic artifacts make up the bulk of the inventory (Table 4). Copious debitage indicates that the final reduction or rejuvenation of stone tools was a major activity. Utilized flakes, unifacial and bifacial tools, and the projectile points testify to procurement activities conducted from a base in this small site. Use-wear analysis identified tools used in scraping (n=58), cutting (n=39), and perforating (n=1), but the specific material processed by only four artifacts could be determined. One uniface was used to scrape hides, and four tools (three utilized flakes and an end scraper) showed evidence that they were used for cutting and scraping plants. Two of the latter—the scraper and one utilized flake—had the high silica sheen that is characteristic of plant-processing tools.

The intensive use of this small part of the DRSNA, including this rockshelter, nearby 41VV888, and an open campsite on the flats above, suggests that an upland water source, no longer obvious, was available at least intermittently during all the broad periods of prehistory. The bedrock depressions at the Windmill Midden nearby are a possibility. However, the field crew at 41VV889 noted that some water-loving plants were growing against the wall of the shelter, suggesting that during periods of high ground moisture, seep springs may have attracted people to this small site and its environs, which were an optimal location for exploitation of the canyon resources below and of the upland habitat above.

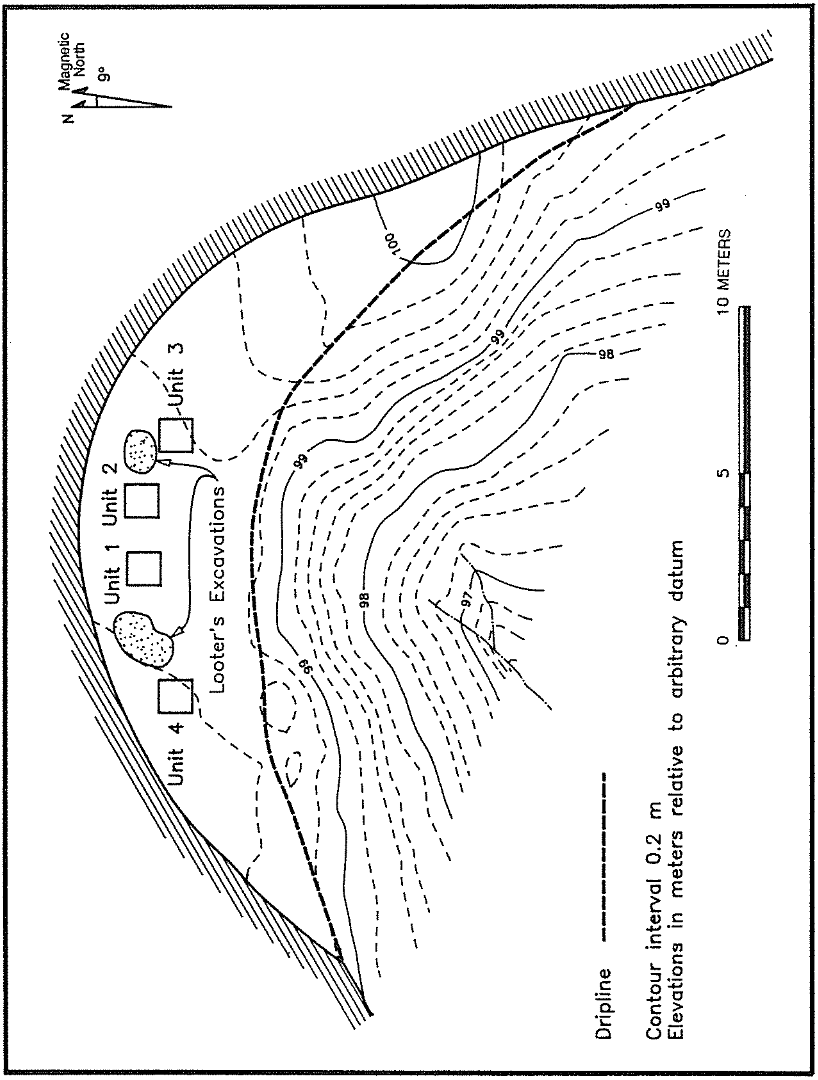


Figure 11. Topographic map of site 41VV889.

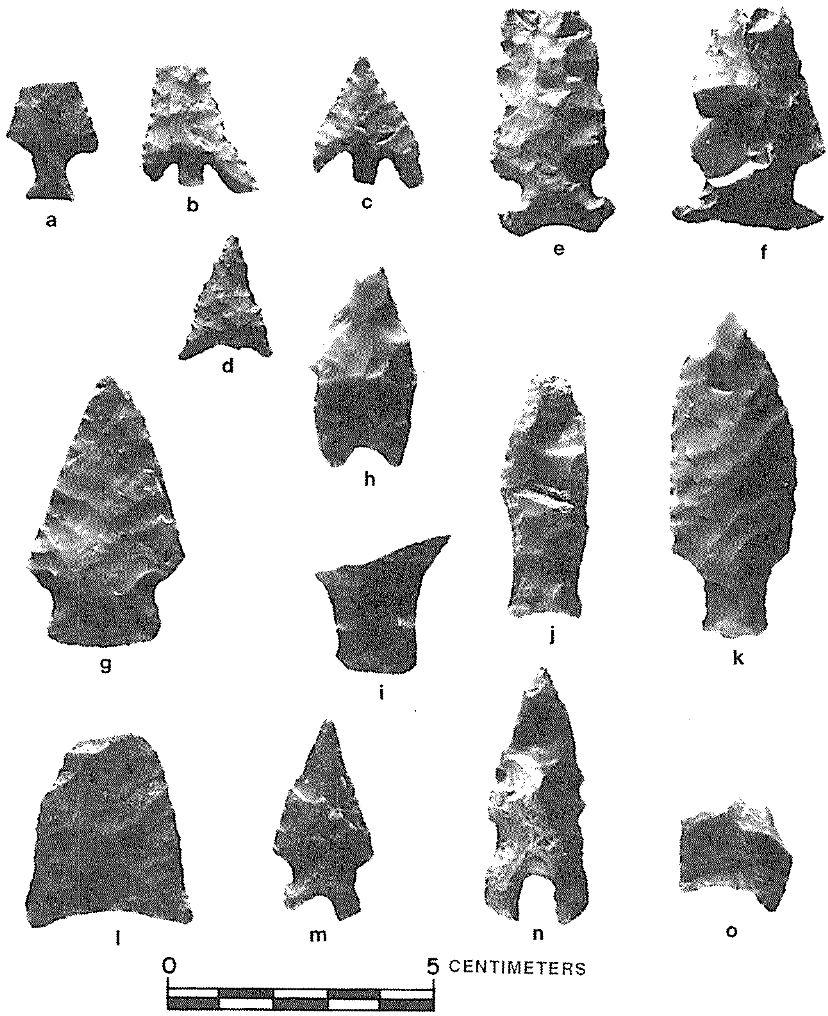


Figure 12. Lithic artifacts from 41VV889: a–d) arrowpoints; e) Frio dart point; f) Ensor dart point; g) Marcos dart point; h) Pedernales dart point; i) Langtry dart point; j–k) Pandale dart points; l) Early Triangular dart point; m–n) Baker dart points; o) Plainview-like dart point fragment.

41VV964, Windmill Midden Site

On the broad, flat interfluvial divide between the heads of tributaries of Rough Spring Canyon, Jane Hollow, and Escondido Canyon, a dense scatter of burned rock and flint debris surrounds a borrow pit that supplied caliche for construction of the adjacent airstrip. Directly north of the borrow pit is a second depression now filled

Table 3. Projectile Points From Site 41VV889

Level (cm)	Unit	Projectile Points
0-10	Surface, 1	1 Early Triangular 1 Unidentified dart point 1 Unidentified arrowpoint
10-20	1, 2, 3	2 Ensor 2 Frio 1 Langtry 1 Unidentified dart point 1 Arrowpoint fragment
20-30	1, 2, 3, 4	1 Marcos 2 Pandale 1 Gower 1 Plainview base
30-40	1, 2, 3, 4	1 Pandale Zorra 1 Gower 1 Perdiz 1 Unidentified arrowpoint
40-50	1, 2, 3	3 Dart point fragments 1 Arrowpoint fragment

almost to the top with fine-grained sediments. The correlation between burned rock middens and caliche pits is a common one that can be attributed to two circumstances: the soft, level surfaces of the Del Rio Clay flats were preferred camp sites throughout prehistory, and natural depressions, or *tinajas*, now filled with wind- and water-borne sediments, were special attractions that might well have increased the duration or frequency of camping episodes. In other words, the caliche flats were exploited prehistorically and historically for two very different reasons; the historic land use often obliterated the evidence of prehistoric occupation.

Despite the obvious disturbances wrought by construction of the windmill, the stone tank, and the airstrip, this site was selected for excavation to explore the possibility that the caliche borrow pit was once a reservoir that held rain water and attracted task groups to this site where they processed vegetal resources gathered on the broad flat divide. A similar relationship between intensively occupied burned rock midden sites and casual water sources was later recorded by the TAS survey crew at 41VV1075 and 41VV1076.

Table 4. Lithic Artifacts From Site 41VV889, Small Shelter

Level (cm) Unit	Primary Flakes	Secondary Flakes	Tertiary Flakes	Chips	Utilized Flakes	Unifaces	Bifaces	Cores	Tools
Surface							4		
0-10, 1		45	127	132	19	6	4(F)	5	3 scrapers
10-20, 1–3	6	78	424	409	21	3	1 7 (F)	2 (F) 11 (F)	1 rejuvenated flake 1 scraper
20-30, 1–4	9	65	447	412	26	1	2 6 (F)		1 perforator
30-40, 1–4	2	38	244	191	18	1 (F)	9 (F)		1 rejuvenated flake
40-50, 1–3	1	29	135	137	2	4	1	2 (F)	1 perforator tip
50-60, 2			9	153	131	1	1	1 3 (F)	
60-70, 2			7	33	31	2	3	2 (F)	1 perforator tip
70-80, 2	1	1	17	6					

NOTE: (F)) = Fragment(s)

In addition, occupation of this midden site may be related to the intensive use of nearby rockshelter 41VV889, reported above. If the presence of a spring in the 41VV889 canyon is discounted, the Windmill Midden tinaja is the closest known source of water for the inhabitants of several sites on this interfluvial divide.

Under the direction of Brownie Roberts and Bill Chandler, seven contiguous 1-by-1-meter units that formed a linear strip and two isolated squares were excavated in the least disturbed part of the site, southwest of the tinaja borrow pit (Figure 13). Maximum depth was 24 cm, with some of the units reaching bedrock at 10 to 20 cm below the surface. All material was screened through quarter-inch mesh; only one feature, a probable hearth, was uncovered.

The temporally diagnostic artifacts recovered here reflect episodic use of this location during the Early Archaic period, which is represented by one projectile point, a Baker dart point (Figure 14, f), the Late Archaic, which is represented by five dart point fragments, and the Late Prehistoric, which is evidenced by three arrowpoint fragments (Figure 14, a–e). The absence of Middle Archaic-age projectile points may well be due to sampling error, considering the small area of the site that was excavated. The remainder of the artifact assemblage reflects expedient tool use for the same broad variety of purposes seen in the inventory from 41VV889 (Table 5). The obvious conclusion is that the Windmill Midden is the result of episodic task-oriented exploitation of this upland flat at times when water was available in the tinajas.

Figure 13. Photograph showing work in progress at 41VV964.

Table 5. Artifacts From the Windmill Midden Site, 41VV964

Level (cm)	Primary Flakes	Secondary Flakes	Tertiary Flakes	Chips	Edge-Modified Flakes	Unifaces	Bifaces	Cores	Projectile Points
Trench area									
Surface	1	47	83	152		14	52	2	1 Ensor, 3 (F) dart points
0-10	2	43	213	278	10	3 2 (F)	1 11 (F)	1 (F)	
10-20		30	133	168	4 3 (F)	3 2 (F)	2 9 (F)	2	1 Baker, 2 (F) dart points
20-24		1	12	16	1				
Other units									
0-10		4	29	29			2 (F)		1 (F) arrowpoint
10-20		23	103	102			3 (F)		
0-10	1	31	229	341	7	3 (F)	10 (F)		2 (F) arrowpoints

NOTE: F = Fragment(s)

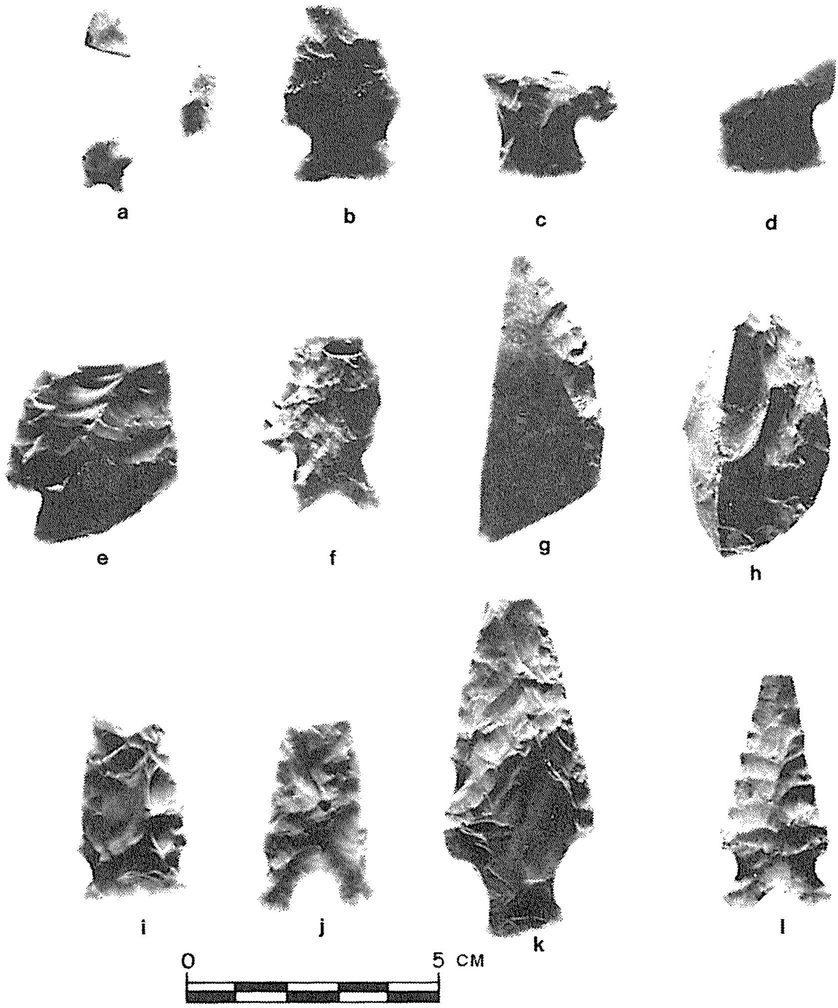


Figure 14. Upper two rows from 41VV964: a) arrowpoint fragments; b) Ensor dart point; c) Marcos dart point fragment; d–e) Castroville fragments; f) Baker dart point; g) uniface with silica sheen; h) uniface with step-fractured edge. Lower row from 41VV1145: i) Ensor; j) Frio; k) Val Verde, l) 41VV999: Frio dart point.

41VV974—Spring Midden

The largest group of excavators concentrated on the Spring Midden, 41VV974—a large buried open campsite on an alluvial terrace on the left bank of Dolan Creek, 200 meters above Dolan Springs—and Yellow Bluff, about 1.5 km above the confluence with the Devils River (Figure 15). Norman Flaigg was field supervisor of the excavations, and Paul Lorrain led the youth group.

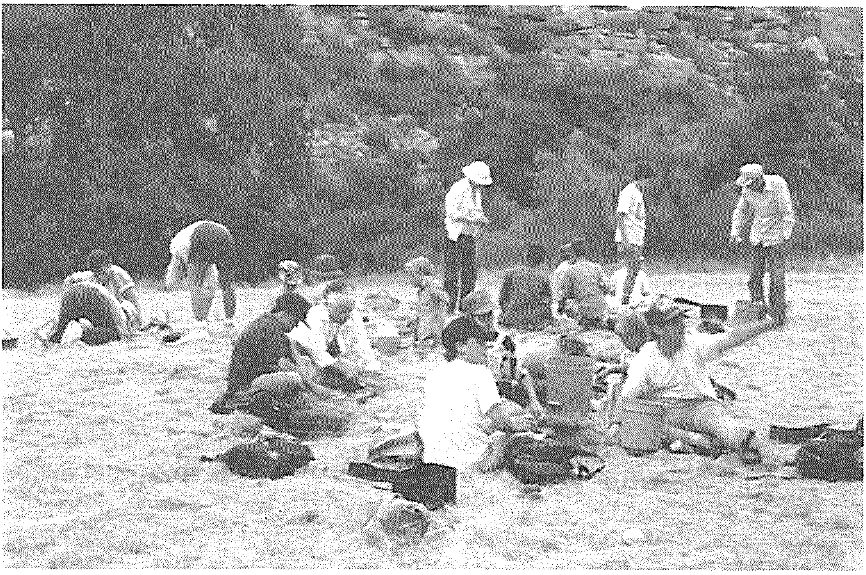


Figure 15. Photograph showing the youth group at work at 41VV974.

The terrace that is now part of site 41VV974 was for a time the location of the Dolan Creek Ranch commercial camping facility, which was complete with underground utilities. The site was identified from dense quantities of lithic debris and burned rock that were exposed in the cutbank of a dirt road leading from the campground to the major pool formed by Dolan Springs. Cultural material had been reported at each of the commercial campsites during installation of the utilities. The site was excavated because TPWD needed a basis for making informed decisions on the future use of this camping area and the road to the spring.

Excavations at Spring Midden were confined to the extreme south end of the area in order to avoid as much as possible disruption of underground utilities and of the habitat of the black-capped vireo. The excavation units were placed above the erosional cut created by vehicular traffic, for the area was known to be rich in buried cultural debris, including burned rock, ashy soil, charcoal, and chipped and ground stone artifacts.

Fifteen 1-meter squares were excavated by the adults and 31 50-cm units by the youth group. The test pits were scattered over an area measuring 26 meters north to south by 27 meters east to west; their locations were triangulated from north-south and east-west baselines established by the transit. Units were identified by grid coordinates measured from a primary datum point—N50/W100—at the south end of the terrace. A permanent vertical datum was a nail driven into a large oak tree that dominated the western excavation area and provided welcome shade for certain fortunate excavators. Elevations were controlled with line levels attached to unit corners at ground level and were verified by transit readings at the bottoms of levels;

vertical control was in 10-cm increments. The matrix was screened through quarter-inch mesh, and a limited amount of fill was fine-screened through sixteenth-inch mesh. Most of the excavation was done with trowels and shovels, though it was necessary to use picks in particularly hard-packed areas. Profiles of selected test pits were drawn at the close of fieldwork.

The excavations exposed the remains of an intensive occupation in a lens that ranged in thickness from 20 to 50 cm. The densest accumulations of burned rock were in the southern part of the excavation area near the edge of the terrace. The midden zone consisted of black clay loam that contained a wide variety of chipped stone tools, considerable quantities of debitage and charcoal, and limited amounts of mussel shell, snails, and bone (Table 6). Above the midden zone, prehistoric cultural materials were in a thick dark brown clay. Below the midden zone was a gray sandy matrix, ranging from 15 to 30 cm in thickness, and cultural debris that decreased with depth. Absent from this zone were the abundant fire-fractured limestone rocks found in the midden zone. A clearly identifiable, culturally sterile, coarse-grained yellow sand with rounded gravels and cobbles was encountered below the gray sand. A single 20-cm-square shovel test was excavated 65 cm into this yellow sand zone, but the single flake and few chips that were recovered can be attributed to downward displacement by bioturbation. All of the soils at the site are alluvial in origin and were deposited on the site by overbank flooding of Dolan Creek.

Aside from the burned rock midden along the south edge of the excavation area, only one feature was documented—a loose concentration of burned limestone rocks in Level 2 of Unit N59/W101 (midden zone) was identified as a hearth remnant. The feature was surrounded by loose, ashy midden soil flecked with charcoal. Secondary and tertiary flakes, chips, and several pieces of heat-shattered chert were recovered from the level.

The variety in the projectile point inventory demonstrates that the site contains multiple buried prehistoric components and has been occupied for several millenia. The Late Prehistoric Period is represented by Perdiz arrowpoints (Figure16, a, b). Occupation during the Late Archaic is indicated by the recovery of Ensor, Fairland, and Frio-like dart points (Figure 16, c–e), and an Early Archaic component is represented by an extensively reworked dart point that has morphological characteristics similar to Bell (Figure16, f). The absence of Middle Archaic specimens is curious but may be attributable to sampling error. The vertical positioning of these temporally diagnostic artifacts indicates that this part of the site is stratified and apparently undisturbed (Table 6). This observation is strengthened by the absence of recent or historic materials below Level 1, despite the intensive use of the area in modern times. Unfortunately, because no unit was more than 80 cm deep and many contacted sterile matrix at 50 to 60 cm below the surface, separation of components or identification of particular assemblages in the inventory of artifacts would be difficult. Apparently this part of the terrace has long been a stable landform where very little deposition has occurred. Many other chipped stone artifacts were recovered during the excavation—edge-modified flakes (by retouch

Table 6. Artifacts Recovered From the Adult Excavation Units at Spring Midden, Site VV974

Unit	Level	Primary Flakes	Secondary Flakes	Tertiary Flakes	Chips	Utilized Flakes	Unifaces	Bifaces	Cores	Tools	Projectile Points
N56/W96	1		10	10	5					1 Drill	
N56/W102	2		4	14	21	1					1 Perdiz base
	3		16	20	26	1		1 (F)	2		1 Dart point (F)
N75/113	2		1	4	6				1		1 Perdiz
N56/W99	2	2	9	11	5					1 scraper	1 arrowpoint (F)
N50/W100	2		3	7	10			1 (F)	1		1 Ensor
N59/W101	2		6	9	13	2					1 Frio (F)
N60/W96	3		20	45	14	1				1 (F)	1 Ensor, 1 Frio
N76/W114	3		3	3	4				2		1 dart point
N60/W102	2	14	4		4	1	2	1 (F)		1 side scraper	
	3		3	9	5			1 (F)	1		
	4		1	3	2			1 (F)	1		
	5		4	5						1 scraper	
N76/W118	5	1	1	7	3		2			1 side scraper	
N60/W92	5		2					1 (F)			
	6										
	7			6	1	1					1 Bell-like dart point

NOTE: (F) = fragment

and utilization), a variety of thick and thin bifaces, scrapers, and unifaces (Figure 16, g–l, Table 6). These formal tools, as well as the projectile points, were distributed throughout all levels of the excavation, indicating that the site's inhabitants were involved in diverse but similar activities—hunting, gathering, and processing—throughout the history of the site.

Lithic debitage is the most common artifact recovered in all levels of the excavation, indicating that lithic reduction was one of the primary activities in the

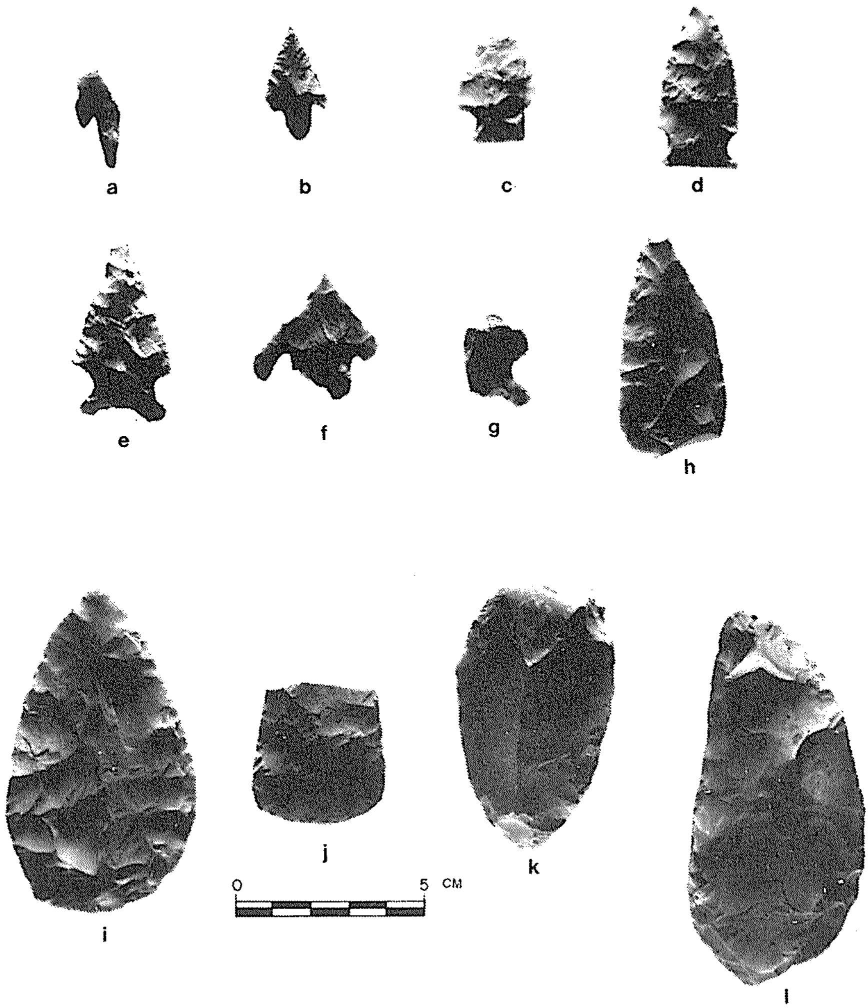


Figure 16. Projectile points and tools from 41VV974: a–b) Perdiz arrow points; c–d) Ensor-like and Ensor dart points; e) Frio dart point; f) Bell-like dart point; g–l) various bifaces and unifaces.

area tested. Most of the inventory consists of tertiary and secondary flakes and decorticate chips, but cores and thick bifaces are also present. Samples recovered by fine screening from several levels in various test units yielded only minimal quantities of small bifacial thinning flakes, indicating that much of the final knapping apparently was being done in other areas of the site.

The Spring Midden typifies the patterning of large open campsites along the Devils River in optimal resource zones. The stately oaks that surround the campground are but a vestige of the dense groves of hardwood trees described by early settlers. The site overlooks the largest and most reliable spring in the area and would be expected to have been occupied throughout prehistory. The wide range of activities illustrated by the artifact inventory is compatible with a reliable resource base that probably would have encouraged long-duration habitation. These test excavations have served to demonstrate the archeological significance of the Spring Midden, both in terms of its information potential and its special role in the overall settlement patterns of this region.

Fawcett's Cave, 41VV999

Fawcett's Cave is a well-known geologic feature, explored, mapped and studied by the Texas Speleological Society (TSS) (TSS files) and described for the Devils River Natural Area survey by Deal and Fieseler (1975). The cave extends under the divide between Horseshoe Bend Canyon and Jane Hollow, north of the Horseshoe Bend of the Dry Devils River in the heart of the densely utilized upland flat near excavated sites 41VV964 and 41VV889. Important geologic features are found in six mapped galleries more than 2,450 feet (750 meters) long and dropping to as much as 110 feet (33 meters) below the surface. Although the entrance, a round opening in the limestone bedrock, is less than a meter in diameter, the massive talus cone in the cave beneath it is at least 10 meters high and 10 meters wide. The cave is also a bat sanctuary, so the downslope side of the talus is slick with guano.

Fawcett's Cave mirrors on a much grander scale the configuration of Seminole Sink, a vertical shaft cemetery in Seminole Canyon State Historical Park, where Early Archaic and Late Prehistoric skeletal material was excavated in 1984 (Turpin 1988). Before TPWD acquired the cave, and, in conjunction with a TSS bat census field trip, David G. Robinson excavated a 1-by-1-meter test unit on the slope of the talus cone beneath the entrance hole. Among the faunal remains recovered was a fragment of a long bone shaft that resembled a human tibia. Further testing of this enormous talus cone was carried out under the supervision of Leland C. Bement during the field school to ascertain whether the site was archeologically as well as biologically and speleologically significant. The following summary of site testing is based on Bement's field report.

The testing presented several logistical problems that were resolved by the use of equipment of proven utility at other sinkhole burial sites. A heavy steel bar placed across the entrance held a pulley for hoisting matrix from the depths of the cave, and a cable ladder suspended from a frame below the entrance led to an extension ladder set against the massive breakdown blocks. A portable generator on the surface provided electricity for lighting. All materials that accumulated near the opening each day had to be removed at the close of work lest they impede the evening bat flights.

Two 1-by-1-meter units were excavated in 10 cm levels (Figure 17), and the matrix was bagged and removed to the work station at the Windmill Midden site (41VV964) where it was water-screened through window screen-sized mesh. Unit A was in the drop zone directly below the entrance in a narrow, rock-strewn crawl space affectionately called the Antechamber. Recovery was limited to faunal remains, including bones of porcupine, rattlesnake, deer, and hundreds of bats of the species *Myotis velifer*, the common cave bat that still inhabits the sinkhole. This unit was terminated at 40 cm.

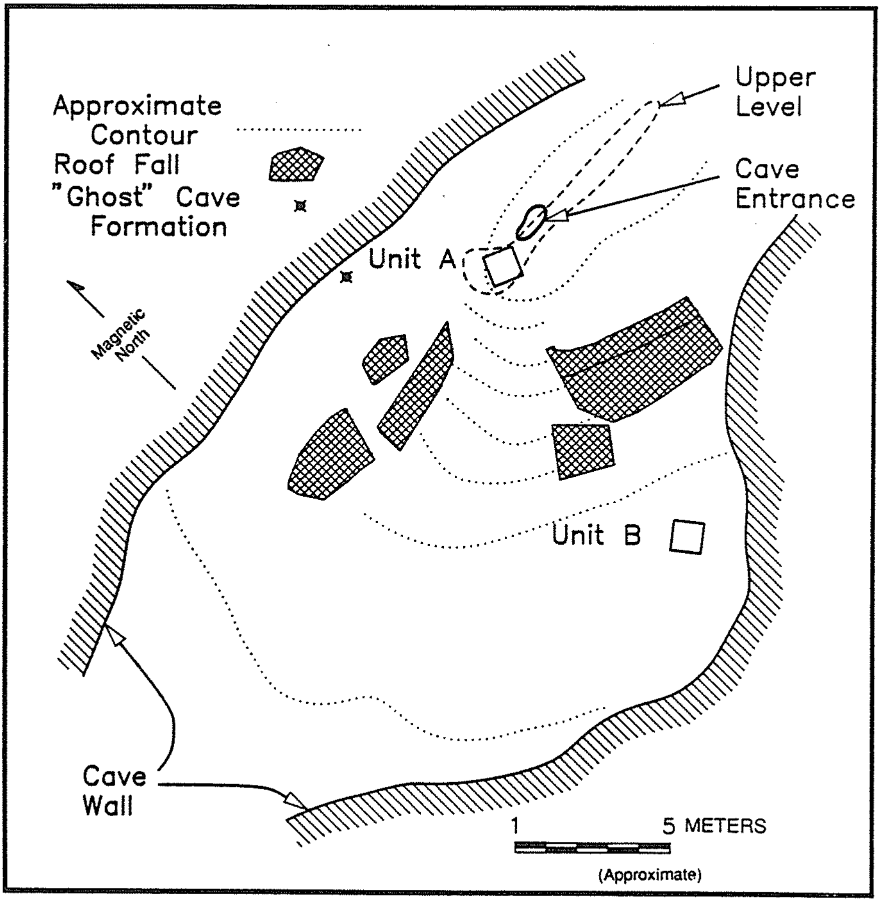


Figure 17. Topographic map showing excavation units at 41VV999, Fawcett's Cave.

Unit B was near the base of the talus cone beneath a zone of large breakdown blocks (Figure 17). A discrepancy between compass readings and magnetic north as shown on the 1961 TSS map could not be reconciled, but the field school map (Figure 17) shows the locations of both units in relation to the outstanding speleological feature in this part of the cave—a white flowstone drape 15 feet (4.6 meters) tall known as The Ghost of Fawcett's Cave. The remains of at least two large deer were removed from the surface of and around Unit B. Included in a quantity of animal bone removed as Level 1 was one human finger bone, recovered during water screening. A second human bone, a metatarsal identified in Level 2, confirmed the archeological nature of the cave deposit. The crew broke through the flowstone at the bottom of Level 2 and obtained from Level 3 a sample of Pleistocene-age fauna, including camelid, turtle, deer, and the ubiquitous bat. The unit was abandoned on contact with an impenetrable flowstone sheet at the base of Level 3, beyond the range of possible human use of the cave. The only artifact recovered during this investigation was a complete Frio dart point found on the surface of the talus cone (Figure 14, l).

This testing program demonstrated that Fawcett's Cave is an archeological site with the potential to yield significant information about regional mortuary practices and human health, diet, and physical characteristics. The camelid remains recovered from Level 3 of Unit B also suggest that the cave may be of paleontological importance. The talus cone is a fragile environment for these osteological remains unless traffic from the nearby entrance is controlled. These test excavations should help TPWD plan for future exploration and protection of both the cultural and natural resources of Fawcett's Cave.

41VV1145, Horizontal Shaft Cave, Rough Spring Canyon

Limited testing of 41VV1145, recorded during the field school, was conducted by a group of TAS volunteers during the 1989 Thanksgiving weekend. The site is a horizontal shaft cave in the bottom of Rough Spring Canyon, 4.3 km above its confluence with the Devils River. Formed by ground water action, this solution cavity was exposed in the vertical canyon wall by stream downcutting (Figure 18).

The cave was first documented as a rock art site because many apparently random straight lines have been incised into the bedrock on the gently sloping floor, sides, and roof inside the opening (Figures 18, 19). Its small size and the likelihood of frequent flooding precluded extensive habitation, but it seems highly probable that it was used as a ritual or sacred location. Testing was undertaken to determine whether the cave held human burials and to identify the activities that may have produced the cut-marks and lithic debris in the antechamber.

The cave entrance is 2.2 meters high and 2.7 meters across at the mouth, and the floor is about a meter above the creek bed. The antechamber extends about 3 meters into the bedrock before the upward slope of the floor begins to constrict it. At 5 meters, the shaft is reduced to a low, horizontal tunnel, ranging from 30 to 50 cm in height and 60 to 90 cm in width, for 27 meters, where the crawl space is blocked by sediments that have filled the tunnel.

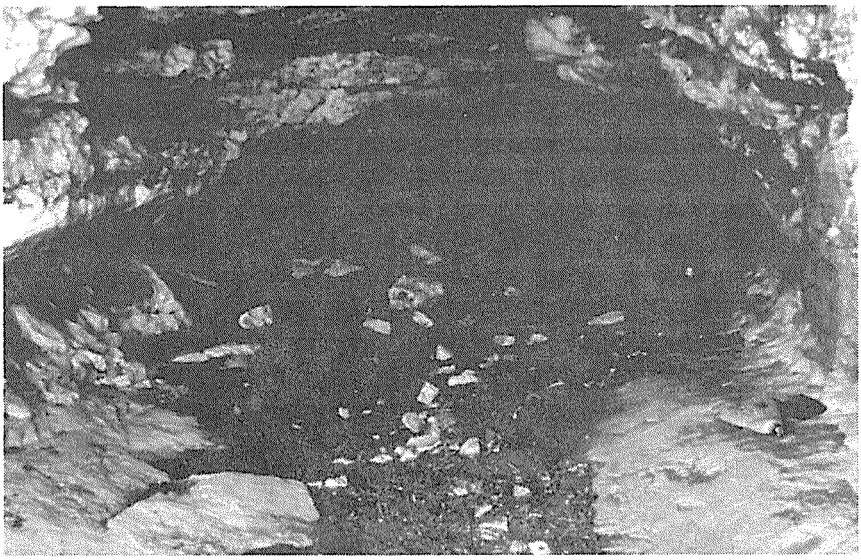


Figure 18. Photograph showing cut marks around the entrance to the horizontal shaft cave, 41VV1145.

The loose fill that covered the floor just inside the mouth of the cave was removed to determine whether additional cut-marks may have been buried when material slumped from the mound of dirt that extends from the middle of the antechamber to the mouth of the small tunnel. Not only were more grooves exposed, but screening also produced a considerable number of chipped stone artifacts.

Two contiguous test pits were excavated in the front part of the cave. Test Pit 1, a 1-meter square, was laid out in the center of the mounded deposit, with one edge paralleling the profile that had been exposed by cleaning out the loose fill. Test Pit 2 extended the grid-east wall of Test Pit 1 to the curving wall of the cave, a distance of roughly 75 to 90 cm. Both were dug in arbitrary 10 cm levels, and all matrix was screened through quarter-inch hardware cloth.

Excavation revealed that 30 to 40 cm of prehistoric cultural material is buried in a dark gray sediment deposited in the front of the cave by backwash flooding. The depth of deposits increases toward the rear of the antechamber, reaching perhaps 80 cm near the mouth of the tunnel. Temporally diagnostic projectile points, typed as Ensor, Frio-like, and Val Verde (Figure 14, i–k), were recovered from these test pits (Table 7), indicating that the site was used from the Middle to Late Archaic. Lithic chipping debris was the largest artifact category, but a few chipped stone tools, a mano fragment, and bone, charcoal, and burned rock were recovered.

A third test unit, 50 cm square, was excavated in the tunnel at an arbitrary point 2.5 meters from its entry, where the unit was readily accessible and matrix

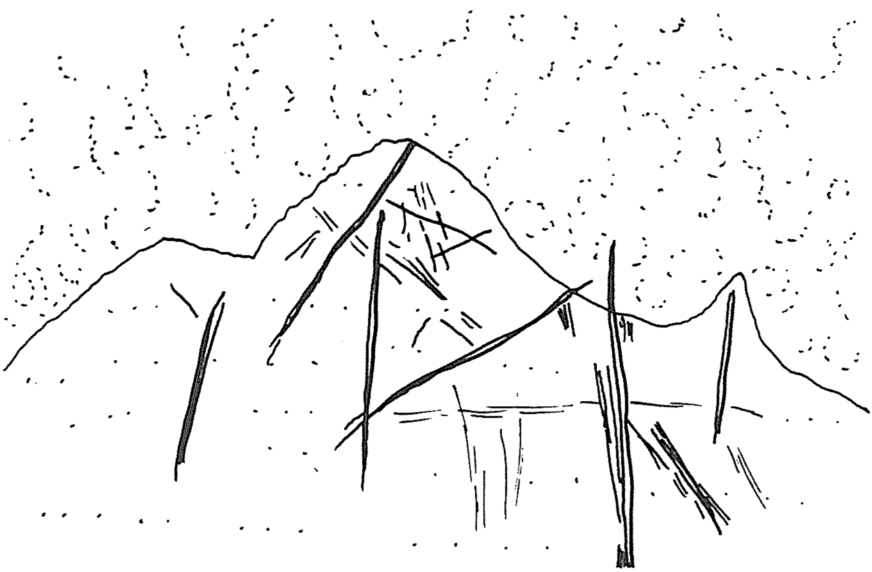


Figure 19. Sketch showing apparently random cut marks on the smooth surface inside the entrance to the horizontal shaft cave, 41VV1145 (drawn by David G. Robinson).

could be moved from it out to the screens. The top of the first 20-cm level, Level 1, contained quantities of recent decaying organic materials—bone and teeth—all byproducts of sheep, goats, and small animals that used the cave, and a small amount of lithic debris and charcoal. Level 2 yielded bone, charcoal, and lithic debris. From the bottom of Level 2 to bedrock at 78 cm, only one bone fragment and one lump of charcoal were recovered.

This very limited testing program produced no evidence of human burials in the shaft cave, but so little of the tunnel area was sampled that these findings are not conclusive. The lithic debris found in the upper level of the one test pit in the tunnel may have been redeposited by flood waters from the larger entrance chamber. The more substantial cultural deposits in the antechamber demonstrate that the cave was used for maintenance activities, but the low rate of deposition makes separation of temporal components difficult. The intensity of occupation apparently was not sufficient to have produced the dense concentration of incised lines, from either tool manufacturing or hide processing, suggesting that a nonutilitarian explanation is more appropriate.

Table 7. Artifacts from Horizontal Shaft Cave in Rough Spring Canyon Site (41VV1145)

Level	Primary Flakes	Secondary Flakes	Tertiary Flakes	Chips	Edge Modified Flakes	Unifaces	Bifaces	Cores	Tools	Projectile Points
Surface				13	4		2 (F)	7	1 Chopper	
Test Pit 1										
0-15		1	1							
15-25		9	15	22		1	1 (F)	10		
25-35	5	40	87	66	2		1 (F)	9	1 End scraper	
35-43	1	7	11	48	1					Val Verde
Test Pit 2										
0-20				1				1		
20-38			1	7						
38-60										
60-bedrock										
Test Pit 3										
0-15	2			1						
15-25		2	1	1						Frio
25-35	1	13	25	20				4	1 Mano (F)	Ensor

NOTE: (F) = Fragment(s)

ROCK ART RECORDING

Another task undertaken by TAS in 1989 was the accurate recording of both previously recorded and recently discovered rock art sites in the DRSNA. The call for preservation of the famous rock paintings of the Lower Pecos region has echoed through the literature for more than 50 years (Jackson 1938), but the myriad sources of deterioration, from both natural decay and human intervention, have impeded any major conservation programs (Silver 1985; Turpin 1982). Detailed recording is emerging as the most important task in rock art research (Smits 1990) because of the lack of technical means of preserving the paintings and the prohibitive cost of protecting them from further deterioration. Long-time photographic recorder of Lower Pecos rock art, Jim Zintgraff, donated his services to the project, photographing the most well-preserved pictographs in the DRSNA and vicinity. In his 30 years of experience, Zintgraff has developed a special system for photographing rock art, using polarized flashes and filters, and a large-format camera to produce excellent color reproductions.

Since the dolomitic limestones of the Devils River area, especially those along Dolan Creek, tend to fracture and powder, they provide a poor surface for the preservation of paintings. Weathering has dimmed the once vibrant colors, and mineral accretions have both obscured many elements and accelerated exfoliation. The DRSNA pictographs vary in their clarity, so reconstruction is necessary if the entire range of the iconography is to be documented. An alternative to photography—the one used in the Lower Pecos by the most famous rock art recorder in Texas, Forrest Kirkland (Kirkland and Newcomb 1967)—is water-color scale copies. They are sometimes criticized as being prone to artistic bias, but drawings allow for some reconstruction of the artist's intent, especially if the copyist is intimately familiar with the topics, conventions, and techniques of the various styles. In the DRSNA, all the pictographs belong to the Pecos River style (the most ancient art [Figures 2, 3]), the Red Linear style (a Late Archaic miniature art form), or the Historic period (differentiated by the introduction of motifs from European or Plains cultures [Figure 4]).

The TAS responded to the urgent need for renderings of the DRSNA rock art by fielding a special team of artists and photographers (Figure 9). Led by Teddy Stickney, this crew recorded pictographs at rockshelters 41VV207, 41VV209, 41VV888, 41VV889, 41VV921, and 41VV1088 during the field school (Robinson 1989). Later, on weekends and holidays, these volunteers continued the documentation by copying remnant figures in 41VV527 and 41VV915.

The procedures used and refined by the rock art crew were drawn up by artist Nola Montgomery, of TPWD; they were tested during the field school for broader application to other endangered pictograph sites on state-owned lands. David G. Robinson, of TARL, who has been producing illustrations of rock art for the past ten years, contributed his experience in the reconstruction of badly deteriorated images.

The first step in the recording process is to lay a 1-meter baseline along the bottom curvature of the rear wall of the shelter to permit the accurate recording of the provenience and relationships of the individual figures. The designs are sketched and described on a preliminary map on graph paper referred to the measured base line. Overlapping black-and-white and 35 mm color photographs are then taken to cover each section of the panel (each photograph includes color and tone correction charts and a scale). Slow color film, such as color positive or slide film, requires the use of a tripod, but is preferred because of its fine texture.

Each scene is then copied in pencil onto graph paper, using the most convenient scale. A transparent plastic grid is sometimes superimposed on the larger paintings to provide a guide for proportions and relationships. Water color copies are made, using a color palette matched to the earth tones of the mineral pigments used in the pictographs.

TPWD plans to use the techniques and methods developed at the field school in documenting the rock art in other parks, most notably sites that were not copied during a survey of Seminole Canyon State Historic Park and the newly recorded pictographs at Big Bend Ranch State Natural Area. The one cautionary note introduced by a review of the copies produced during the field school is the oft-repeated criticism of artistic bias. It is imperative that reconstruction of faded or deteriorated rock art be done by artists who are well versed in the regional styles. There is no room for artistic license in this type of documentation, but restricting the copiers to reproducing only the paint that remains on the walls today results in images that bear little resemblance to the original drawings or the intent of the prehistoric artist.

DISCUSSION OF FIELD SCHOOL FINDINGS

The major accomplishments of the 1989 field school contributed to three of the TAS's primary goals: conservation of resources, education, and research. In conservation of resources, the identification or reassessment of 239 archeological sites on the newly acquired State property provided the Texas Parks and Wildlife Department with a management tool, saving them hundreds of thousands of dollars and considerable time and effort. More specific testing programs at six sites gave the TPWD information about previously unknown paleontological deposits, possible mortuary sites, and ritual behavior, and advised them of the importance of both rockshelters and open camp sites.

From an educational perspective, the emphasis on broad area survey exposed many of the participants to recording methods that had not been addressed in most of the previous TAS field schools. This field school also launched the rock art recording crew, an endeavor that has taken on a life of its own as a formal organized activity of the TAS that now extends far beyond the boundaries of the DRSNA (Robinson 1989).

Finally, the comparative data gathered by this large area survey permit refinement of regional settlement patterns on the Devils River that previously had been based largely on information gathered on the Rio Grande and the Pecos River. One major difference from the Rio Grande and the Pecos, seen in the DRSNA and corroborated by subsequent surveys, is the dearth of large, deep rockshelters along the Devils River. The few exceptions, such as Baker Cave, Big Satan Canyon, and Skyline Shelter, were obviously intensively utilized throughout prehistory. Most of the rockshelters in this area are small or structurally weak shallow overhangs that provided only limited protection, so there was less intensive occupation, shallower deposits, more disturbance of the strata, and poorer preservation. The equivalent of Pecos River rockshelters, in terms of intensity of occupation, may be the enormous open camps that line both banks of the Devils River and are concentrated at the mouths of the major tributaries where several different resource zones meet.

The tendency of the limestone bedrock to exfoliate has drastically affected the preservation of rock art along the Devils River, but enough remains to detect regional differences within the various styles. Sites in the DRSNA have at least two examples (41VV207 and 41VV209) of the Devils River variation on the typical Pecos River style feline theme. At 41VV207 and at other sites down river, the cigar-shaped mountain lions are painted high on the shelter walls above other figures. The Devils River artists were also more likely to conventionalize human figures into miniature parabolic bodies with upraised stubby arms, usually lining up several in a row (Figure 20).

The recording of many middens on the upland flats is another contribution of the field school to clarification of Lower Pecos settlement patterns. Along the Rio Grande, the Pecos River, and on the extreme lower reaches of the Devils River, remnant outcrops of Buda Limestone form rounded hills surrounded by flat surfaces of Del Rio Clay. The prehistoric people preferred open campsites on these flat surfaces as long as they were near the heads of rapidly entrenching tributaries. Inevitably, the rounded hills of Buda Limestone are fringed by burned rock middens and hearth fields composed of flat pavements of burned rock and dense lithic debris. However, in the DRSNA, and in general along the Devils River above Big Satan Canyon, the Buda Limestone has completely eroded away, so this setting is not represented in the inventory of sites. But, in all three river systems, burned rock middens and scatters line the gentler reaches of the tributaries, especially at confluences with other minor drainageways. The more rapid entrenchment of canyons along the Pecos and Rio Grande is reflected in the lower frequency of sites in the lower stretches where the walls limit the living space. Upland middens in the Pecos and Rio Grande survey areas are concentrated along the rims of the major river valleys and around the heads of plunging tributaries, where steep dropoffs often create tinajas that hold rain water. In the DRSNA, middens and open campsites are most frequently seen on the upland flats near springs, the heads of minor drainageways or natural depressions that served as rainwater reservoirs. Many of these upland tinajas are now filled with sediment that masks the role they played in settlement strategies.

A less obvious, but nevertheless important, environmental response to differences in topography is illustrated by the relationship of site types to landforms along

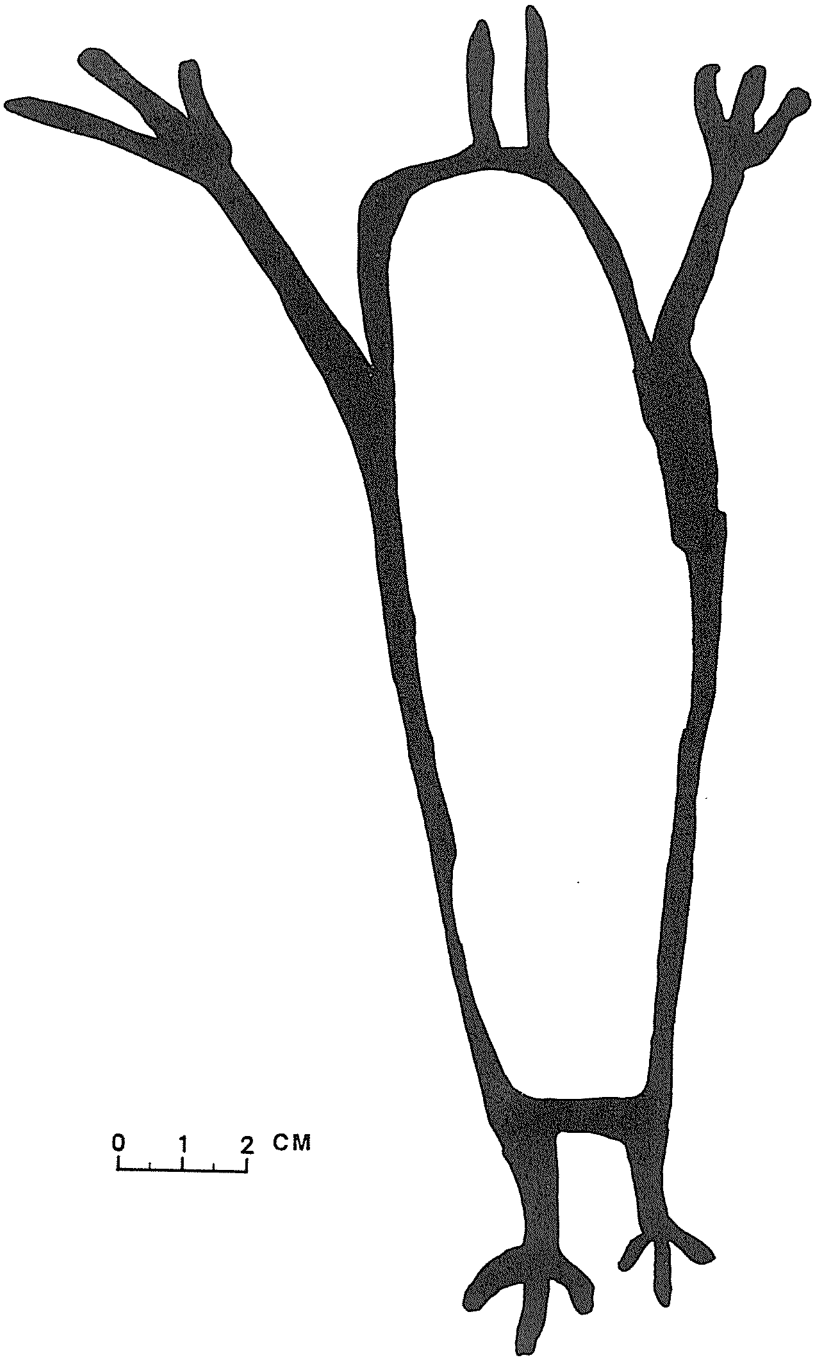


Figure 20. A typical Devils River anthropomorphic figure.

the three rivers. The Pecos canyon is relatively narrow and deeply entrenched, with sheer cliffs broken only by tributary streams that have formed their own equally steep-sided canyons. Although the Rio Grande has a much broader floodplain with terraces suitable for open campsites along much of its course, access from the riverine floodplain to upland resources is restricted to the avenues provided by the tributaries. The many hanging tributaries, formed where their downcutting has not kept pace with the entrenchment of the river, have formed cliffs that block transit between the two drainageways, limiting settlement on these floodplains.

Although massive bluffs loom over the lower Devils River, the cliffs alternate with gentler, sloping valley walls, creating an undulating terrain. Typically, the slopes are stepped, rising in three tiers from the river bed to the bluff top. The distance between the streams and the upland flats is greater where the slopes are stepped than where the cliffs are steep, but travel on the uplands was not restricted to the drainages or the occasional breaks in the cliff line. These differences in elevation influenced site selection, with the result that open campsites fringe the canyon rims along the Pecos and Rio Grande, where there was better access to resources. Reliance by inhabitants of the Devils River area mainly on open campsites that are scattered across the broad upland flats may have been due in part to the scarcity of habitable shelters along the streams and in part to the abundance of springs. In addition, these upland locations were free from the constraints imposed by limited accessibility.

The differences in distribution of site types between the Pecos and Devils rivers are of importance in studies of settlement patterns where the causal, or deterministic, effect of environment as opposed to the effect of culture has long been argued. In the Lower Pecos, it is possible to see the effects of both environment and culture as settlement preferences changed over time and space. The environmental constraints discussed above are obvious, since they operated directly upon the basic human needs for water, food, and shelter, but several equally effective options were part of this broad adaptation to the topography, hydrology, and biota of the region.

The effect of cultural selection on site distributional patterns in the Lower Pecos region is best illustrated by several changes that first become evident in the Late Prehistoric period, when rock art, which presumably is not overly influenced by environmental factors, was painted in a different style and in different places. Similarly, after a long tradition of interment of the dead in rockshelters, caves, and sinkholes, cairn burial emerged in the Late Prehistoric period as another choice of mortuary practice. Despite the availability of rockshelter homes, intrusive people apparently preferred open camps on high promontories, where they erected the circular rock structures that identify the Infierno phase. Still later, in the historic Native American period, acquisition of the horse produced yet another shift in site selection, favoring campsites that were more accessible to water holes and grazing land.

In summary, the 1989 TAS Field School produced data that made possible the first comparisons of settlement patterns in subregions within the relatively well defined Lower Pecos cultural area. The survey identified several environmental factors that affected prehistoric use of the landscape. Most obvious are the distribution of permanent and casual water sources, the availability of rockshelter habitation, and accessibility among diverse resource zones. The human element is most apparent in the various options exercised by the people whose cultural preferences are expressed by where they lived, how they buried their dead, and what they considered worthy of commemoration in their art.

REFERENCES CITED

Alexander, R. K.

1974 The Archeology of Conejo Shelter: A Study of Cultural Stability at an Archaic Rockshelter Site in Southwestern Texas. Unpublished Ph.D. dissertation, The University of Texas at Austin.

Andrews, R. L., and J. M. Adovasio

1980 Perishable Industries from Hinds Cave, Val Verde County, Texas. Department of Anthropology *Ethnology Monograph* 5, The University of Pittsburgh.

Austerman, W. R.

1985 *Sharps Rifles and Spanish Mules, The San Antonio-El Paso Mail, 1851–1881.* Texas A&M University Press, College Station.

Brown, K. M.

1989 Test Excavations at 41VV209, A Preliminary Report. Ms. on file at Texas Archeological Research Laboratory, The University of Texas at Austin.

1991 Prehistoric Economics at Baker Cave: A Plan for Research. In: Papers on Lower Pecos Prehistory, edited by S. Turpin, pp. 87–140. Texas Archeological Research Laboratory *Studies in Archeology* 8. The University of Texas at Austin.

1993 Wooden Artifacts from the Lake Amistad Area. Texas Archeological Research Laboratory *Studies in Archeology*. The University of Texas at Austin (In press).

Bryant, V. M. Jr.

1969 Late Full-Glacial and Postglacial Pollen Analysis of Texas Sediments. Unpublished Ph.D. dissertation, The University of Texas at Austin.

Bryant, V. M., Jr., and H. J. Shafer

1977 The Late Quaternary Paleoenvironment of Texas: A Model for the Archeologist. *Bulletin of the Texas Archeological Society* 48:1–25.

Campbell, T. N.

1979 Ethnohistoric Notes on Indian Groups Associated with Three Spanish Missions at Guerrero, Coahuila. Archaeology and History of the San Juan Bautista Mission Area, Coahuila and Texas. *Report 3,* Center for Archaeological Research, The University of Texas at San Antonio.

Caran, S. C.

1989 Field Notes and Discussion of Local Geology, Comments on Geology of 41VV209. On file at Texas Archeological Research Laboratory, The University of Texas at Austin.

Chadderdon, M. F.

1983 Baker Cave, Val Verde County, Texas: The 1976 Excavations. *Special Report* 13, Center for Archeological Research, The University of Texas at San Antonio.

Collins, M. B.

1969 Test Excavations at Amistad International Reservoir, Fall 1967. *Papers of the Texas Archeological Salvage Project* 16, The University of Texas at Austin.

Deal, D. E.

1975 Geologic Environment of the Devils River-Dolan Creek Area. In: *Devils River: A Natural Area Survey,* Part VI:14–28. Division of Natural Resources and Environment, The University of Texas at Austin.

Deal, D. E., and R. G. Fieseler

1975 Cave Resources in the Devils River-Dolan Creek Area. In: *Devils River: A Natural Area Survey,* Part VI. Division of Natural Resources and Environment, The University of Texas at Austin.

Dibble, D. S., and D. Lorrain

1968 Bonfire Shelter: A Stratified Bison Kill Site, Val Verde County, Texas. *Texas Memorial Museum Miscellaneous Papers* 1, The University of Texas at Austin.

Fehrenbach, T. R.

1983 *The Comanches, Destruction of A People.* Alfred A. Knopf, New York.

Gebhard, D.

1965 *Prehistoric Rock Paintings of the Seminole Canyon Area, Val Verde County, Texas.* Report to the National Park Service, University of California at Santa Barbara.

Greer, J. K.

1952 *Colonel Jack Hays: Texas Frontier Leader and California Builder.* E. P. Dutton, New York.

Greer, J. W.

1976 Fauna in Val Verde County, Texas: The Castle Canyon Site and a Modern Overview. *The Artifact* 14(1):9–18.

Hester, T. R.

1983 Late Paleo-Indian Occupations at Baker Cave, Southwestern Texas. *Bulletin of the Texas Archeological Society* 53:101–119.

1989 Chronological Framework for Lower Pecos Prehistory. *Bulletin of the Texas Archeological Society* 59:53–64.

Jackson, A. T.

1938 Picture-Writing of Texas Indians. *Anthropological Papers, Vol. II* and *Bureau of Research in the Social Sciences Study No. 27, University of Texas Publication No. 3809*. The University of Texas at Austin.

Kirkland, F., and W. W. Newcomb, Jr.

1967 *The Rock Art of Texas Indians*. University of Texas Press, Austin.

McGregor, R.

1989 Basketry from the Lower Pecos: Salvaging a Museum Collection. Master's thesis, The University of Texas at San Antonio.

Marmaduke, W. S.

1978 Prehistoric Culture in Trans-Pecos Texas: An Ecological Approach. Unpublished Ph.D. dissertation, The University of Texas at Austin.

Marmaduke, W. S., and H. Whitsett

1975 An Archeological Reconnaissance in the Devils River-Dolan Creek Area. In: *Devils River Part VI*. Division of Natural Resources and Environment, The University of Texas at Austin.

Parsons, M.

1986 Painted Pebbles: Styles and Chronology. In: *Ancient Texans* by H. J. Shafer, pp. 180–185. Texas Monthly Press, Austin.

Patton, P. C., and D. S. Dibble

1982 Archeologic and Geomorphic Evidence for the Paleohydrolic Record of the Pecos River in West Texas. *American Journal of Science 282*: 97–121. Yale University Press.

Powell, J.

1991 Human Skeletal Remains from Skyline Shelter (41VV930), Val Verde County, Texas. In: Papers on Lower Pecos Prehistory, edited by S. Turpin, pp. 149–174. *Studies in Archeology* 8. Texas Archeological Research Laboratory, The University of Texas at Austin.

Robinson, D. G.

1989 Devils River: Rock Art Preservation. *Heritage Magazine* 7(4):8–11. Texas Historical Foundation, Austin.

Schroeder, A. H., and D. S. Matson

1965 *A Colony on the Move. Gaspar Castaño de Sosa's Journal 1590–1591*. School of American Research, Santa Fe.

Shafer, H. J.

1981 The Adaptive Technology of the Prehistoric Inhabitants of Southwest Texas. *Plains Anthropologist* 26(92):129–138.

1986 *Ancient Texans*. Texas Monthly Press, Austin.

Shafer, H. J., and F. Speck, Jr.
1974 A Clay Figurine Cache from the Lower Pecos Region, Texas. *Plains Anthropologist* 19:228–230.

Silver, C. S.
1985 *The Rock Art of Seminole Canyon State Historical Park: Deterioration and Prospects for Conservation.* Texas Parks and Wildlife Department, Austin.

Smits, L.
1990 Research on the Rock Art of Southern Africa in the 1980s. *American Indian Rock Art* 16:11–20.

Sobolik, K. D.
1991 The Prehistoric Diet and Subsistence of the Lower Pecos Region as Reflected in the Coprolites from Baker Cave, Val Verde County, Texas. *Studies in Archeology* 7, Texas Archeological Research Laboratory, The University of Texas at Austin.

Stock, J. A.
1983 The Prehistoric Diet of Hinds Cave, Val Verde County, Texas. Masters thesis, Texas A&M University, College Station.

Story, D. A., and V. M. Bryant, Jr.
1966 A Preliminary Study of the Paleoecology of the Amistad Reservoir Area. *Report to the National Science Foundation (CS 667).* The University of Texas at Austin.

Turner, E. S., and T. R. Hester
1985 *A Field Guide to Stone Artifacts of Texas Indians.* Texas Monthly Press, Austin.

Turpin, S. A.
1982 Seminole Canyon: The Art and the Archeology. Texas Archeological Survey *Research Report* 83, The University of Texas at Austin.

1986 Toward the Definition of a Pictograph Style: The Lower Pecos Bold Line Geometrics. *Plains Anthropologist* 31(112):153–161.

1987a Ethnohistoric Observations of Bison in the Lower Pecos River Region: Implications for Environmental Change. *Plains Anthropologist* 32(118):424–429.

1987b Be It Ever So Humble: Rock Shelter Homes of Early Settlers. *Heritage Magazine* 5(3):22–23, Austin.

1988 Seminole Sink: Excavation of a Vertical Shaft Tomb, Val Verde County, Texas. *Plains Anthropologist Memoir* 33(122).

1989 The Iconography of Contact: Spanish Influences in the Rock Art of the Middle Rio Grande. In: David H. Thomas, Editor, *Columbian Consequences, Vol. 1.* Smithsonian Institution Press, Washington D.C.

1990a Skyline Shelter. Report to the Texas Historical Commission, on file at Texas Archeological Research Laboratory, The University of Texas at Austin.

1990b Taming the Devils Country. *Heritage Magazine 8*(2):16–19.

1990c Speculations on the Age and Origin of the Pecos River Style. *American Indian Rock Art* 16:99–122.

1991a Time Out of Mind: The Radiocarbon Chronology of the Lower Pecos River Region. In: Papers on Lower Pecos Prehistory, edited by S.A. Turpin, pp. 1-49. *Studies in Archeology* 8. Texas Archeological Research Laboratory, The University of Texas at Austin.

1991b More About Mortuary Practices in the Lower Pecos River Region. *Plains Anthropologist* 37(138):7–17.

1991c Sin Nombre and El Fortin: Pecos River Style Pictographs in Northern Mexico. *Bulletin of the Texas Archeological Society* 60 (for 1989):267–281.

1991d Shields and Shield Bearers in the Rock Art of the Middle Rio Grande. *La Tierra* 18(2):5–11. Journal of the Southern Texas Archaeological Association.

Turpin, S. A., and L. C. Bement
1991 Skyline Shelter and Devils Triangular Dart Points: Evidence for a New Component of the Lower Pecos Early Archaic. *Plains Anthropologist* 37(138):41–57.

Turpin, S. A., M. Henneberg, and D. H. Riskind
1986 Late Archaic Mortuary Practices of the Lower Pecos River Region, Southwest Texas. *Plains Anthropologist* 31(114):295–316.

Williams-Dean, G.
1978 Ethnobotany and Cultural Ecology of Prehistoric Man in Southwest Texas. Unpublished Ph.D. Dissertation, Texas A&M University, College Station.

Word, J. H., and C. L. Douglas
1970 Excavations at Baker Cave, Val Verde County, Texas. *Texas Memorial Museum Bulletin 16*, The University of Texas at Austin.

Archeological Excavations at the Overseer's House, the Eagle Island Plantation, Brazoria County, Texas

W. Sue Gross, Chris Kneupper, W. L. McClure, Johnney T. Pollan, Jr., and James L. Smith

ABSTRACT

During 1984 and 1985 the Brazosport Archaeological Society investigated a house site on the former Eagle Island Plantation, in the present town of Clute in Brazoria County, Texas. The excavations exposed parts of the brick foundations of a rectangular building, an outbuilding, and a cistern. We concluded that the rectangular building was the home of the overseer and his family because it was beside the elevated roads leading to the main house, fields, slave quarters, sugar mill, and river landing, and the earliest (late 1830s) residential artifacts recovered were there. The house was later occupied by one or more working class farm families, probably black tenant farmers, until sometime after 1875, when it was abandoned as a residence and became a storage and dump site.

DISCOVERY

In December 1983 the Brazosport Archaeological Society, at the request of the Brazoria County Historical Commission, located the earliest Wharton family cemetery (Daughters of the American Revolution in Texas 1965; Pollan 1984). A map (Figure 1), drawn in 1958 by Sarah Wharton Groce Berlet, shows the much-sought-after cemetery on the north side of Eagle Lake (called Wharton Lake by members of the Wharton family). A very similar map is shown in *Autobiography Of A Spoon* (Berlet 1971:75). A larger-scale drawing of the area (Figure 2), also by Sarah W. G. Berlet, shows a sugarhouse on the shore of Bend Lake and also indicates that the house was built in 1828. The property is owned by Restwood Memorial Park, Inc., and since they are interested in learning the history of their property, the Brazosport Society began its search for the cemetery with their cooperation.

During the investigation, Jay Luce, assistant manager of the cemetery, told the authors that there was a cistern in a nearby field the cemetery had purchased for future expansion. Excavation of the site became a major objective of the Society since the property was to be developed in the near future, since the Brazosport Society needed a nearby site for training Society members in archeological techniques, and, most of all, since knowledge of nineteenth century plantations in Brazoria County—known as the Cradle of Texas History—was almost nonexistent.

Just northeast of the large open cistern, which was found in the field, was a low undulating mound. Upon investigation, we also discovered the remains of

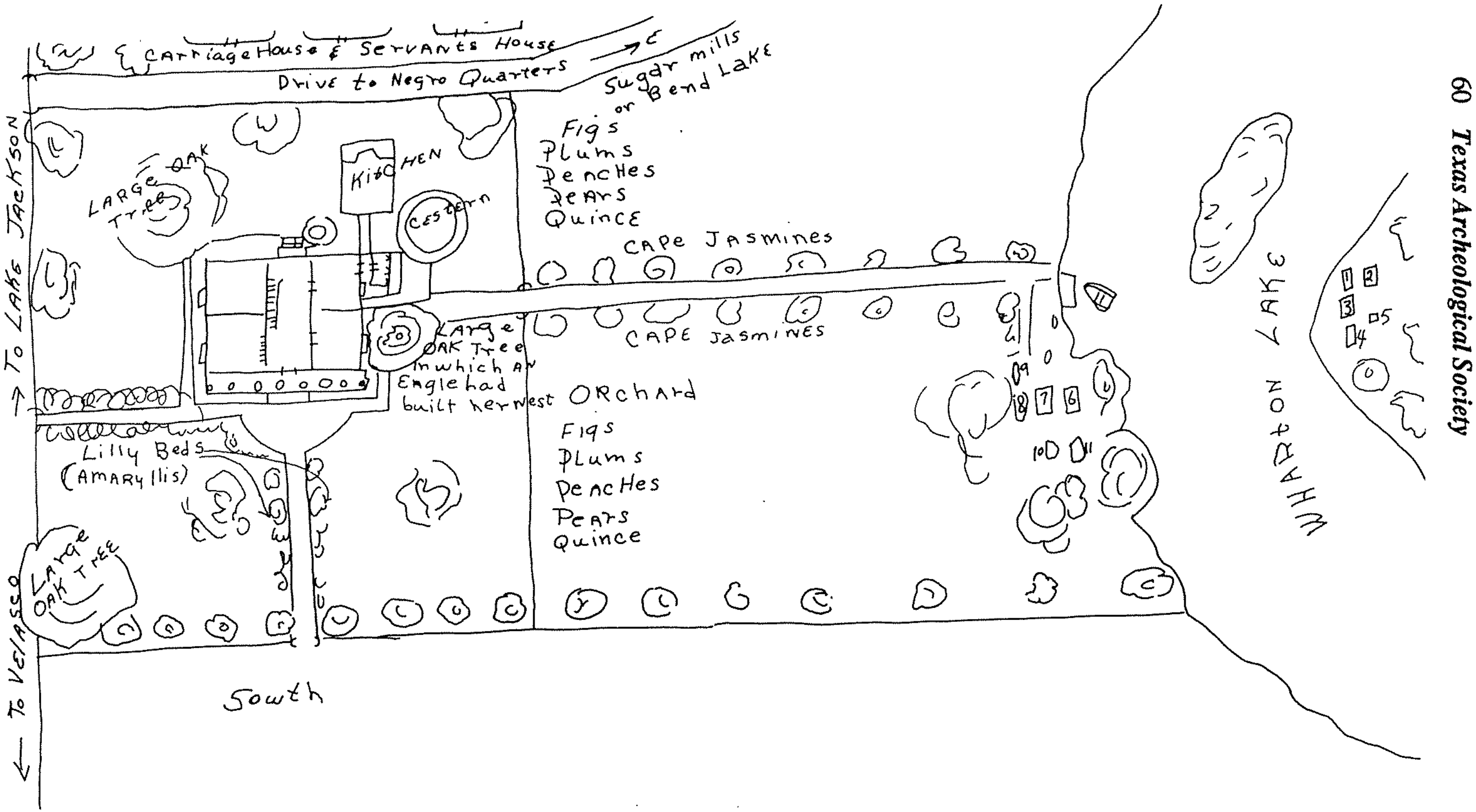


Figure 1. Copy of a sketch map of the Eagle Island Plantation house and grounds by Sarah Wharton Groce Berlet. "South" on this map is actually southeast. The original drawings for Figures 1 and 2, which belonged to Dorothy Cielinski, of Lake Jackson, were lent out and have been lost.

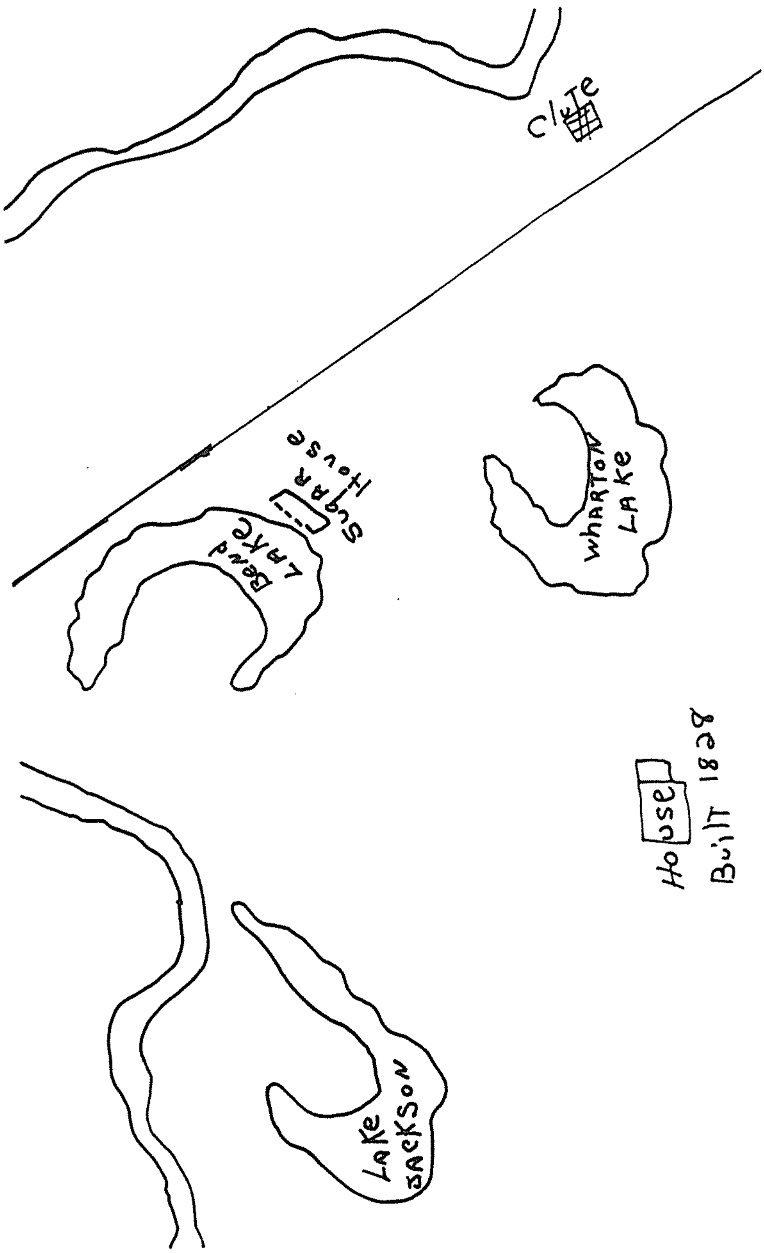


Figure 2. Copy of a sketch map by Sarah W. G. Berlet of the area surrounding the Eagle Island Plantation, Brazoria County, Texas.

an old road with ditches on both sides that passed by the site in the direction of the old sugar mill. Large pecan trees (the largest about three feet in diameter) were growing in the middle of this old road segment, and several large black walnut (*Juglans nigra*) trees were growing beside it. Black walnut is not generally native to the area, but is occasionally found near older plantation home sites, together with camphor trees (*Cinnamomum camphora*), which were often planted by settlers. Several patches of St. Augustine grass, which thrives in rich organic soil, were found in the field, so some of these grass areas were tested superficially with a metal detector, which revealed the presence of many metal objects. Subsequent shovel tests proved that most of the metal objects detected were square nails. None of these outlying areas was tested further, but it was assumed that these areas of nails were once the sites of other buildings. The low mound that covered the remnants of structures and the cistern have together been designated 41BO143, Site B, which was excavated by the Brazosport Archaeological Society during 1984 and 1985.

ENVIRONMENTAL SETTING

The Eagle Island Plantation site in Brazoria County is in a hardwood forest about 12 miles from the Gulf of Mexico (Figure 3). Most of the few sloping areas in the site are adjacent to the Brazos River and Oyster Creek. Remnants of past stream meanders are preserved in the many oxbow lakes in the region.

The many varieties of fauna and native flora in the area were exploited as food sources. The major animal species found in this forest habitat today are squirrels, deer, swamp rabbits, fur-bearing animals, and a great variety of birds. Archeological data indicate that *Rangia* clams, fish, alligators, turtles, birds, bison, and rodents were the animals most often utilized by the area's prehistoric inhabitants (Ambler 1967:69).

According to the Soil Survey Of Brazoria County (U.S. Soil Conservation Service 1981), Brazoria County is in the West Gulf Coast subdivision of the Atlantic and Gulf Plains geomorphic province. The subsurface sediments dip gently gulfward and are of Holocene or Pleistocene age. The two major soils in the former plantation are Asa silty clay loam and Pledger clay. Asa silty clay loam is a nonsaline soil with slopes averaging about 0.3 percent, and with a surface layer of neutral, very dark grayish brown silty clay loam about 14 inches thick. The soil is well drained and is rarely flooded. Surface runoff is slow, and permeability is moderate. Pledger clay is also a nonsaline soil with slopes averaging about 0.1 percent. This soil mainly supports pastureland, but also supports sorghum, soybeans, and corn. The Asa and Pledger soils are two of the most productive soils in Brazoria County.

The wooded areas are typical of the lower Brazos Valley, standing in contrast to the historically treeless coastal plain where wooded areas are generally confined to the margins of rivers and small streams. The wooded areas are dominated by hackberry, green ash, American elm, cedar elm, and live oak, with lesser amounts

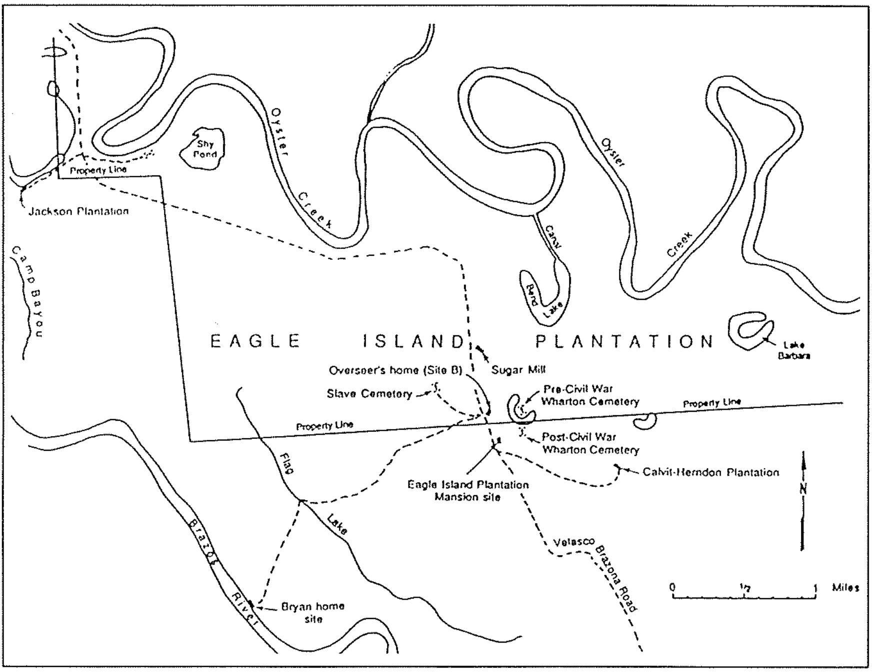


Figure 3. Area map showing the Eagle Island Plantation area as it was in the 1800s. Roads have been added from USGS 1:31,680, Snipe Sheet, 1943; boundaries have been added from deeds (Brazoria County Court Records [BCCR], Vol. T-342).

of water oak, Shumard oak, pecan, and boxelder maple. Elm, ash, water oak, and Shumard oak grow tall and straight, with only slightly tapering trunks, which makes them very suitable for construction logs. A great variety of other trees, shrubs, and vines also grow in the area, often creating dense brush-filled, almost tropical, woods.

It can be assumed that the first Anglo settlers chose this location because of its rich soil, vast supply of raw materials—clay sources for brick, timber for buildings, and plants and animals for food—and ready access to navigable waterways that linked them to profitable markets. Under the plantation system the county became a major producer of sugarcane and was known as the Sugar Bowl of Texas. In the late nineteenth century, sugar production slowly decreased while cotton production increased to twice that of any other Texas county.

HISTORICAL SUMMARY

The Eagle Island Plantation was carved from the southern five leagues deeded in 1824 to Jared E. Groce II as part of a Mexican land grant in Stephen F. Austin's colony (Ray 1970). Much has been written about the wealth of J. E. Groce, but the most important assets he brought to Texas probably were a skilled work force and his own experience. J. E. Groce had owned a plantation in Georgia and later operated a plantation and timber holdings in Alabama (Berlet 1921:22). In 1821, while in New Orleans on business, he learned of Stephen F. Austin's plan to colonize Texas, and by the fall of that same year he was on his way there with a large caravan (Berlet 1921:23–24).

"On account of his good qualities and circumstances (a notorious application to agriculture and nearly one hundred slaves)," 10 leagues of land (comprising two *haciendas*) were granted to J. E. Groce (Brazosport County Courthouse Records [BCCR], Spanish Records [SR] 1824:244). His hacienda of five leagues on "Arroyo Oyster" was in what is now Brazoria County, and Eagle Island Plantation was formed from a portion of these lands. In early spring 1822, J. E. Groce chose land on the Brazos River 4 miles south of the present town of Hempstead as the site for construction of his northern hacienda, Bernardo (Berlet 1921:41); it was from here that he established a cotton empire.

After finishing school in New York in 1827, Sarah Ann Groce came to join her family in Texas. When, on December 5, 1827, at the age of 17, she married William H. Wharton of Nashville, Tennessee, her father J. E. Groce gave the couple land in Brazoria County as a wedding present (Berlet 1921:49; O'Connell 1959). However, Wharton returned with his bride to Nashville, where he practiced law (Hale 1942:62) (for another version of this history, see Berlet [1921:52]), and their only child John A. Wharton was born July 3, 1829, at the home of William Wharton's sister, Elizabeth Washington, near Nashville (Berlet 1921:52).

At the insistence of J. E. Groce, the couple returned to Texas in 1831 (Hale 1942:62). While crossing their land, Sarah and William came upon a grove of large oak trees, in one of which an eagle had made her nest, so they decided to make their home there and named it Eagle Island. The couple first lived in a log home with an earthen floor and an enormous fireplace that occupied one entire end of the house. J. E. Groce, who had once admired a one-and-a-half-story mansion near Mobile, had a copy of the house precut in Alabama from native pine and Cuban mahogany and shipped to Texas (A floor plan of the home can be found in *Autobiography of a Spoon* [Berlet 1971:98]). The interior of the home was comfortably furnished, and the grounds were well kept (Berlet 1971:15–21). A reconstruction of the plantation's boundaries from later deeds (see Figure 3) shows the mansion site actually south of the boundaries of the plantation, a situation that was not unusual before the days of careful surveying.

Little is known about the day-to-day operations of the plantation, but they were similar in several ways to the layout and operations at Bernardo, especially since J. E. Groce had given a third of his slaves from Bernardo to his daughter.

At Bernardo, the slave quarters were about three-fourths of a mile from the main dwelling, the cabins were built fronting a large lake, and nearby were the overseer's house, a large kitchen, eating hall, and day nursery (Berlet 1921:75). Eagle Island also had many of these elements, and the overseer's home, slave cabins, and sugar mill were made of brick (Strobel 1926:23); cotton was probably the main cash crop.

John A. Wharton, William's brother for whom William's son was named, came to stay at Eagle Island in 1833. The brothers' participation in the Texas Revolution and the political arena has been documented in many sources (Berlet 1917, 1921, 1971; Hale 1942; Strobel 1926); both men were vital to the formation of the Republic of Texas. In the Wharton brothers, the Hawks of War had two very able allies.

There was an overseer at the plantation during the time of the Texas Revolution (Berlet 1921:57), but the authors could not find his name. However, due to the amount of time William Wharton spent away from Eagle Island, it can be assumed that the overseer was in charge of the plantation for much of the middle to late 1830s. The plantation was prospering, and the home and grounds are described in the diary Mary Austin Holley wrote during a short stay with the Whartons (Holley 1965:60–63).

William H. Wharton was appointed Texas's Minister to the United States, and he secured U.S. recognition of the Republic of Texas on March 3, 1837, but while he was on the New-Orleans-to-Texas leg of his return trip aboard the Texas Navy cutter *Independence,* he was captured, together with the *Independence,* in a gun battle that erupted when the cutter encountered the Mexican brigs-of-war *Vencedor del Alamo* and *Libertador*, which were blockading the mouth of the Brazos River. "The *Independence* had struck her colors almost within sight of Eagle Island, whose fields and broad well wooded acres constituted the plantation of the captured Texas minister" (Hill 1987:74–80). William's brother John traveled by sea to Matamoros, Mexico in early October, where he tried to exchange 30 Mexican soldiers captured at San Jacinto for Wharton and other prisoners; however, when John returned to Eagle Island late in October, he found that William had escaped and was already home.

The family moved to Houston in late 1838, since both Wharton and his brother John had been elected to the Congress of the Republic of Texas. It was during his term of office that John A. Wharton died of dysentery on December 17, 1838 (Berlet 1971:34–35). Though first buried in Houston, his body was returned to Eagle Island; his burial was probably the first in the family cemetery (Pollan 1984:2–12).

On March 4, 1839, tragedy struck the Wharton family again when William H. Wharton accidentally shot himself while drawing his pistol from its holster. On March 14, 1839, when his son was nearly ten years old,William died at Bernardo and was buried at Eagle Island next to his brother John (Berlet 1921:57–58).

After the death of her husband, Sarah Wharton spent much of her time at the home of her brother Leonard W. Groce. Her son John was being educated there—

the 1840 census lists Montgomery County as her place of residence. Leonard, at his sister Sarah's request, changed the name of his 18-month-old son from Edwin Waller Groce to William Wharton Groce (Berlet 1921:58), and, until he was of school age, William Wharton Groce was allowed to spend most of his time with his Aunt Sarah.

Like many plantations in the area, the Eagle Island Plantation probably developed into a sugar plantation during the 1840s (Platter 1961). Family tradition has it that William Wharton purchased two sets of machinery for the sugar mill in order to eliminate down-time during the crucial harvest season (Strobel 1926:23).

At this time, Sarah Wharton depended upon John Harris, of Galveston, to help her with business transactions, particularly the buying and selling of properties (BCCR, Deed D, 1844:16). Both William and John Wharton had speculated in real estate in Brazoria and Velasco. The 1840 Census (White 1966) lists the estates of both William (title 15,498 acres, survey 61,992 acres, 41 slaves) and John (title 1107 acres, survey 3321 acres, 2 slaves). Sarah bought and sold several of these properties, probably in order to consolidate her holdings and to get cash for the education of her son John.

John A. Wharton was educated with his cousins at Bernardo in Hempstead by a Mr. Dean from New York (Berlet 1971:42). Later, John attended college in Columbia, South Carolina, and, after graduation in 1848, read law in the office of William C. Preston, of Columbia. There he met Penelope, the only daughter of South Carolina Governor David Johnson, and, after their marriage, the couple returned to Eagle Island to make their home. John continued to study law with Jack Harris and E. M. Pease and, after receiving his license, went into partnership with Clint Terry of Brazoria (Berlet 1971:44–45).

Eagle Island began to prosper during the 1850s, when five acres were bought on the Brazos River for a landing, and a right-of-way for a road to Eagle Island was also procured (BCCR, Deed E, 1850:438). The sugar crops for the years 1852–1858 (Table 1) reflect the financial return from the land (Platter 1961:14–18).

John and Penelope Wharton had two daughters during this period: Sarah, who died in infancy, and Kate Ross; for Christmas in 1855, Sarah Wharton gave her infant granddaughter Kate Ross, two slaves, Carpana, age 5, and Lewana, age 3 (BCCR, Deed G, 1855:461).

John Wharton also began to speculate in land, as had his father and uncle. He bought several lots in Columbia, Texas, and, together with William Goodlet, he bought the Cloman Plantation (between the present-day towns of Brazoria and Lake Jackson) complete with slaves (BCCR Deed J, 1859:332). The slave population at Eagle Island had risen from 76 in 1850 (U.S. Census Bureau 1850) to 132 in 1860, housed in 30 slave houses. In the 1860 Census, John A. Wharton listed his real estate value at $113,000 and personal wealth at $123,000 (U.S. Census Bureau 1860). So Eagle Island reached its zenith just before the Civil War.

Shortly after the war started, John A. Wharton joined Terry's Texas Rangers (Graber 1987; Groce 1916:271–278). The home at Eagle Island was considered too close to the coast for safety, so John Wharton's cousin William Wharton

Table 1. Sugar Production at Eagle Island from 1852 to 1858

Year	Sugar Production (in hogsheads *)
1852	240
1853	135
1854	170
1855	130
1858	165

*A hogshead, a large wooden barrel or cask, held about 1000 lbs. of sugar.

Groce, now grown and a captain in the Confederate Army, returned to Texas to move family and slaves to the Shelton Oliver home in Walker County, and bring the family closer together (Berlet 1971:48). Shortly before the end of the war, General John A. Wharton was shot and killed in the Fannin House in Houston by one of his subordinates, Colonel G. Baylor, after a disagreement (Hale 1942:126–130). He was first buried at Liendo (near Hempstead), but his remains were later moved to the State Cemetery in Austin (Berlet 1971:52).

Sarah and her daughter-in-law Penelope Wharton moved back to the main house at Eagle Island after the war and continued the rearing of Kate Ross. As with most families in Brazoria County, the Reconstruction Period was very harsh for the Whartons. With no labor to work the fields, Sarah rented out the plantation from 1868 to 1870 to William Masterson for one-fourth of the sugar and cotton crops for the contracted years. Sarah was allowed to keep the gardens close to her house but had to pay for repairs to the sugar mill and had to provide homes for the freedmen (BCCR, Deed L, 1867:102). These homes may be the ones shown on a map of the county near Bend Lake in the County Deed Records (BCCR, Deed S, 1879:93). Colonel John Harris, of Galveston, again became the family lawyer, and, being "land poor," the family began to sell off various parcels of land to pay debts (Berlet 1971:53).

On August 8, 1872, after a short illness, shortly after returning from school in Nashville, Sarah's granddaughter Kate Ross Wharton died at Eagle Island; her burial was the first in the new cemetery area on the near side of the lake behind the main house (Berlet 1971:75). Penelope's health was also failing, so Sarah asked her nephew William W. Groce to return to Eagle Island with his family. William, his wife Kate Wyatt, and their three children moved to Eagle Island in 1873 and took over all the affairs of the plantation (Berlet 1971:61).

In 1875, a hurricane damaged much of nearby Velasco and Quintana and destroyed the sugar mill at Eagle Island. (In 1984, one of the present authors, James L. Smith, visited the site of the sugar mill and found it at the edge of a modern sand pit being destroyed by the removal of topsoil and sand. The exposed stepped foundations were well over 3 feet thick. The floor, made from half and three-quarter bricks, was two bricks thick. A large below-ground cistern south of the building had been destroyed; most of the material from the cistern, which contained artifacts from the turn of the century to the 1930s and 1940s, had been used as road fill.) The strong winds of the 1875 hurricane also destroyed half of the old tree in which the eagle had originally made her nest (Berlet 1971:80).

Penelope Wharton died May 15, 1876 and was buried next to her daughter at Eagle Island. Later that same year, William and Kate Groce had another daughter, Sarah Wharton Groce, the last child born at Eagle Island (Berlet 1921:132).

On February 1, 1878, while visiting Galveston, Sarah A. Wharton died at the age of 68, in the home of Judge John W. Harris. She willed the Eagle Island homestead (200 acres) to William and Kate Groce (BCCR, will of Sarah Ann Wharton, Case No. 1027, 1878). This was almost all that was left of the many thousands of acres owned by the family before the Civil War. William W. Groce actually had to sue the estate to get his property (BCCR, Deed S, 1879:92). The Groce family remained at Eagle Island until 1879, when the death of their daughter Fannie filled them with such despair that they moved to their beach house at Velasco (Berlet 1971:69).

Most of the remaining Wharton lands were sold at sheriff's auctions to settle claims against the estate of Sarah Wharton or to pay back taxes, and Harris Masterson acquired possession of the greater part of the properties (BCCR, Deeds T, 1881:343 and U, 1882:240).

Some of these sales were ludicrous by today's standards. For a back tax of $3.80 state and $4.05 county, 3400 acres were bought for $12.95 (BCCR, Deed U, 1882:240). Masterson sold most of these lands to a northern syndicate that later subdivided the acreage into small farm tracts (Berlet 1971:73). William W. Groce and his wife sold the homestead tract to Harris Masterson in 1884 for $200—$100 cash and $100 payable to their children later (BCCR, Deed W, 1884:217). Several lawsuits ensued over the years, and the children sold their portion to D. R. Pearson in 1892 for $325 (BCCR, Deed 17, 1892:177). The house site excavated by the Brazosport Archaeological Society in 1984 and 1985 was part of a 20-acre parcel sold in 1892 to Sam B. Dolly by Harris Masterson (BCCR, Deed 18, 1892:505).

Very little information has been recorded about the overseer at Eagle Island. There is reference to a "Mr. Maxie, the overseer, and his wife" preparing for the homecoming of John A. Wharton and his new bride Penelope (Berlet 1971:45). But the 1850 Census does not list a Maxie, nor does it list John and Penelope as having arrived at Eagle Island. However, the census does list Peter C. Eicher, aged 51, his wife and two daughters next to Sarah A. Wharton and Dr. Branch T. Archer, who were living at Eagle Island. Since the census lists often reflect the sequence of visitation by the census taker, it is likely that the Eicher family was living in the next house down the road from Sarah Wharton. In the 1860 Census, Peter Escher (sic) and family, together with E. Maxey (Smith 1990) and Jno. Campbell, from Scotland, are listed. These may be "Maxie" the overseer, and the Scottish gardener of family tradition (Berlet 1971:79). The structure that was excavated easily could have housed a family in one end and two bachelors in the other. After the Civil War, William Masterson may have lived in the house, since he was overseeing the operation of the plantation in the late 1860s. After the return of William W. Groce and his family to Eagle Island, the house may have stood empty. An 1881 deed (BCCR, Deed T, 1881:343) is the only document that shows a structure near the excavation site, but none of the people interviewed who were living in the vicinity in the early 1940s remember such a structure

The Eagle Island mansion was destroyed by the 1900 hurricane, and its residue was used to repair other homes in the area (Berlet 1971:23). Later, the Brazoria County Cemetery Association acquired land around the mansion site and sold its first burial plot in January 1946. Most of the mansion area is now covered by Restwood Memorial Park. In accordance with her wishes, Sarah Wharton Groce Berlet, the daughter of William and Kate Groce, who was born in 1876, is buried there next to her husband, in the area of the kitchen associated with the mansion. The old oak tree that stood beside the mansion and had housed the eagle nest for which the plantation was named is visible today only as a huge stump cut off at the ground. The urban areas of the towns of Lake Jackson and Clute now surround and cover the once-proud Eagle Island Plantation.

EXCAVATIONS

The Brazosport Archaeological Society undertook extensive excavations and subsequent analytical research at the site during the spring of 1984 and again in the spring of 1985 (Table 2).

A datum was established northwest of the low mound near the cistern, and a study area of 10,000 square feet was laid out in 5-foot squares. English measurement units were chosen because the only surveying instruments available were so equipped. Excavation units were named for the coordinates at the southwest corners. During the two years of work at the site, 28 units were excavated, opening up 700 square feet or 7 percent of the study area (Figure 4)

In 1984, vertical control was maintained by transit; an arbitrary elevation of 15 feet was given to the datum. Four-inch increments (plus or minus an eighth of an inch) were dug to specific elevations (i.e., 15 feet, 14.67 feet, 14.33 feet, 14 feet). However, lack of a transit in the 1985 season made it difficult to maintain this degree of accuracy.

All excavated soil was put through quarter-inch screens. No fine screening was done, nor were soil samples collected. Because of the large amount of brick rubble, mortar, and brick fragments, all soil was removed with trowels. When sterile soil was encountered, shovel tests insured that there were no artifacts below. All cultural

Table 2. Excavation Units A–Y, 1984 and 1985 Excavations at Lake Jackson Plantation

1984	1985
C. S2.0/E6.5	A. S2.0/E5.5
D. S3.0/E1.5	B. S2.0/E6.0
E. S3.0/E3.5	F. S3.0/E4.0
R. S5.0/E2.5	G. S3.0/E4.5
S. S6.0/E3.0	H. S3.0/E5.0
levels 1–3: 8' x 10'	I. S3.0/E5.5
T. S6.0/E3.0h	J. S3.5/E3.5
fill inside south hearth	K. S3.5/E4.0
U. S6.0/E4.0	L. S3.5/E4.5
levels 1–4: 8' x 10'	M. S3.5/E5.0
level 5: 10' x 10'	N. S3.5/E5.5
X. Trench A: 2' x 20'	O. S3.5/E6.0
	P. S3.5/E6.5
	Q. S3.5/E7.0
	V. S7.0/E0.0
Y. No provenience	W. S7.0/E1.0

materials were collected and stored in individual bags marked with the excavation unit from which they came.

Initially, a 2-by-20-foot trench, Trench X, was dug along the south side of the mound (see Figure 4). When brick walls appeared, the area along the south wall of Trench X was expanded by 8 feet, into two 8-by-10-foot units (S and U) that were excavated independently of Trench X. Only level 5 of S6.0/E4.0 (which was below the floor level of previously excavated Trench X) was a full 10 feet square; all other excavation units were 5 feet square.

The site comprised three stratigraphic zones (Figure 5). Zone A, from 1 to 4 inches deep, was dark clay loam, rich with plant root, insect, and rodent disturbances. Zone B, from 4.5 to 10 inches deep, was composed of bricks, brick rubble, and mortar in light tan sandy loam. Zone C, from 10 to 18 inches deep, generally was thinner outside than inside the structure, with dark tan clay loam that became more clay-like with depth. The highest concentration of artifacts, at the interface between Zones B and C, dropped off dramatically toward the base of the foundation (Figure 5).

CULTURAL ASSEMBLAGE

Artifacts recovered during the 1984 and 1985 excavations were classified into nine categories (brick, brick rubble, and mortar are not included) (Table 3).

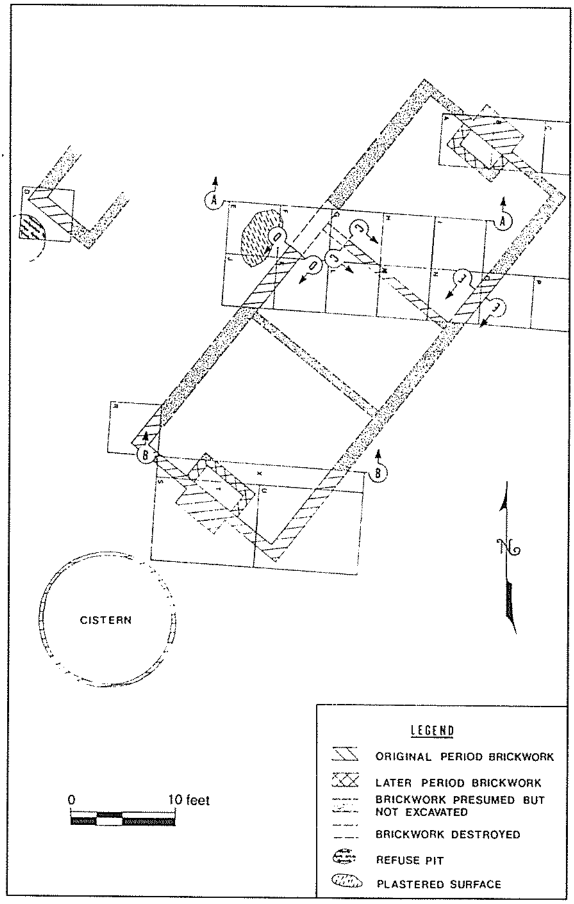


Figure 4. Plan of excavations, Eagle Island Plantation, 41BO143, Site B, showing lines of profiles A-A' through E-E'.

Metal Artifacts

The many metal artifacts were classified according to function into eight groups: clothing, personal articles, table and cooking utensils, household articles, arms and ammunition, building materials, barn and farm equipment, and tools.

Clothing (Figures 6, 7)

The variety of clothing worn on the site was evidenced by the different buckles, buttons, and other clothes fasteners found. The metal buttons were of steel, brass, copper, lead, and combinations of these metals; some of the military buttons were gold plated (see below for analysis of the buttons). Several different types of ferrous and nonferrous buckles were found; some were decorated, gold plated, or brass with chrome, and one was a combination of brass with a steel tongue. These could have been used with cloth or leather (Figure 6). Miscellaneous clothes fasteners include

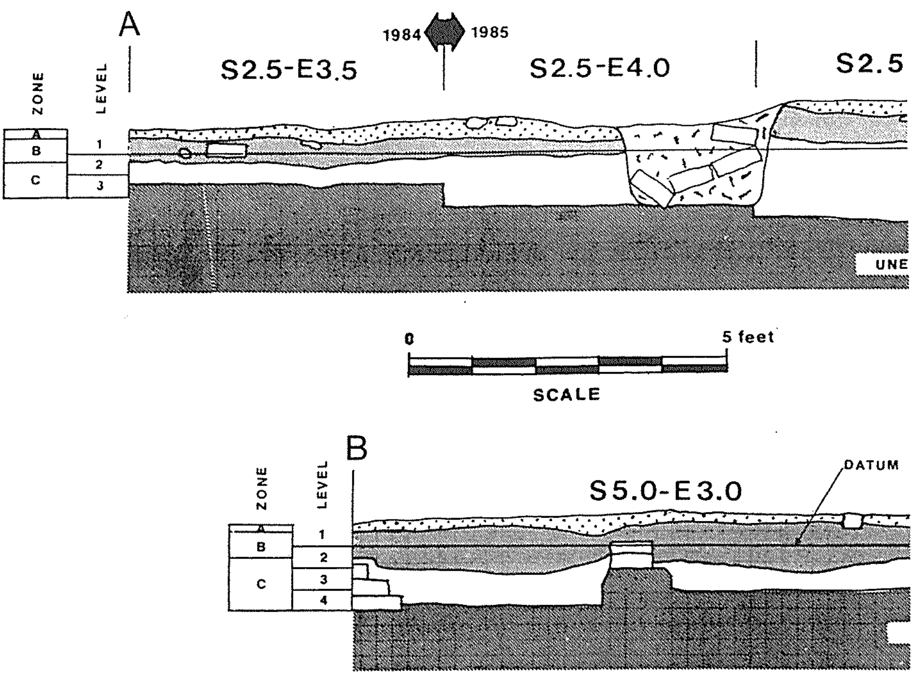
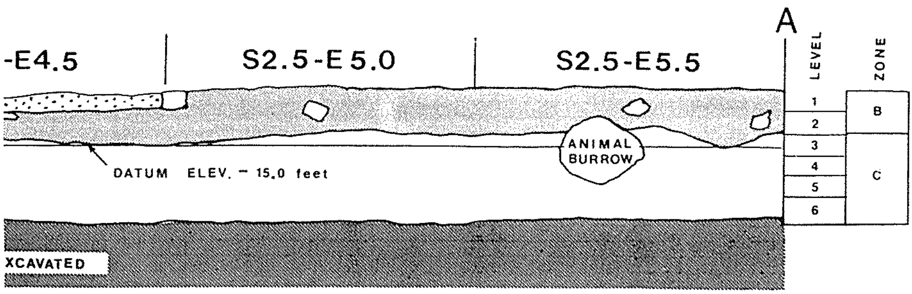
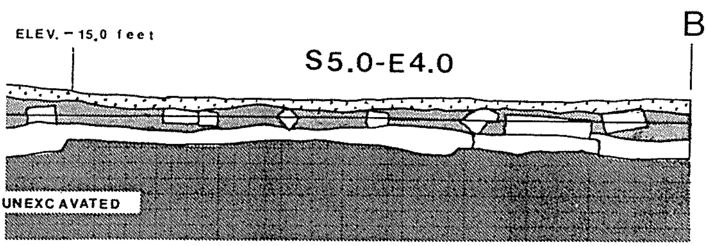


Figure 5. Eagle Island Plantation, 41BO143, Site B, Soil Profiles A–A' and B–B'. See Figure





4 for locations of profiles.

Table 3. Artifact Assemblage from 41BO143, Site B

Artifacts	Number	Percent
Metal		
Ferrous	20,324	54.76
Nonferrous	492	1.33
Total Metal	20,816	56.09
Glass		
Window	3,473	9.36
Bottle	8,769	23.62
Pressed or Molded	237	.64
Other	111	.30
Total Glass	12,590	33.92
Bone		
Modified	25	.07
Total Bone	25	.07
Shell		
Rangia	4	.01
Oyster	134	.36
Other	112	.30
Total Shell	250	.67
Stone		
Worked	515	1.39
Natural	11	.03
Total Stone	526	1.42
Ceramics		
Earthenwares	1,636	4.40
Stoneware	237	.64
Porcelain	146	.39
Yellow Ware	34	.09
Total Ceramics	2,053	5.52
Organics		
Wood	2	.00
Charcoal	59	.16
Leather	3	.01
Other	71	.19
Total Organics	135	.36

Table 3.—Continued

Artifacts	Number	Percent
Buttons		
Ceramic	378	1.02
Shell	115	.31
Metal	79	.21
Bone	39	.11
Glass	22	.06
Rubber	6	.02
Studs	9	.02
Beads	11	.03
Total Buttons	659	1.78
Other or Unknown	64	.17
Grand Total	37,118	100.00

rivets and studs; several have stars embossed on the heads, and one cufflink has a glass insert.

Suspender hardware (Figure 6, D–F), made of brass, copper, and nickel, is abundant, together with various other clothes fasteners, including hook-and-eye fasteners, several of which have patent dates. Two brass loops are dated **1890** (Figure 6, G), and one loop is dated **1855.** A unique suspender buckle has two complete patent dates, **March 7, 1871** and **November 3, 1874** (Figure 6, H). One interesting piece is a lady's garter fastener.

A chrome- or nickel-plated clip attachment (Figure 6, I), embossed **Anchor** and **Pat Appld For** is believed to be a cuff holder—a tool used to hold a cuff to facilitate insertion of a cufflink (Figure 6, I)—since it has a spring clip on one end and a swivel-type stud on the other (Sears Roebuck and Co. 1968:221).

Remnants of shoes and boots found are a shoe eyelet, shoe taps, and an iron riding spur.

Personal Articles

Four coins found on the site, 1866 and 1884 five-cent pieces, an 1880 penny, and an 1856 Liberty dime (Figure 8, A–D) provide definite evidence for the time of occupation.

Handiwork was evidently part of the normal routine in this household, for scissors, safety pins (Figure 8, E), sewing pins, needles, knitting needles, and

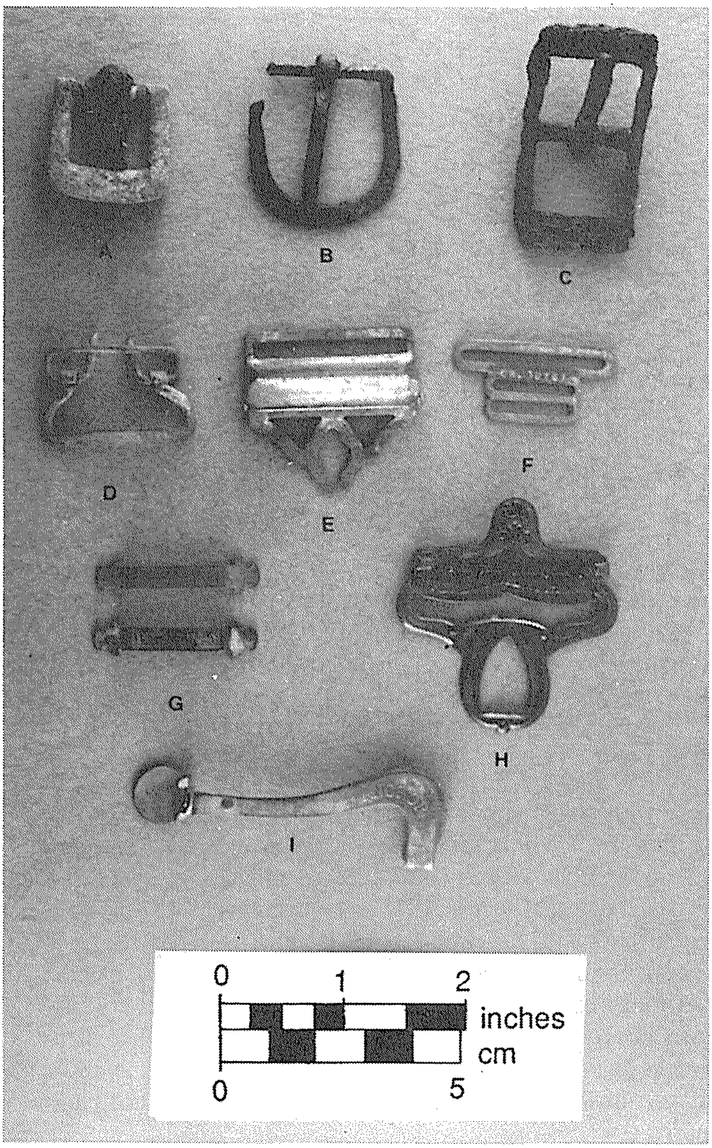


Figure 6. Metal artifacts from Eagle Islalnd—Clothing: A–C, Buckles; D–F, Suspender hardware; G, Brass loops, dated **1890**; H, Suspender buckle, dated **March 7, 1871** and **November 3, 1874**; I, Cuff holder with **Anchor** patent mark.

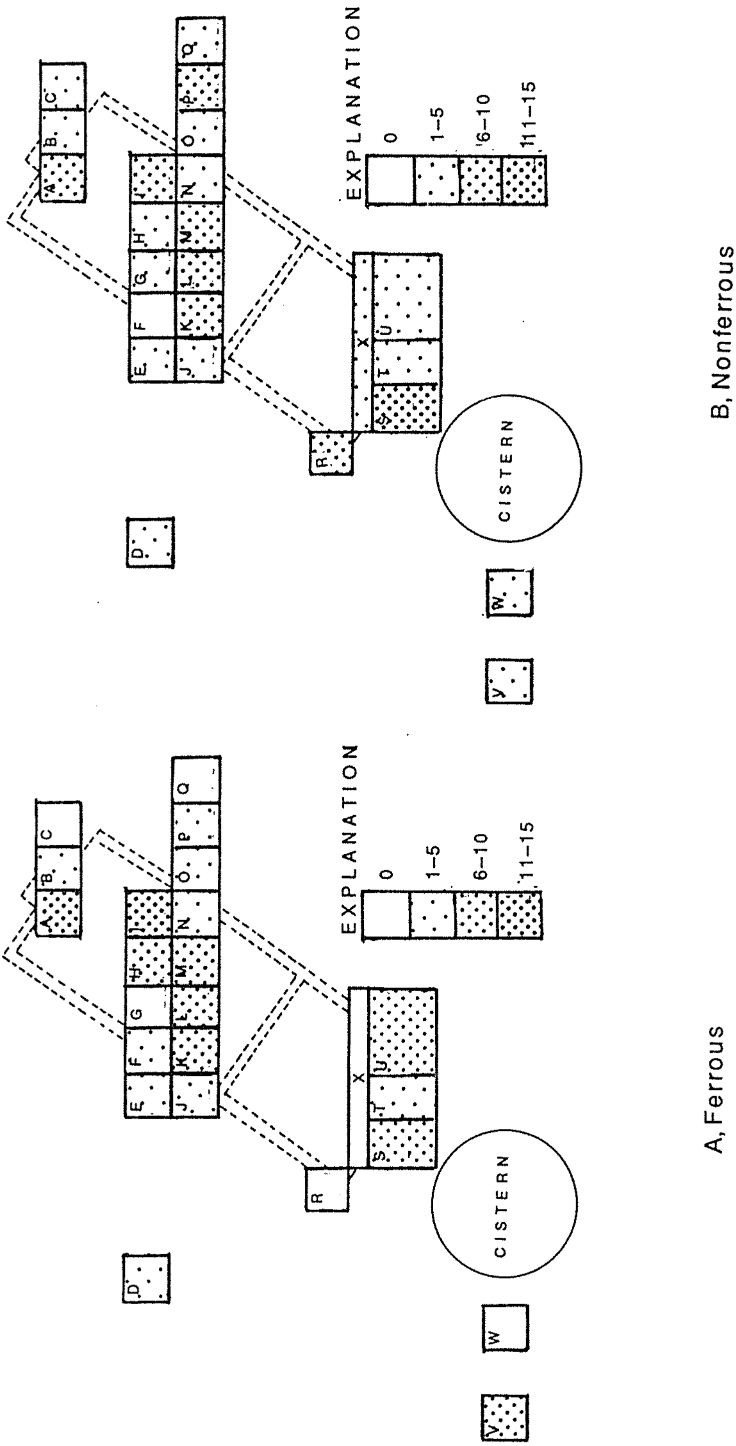


Figure 7. Diagrams showing density of ferrous, A, and nonferrous clothing, B. Both categories include buttons, buckles, fasteners, and parts of shoes.

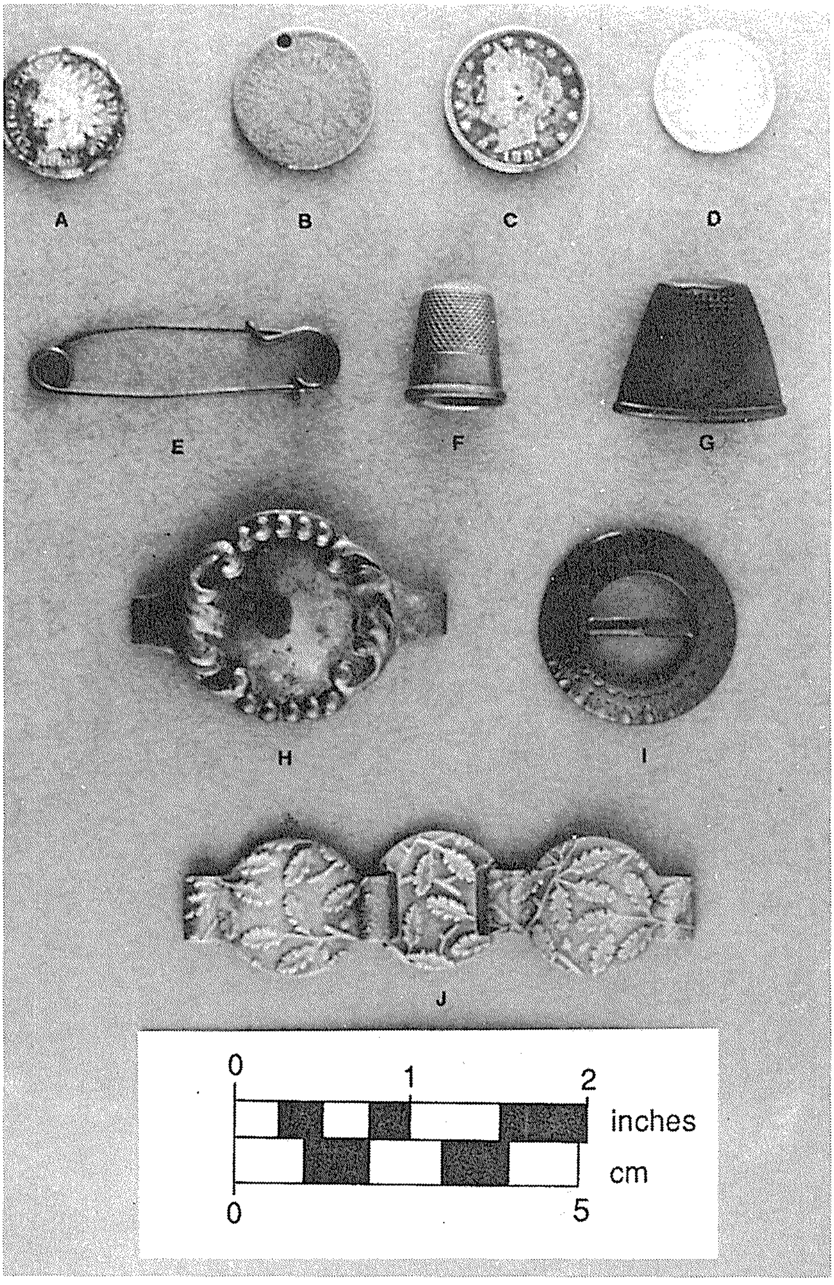


Figure 8, Personal metal artifacts from the Eagle Island Plantation: A, 1880 U.S. penny; B, 1866 U.S. five-cent piece; C, 1884 U.S. five-cent piece; D, 1856 U.S. Liberty dime; E, Safety pin; F, G, Thimbles; H, Copper hair clip; I, Ornate barrette ; J, Three-piece bracelet.

nine thimbles were found (Figure 8, F, G). Of special interest are an iron thimble, a silver thimble, and a copper-on-brass thimble. A pressure foot for a treadle-type sewing machine is evidence of later machine sewing.

Among the items of jewelry are a gold-plated brass barrette, a copper hair clip (Figure 8, H), an ornate barrette buckle (Figure 8, I), jewelry clasp rings, a rhinestone-encrusted pin, and a three-piece decorated bracelet (Figure 8, J).

A shaft with small brass wheels was identified as part of a child's toy, and a jews' harp shows that music was heard in the house. Three pocket knives—one with a bone handle—a straight razor, and a metal hip flask all are evidence of a variety of good living conditions for the occupants of this site. Fishing is evidenced by four fish hooks.

The 22 ferrous and 22 nonferrous personal articles were scattered quite evenly throughout the excavation units.

Table And Cooking Utensils

Many cast-iron fragments are apparently from a stove; two are embossed **Buck saint** and **Lily**. Pieces of stove grating, a flue damper, and stove plates were also found, together with cast iron handles for lifting stove plates. Many table utensils—six forks (mostly three-tined) (Figure 9, A, B), 12 spoons, eight knives, and miscellaneous handles—were found, and one interesting item was what we would call a butter knife. Most of these table utensils are of ferrous material, but several (Figure 9, C) are of silver-plated copper. Although no cooking pots were found, a large copper sieve suggests cooking.

All except 11 of the 384 table and cooking utensils were of ferrous material (Figure 10).

Metal Household Articles (Figures 11 and 12)

The furniture and household articles include cast-iron pieces, lamps, keys, locks, and furniture decorations. Some cast-iron pieces, together with a socket and a caster, could be parts of furniture such as beds or tables.

Lamp parts include a socket, wick holders, and wick-turner wheels. One of the wick holders had a manufacturer's name, **SUNLIGHT**, and patent date of **December 14, 1869**; another read **Patented Oct 13, 63, Reissued June 30**. One wick-turner wheel had **Star** embossed on the face (Figure 11, A). A small round tin box of grease was also found, together with a keyhole plate (Figure 11, F), four key fragments (Figure 11, E), a lock, a large padlock, and two window locks (Figure 11, G).

The furniture fragments included drawer pulls and hasps, a small ornate finial, a large brass bedpost top or finial for a stove, a gold-decorated knob, and several brass knobs and caps. One of the small brass knobs was embossed **PAF**. Other miscellaneous items were several brass and silver decorated pieces, a decorated tin star, and iron, brass, and silver tubes.

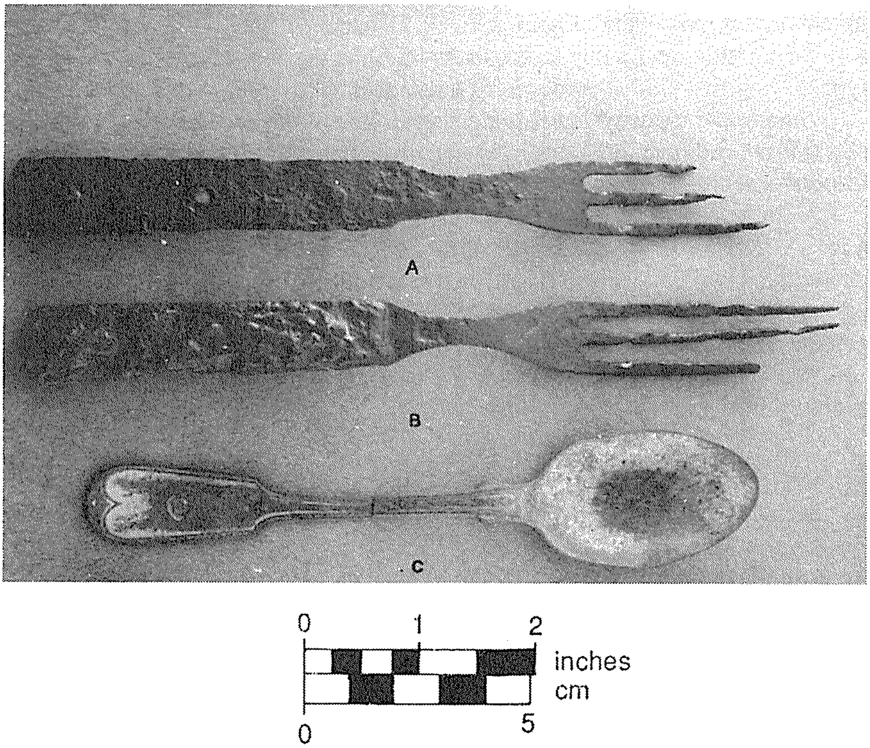


Figure 9. Metal artifacts, table and cooking utensils: A, B, Three-tined forks; C, Silver-plated copper spoon.

Arms And Ammunition

The only firearms parts are one musket wedgeplate (Figure 13, C) and a gunlock spring. However, extensive evidence of ammunition was found—lead ball shots, percussion caps, and cartridges. Most of the ammunition and related objects were along the inside wall of the structure, at or below the third level. This is below the brick rubble, which is evidence that these materials probably were inside the house during the occupation period or at least were there before the structure was completely destroyed.

Cap and ball ammunition indicates that pre-1860 firearms were used. The many lead shot balls (Figure 13, G) that were found were of calibers ranging from .22 to .45, and also included lead and tin buckshot. Two of the lead shot had sprue still attached, and one piece of sprue was recovered, together with a round-shot bullet mold (Figure 13, A) and lead slag fragments, making it almost certain that shot were manufactured at the site.

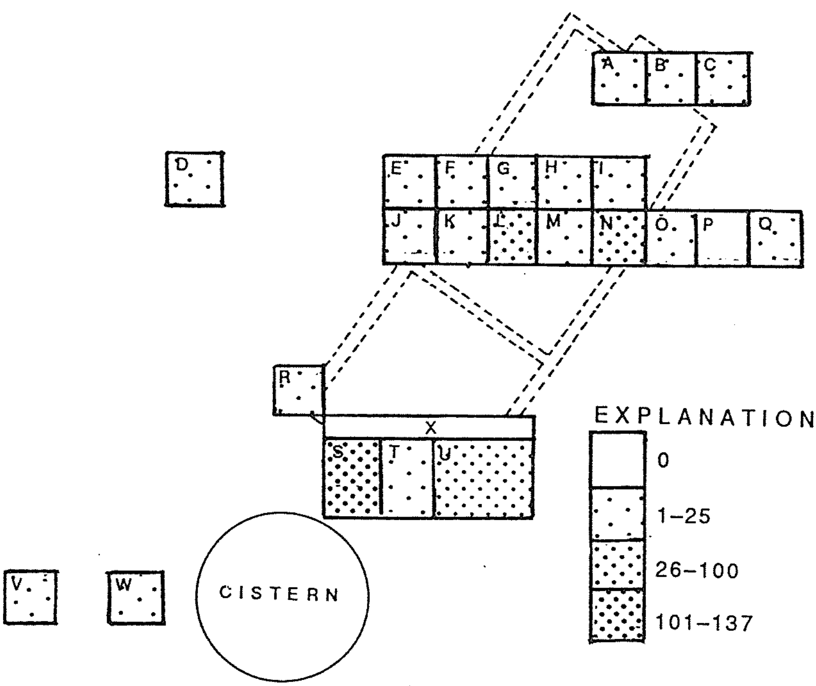


Figure 10. Diagrams showing density of ferrous and nonferrous table and cooking utensils. Ferrous items include stove hardware and utensils; nonferrous items include utensils.

Percussion caps for pistols and muskets were found (Figure 13, H); one musket cap is of copper. Twelve-gauge shotshells (Figure 13, I) were in the same main areas where the cartridges and lead shot were found. The cartridges were from a variety of weapons (.22, .30, .32, .38, .41, and .44 caliber), both rim- and center-fire (Figure 13, D, E), with .32 caliber predominant. Of particular note was a .44-caliber rim-fire cartridge that had been fired with a dual firing pin, evidence that a Henry rifle (an early repeating rifle) was used. Manufacture dates of the cartridges range from 1860 to the present (Table 4). Primers for some of the shotshells and cartridges were missing. Two loose-fired primers were found, together with a brass primer case embossed **HICKS CENTRAL FIRE** (Figure 13, B) and a zinc cap marked **HAZARD POWDER**, evidence that cartridges were being reloaded at the site. In addition, there was an unidentified brass object stamped **US** (Figure 13, F), which could be of military origin.

All except two of these artifacts (a gun part and an ammunition mold) are of nonferrous material (Figure 14).

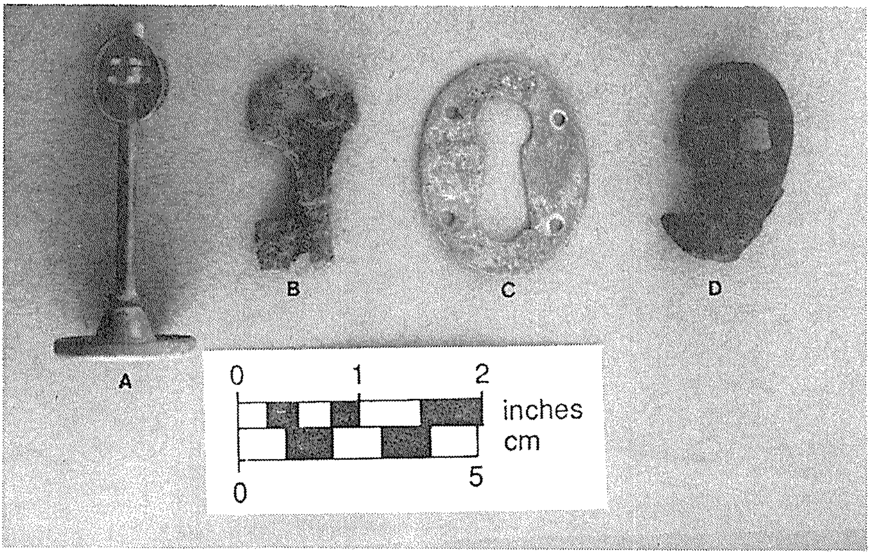


Figure 11. Household articles: A, Lamp wick-turner with **Star** patent mark; B, Key; C, Keyhole plate; D, Window lock.

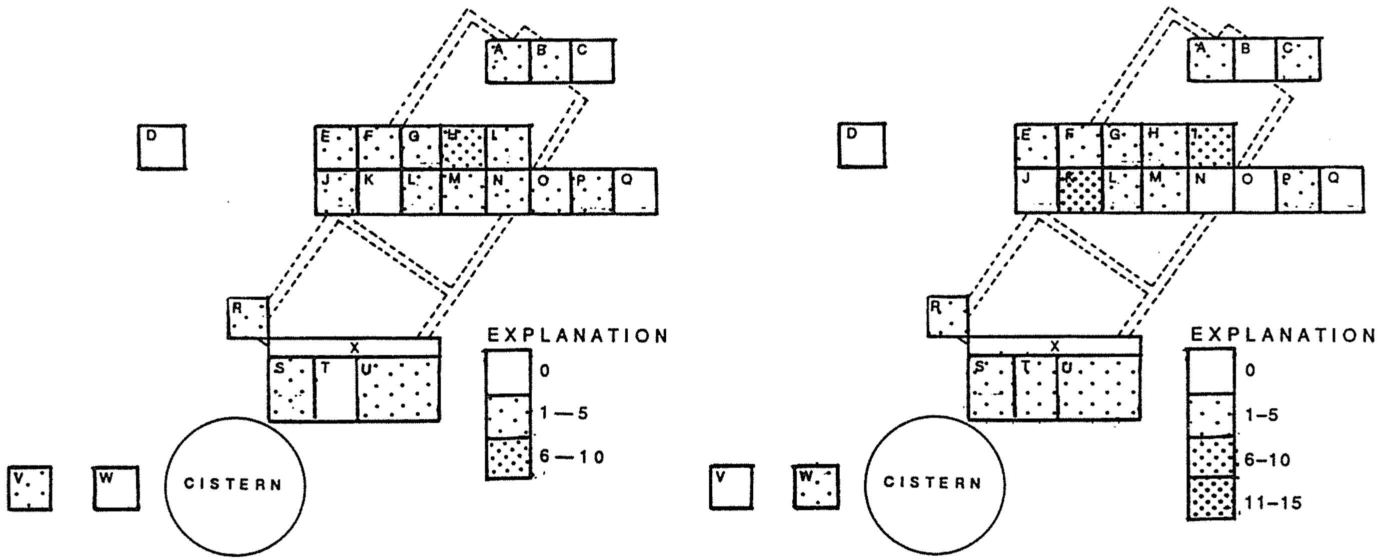
Building Materials

The abundance of building materials attests to the fact that a very sturdy structure had been built. Nails were the largest category of artifacts found, as is to be expected in a dwelling. The nails were scattered throughout the site, most abundantly along the ends of the structure, near the two hearths and along the outside walls. The nails are mainly the common square-cut variety, which were available from about 1830 until the 1890s (Hume 1970:254); they are wrought head, floor, box, and round nails, the latter accounting for less than 2 percent of all the nails found. One brass headless brad was also recovered. Only 25 nonferrous items of building materials were found (Figure 15).

Spikes and rods of iron and brass were abundant, together with building studs and brads. Washers and nuts that were used with the I-bolts, U-bolts, and a rafter bolt were found. Wood screws, roofing tacks, and staples were used in building this structure, and pins with eyes and parts of door hinges were recovered, together with a copper window screen that could have belonged to the dwelling.

Barn And Farm Equipment (Figure 16)

Many common fence staples, pieces of wire, and wire hooks supplied evidence of farming and the use of horses or mules as beasts of burden. A few pieces of common post-Civil-War barbed wire were also found, together with chains for normal barn and farming activities.



A, Ferrous

B. Nonferrous

Figure 12. Diagrams showing density of ferrous, A, and nonferrous, B, household articles. Both categories include lamps, keys, locks, and furniture fragments. Ferrous items also include cast iron items and window locks.

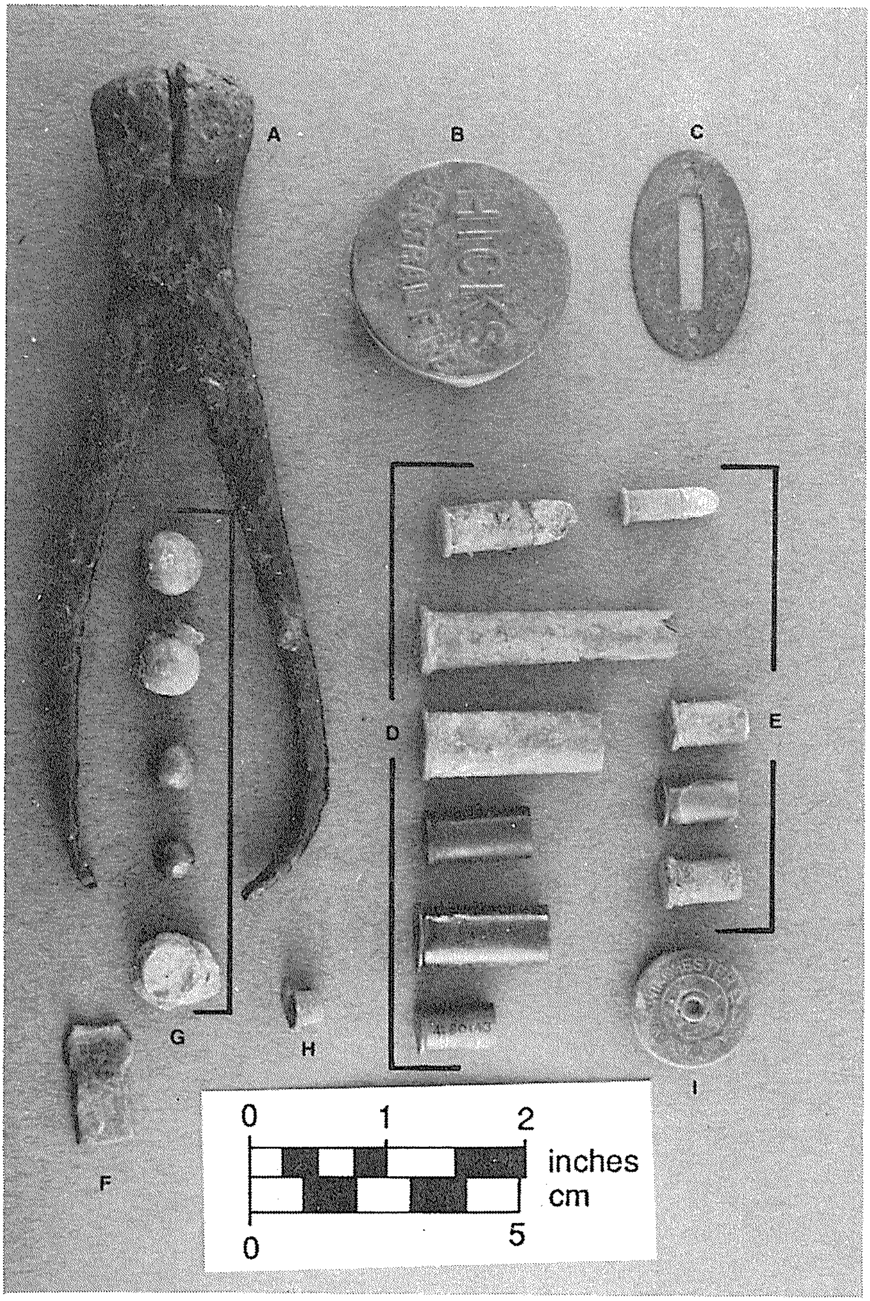


Figure 13. Arms and Ammunition: A, Bullet mold for round ball shot; B, Brass primer case embossed **HICKS CENTRAL FIRE;** C, Musket wedgeplate; D, E, Various cartridges; F, Unidentified brass object stamped US; G, Several lead ball shot; H, Percussion cap; I, Shotshell base.

Table 4. Common Cartridges Found at 41BO143 (Barnes 1976)

Cartridge Type	Date of Manufacture
.44 Henry Flat	1860 to about 1934
.44 Long	1860 to early 1920s
.44 Winchester center-fire	1873 to present
.41 Short rim-fire	1870 to about late 1930s
.38 S&W center-fire	1877 to present
.38 Short rim-fire	late 1860s to about 1940
.38 Winchester center-fire	1874 to present
.32–.35 Remington Hepburn	1880s to 1900
.32 S&W center-fire	1878 to present
.32 Short rim-fire	1860 to early 1930s

Harness rings and buckles typical of the nineteenth century, pieces of plows, and singletree harness connectors and hooks reflect the use of horses or mules. The artifact collection also includes a horseshoe, a horseshoe nail, and two pieces of a bridle, including the bridle bit.

A clevis, a carriage bolt, a flat leaf spring, and a wagon hub-cover reflect the presence of a wagon or similar equipment. A common iron shackle and other large miscellaneous pieces with holes and hooks can also be considered barn and farm equipment.

These artifacts may have arrived at the site when the building was used as a storage shed or barn, just before or after partial destruction.

Tools

Tools were not abundant on the site; axeheads, hoes, a shovel, clamps, a pulley, an auger handle, and a monkey wrench were found, but the most abundant tools are files, one of which is made of brass. All except two of the tools are of ferrous material; all 45 tools were scattered quite evenly throughout the excavation units.

Summary of Metal Artifacts

In summary, the dates of manufacture or use of most of the metal artifacts were difficult to determine precisely, with the exception of the patented and marked artifacts. The patent dates on the clothing and lamps are from 1850 through 1890. The **Anchor** patented article that is believed to be a cuff holder may yield a patent date on further research.

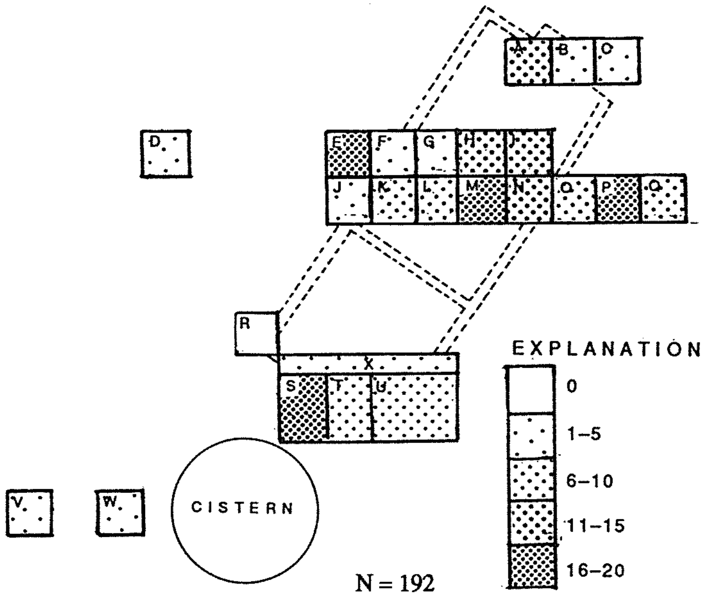


Figure 14. Diagram showing density of arms- and ammunition-related artifacts at Eagle Island. These items include cartridges, percussion caps, primers, shot shells, gun parts, cans, boxes, lead and tin shot, bullets, and fragments.

The coins span the time from 1856 through 1884, and the ammunition and related artifacts point to occupation from pre-Civil-War days to the early 1900s. However, the early 1900s cartridges show that we cannot eliminate the possibility that what remained of the structures was used as an area for hunting small animals or for target practice by local hunters

Glass Artifacts

The glass artifacts fall into three main categories—bottle glass, window glass, and pressed or molded glass—in addition to a few fragments of mirror glass (Table 5).

Bottle Glass

The bottles recovered from the site are of many colors (Table 6) and had been used for beer, ale (Figure 17), wine, distilled alcoholic spirits, medicine (Figure 18, B and C), perfume (Figure 18, A, and 19, B), hair tonic, shoe dye, ink, and condiments (Figures 17–19). A few whole bottles were found, but most of the whole bottles reported here were reconstructed by members of the Brazosport Archaeological Society. Despite the the fact that they came from a

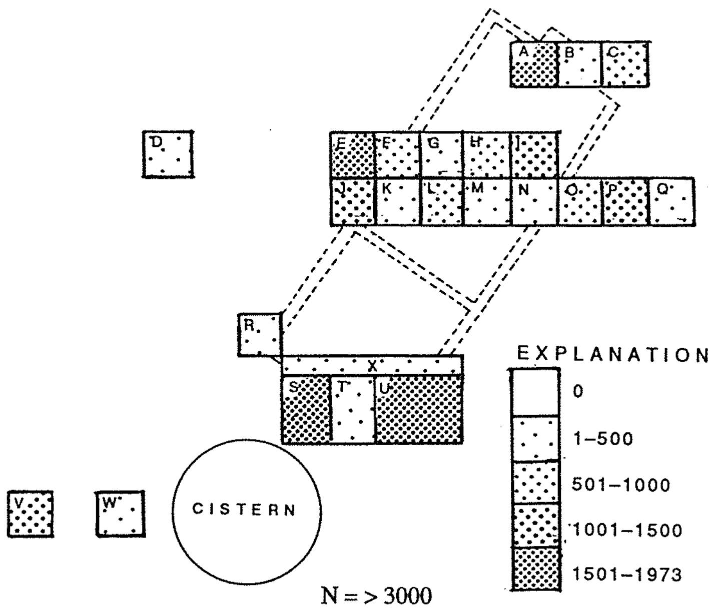


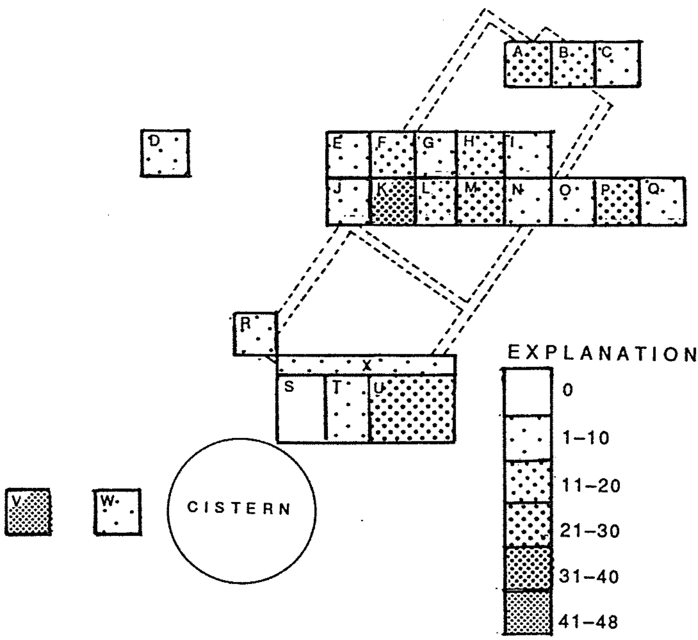
Figure 15. Diagram showing density of building materials. Ferrous items include square and round nails, spikes, rods, studs, brads, washers, nuts, bolts, screws, pins, staples, and hinges. Nonferrous items, which were recovered in only minor quantities, include pins, rods, tacks, nails, screws, screening, and washers.

from a relatively undisturbed site, many bases (Table 7) and necks (Table 8) could not be joined. Some bases have distinguishing or identifiable marks. Bottles with both necks and bases are listed in both tables.

These bottle necks date from about 1860 to 1900. The necks with seams low on the necks are early (some before 1860); necks with seams all the way up date from about 1880. The earliest is a mason jar (they were invented in 1858), and only one pre-1857 bottle with a pontil mark was found. These dates, together with the manufacture dates of the bases, document heavy occupation from 1860 to 1900, with indications of earlier occupation.

Pressed Glass

Pressed glass is represented only by bowl and lantern fragments; molded glass is represented by an aqua canning jar lid, a milk-white canning jar lid, and a swan figure (Figure 20) believed to be a perfume bottle stopper. A very unusual container (Figure 21), recovered in pieces and partially reconstructed, stands upright on a three-point base and is believed to be a perfume bottle or lady's pin holder. Its form—a wicker basket with a backstrap (a woven rucksack)—suggests that it may have been modelled after an Indian cradle board.



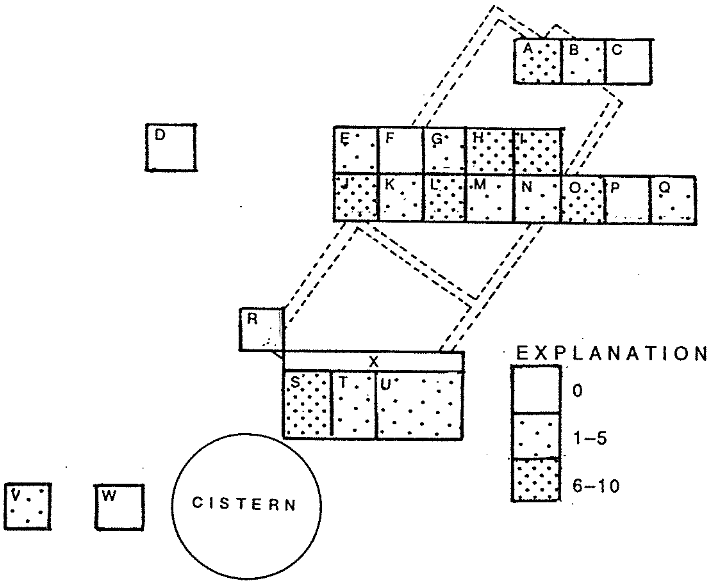
A. Ferrous

N = 393

Figure 16. Diagrams showing density of ferrous, A, and nonferrous, B, barn and farm equipment. Ferrous items include staples, wire, barbed wire, chains, harness bits, horseshoe

Bone Artifacts

A deer antler tool handle (Figure 22, A) and a bone needle (Figure 22, B) show signs of use. The basal three inches of the main beam of a white-tailed deer antler used for the tool handle apparently had been shed and was not removed from the skull during butchering, for it has several rodent gnaw marks that probably were made before the antler was modified. Both the main beam and the brow tine were sawed, two parts of the basal rosette were chipped away, and a socket was drilled into the sawed end for insertion of the tool. Its shape suggests that it was a handle for a file or rasp or similar tool, part of which can be seen in the socket.



B. Nonferrous

N = 84

nails, bridles, plows, and singletrees. Nonferrous items, found in only minor quantities, are wire, brass, lead, copper, and tin items.

Shell Artifacts

Only a few shell artifacts, a large percentage of which are buttons (described separately below) were found on this site; the remaining shell artifacts are mother-of-pearl inlays. A few marine shells were recovered, primarily oysters, and, considering the distance of the site from the Gulf, these shells must have been carried to the site as food or for amusement.

Stone Artifacts

The stone artifacts recovered at the site consist primarily of slate fragments (some of which have hatching incised as on a tally board) and slate pencils (Figure

Table 5. Types of Glass Found at Site 41BO143

Kind of Glass	Quantity	Percent of Artifacts	Percent of Glass
Window glass	3,473	8.75	27.6
Bottle glass	8,769	22.09	69.7
Pressed or molded glass	237	.60	1.9
Other	111	.28	.9
Total	12,590	31.71	100.1

23). In fact, the large number of these items suggests teaching and/or accounting at the site; the management of a large plantation would certainly have required some day-to-day record keeping.

Ceramics

The ceramics at the site were made primarily in the last half of the nineteenth century in Bavaria, England, the United States, and possibly Mexico (Cushion

Table 6. Color of Bottle Glass at 41BO143

Color	Quantity	Percent of Bottle Glass
Clear (includes amethyst)	6,147	70.10
Aqua (clear with blue cast)	1,251	14.27
Green	582	6.64
Brown, amber, dark brown	575	6.56
Pale green (clear with a green cast)	62	.71
Cobalt blue	59	.67
Milk white	59	.67
Dark green	31	.35
Yellow	3	.03
	8,769	100.00

Table 7. Bottle Bases Found at 41BO143

Bottle No.	Maker's Mark	Manufacturer[1]	Description	Dates
1	A & D.H.C. 6	A & D. H. Chambers Pittsburgh, Pa.	Amber, beer	1843–1886 or later
2	BGC° 7	Burlington Glass Works Hamilton, Ont., Canada	Aqua	1877–1909
3	D	Davey & Moore, LTD Brimsdown, Middlesex, England	Amber, beer	1870–1900
4	D 28	Same	Amber, beer	1870–1900
5	FHGW 25	Frederick Hampson, LTD. Salford 5, Lancashire, England	Aqua	1880–1900
6	F H.G.W 6	Same	Amber, beer	1880–1900
7	FRANKFURT· ·······ICK	Unknown	Emerald green	—
8	H, HEYE	Hermann Heye Glasfabrik Bremen, Germany	Dark green	1880–1936
9	LGC°	Louisville Glass Works (Co.) Louisville, Ky.	Amber	1880 for hand-made beer bottles
10	McC&C° D	Wm. McCully & Co. Pittsburgh, Pa.	Amber, square	1841–1886
11	MGC° 21	Modes Glass Co. Cicero, Ind.	Amber	1895–1904
12	(N)	Oberr-nester Glass Co. East St. Louis, Ill.	Aqua	1894–1915
13	R&C° 49	Unknown	Light blue-green	1880–1900 techniques
14[2]	SB&GCo 4	Streator Bottle & Glass Co. Streator, Ill.	Aqua	1881–1905
15[3]		Unknown	Light amber, beer	—

Table 7.—Continued

Bottle No.	Maker's Mark	Manufacturer[1]	Description	Dates
16[4]	P.N. P Co	Unknown perfume	Clear,	—
17[5]	Ⓐ	Unknown picnic	Clear,	—
18	PATENT APPLIED FOR	Unknown	Clear	—
19	A G \	Unknown	Clear	—
20	Pontil Mark	Unknown 2" round	Aqua,	pre-1857
21	5	Unknown	Aqua, rectangular	—
22	I	Unknown	Clear, picnic	—
23[6]	W; PAT JAN 1 1892	Unknown	Clear, patent medicine	—

[1]Toulouse 1971
[2]Illustrated, Figure 19, A
[3]Illustrated, Figure 19, Bottle 15
[4]Illustrated, Figure 21, Bottle 21
[5]Illustrated, Figure 21, Bottle 17
[6]Illustrated, Figure 20, C

1980; Dean 1984). The collection has been divided into three functional groups: housekeeping and cooking, personal activities, and building hardware (Table 9).

Housekeeping and Cooking Ceramics

Ceramics that were used in the preparation, serving, and storage of food are subdivided into five types, based on paste, surface treatment, decoration, and firing temperature: soft paste earthenware, hard paste earthenware, yellow ware, stoneware, and porcelain.

Table 8. Bottle Necks Found at 41BO143

Bottle No.	Neck Seam: Percent Up Neck	Color	Description	Location Unit	Location Level
			Applied lip		
3	50	Brown	Beer	S3.0/E4.5	3
14	100	Aqua	Condiment	Trench X	2
16[1]	and neck	Clear	Decahedral, perfume	S3.5/E4	2
17[2]	50	Clear	Picnic flask	S2.0/E6.0	4
22	50	Clear	Picnic flask	S5.0/E2.5	2
23[3]	50	Clear	Patent medicine, **E. A. Stevens & Co. Druggists Angleton, Texas**	S3.5/E4.5	3
24	75	Aqua	Beer	S3.5/E4.0	2
25	100	Aqua	Beer	S3.5/E4.5	1
26	50	Clear	Picnic flask	S2.0/E6.0	3
27	50	Aqua	Patent medicine, complete	S2.0/E5.5	3
28	0	Clear	Patent medicine	S6.0/E4.0	2
29	100	Aqua	Ink bottle	S3.5/E6.0	2
30	50	Clear	Picnic flask	S3.5/E4.5	2
31	50	Brown	Beer	Unknown	
32	50	Brown	Beer	S3.5/E4.0	3
33[4]	75	Aqua	Patent medicine	Trench X	
34	0	Clear	Longneck medicine	S6.0/E3.0	1
35	50	Aqua	Longneck medicine	Trench X	
36	100	Aqua	Longneck medicine	S6.0/E3.0	1
37	100	Aqua	Patent medicine	S7.0/E1.0	1
38	50	Aqua	Patent medicine	S3.0/E5.5	1
39	50	Aqua	Patent medicine	S3.0/E5.5	1
40	100	Aqua	Patent medicine	S3.5/E5.5	2
41	100	Aqua	Longneck medicine	S6.0/E3.0	1
42	50	Aqua	Patent medicine	S6.0/E3.0	2
43	50	Aqua	Patent medicine	S6.0/E3.0	2
44	50	Aqua	Patent medicine	S6.0/E3.0	2
45	50	Aqua	Patent medicine	S2.0/E6.0	4
46	50	Aqua	Patent medicine	S3.5/R4.0	3
47	0	Aqua	Unknown	S3.5/E4.5	2
48	75	Aqua	Ink bottle	S3.5/E4.5	2
49	50	Aqua	Patent medicine	S3.5/E4.5	5

Table 8.—Continued

Bottle No.	Neck Seam: Percent Up Neck	Color	Description	Location Unit	Level
50	75	Aqua	Longneck medicine	S3.5/E4.5	
51	—	Aqua	Beer	Trench X	2
52	75	Aqua	Large patent medicine	Trench X	3
			Three-piece Mold		
53		Aqua	Mason jar	S5.0/E2.5	1
			Applied Lip		
54	50	Aqua	Patent medicine	S5.0/E2.5	2
55	50	Aqua	Picnic flask	S5.0/E2.5	1
56	50	Aqua	Patent medicine	S3.0/E4.0	1
57	50	Aqua	Patent medicine	S3.0/E4.0	4
58	100	Clear	Whiskey	—	
59	50	Clear, light purple	Picnic	—	
60	50	Clear	Patent medicine	S3.5/E5.5	2
61	50	Clear	Patent medicine	S3.5/E5.5	2
62	50	Clear	Patent medicine	S3.5/E6.5	2
63	75	Clear	Patent medicine	S7.0/E1.0	1
64	50	Clear, light purple	Picnic	—	
65	50	Clear	Picnic flask	S3.5/E5.5	2
66	—	Clear	Ink bottle	S3.5/E5.5	2
67	—	Clear	Ink bottle	—	
68	0	Clear	Ink bottle	S2.0/E6.5	2
69	50	Clear	Picnic flask	S3.5/E5.0	3
70	50	Clear	Unknown	S3.0/E5.5	2
71	100	Clear	Large patent medicine	S3.0/E5.0	
72	0	Clear	Unknown	S7.0/El.0	1
73	0	Clear	Patent medicine	—	
74	—	Brown	Beer	—	
75	50	Brown	Patent medicine	—	
76	50	Brown	Large, unknown	S7.0/E1.0	1
77	100	Brown	Beer	S3.5/E4.0	3
78	100	Brown	Patent medicine	S3.5/E4.5	2
79	0	Brown	Bitters	S3.5/E5.5	2
80	100	Brown	Bitters	S3.5/E5.5	2
81	—	Brown	Whiskey	—	

Table 8.—Continued

Bottle No.	Neck Seam: Percent Up Neck	Color	Description	Location Unit	Location Level
82	—	Brown	Whiskey	—	
83	—	Brown	Bitters	—	
84	—	Brown	Bitters	—	
85	100	Green	Wine	S3.0/E5.5	2
86	0	Aqua	Wide-mouth condiment?	S2.0/E6.0	5
87	—	Dark green	—	—	
88	—	Light green	Wide-mouth condiment	S3.5/E5.0	1
89[5]	0	Clear	Oval, **Layell's Perfumes**	S3.5/E4.5	2
90[6]	No seam	Clear	Vial	S3.0/E5.0	4
91	50	Aqua	**Dr. Harter's Lung Balm, Dayton, O.**	S6.0/E3.0	2
92	75	Aqua	**DeWitt's Colic & Cholera Cure Chicago, U.S.A.**	S3.5/E4.5	4

[1]Illustrated, Figure 21, D
[2]Illustrated, Figure 21, A
[3]Illustrated, Figure 20, C
[4]Illustrated, Figure 20, B
[5]Illustrated, Figure 20, A
[6]Illustrated, Figure 21, C

Soft Paste Earthenware:

Undecorated Sandy Paste Earthenware is generally undecorated, unglazed earthenware, made by Native American occupants of the area between A.D. 500 and 1800 (Aten 1971:52), with dark brown sandy paste and fire-mottled exterior surfaces; it includes Goose Creek Plain pottery. Vessels usually are vertical-walled jars with round or nodal bottoms.

Tin-glazed Red Paste Earthenware is characterized by a low-fired red paste earthenware with a cream-colored tin glaze. The two sherds found on this site are glazed only on the interiors. The larger sherd, from the bottom of a flat-bottomed vessel, is decorated with small brown dots applied to the glaze and is unusual because it is glazed only on the interior; it is probably of Mexican origin (Fox 1986). Wares with this type of glaze and paste are common in early nineteenth century sites in the San Antonio area (Labadie et al. 1986:111).

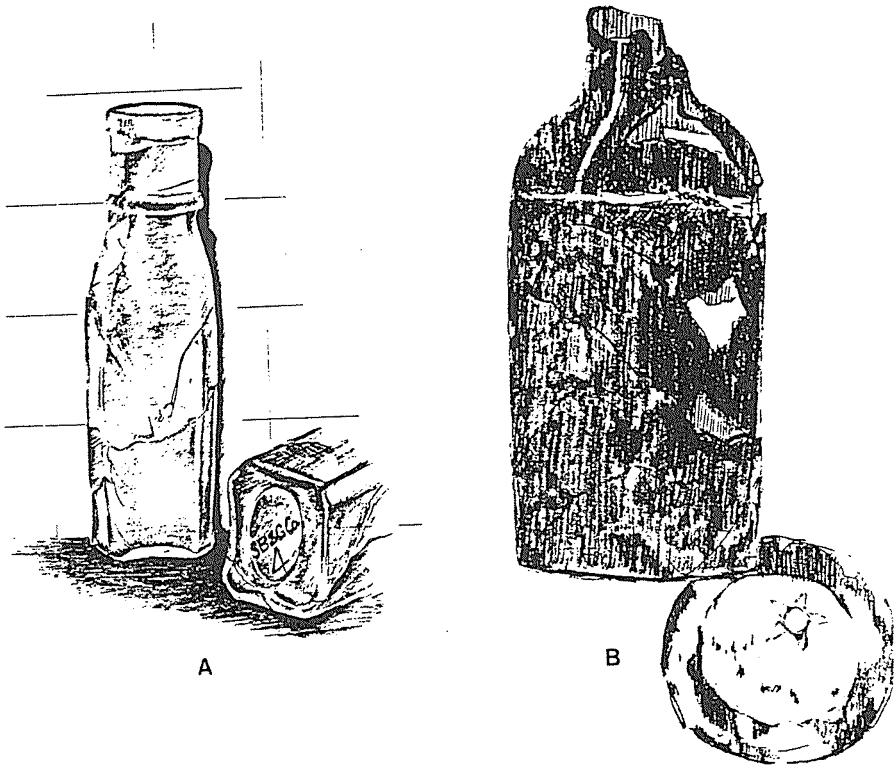


Figure 17. Beer bottles from 41BO143, Site B: A, Bottle 14, aqua beer bottle; B, Bottle 15, light amber beer bottle.

Hard Paste Earthenwares

Luster-glazed Brown Paste Earthenware, made from a variety of pastes (refined earthenwares, porcelain, and well-fired red bodies) and glazed by a unique process in which various metals are added to the glaze, creating a lustrous effect. One sherd of this type was found at the site, made from a hard dark brown paste with an interior glaze of dark brown copper luster, and an exterior glaze of blue, brown, and tan luster stripes. Luster wares were popular in the San Antonio area in the 1830s (Labadie et al. 1986:122) and were usually used for pitchers and jars (Fox 1986).

Decorated White Paste Earthenwares , decorated in several different ways (Figure 24), were imported from England in great quantities during the first half of the nineteenth century and, to a lesser degree, in the last half (Godden 1967; Kovel and Kovel 1986). Ten decoration categories of decorated white paste earthenware are found in the Eagle Island collection: transfer prints, transfer

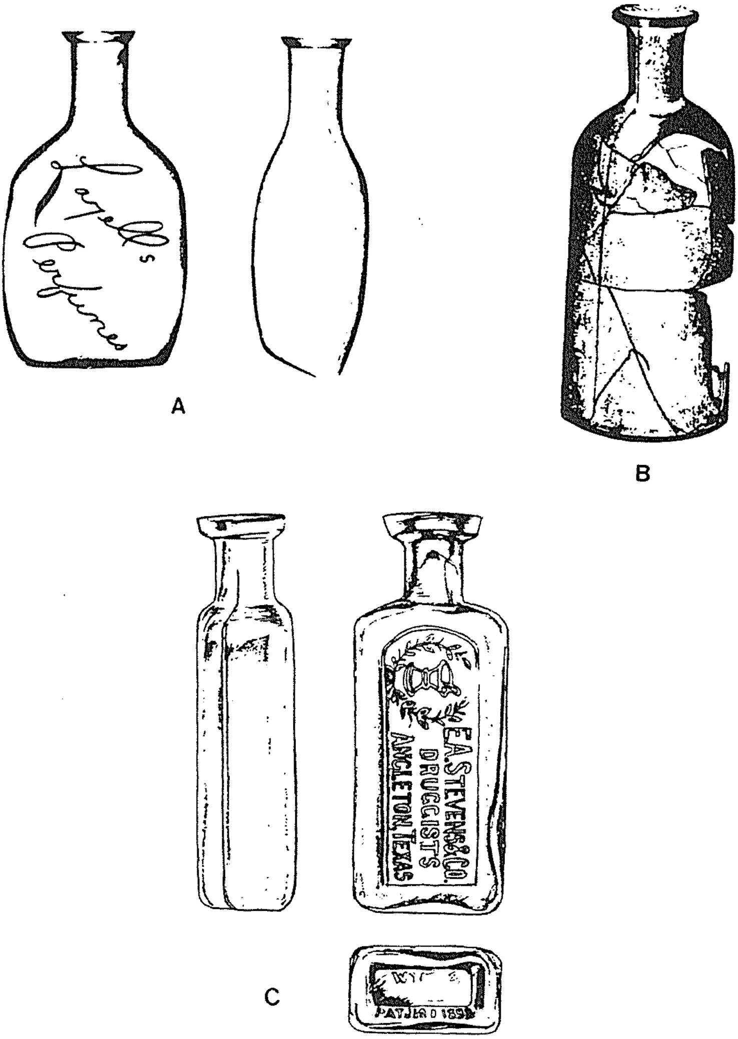


Figure 18. Bottles from 41BO143, Site B (provenience in parentheses): A, Bottle 89, oval clear, labeled **Layell's Perfumes** (S3.5/E4.5-2); B, Bottle 33, aqua patent medicine; C, Bottle 23, clear patent medicine, labeled **E. A. Stevens & Co.** (S3.5/E4.5-3).

prints with enamels, hand-painted, blue edged, sponge or spatter, flown blue and flown black, cut sponge, banded slip, decal, and undetermined edge decoration.

Transfer prints (Table 10) are seen on most of the decorated sherds. These prints are in six colors (black, blue, brown, green, purple, and red), with blue predominating. The patterns include florals, geometrics, and pictorials; eleven sherds with transfer prints were identified (Figure 25), and their

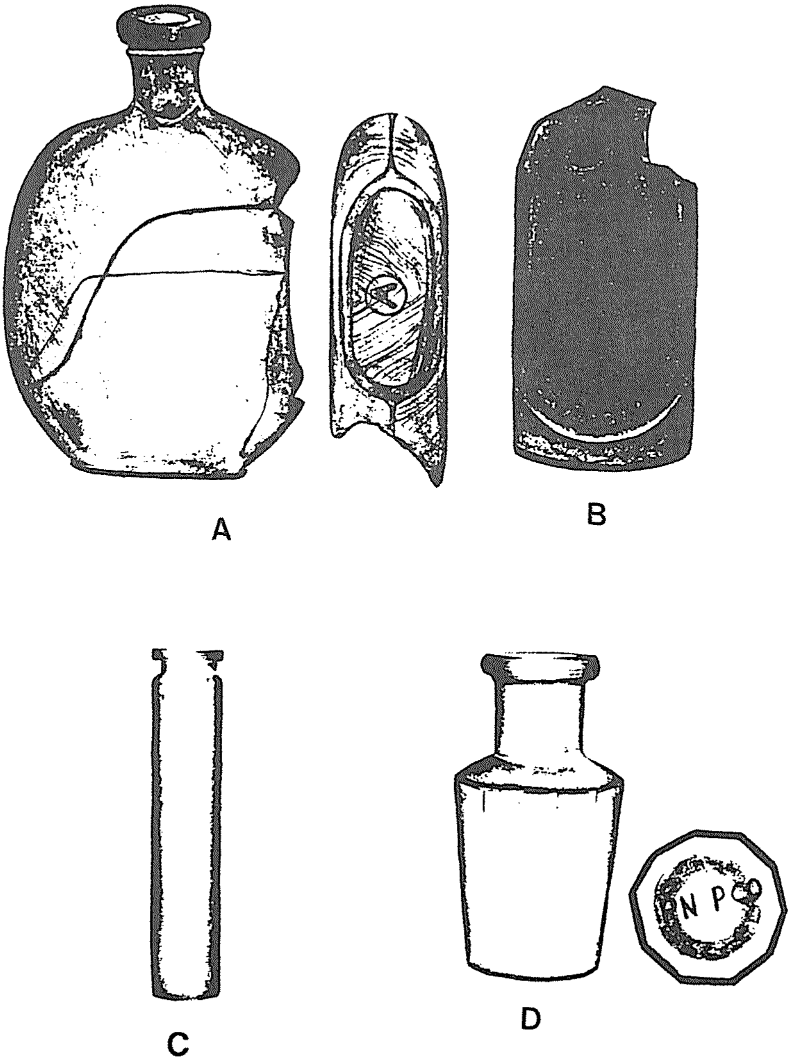


Figure 19. Bottles from 41BO143, Site B (provenience in parentheses): A, Bottle 17, clear picnic, (S2.0/E6.0-4); B, Corning German cologne (S3.0/E5.0-4); C, Bottle 90, vial (S3.0/E5.0-4); D, Bottle 16, clear molded glass, marked **P.N.P. Co.** (S3.5/E4.0-2).

distribution over the site indicates that the older patterns were generally found inside the structure and in levels 3 to 6. The vessel forms are plates, saucers, cups, bowls, and tureens. One fragment of a blue transfer print plate also had part of an importer's mark, identified as Hill and Henderson, Importers, New Orleans.

Transfer Prints with Enamels are represented at the site by sherds with single purple transfer patterns identified as **Florilla** (Williams 1978:628), enhanced

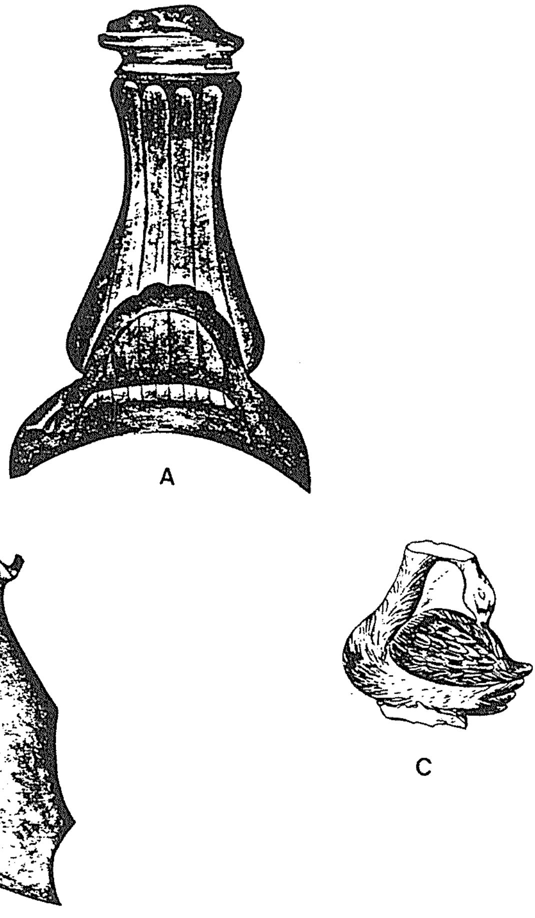


Figure 20. Molded glass artifacts found at 41BO143, Site B: A, Lantern base; B, Fragment of a hurricane lantern glass; C, Molded glass swan (S3.5/E5.0-Level 3).

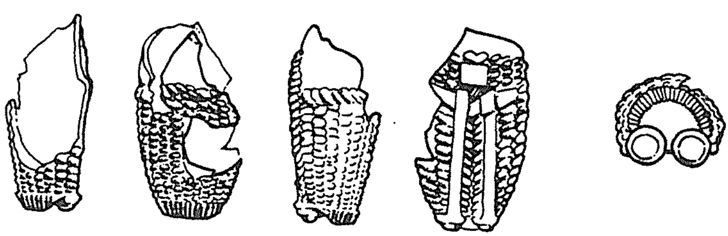


Figure 21. Unusual bottle fragment from 41BO143, Site B: A very delicate thin bottle that appears to be made in imitation of a pack basket or rucksack with straps on the flat back side.

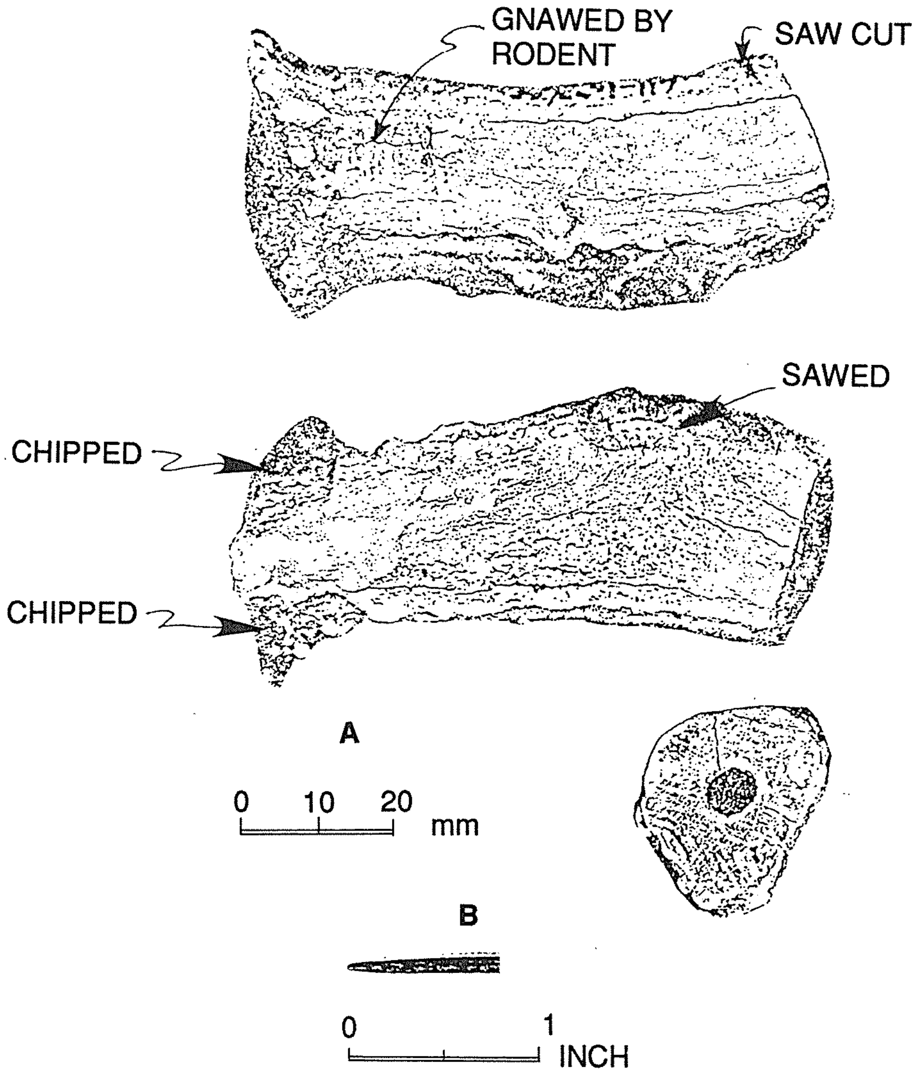


Figure 22. Bone artifacts from the Eagle Island Plantation, Site B: A, Deer antler tool handle; B, Bone needle.

with multicolored overglazed enamels (Figure 25, M, N). The sherds are thick and appear to be part of a large platter. This pattern dates from 1842 to 1867 and was found predominantly outside the structure in level 2 or 3 (See Table 10).

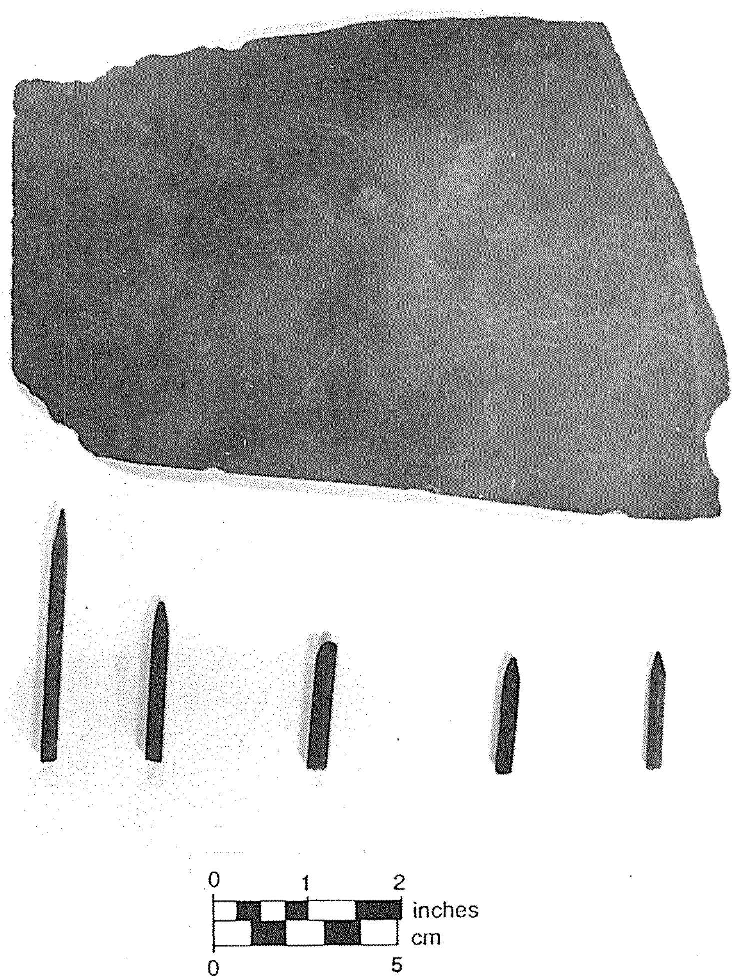


Figure 23. Writing slate and five pencils recovered from Site B, Eagle Island Plantation.

One sherd had an unidentified black transfer enhanced with a black overglazed squiggle (Figure 26, C).

Hand Painted decorations at the site consist of floral and concentric bands. The floral patterns are bright polychromes done in a broadline style (Figure 26, E, F) in rose, blue, and green, with thin lines (branches) in black. One rim sherd from a saucer is decorated with a wheel-turned hand-painted black concentric line at the lip (Figure 26, G).

Blue-edged decoration consisted of a painted blue band around the rim of the vessel. The rims generally have a molded decoration—shell-edge is the most

Table 9. Ceramic Counts By Function

Category	Count	Percent
Housekeeping and Cooking		
Soft paste earthenware		
Undecorated sandy paste (aboriginal)	1	
Tin-glazed brown paste	2	
	3	.15
Hard paste earthenware		
Luster-glazed brown paste	1	
White paste	1632	
	1633	79.53
Yellow Ware		
Rockingham glazed	17	
Undecorated	17	
	34	1.66
Stoneware		
Salt-glazed exterior only	8	
Salt-glazed exterior with slip interior	111	
Slipped interior and exterior	29	
Undetermined surface treatment	17	
	165	8.04
Porcelain		
Decorated	60	
Undecorated	58	
	118	5.75
Personal Activities		
Toys		
Dolls	10	
Marbles	14	
Tea service	17	
	41	2.00
Pipes	56	2.73
Furniture	1	.05
Building Hardware		
Door knobs	2	.09
Grand Total for Site	**2053**	**100.00**

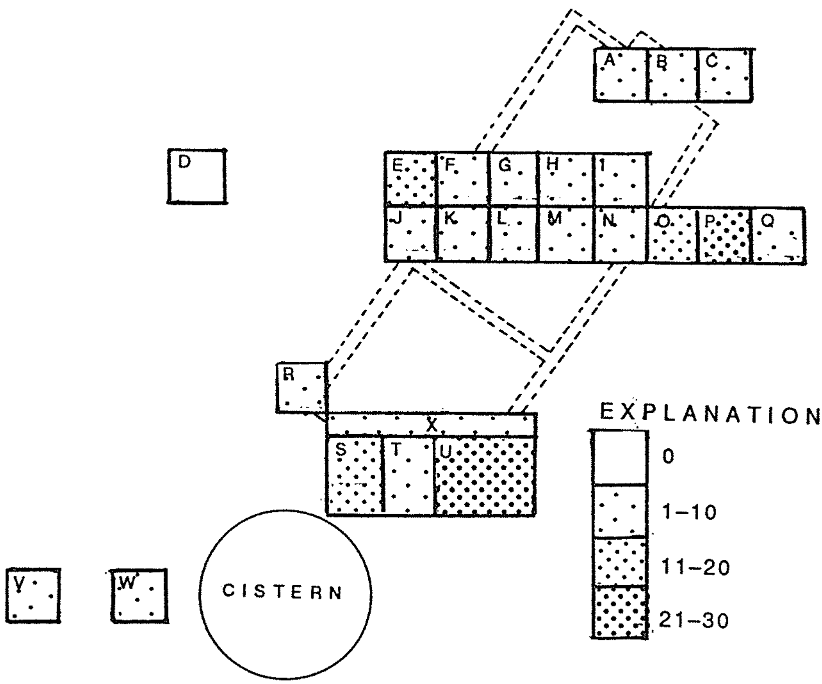


Figure 24. Diagram showing density of decorated white paste earthenware at the Eagle Island Plantation.

common—over which the colored band is applied, usually on plates and platters. Three different edge treatments were identified and roughly dated. The first is Cockled Edge (small shell with feather motif) about 1795 to 1825 (Figure 26, H), the second is a Noncockled Edge (lightly incised trident) about 1840 to 1860 (Figure 26, I), and the last is a Noncockled Edge (no incising; shell is brush stroked) about 1870 to 1890 (Figure 26, J). These dates are from a paper presented by Randall Moir at the 1987 Texas Archeological Society Annual Meeting in Waco, Texas.

Sponge or Spatter, sometimes called spatterware, consists of the application of various colors to a vessel surface by means of an inked sponge. The colors used in the collection are blue and red, and cups are the only vessel form represented (Figure 26, K).

Flown Blue and Flown Black decorations consist of transfer-printed designs in which the color has flowed out or "bled" into the surrounding undecorated parts of the vessels. Cobalt blue sherds from saucers and plates and the black sherds from a pitcher (Figure 26, O) are the most common in the collection.

Table 10. Transfer Patterns: Distribution, Manufacturers, Dates, and Colors

Pattern[1]	Unit/Level	Manufacturer.	Color	Dates
Abbey Ruins	F/4	T. Mayer	Blue	1836–1838
Agricultural Vase	L/4	Ridgway, Morley, Wear & Co.	Green	1836–1842
Canova	U/4	T. Mayer	Black	1834–1848
	L/5		Blue	1834–1848
Chinese Pastime	U/2	Davenport	Purple	1820–1860
Florentine Fountain	A/5	Davenport	Purple	1830–1835
Florilla	U/2	E. Challinor	Purple	1842–1867
	R/3			
	J/2			
	L/2			
	K/3			
	I/2			
	P/1			
Isola Bella	X/2	W. Adams & Sons	Blue	1819–1864
	U/2			
	L/2			
	O/2			
	O/3			
	H/5			
Oriental	P/2	W. Ridgway	Blue	1830–1834
	I/2		Green	1830–1834
Parisian	S/3	G. Phillips	Blue	1838–1848
Scroll	S/3	Unknown	Black	—
	L/4		Red	—
Sirius	U/3	J & T Edwards	Blue	1839–1841
	N/4			

[1]Source: Williams 1978, 1986

Cut Sponge decorations, sometimes called stamped, are applied to vessels by means of a stamp cut from a sponge and inked. Red and green geometric stamping is found on plates and cups (Figure 26, L–N).

Banded Slip decoration is a baby-blue checkered pattern on a white background applied to a large bowl; this decoration may date to the late nineteenth century.

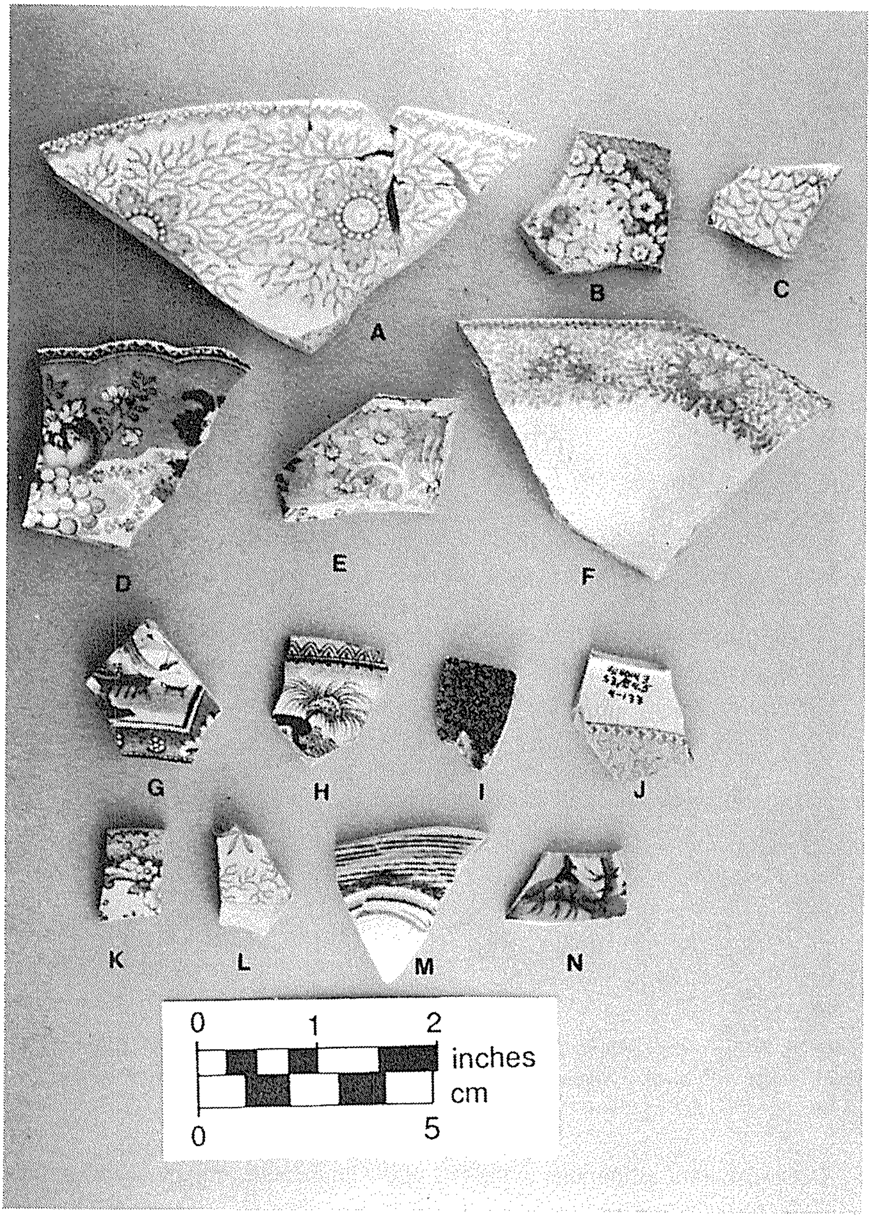


Figure 25. White paste earthenwares with transfer patterns: A, **Sirius**; B and K, **Oriental**; C, **Parisian**; D, **Abbey Ruins**; E, **Florentine Fountain**; F, **Isola Bella**; G-H, **Canova**; I-J, **Scroll**; L, **Agricultural Vase**; M-N, **Florilla**.

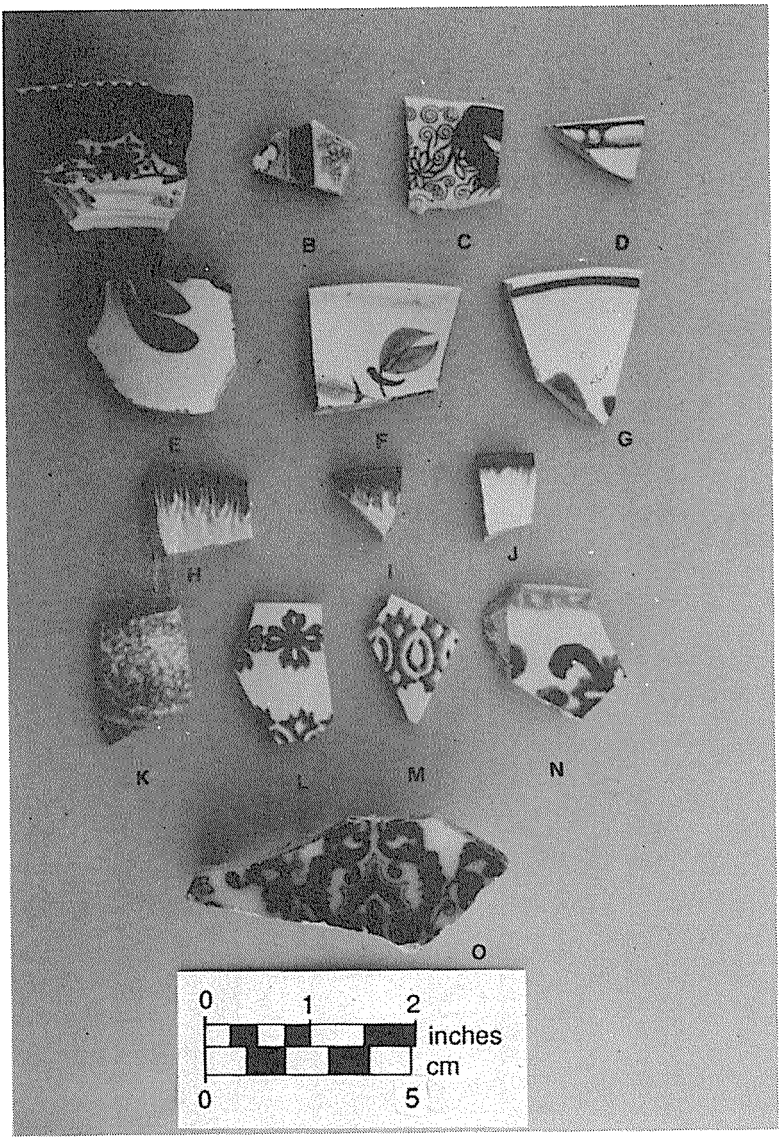


Figure 26. White paste earthenwares: A, B, Unidentified transfer patterns; C, Unidentified black transfer with black overglaze; D, Unknown edge decoration; E-G, Hand-painted; H-J, Blue-edged; K, Sponge; L-N, Cut-sponge; O, Flown black.

Decal decorations, popular at the end of the nineteenth century, were applied to the surfaces of vessels to keep costs down by reducing firing loss and to keep ceramic costs down. The sample from Eagle Island has a floral decal applied to the surface of a scallop-edged molded rim sherd enhanced with hand-painted gold overglaze.

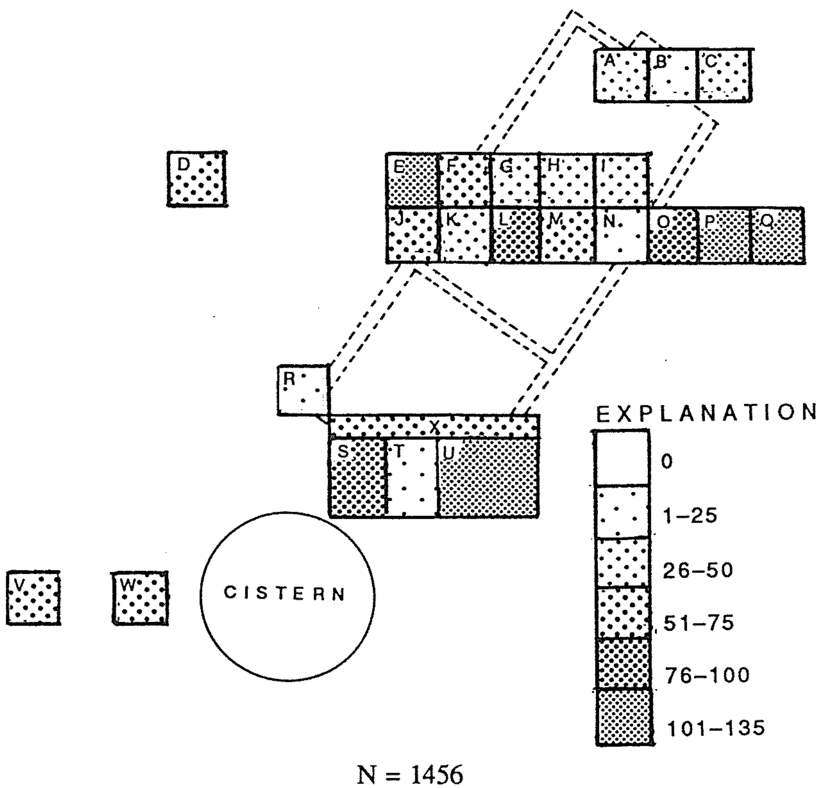


Figure 27. Diagram showing density of undecorated white paste earthenwares.

Unknown edge decorations, which do not fall into any of the groups described and appear to be late nineteenth century decoration traditions, are found on three sherds. Within a blue band at the rims are alternating white circles and ovals. This band, on both the inside and outside of the vessel but wider on the inside (Figure 26, D), is found on large and small plates, cup saucers, cups, pitchers, serving dishes, bowls, and chamber pots.

Undecorated White Paste Earthenwares (Figure 27) include the undecorated parts of decorated white paste earthenwares, pearlwares, granite wares, or ironstones. All of these white wares are combined here because they cannot be separated with any confidence into their appropriate groups. By the 1850s, the popularity of the decorated white paste earthenwares began to wane, and by the end of the Civil War the ironstones and granite wares became the vogue. The collection from Eagle Island contains a few examples of the early Gothic styles popular before the war; but most of the styles are from the last quarter of the nineteenth century. Vessel forms are large and small plates, saucers, bowls, platters, serving dishes, and chamber pots. Some of these sherds have makers'

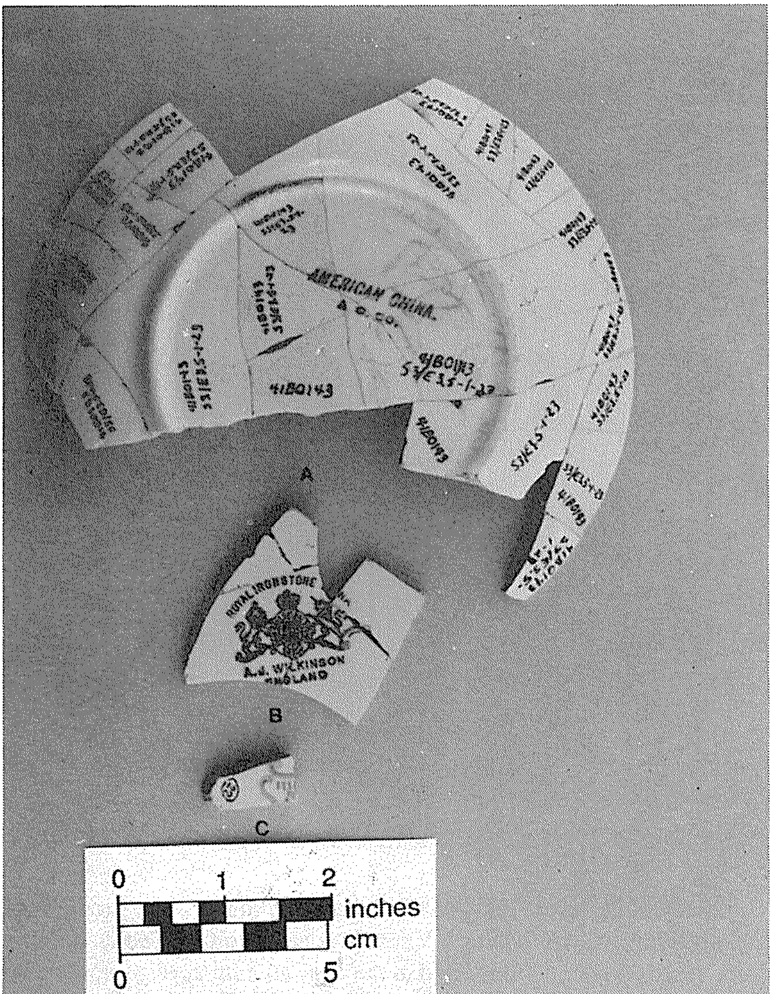


Figure 28. White Paste Earthenware marks: A, American China Co.; B, A. J. Wilkinson; C, Hill and Henderson, Importer's, New Orleans.

marks, and, except for one American mark, all are English (Figures 28 and 29; Table 11).

Yellow Wares are of buff clay that is finer in texture than red ware and stoneware, to which it is very similar, except that it has more iron, kaolin, and feldspar. Yellow wares are less dense and vitreous than stonewares, which are fired at about 2000°F; yellow wares are fired somewhat above this temperature (Gallo 1985:38). Sherds in the collection are either undecorated or decorated with a brown manganiferous glaze known as Rockingham. The undecorated yellow ware sherds are from bowls and baking dishes. One dish is an 11-inch flat-bottomed vessel with sloping sides

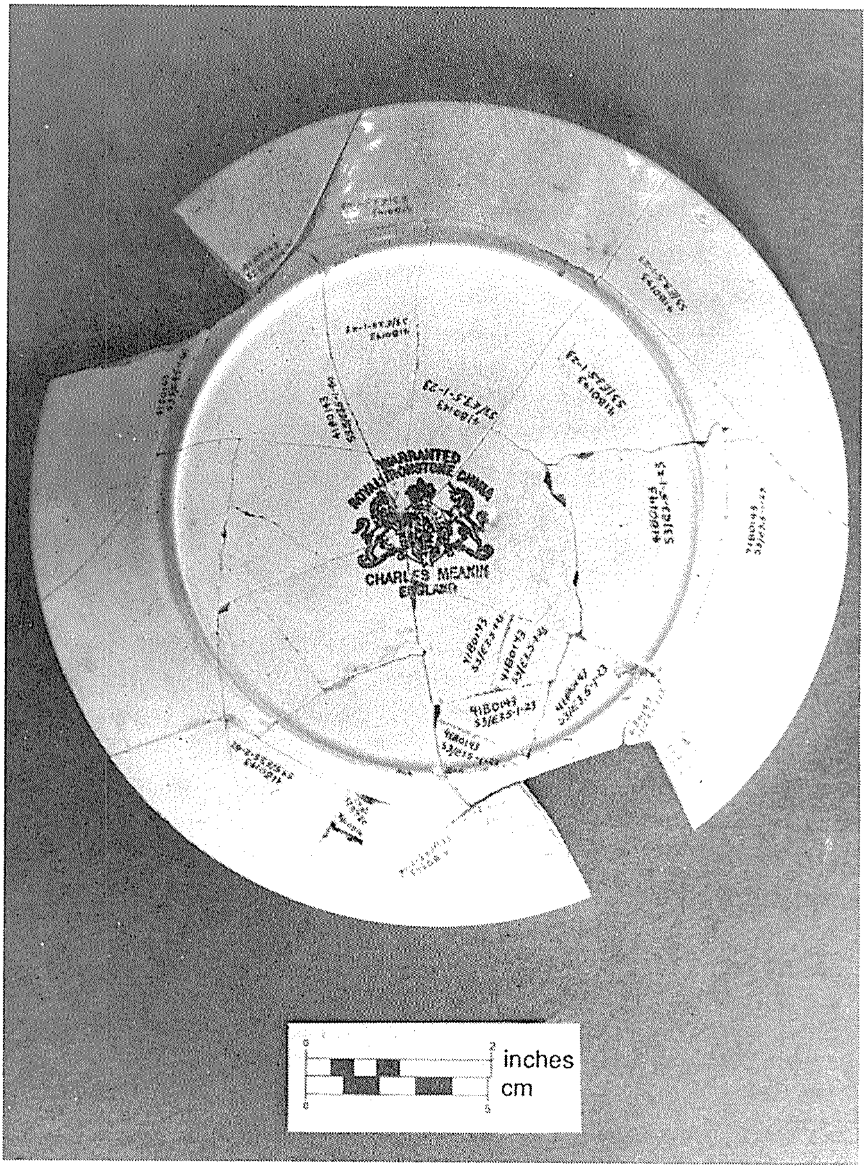


Figure 29. White Paste Earthenware plate with Charles Meakin maker's mark.

called a nappie, manufactured by Sharpe Brothers and Co. (1838–1900) of Derbyshire, England (Gallo 1985:11). The sherds with Rockingham glaze are from pitchers and possibly a cuspidor. The possible cuspidor sherds are similar to those of a Rockingham glazed yellow ware cuspidor found at Quintana, Texas (Pollan 1986:3-4).

Table 11. Undecorated Earthenware: Makers' Marks

Makers' Marks	Dates
American Crockery Co.	1870–1900
Alfred Meakin	1897–1913
Charles Meakin	1891+
A. J. Wilkinson	1891–1896

Fourteen of the 35 yellow ware sherds were recovered from excavation unit E; the remainder were scattered evenly throughout the site.

Stonewares (Figure 30) have hard, vitrified, clay-colored earthenware bodies. The stoneware sherds found at Eagle Island can be subdivided into four types based on surface treatment—salt-glazed exterior only, salt-glazed exterior with slipped interior, slipped exterior and interior surfaces, and undetermined surface treatments.

Salt-glazed, Exterior Only is represented at Eagle Island by two vessels. The first, either a beer, ale, or ink bottle, has a light brown paste and a dark brown salt-glazed exterior. The second vessel, possibly a crock or churn lid, is represented by a single sherd of gray paste with gray salt-glazed exterior.

Salt-glazed Exterior with Slipped Interior is represented by many sherds from crocks, jugs, and jars, with paste ranging from dark brown high-fired to light tan low-fired. The exterior slip ranges from tan to almost black; the interiors are all brown slipped. Most of the vessels were wheel thrown, but some were made by the jiggered method.

Slipped Exterior and Interior Surfaces, represented by a large mixing bowl popular in the 1890s, have dark brown slip. One and a half inches below the rim of this vessel is a large ring flange that permitted stacking of a maximum number of bowls for firing in the kiln (Georgiana Greer, 1987 personal communication).

A second slipped stoneware piece has a light reddish brown wash on gray paste, and on the interior, a light tan slip. On one of the sherds is an impressed seal—a circle with the letters **SEL** around the perimeter and a crowned eagle whose head is facing left and has the letters P.R. on its breast. A similar mark was found on a stoneware wine bottle at the Little Campus site at The University of Texas in Austin. The mark was identified as the seal of the Duchy of Nassau, one of the 39 independent states created by the Congress of Vienna in 1815 from lands conquered by Napoleon; they existed as political entities until 1871 (Jackson 1986:15). Munsey, however, identifies these vessels as mineral

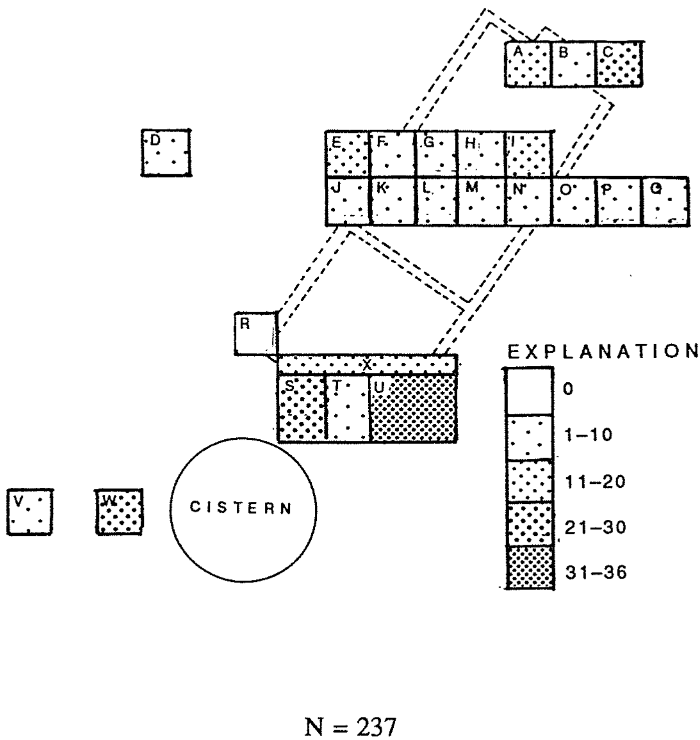


Figure 30. Diagram showing density of stonewares at 41BO143, Site B.

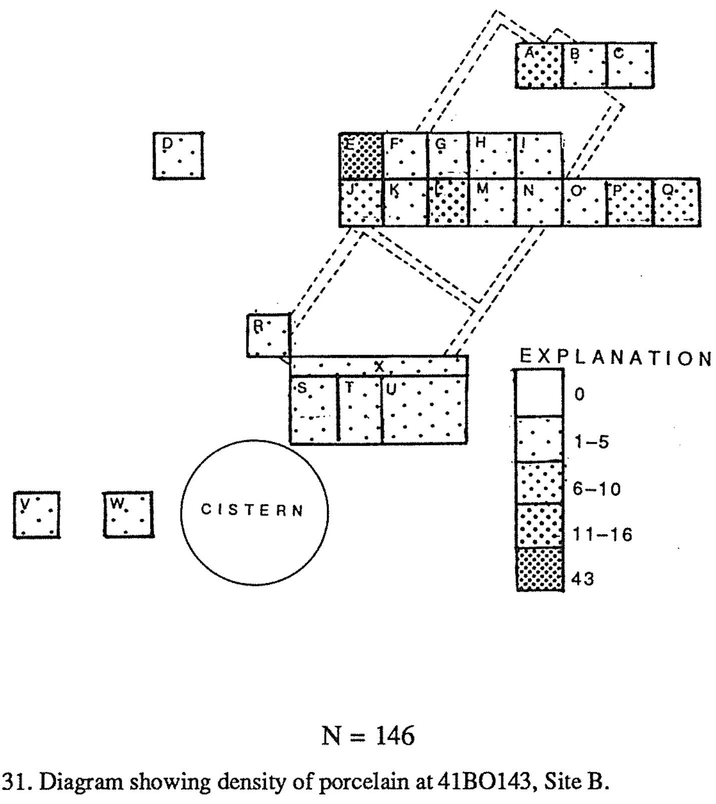
water bottles (Munsey 1970:135), describing them as almost always with a handle near the neck, about 12 inches tall, and holding about a quart. He dates these bottles from 1880 to 1900 and states that

> many came from Germany and Holland; one of the most common is stamped "Nassau", which is a region in the province of Hesse in Germany. Mineral water was imported to meet a demand by immigrants to this country who were fond of mineral waters from the "old country" [Munsey 1970:135].

Miscellaneous sherds from undetermined vessels were also found, some with an almost copper luster sheen on the exterior and a brown wash on the interior. One sherd has a white Bristol-like slip on both interior and exterior, and a cream-colored paste.

Most of the stonewares apparently were manufactured in the midwestern United States, possibly the Ohio River valley, and date to the 1880s. All of the stonewares were made in the last thirty years of the nineteenth century (Georgiana Greer, 1987 personal communication).

Porcelain (Figure 31)



N = 146

Figure 31. Diagram showing density of porcelain at 41BO143, Site B.

Undecorated Porcelain sherds are all of hard paste, from plates, saucers, and cups. No makers' marks were found on any of the undecorated sherds.

Decorated Porcelain sherds in the collection are parts of four vessels. On the rim of the first vessel, a saucer, 5-1/2 inches in diameter, is a molded geometric design with gold overglaze at the edge, below which is the faint image of a decal floral pattern. This saucer has a maker's mark from Zeh, Scherzer & Co., of Rehau, Bavaria (Figure 32). The second vessel is a cup bearing the same mark. The third decorated vessel is a cup or vase covered with an over-glaze decal composed of a floral pattern with geometric designs and the letters **o**, **r**, **g**, **e**, **t**, probably part of

Forget Me Not. The fourth decorated porcelain vessel may be a vase with long flutes with a rose overglaze.

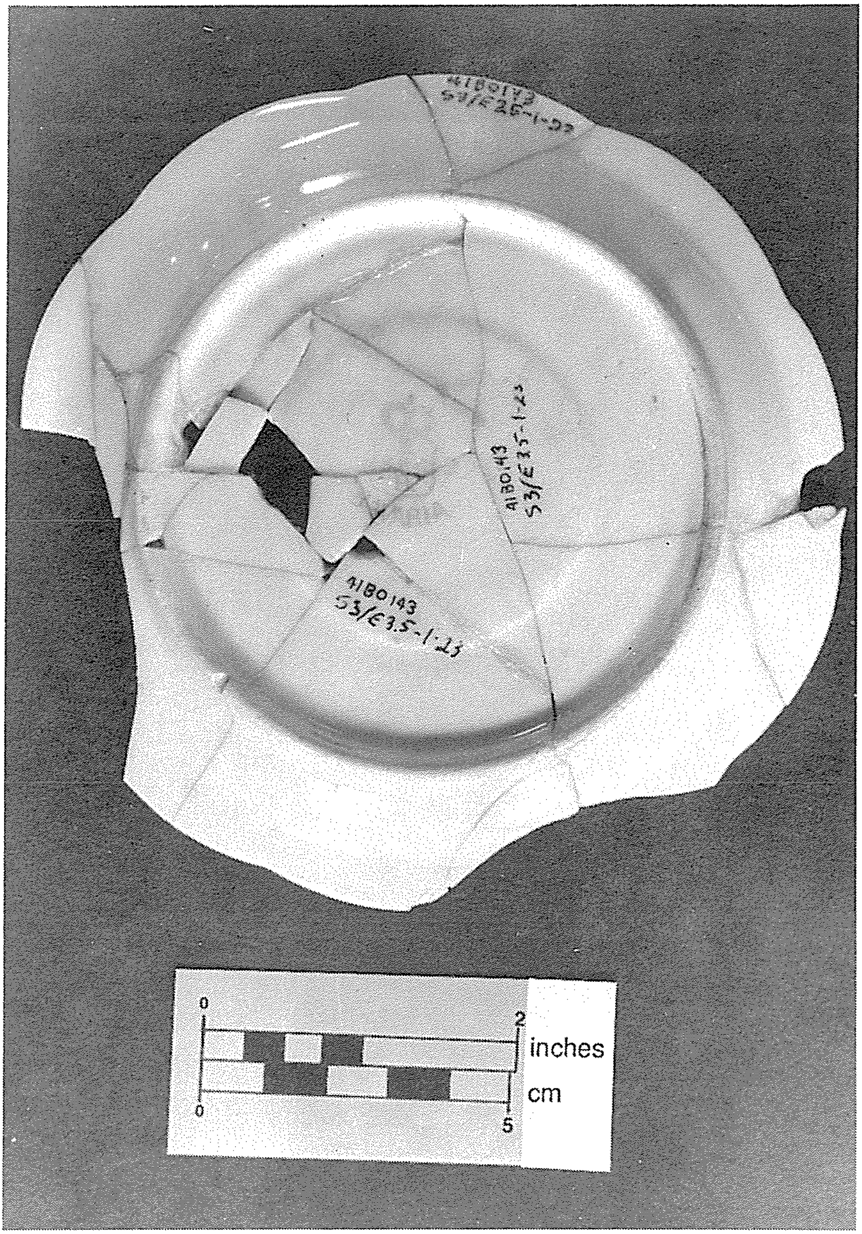


Figure 32. Bavarian porcelain saucer with Zeh, Scherer & Co. maker's mark.

Personal Ceramics

Ceramics used for personal activities by the inhabitants were limited to toys, pipes, and furniture.

Toys found on the site are marbles, doll parts, and children's tea sets. The marbles are unglazed stoneware, ranging between 9/16 and 1 inch in diameter. One marble is decorated with two blue lines crossing at right angles. The doll parts—upper torso, arms, legs, and part of a face—are made of porcelain and represent at least four dolls. The sherds of children's tea sets—parts of a cup, a pitcher, and four saucers (Figure 33)—are also porcelain.

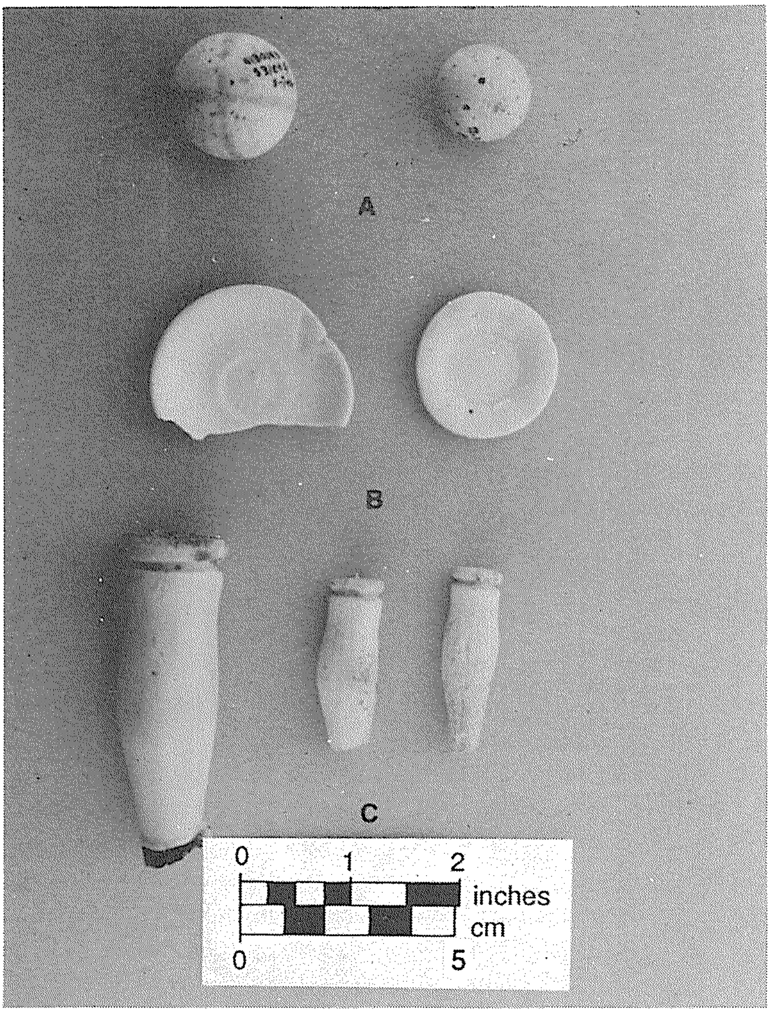


Figure 33. Ceramic toys: Row A, Marbles; Row B, Child's porcelain tea set saucers; Row C, Porcelain doll parts.

Pipes were abundant and of many forms. The stem of one white kaolin pipe and a green-glazed white kaolin Turk's head effigy pipe are from England and were common before the Civil War. An agate-ware pipe bowl possibly came from England or Germany, and the remaining pipes are American. The stoneware pipes date to the latter half of the nineteenth century. The thin dark-glazed pipes may be from Kentucky, the salt-glazed pipes, from Pt. Pleasant, Ohio, and the light colored pipe, bowls, and stems, from Virginia (Georgiana Greer, personal communication) (Figure 34).

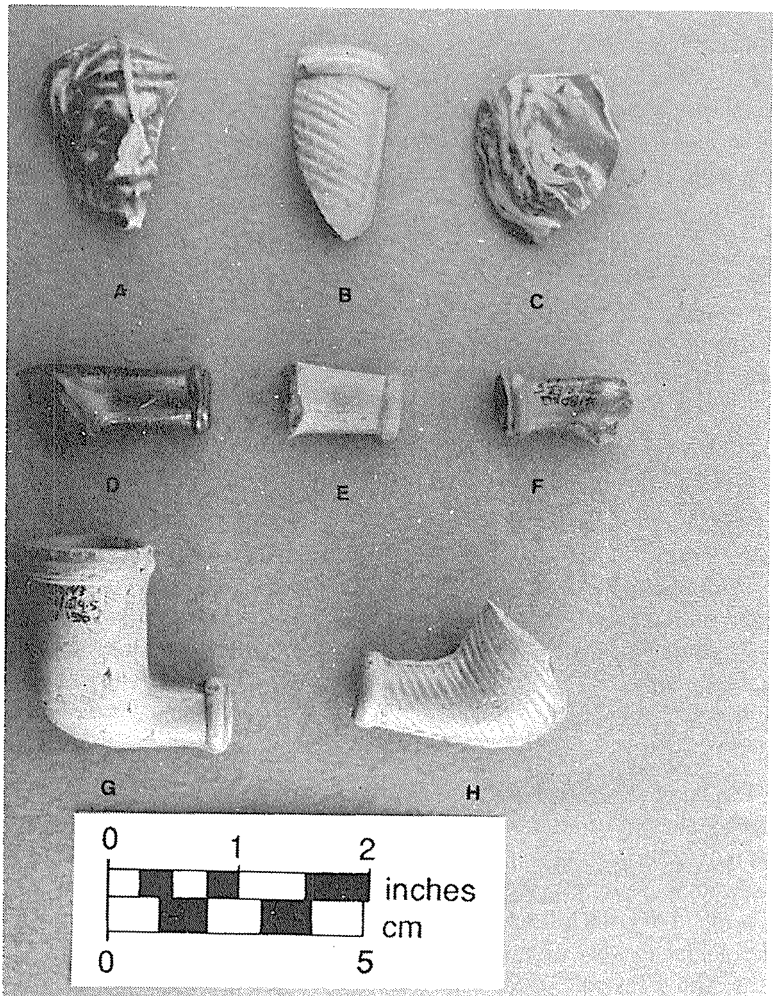


Figure 34. Ceramic pipes from 41BO143, Site B: A, Green-glazed Turk's head effigy pipe bowl; B, Molded pipe bowl fragment; C, Agate-ware pipe bowl fragment; D–F, Pipe stem fragments; G, Complete pipe; and H, Pipe fragment.

Ceramic Furniture is represented at the site by a porcelain wheel still attached to a steel axle and swivel assembly that would have been driven into the furniture leg. The wheel is 1-1/2 inches in diameter and 1 inch wide.

Ceramic Building Hardware is represented by two doorknobs—2 inches in diameter and an inch thick in the center—made of dark brown stoneware paste marbleized with different shades of brown clay. Similar doorknobs have been found on other historic sites in Brazoria and Jackson counties (Fox et al. 1981:69; Mallouf et al. 1973:177).

Summary of Ceramics

In summary, the ceramics indicate that the site was occupied from the late 1830s to about 1900. The early transfer patterns, together with the red-paste wares, easily support the early date. The preponderance of undecorated white paste earthenware with late nineteenth century makers' marks and the lack of early twentieth century ceramics help solidify the latter date.

Organics

Hard rubber items make up the greater part of the organic artifacts recovered. The many novelty items—hard rubber combs, pipe stem, hairpin, barrette, buttons, and a ring (Figure 35)—reflect the desire of rubber manufacturers of the day to find markets for their new vulcanizing process (see "Buttons," below).

Food Residues

The modest culinary tastes of the household are indicated by the many peach pits, eggshell fragments (including one goose or turkey egg), and corn cobs.

Buttons And Studs

The six hundred fifty-nine buttons, studs, and beads recovered from the site are broken down into six major categories: bone, shell, ceramic, hard rubber, glass, and metal.

Bone Buttons

The large shinbones of cattle provided the best raw material for the thousands of plain two-, three-, four-, and five-hole bone buttons that were produced in the nineteenth century. The bones were cleaned and boiled to soften them, then sawed open and pressed flat, and, after the spongy interiors of hollow bones were scraped out, the button blanks were cut from the resulting slabs. Commercial bone blanks were usually cut on lathes, which imparted simple ring-turned designs. The discs were fitted with nailhead shanks or stout pin shanks, or they were drilled with two, three, four, or commonly five holes (four spaced evenly and one in the middle); the center holes were drilled in the marks left by the pricks that secured the discs in the lathes (Hughes and Lester 1981:8–13). Thirty

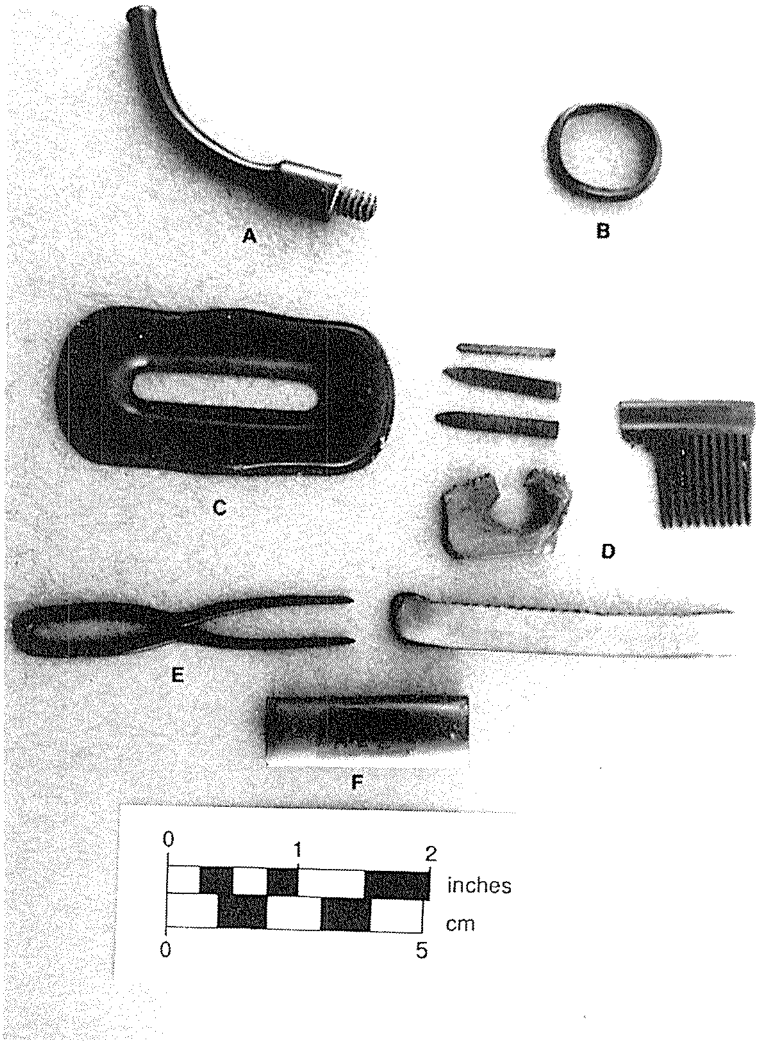


Figure 35. Hard rubber artifacts: A, Pipe stem; B, Ring; C, Barrette; D, Comb pieces; E, Hairpin; F, Tubular cigar holder.

of the 39 bone buttons from the site have four holes, six have five holes, one is a solid oval with a steel shank, and two are bone studs (Figure 36).

Shell Buttons (Figure 37)

Shell buttons, or "pearls," made from the nacreous lining of the shells of various marine or fresh water mollusks, are highly iridescent, breaking the light into

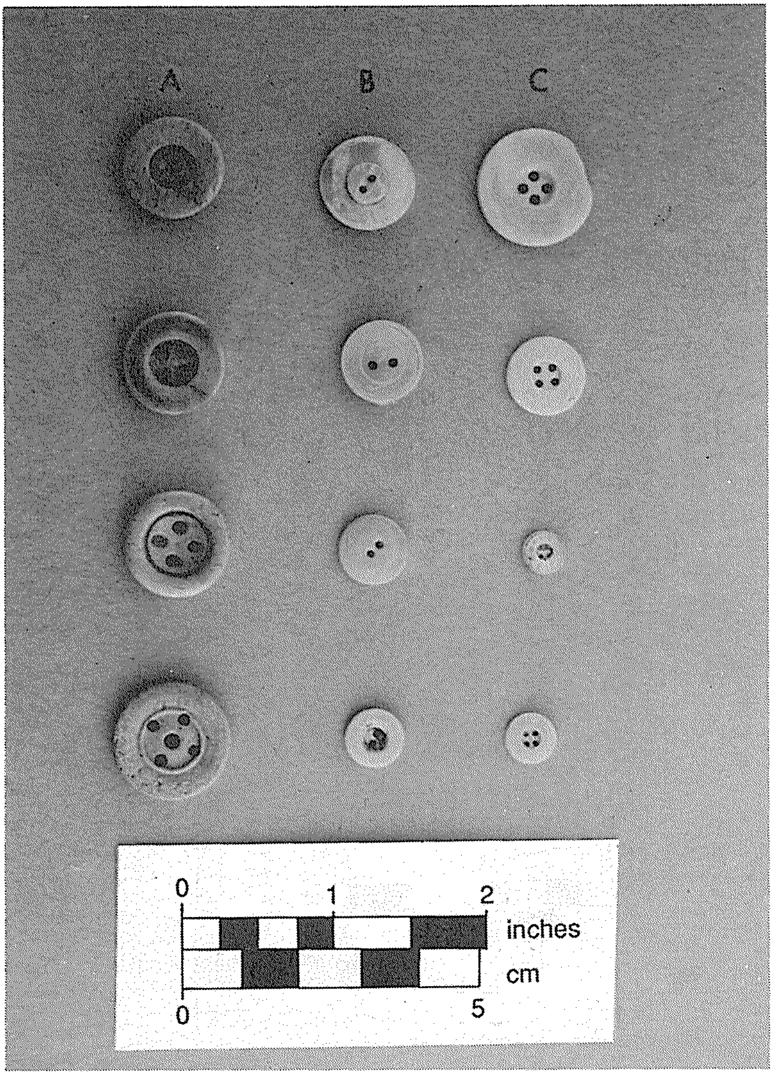
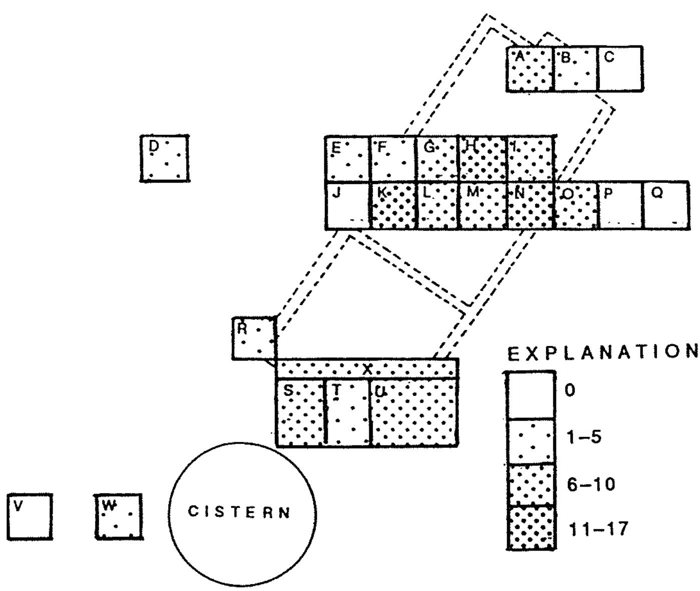


Figure 36. Bone and shell buttons from 41BO143, Site B: A, Four- and five-hole bone buttons; B, Two-hole shell buttons; C, Four-hole shell buttons.

rainbows of colors. The shells of the pearl oyster, several species of the genera *Meleagrina* or *Pinctada* have been most extensively used for buttons. Birmingham was the English center for the manufacture of pearl buttons well into the nineteenth century, but the French also made beautiful pearl buttons. "Colonial" pearls, pearl discs with conventional designs and short brass wire pin shanks, were used from the last of the eighteenth century through the 1840s. Most of these buttons were imported from Europe, but there is evidence that Amaja D. Goodyear, of Ohio, was making cuff and sleeve "colonial" buttons as early as 1807. Imported shell, always an expensive item, was cut with as little waste as possible, and after blanks had been cut from the prime part of the shell, the smaller pieces were sold to other factories, to be made into tiny buttons for shirts and shoes. From 1800 to 1860, most pearl buttons were decorated with simple turned or pierced designs, often with delicate milled edges. In the second half of the nineteenth century an American industry in the East began to make buttons of imported ocean pearl, and by the 1890s the pearl button industry had also developed in the Midwest, based on the abundant supply of freshwater mussel from the Ohio and Mississippi rivers. The nacreous lining of the freshwater mussel is almost pure white but is not iridescent. It was used mostly for utilitarian shirts, underwear, and baby-clothes buttons (Hughes and Lester 1981:230–231). More than 17 percent of the buttons at the site were made from shell; most were two- and four-hole utilitarian buttons (Figure 36, B, C), and only four were of a different type—one possible "colonial" pin shanked, two oval with swaged-in shank, and one cut design square with brass shank (possibly post-1900). The last button here is the only one with part of the shank remaining so the other identifications are only tentative.

Ceramic Buttons and Studs (Figure 38)

Ceramic buttons and studs for utilitarian uses comprised almost 60 percent of the button artifacts recovered. In 1840, a process for making ceramic buttons from



N = 115

Figure 37. Diagram showing density of shell buttons at 41BO143.

dry china-clay powder was patented in England by Richard Prosser. The powder was poured into steel dies or molds and compressed into small button shapes that were then fired. By 1848, plain white and calico-printed buttons were being made in the United States; from the 1850s to the early twentieth century, the greater part of the market was dominated by the firm of Jean Felix Bapterosse, of France, who used a process that stamped out buttons from wet china clay. Two-, three-, and four-hole plain white and colored body buttons were produced, together with calico prints. Ceramic buttons can be classified by shape, size, pattern, body color, shank type, finish, etc. (Hughes and Lester 1981: 31-33) (Figure 39).

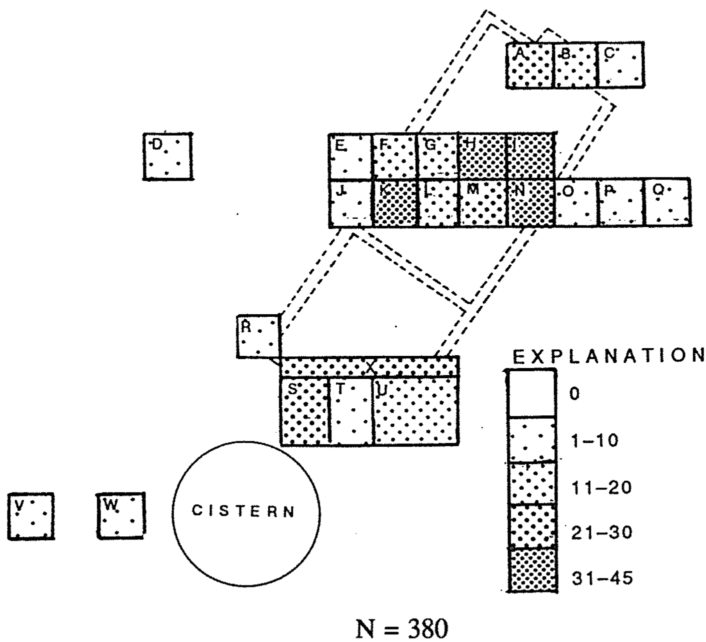


Figure 38. Diagram showing density of ceramic buttons and studs at 41B0143.

Rubber Buttons

Buttons made of hardened India rubber apparently were made only in the United States by vulcanization, which was discovered by Charles Goodyear in 1839 and patented by him in 1844. Nelson Goodyear patented an improved process for hardening rubber in 1851. The date 1851, with the designation "Goodyear's patent" and the manufacturer's name, either in full or abbreviated, is the most common backmark on hard rubber buttons made by two American companies, the Novelty Rubber Co. of New York and New Brunswick, New Jersey, and the India Rubber Comb Co. of New York. Two firms that manufactured hard rubber buttons after Goodyear's patents expired in the 1870s were the Dickinson Hard Rubber Co. from the late 1870s to the early 1890s, and the American Rubber Co. in the 1880s and

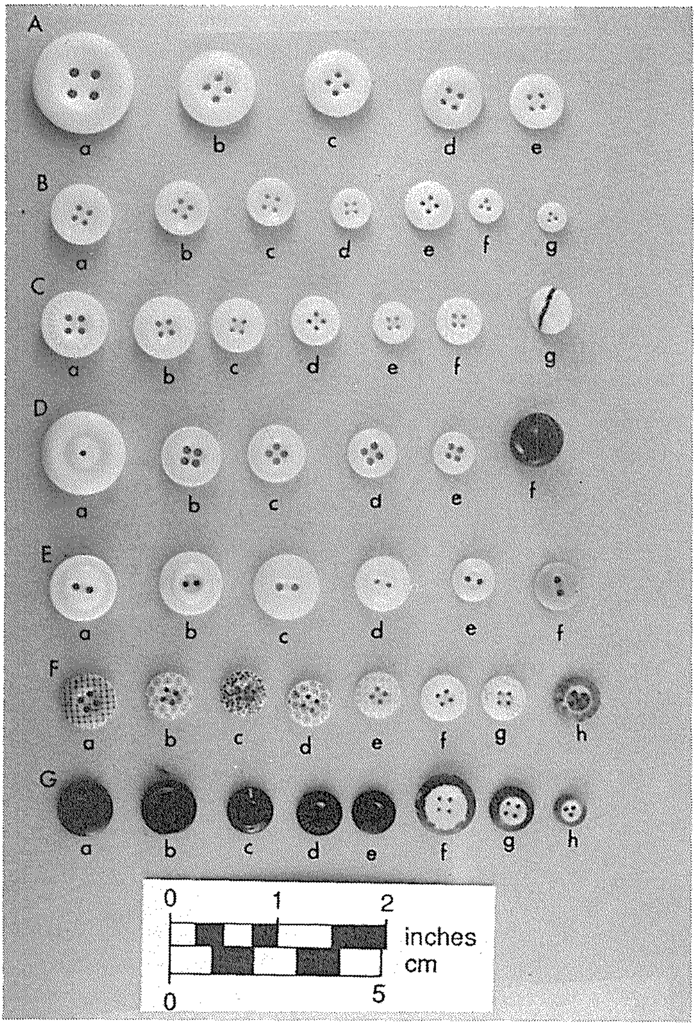


Figure 39. A representative sample of porcelain buttons from 41BO143, Site B:

Row A; a–e, White four-hole Dish buttons.

Row B; a–d, White four-hole Saucer; e, White four-hole Ink Well; f, g, White three-hole Dish.

Row C; a–e, White four-hole Pie Crust; f, White four-hole Hobnail; g, White Gaiters wire shank.

Row D; a, Ivory Whistle; b–e, Ivory four-hole Dish; f, Brown shoe wire shank.

Row E; a, c–e, White two-hole Oval Eye; b, White two-hole Hollow Eye; f, Pink two-hole Oval Eye.

Row F; a–g, Calico four-hole Dish; h, Spatter four-hole Dish.

Row G; a, e, Black four-hole Dish; b, Black four-hole Saucer; c, Black four-hole Ink Well; d, Black four-hole Pie Crust; f, Brown ringer four-hole Dish; g, Brown ringer four-hole Ink Well; h, Brown ringer three-hole Dish.

1890s. Shank types include wire loop shanks, pin shanks, two- or four-hole, and a self shank (Hughes and Lester 1981:48–56). All six rubber buttons from the site are of the two-hole variety; three were manufactured by the Novelty Rubber Co. (Figure 40, A–D).

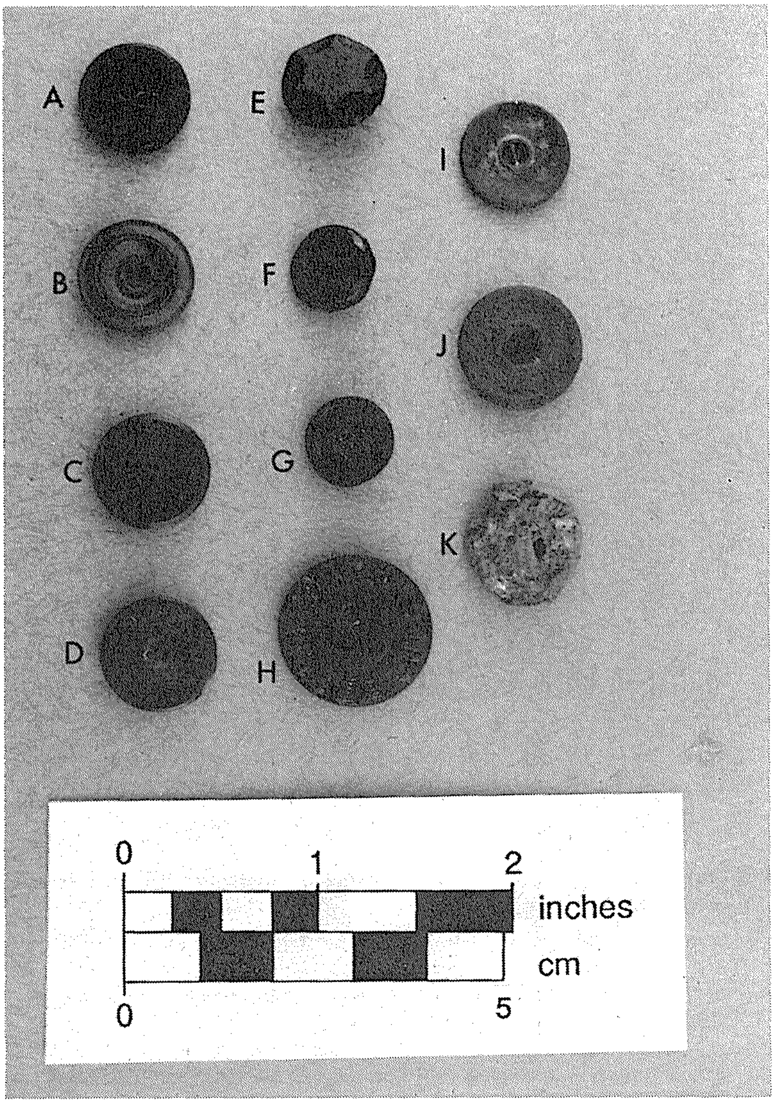


Figure 40. Hard rubber, black glass, and metal buttons from 41BO143, Site B: A, D, Two-hole hard rubber; B, C, Two-hole hard rubber button imprinted **Novelty Rubber Co.**; E–G, Black glass with brass shanks; H, Two-hole black pressed glass; I, J, Brass suspender button; K, Iron suspender button.

Glass Buttons

Most of the glass buttons recovered from the site are black (Figure 40, E–H), but one round button of clear glass with a wire loop shank dating from 1840 to 1890, one round button of clear glass with impressed design top and bottom and a brass shank from the 1860s, and three round clear glass inserts that possibly had brass backs were also recovered. Most of the small black glass buttons with or without pictorial designs made between 1870 and 1914 were imported from Bohemia, Germany, and Austria until 1880, when several firms began to manufacture them in the United States (Hughes and Lester 1981:88–109). The popularity of black buttons during this time is attributed to the black mourning clothes worn by Queen Victoria after the death of her husband.

Metal Buttons (Figure 41)

More than half of the 79 metal buttons are four-hole pants buttons. Some have brass tops, but most tops are tinned iron or steel. Corrosion was quite severe on all, but the brass buttons (Figure 40, I–J) survived sometimes in amazingly good

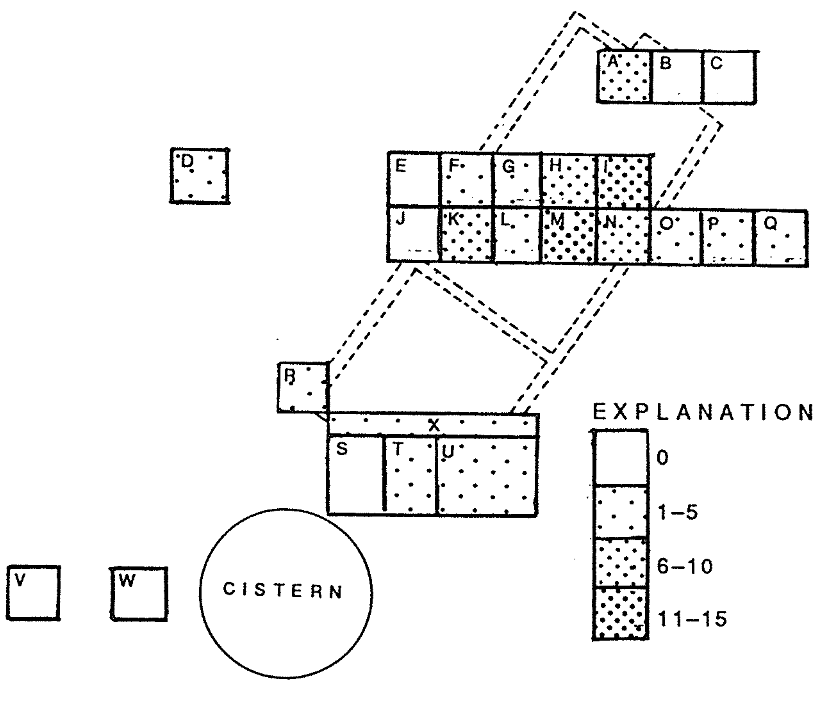


Figure 41. Diagram showing density of metal buttons at 41BO143, Site B.

shape. Brass buttons can be put into several groups, including the Jacksonians of the 1825 to 1840 period, the Golden Age gilts, military buttons, and Victorian picture buttons. In the early years of the nineteenth century, brass buttons continued to be imported into this country from Britain, but by the 1830s, several American manufacturers had developed the technical ability to compete with the foreign imports. The earliest gilt buttons were one piece; by 1820, the two-piece button had become established in Britain and was soon introduced into the United States. It consisted of two stamped metal shells, front and back, folded tightly over at the rims. Americans called it the Sanders type after the British inventor Benjamin Sanders. Two steel dies were required to stamp the top face, a negative and a positive die, to give more definition to the design stamped in the thin metal. The production of these gilt buttons reached its peak in the United States between 1830 and 1850. The gilt buttons from this period are called Golden Age gilts; only one Golden Age gilt was recovered from the site, a one-piece design with an impressed back mark, Warranted Rich **Orange** (Figure 42, E). The Jacksonian buttons, also of the Golden Age period, were small gilt brass waistcoat buttons characterized by separate rims that were added to the one-piece bodies. More than a hundred patterns, including die variants, have been listed. The back marks of true Jacksonians are in raised letters, and factory marks include L. & Kendrick (1829–1835), R. J. & Co. (1832–1836), Scovills (1840–1850), and R. R. & Co. (1826–1832). Two buttons from the site could possibly be called Jacksonian; careful cleaning of the backs of both of these would be required for positive identification. After 1850, the quality of gilt dress buttons began to decline with lighter construction and less hand finishing, and in the 1860s, small chased gilt buttons of cheap two-piece construction with tinned iron backs and flexible wire shank were made for women's wear. Victorian stamped brass picture buttons, most of which were cheap stamped brass with lacquered steel backs, followed in the late 1860s for ladies' and children's wear. Because of the steel backs, the four or five picture buttons recovered are in bad condition; three are of the same flowered design. Brass buttons for the military follow the same sequence in construction as the civilian dress buttons. Both one- and two-piece buttons from the 1800 to 1840 period often have superb die work. Most were imported from Britain in the early part of the nineteenth century, but by the 1840s, American manufacturers began to fill the government contracts (Hughes and Lester 1981:214–224).

Four gold-gilt military buttons were recovered: one Republic of Texas Navy button (2-piece with border and rope edging and back-marked **Scovills & Co. Waterbury**) and three dating to the Civil War (Figure 42, A–D). Of these Civil War buttons, one is a South Carolina militia button (back mark unreadable), one is a Confederate infantry button (no back mark), and one is a Confederate cavalry button marked **Willm Bird & Co., London** (Albert 1973).

Summary

After examining the buttons from the site, M. W. (Freddie) and Jean Speights, members and officers of the National Button Society, were immediately able to date the buttons roughly from the 1840s to the very early turn of the century, based only on buttons, with no historical data. This correlates well with the other artifacts from the site. The Speights also ascertained that the vast majority of buttons, no matter the material of construction, were utilitarian buttons for both men and women, used on dresses, shirts, pants, overalls, and underwear. As with

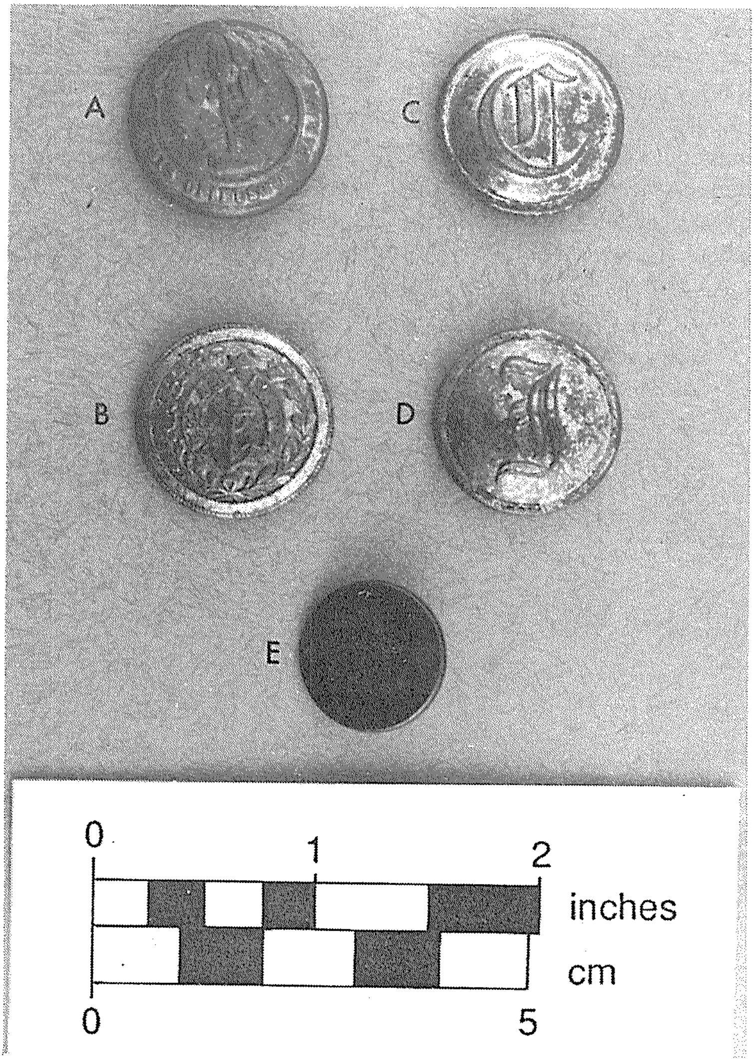


Figure 42. Brass gilt buttons from 41BO143, Site B: A. Confederate South Carolina Militia, two-piece convex gilt; B, Texas Navy, two-piece convex gilt Scovills & Co., Waterbury; C, Confederate Cavalry, two-piece convex gilt Willm Bird & Co London; D. Confederate Infantry, two-piece convex gilt; E, Brass gilt, pain face disc, wire eye soldered to back, which is imprinted **Warranted Rich Orange**.

the ceramics and coins, we were able to specify rather precise dates for manufacture of many of these buttons.

Architectural Remains

The main house foundation measures 18 by 48.5 feet, and it is estimated that there were three rooms, with a substantial fireplace at each end. This size and room arrangement is similar to other buildings built in Brazoria County during the 1830s and 1840s. The foundations of this building are of massive stepped brick construction that could easily support a two-storied structure (Nia Becknel, personal communication) (Figure 43). A two-story or story-and-a-half structure could easily house one large family or several small family units.

Although there is insufficient brick rubble to account for substantial brick walls, a historical reference (Strobel 1926:23) mentions that the overseer's home, slave cabins, and sugar mill were of all-brick construction. Since part of the west

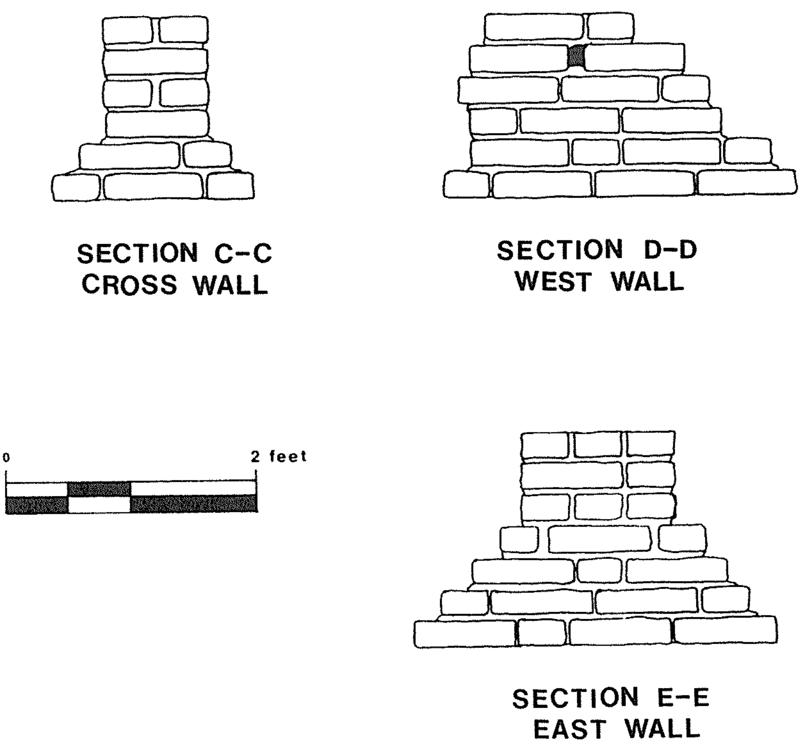


Figure 43. Cross sections C–C', D–D', and E–E' through the brick wall at 41BO143, Site B. See Figure 4 for cross section lines.

foundation and the west end of the south cross wall were missing, it is surmised that the brick walls have been salvaged for use elsewhere.

Building trenches that were cut about 4 inches below the original ground surface and extended 6 inches on each side of the first brick course were found during the 1985 excavations along the cross wall and the east wall.

The red bricks used to build the house and the cistern were hand-made from local subsurface clays; they measured 4-1/2 by 2 by 9 inches and were made in molds, but no evidence of brick-making or firing was found in the area of the structure, so it can be surmised that the bricks were made next to one of the nearby oxbow lakes—Oyster Creek, or even the Brazos River—because of the ready access there to raw materials.

In front of each hearth are brick-lined compartments of very poor workmanship that were not incorporated into the original house walls. They were made of the same kind of brick used to build the house, but incorporated many broken bricks as well; the bricks used to build the compartments were placed on the ground about 6 inches above the bottom brick course. We believe these compartments are small cellars used for the storage of food, for small root cellars similarly located are common among Colonial slave houses of the eighteenth and early nineteenth centuries (Kelso 1984:30–31). So it can be asked if this is evidence of occupation by a former slave family when the plantation was share-cropped after the Civil War or if this is a slave tradition passed down from generation to generation?

The small structure about 16 feet west of the house was built from the same kind of brick as the house, with the addition of late nineteenth century commercial bricks; it may be a later outbuilding such as a smokehouse.

The cistern, 10 feet from the south end of the house along its longitudinal axis, has an inside diameter of about 14.5 feet, and a double-course brick wall, thickly plastered on the inside with mortar that extends up and over the top of the last brick course, about 2 inches above the ground surface. This type of construction is unlike any other cistern seen in Brazoria County; cisterns there usually have arched brick shoulders and narrow round chimneys that protrude well above the ground surface. This may mean that the original roof had been removed, and the cistern was used for some other purpose such as a stock tank. The cistern was not excavated (dirt filled it to within 3 feet of the surface), but probing indicated its depth to be 8 to 10 feet below ground surface.

A floorboard lip that shows on a wall profile and the assumption that the stepped brick foundation was subterrannean, all indicate that the original ground surface did not differ much from the present. This area is not regularly subject to flooding, and there apparently has been less than a foot of soil deposition on top of the 1900-era artifacts.

UNMODIFIED BONES

The collection from 41BO143, Site B has more than 6,700 vertebrate animal remains weighing about 17 kg and comprising 350 fish bones and fish scales, 10 amphibian bones, 450 reptile bones, 330 bird bones, and more than 5,600 mammal bones (the bone counts include both fragments and whole bones). The vertebrate remains were identified by comparison with bones in the collections of W. L. McClure and the Houston Archeological Society.

Vertebrates

Fish (Hubbs 1982)

The gar (*Atractosteus* or *Lepisosteus* sp.) is represented by scales (2), vertebrae (2), and sculptured head bone fragments (3), but these are not sufficient for separation of the alligator gar from other species. The channel catfish *(Ictalurus punctatus)* is represented by 11 bones—frontal, nasal, ceratohyal, cleithrum, clavicle, dorsal spine, pectoral spine (2), and vertebrae (3). The bullhead *(Ictalurus* cf. *melas)* is represented by clavicle and pectoral spine (3). The largemouth bass *(Micropterus salmoides)* is represented by 37 bones—preopercular (8), opercular (3), subopercular, interopercular, articular (2), dentary (2), maxilla (4), premaxilla (2), basipterygium (3), cleithrum (2), vertebra (3), pelvic spine (3), pterygiophore (2), and one other head bone, and 24 scales. The sunfish (*Lepomis* sp.) is represented by 81 bones—preopercular (15), opercular (14), subopercular, interopercular (2), dentary (2), parasphenoid, premaxilla, supra-occipital, basipterygium, spine (18), cleithrum (14), pterygiophore (6), and 5 other head bones, and one scale.. The red drum (*Sciaenops ocellatus*) is represented by dentary, dorsal spine, and a scale. Unidentified fish are represented by 160 bones—vertebrae and various other fragments—and 22 scales.

Amphibians (Dixon 1987)

The collection includes 10 bones of three kinds of amphibians. The Gulf coast toad (*Bufo valliceps*) is represented by sacrum, radio-ulna, ilium (3), and tibio-fibula. The bullfrog (*Rana catesbeiana*) is represented by femur and ilium. The southern leopard frog (*Rana sphenocephala*) is represented by tibio-fibula (2).

Reptiles (Dixon 1987)

In the collection there are 450 reptile bones—one crocodilian, four kinds of turtles, and a snake. The American alligator (*Alligator mississippiensis*) is represented by 10 bones—mandible, articular, tooth (2), dermal bone (5), and ulna fragment. The snapping turtle (*Chelydra serpentina*) is represented by 46 bones—carapace (29), plastron (4), scapula (3), radius, ulna (2), hyoid bone, cervical vertebra, tibia (3), and fibula (2). The stinkpot (*Sternotherus odoratus*) is represented by only a single left hypoplastron. A large Eastern box turtle is represented by 9 bones—carapace (6), plastron (2), and tibia. The red-eared slider (*Trachemys scripta*) is the most common turtle in the collection with 333 bones—carapace (200), plastron (40), dentary (3), scapula (16), humerus (16), radius (3), ulna (3), cervical vertebra, coracoid (13), ischium (3), ilium (7), pubis (5), femur (10), tibia (4), and fibula (15). The only snake bone in the collection is a midbody vertebra of a rat snake (*Elaphe obsoleta*).

Birds (Terres 1980)

The collection comprises 330 bones of at least 14 kinds of birds; 125 bones are of water birds and include the upper and lower beaks of the double-crested cormorant. The many species of ducks and geese that pass through Brazoria County make it impossible to identify all the bones of the waterfowl, but comparisons with bones of known birds allow tentative identification. If some of the bones attributed to the following waterfowl are not of the species named, they are of a closely related species of the same size. Two bones that match the Canada goose (*Branta canadensis*) are ulna and phalanx No. 1 of digit 2 of the wing. Mallard (*Anas platyrhynchos*) is represented by 62 bones—mandible (3), articular, skull fragment, synsacrum, humerus (6), radius (4), ulna (3), scapula (5), coracoid (8), carpometacarpus (6), phalanx No. 1 of digit 2 of wing, phalanx No. 2 of digit 1 of wing, furculum (3), sternum fragment (5), rib, tibiotarsus (8), and tarsometatarsus (5).

Twenty-one bones closely match the American wigeon (*Anas americana*): articular, cervical vertebra, coracoid (2), humerus (5), ulna (4), carpometacarpus (4), furculum, sternum fragment (2), femur, and tibiotarsus. Five bones match the northern shoveler (*Anas clypteata*): coracoid (2), scapula, humerus, and carpometacarpus. Thirty-one bones match the teal (*Anas discors* or *crecca*): mandible, coracoid (5), humerus (10), radius (3), ulna, carpometacarpus (5), furculum, rib, and tibiotarsus (4). Two ulnae are probably of the ruddy duck (*Oxyura jamaicensis*).

The two domestic birds in the collection are turkey (*Meleagris gallopavo*), with 16 bones: cervical vertebra, radius, ulna (4), carpometacarpus, coracoid, femur, tibiotarsus, tarsometatarsus (3), and phalanx (3), and domestic chicken (*Gallus domesticus*), with 135 bones: skull, dentary (2), vertebra (13), synsacrum (3), scapula (13), humerus (10), radius (8), ulna (8), carpometacarpus (8), cuneiform, phalanx No. 1 of digit 2 of wing, phalanx No. 2 of digit 2 of wing (2), rib (3), tibiotarsus (11), coracoid (16), ischium, sternum, femur (7), tarsometatarsus (15), fibula (3), and phalanx of foot (9). The red-tailed hawk (*Buteo jamaicensis*) is represented by the coracoid and synsacrum.

Two game birds are in the collection. The bobwhite (*Colinus virginianus*) is represented by only a humerus. The mourning dove (*Zenaida macroura*) bones are coracoid (2), sternum, carpometacarpus, femur, and tarsometatarsus. There are two perching birds in the collection. The mockingbird (*Mimus polyglottos*) is represented by femur and tibiotarsus. The blue jay (*Cyanocitta cristata*) is represented by humerus, ulna (4), and carpometacarpus. A total of 36 bird bones were not identified as to species. These are vertebra (5), scapula (2), humerus (3), carpometacarpus (4), phalanx No. 1 of digit 2 of wing (2), phalanx No. 2 of digit 2 of wing, coracoid (2), sternum, synsacrum, tibiotarsus (2), tarsometatarsus (7), and fragments (6).

Mammals (Schmidly 1983)

A total of 5614 bones of 18 species of mammal was recovered. The Virginia opossum (*Didelphis virginiana*) is represented by 96 bones: maxilla, premaxilla, other skull fragments (8), mandible (7), loose teeth (6), vertebra (17), scapula (8), humerus (15), radius, ulna (10), innominate (2), femur (6), rib, and metacarpal. Three leporids are represented in the collection. The 38 eastern cottontail (*Sylvilagus floridanus*) bones are mandible (3), vertebra (3), scapula (3), humerus (3), radius, ulna, innominate (6), sacrum, femur (3), tibia (5), calcaneus (4), and metatarsal (5). The 114 swamp rabbit (*Sylvilagus aquaticus*) bones are maxilla, other skull fragments (7), mandible (6), vertebra (12), scapula (4), humerus (8), radius (6), ulna (10), metacarpal, innominate (16), sacrum, femur (8), tibia (5), tooth (19), calcaneus (2), metatarsal (15), and phalanx. Black-tailed jack rabbit (*Lepus californicus*) bones are vertebra (2), metacarpal, and metatarsal. Seven kinds of rodents are in the collection. The 69 gray squirrel (*Sciurus carolinensis*) bones are skull fragment, mandible (9), vertebra, tooth (2), humerus (17), radius (2), ulna (7), femur (12), tibia (6), metatarsal (2), and phalanx (3). The 29 fox squirrel (*Sciurus niger*) bones are mandible (6), maxilla, tooth (5), humerus, radius (3), ulna (3), innominate (4), femur (3), and tibia (2). The Louisiana pocket gopher (*Geomys breviceps*) bones are humerus (2), radius, and femur. The 17 bones of hispid cotton rats (*Sigmodon hispidus*) are skull fragment, mandible (6), humerus, femur (3), and tibia (6). The 21 eastern woodrat (*Neotoma floridana*) bones are mandible, humerus (2), ulna (3), innominate, femur (9), and tibia (5).

The roof rat (*Rattus rattus*) is represented by 43 bones: maxilla (5), other skull fragments (2), mandible (8), tooth (3), humerus (4), ulna, innominate (4), femur, and tibia (13). The Norway rat (*Rattus norvegicus*) is represented by 43 bones: maxilla, other skull fragment, mandible (2), tooth, scapula (2), humerus (5), ulna (4), innominate (11), femur, and tibia (13).

Four kinds of carnivores are in the collection. Three domestic dog (*Canis familiaris*) bones are vertebra, calcaneus, and astragalus. The 49 raccoon (*Procyon lotor*) bones are maxilla, other skull fragments (3), mandible (7), tooth (4), vertebra (6), scapula, humerus (7), radius (5), ulna (4), metacarpal (4), rib, innominate (3), femur (2), and tibia. Two bones of the long-tailed weasel (*Mustela frenata*) are upper incisor and left femur. The 36 bones of domestic cat (*Felis catus*) are skull fragments (2), mandible (3), tooth, vertebra (10), humerus, ulna, metacarpal (4), rib (5), femur (2), tibia, metatarsal (4), and phalanx (2).

Three artiodactyls complete the collection. White-tailed deer (*Odocoileus virginianus*) is represented by 17 bones: tooth (2), scapula, humerus (2), radius (3), innominate, femur, rib (4), tibia (3), centroquartal, and astragalus. The 300 bones of domestic pig (*Sus scrofa*) are skull fragments (11), maxilla (7), mandible (9), tooth (153), vertebra (15), scapula (19), humerus (5), radius (2), ulna (8), metacarpal (9), carpal (9), innominate (2), rib (6), femur, astragalus (3), calcaneus (4), metatarsal (8), and phalanx (21). The 182 bones of domestic cow (*Bos taurus*) are mandible (3), tooth (36), vertebra (21), rib (56), costal cartilage, scapula (3), humerus, radius (2), innominate (3), femur (6), tibia (4), metacarpal (5), metapodial (3), carpal (6), malleolus (2), centroquartal, astragalus (2), calcaneus (2), sesamoid, long bone fragment (2), and phalanx (22). In the collection are also 4,546 fragments of mammal bones that are too fragmentary to assign to species.

Vertebrate Discussion

The excavations yielded remains of at least 47 species of vertebrates—6 of fish, 3 of amphibians, 6 of reptiles, 14 of birds, and 18 of mammals. Although most of these animals are technically edible, 16 are not believed to have been eaten by the people who inhabited the site. Twenty-seven different species of wild, nondomestic vertebrates apparently were eaten, and, in addition, four varieties of domesticated animals were a major part of the food resources of the people.

Nonfood Vertebrates:

The 16 animals included in this category are Gulf Coast toad, southern leopard frog, stinkpot, rat snake, double-crested cormorant, red-tailed hawk, blue jay, mockingbird, Louisiana pocket gopher, hispid cotton rat, eastern woodrat, roof rat, Norway rat, long-tailed weasel, domestic dog, and domestic cat. The toad, frog, stinkpot, and snake may have been killed by the inhabitants but it is probable that some were inadvertent inclusions in the deposits. Cormorants (*Phalacrocorax auritus*) may have been shot, but their flesh is so oily and fishy that the people probably would not have eaten it, and hawks may have been shot as potential raiders of the chicken yards. The people apparently kept a few cats and dogs; the cats may have been responsible for the bones of small birds and small rodents in the soil. However, the quantities and distribution of the bones of the gophers and rats strongly indicate that owls or other raptors were responsible. Weasels were probably killed for their fur.

Food Source Nondomestic Vertebrates:

The 27 animals included in this category are gar, channel catfish, bullhead, largemouth bass, sunfish, red drum, bullfrog, American alligator, snapping turtle, eastern box turtle, red-eared slider, Canada goose, mallard, American wigeon, northern shoveler, teal, ruddy duck, bobwhite, mourning dove, Virginia opossum, eastern cottontail, swamp rabbit, black-tailed jack rabbit, gray squirrel, fox squirrel, raccoon, and white-tailed deer.

Food Source Domestic Vertebrates:

The four animals in this category are turkey, chicken, pig, and cow. The turkeys may have been wild and the pigs too, but all were probably domestic animals under the control of the inhabitants or their neighbors.

Summary of Vertebrates

All the wild varieties of animals in the collection are common elements of the local fauna; the water birds are seasonal. The imported roof rat and Norway rat were apparently well established at the time of the deposits. All of the fish could have been caught in the nearby Brazos River or Oyster Creek and, except for the red drum, they could have come from the small lakes that are even closer. The red drum may have been caught at the coast, only a few miles from the site. This fish and a few fragments of marine arthropods, echinoderms, and mollusks are the only indications that the people at Eagle Island visited the beach. The alligator, bullfrog, and water turtles could have been acquired at the local lakes, river, or creek. The goose, bobwhite, dove, box turtle, deer, and small mammals would have been available in the nearby wooded areas or the fields between them. The opossum, raccoon, and weasel may have been trapped for the fur trade as well as for food. The people or their neighbors were either raising turkeys, chickens, pigs, and cattle, or they acquired these species from a market. All four varieties of domestic animals were butchered on the premises from whole, live individuals.

The people were both harvesting locally available fish, frogs, turtles, alligators, birds, and mammals and relying on the four domestic animals. They kept a few cats and dogs, the latter, perhaps, for assistance in hunting. The smaller birds and mammals were preyed upon by raptors that probably roosted on the houses. The vast amount of bone material recovered inside the house, the high percentage of fragmentary material, and the fact that many of the bones were burned all suggest that the house was used as a dumping site in its later years.

CONCLUSIONS

We believe the construction of the brick house and cistern most probably dates to the 1840s, but not before the late 1830s, in part because of the substantial nature and type of brick construction and in part because of the earliest dated artifacts recovered. The small brick foundation west of the house was probably built, or at least repaired, after the Civil War. The fact that the structure was near the roads to the river landing, the sugar mill, and the slave quarters (see Figure 2) indicates that it was the overseer's home, which was usually a center for the business transactions of a working plantation. We have been unable to locate evidence of the brick slave cabins, which, according to the hand-drawn map (Figure 1) are down the road leading northeastward toward the sugar mill and Bend Lake. In the 1840s, both William H. and John Wharton had died, and William's son John was still a boy, often at school elsewhere, so there would have been no family man to run the plantation. The artifact assemblage indicates residential occupation by a working-class family. The structure appears to have been occupied continuously from the 1840s toward 1900, with the preponderance of artifacts dating late in this period, indicating that one or a succession of middle-class farm families, perhaps with the names of Maxie (or Maxey), Eicher, Masterson, or Dolly may have lived in the house or in the area. At some time after occupation ceased, the brick walls and part of the foundation were salvaged for other uses.

The density of artifacts in soil zone B inside the walls suggests that the house went into disuse sometime after 1875 and was used thereafter, but no later than 1900, as a dumping site. The large number of household items (metal, buttons, etc.) indicates that the house may have collapsed on a large portion of the interior furnishings during one of the major hurricanes that hit the area in 1875, 1886, or 1900. Salvage of the wrecked structure would have left a major share of the contents of the house as a pile of rubble that was then a likely spot for a dump. In fact, some of the dumping could be a one-time episode associated with cleanup of the area after the same storm that caused the collapse. The large amount of bone material further supports the dumping hypothesis, since few people would dump such a quantity of food refuse inside their homes. Since more than 150 bones of five small rodent species were concentrated along the north cross-wall, there may have been an owl roost atop this wall after human occupation ended, but while the walls still stood. So human occupation may have ended (perhaps due to only partial destruction in a hurricane or abandonment due to the poor financial condition of the owners during Reconstruction) before total destruction of the walls, again making this a likely spot for dumping or for salvaging bricks. In any event, the artifacts indicate that there was no significant use of the site after 1900, and all above-ground evidence of the structure had gone by the early 1940s, since 1940s residents (interviewed in 1984) who were aware of the cistern there, recall no structure in the area.

This site was unusual in the great quantity and high quality of the artifacts collected. Only about a third of the interior of the house, and only 7 percent of the overall study area, was excavated, yet the volume of artifacts strained our capacities to catalog, analyze, and store them. Questions that remain to be answered are the function of the small outbuilding west of the house, the location of the kitchen, and the function of other outbuilding sites discovered during the initial survey.

Additional excavations were carried out in 1989, but the results of that work are not included in this report. Artifacts and field notes from the 1989 investigation are stored together with the materials from 1984 and 1985 at the Brazosport Museum of Natural Science.

ACKNOWLEDGMENTS

We acknowledge the help of the following individuals with the excavations and lab work: David Atherton, B. Arnold, T. Arnold, Fr. Ed Bader, Jean Ball, Kathy Bayer, Nia Becknel, K. Blackmon, Dennis Bowers, C. Correy, David Crowley, J. Dochenetz, Steve Duffy, Richey Ebersole, Joan Few, L. Foster, J. Gary, Richard Gregg, Marcy Grubbs, Jean Hartnell, D. Heffington, Tom House, Laura House, F. Jordan, Sheldon Kindall, Eric Kneupper, Louis Lara, Melissa Marrs, Ray McClausland, A. Mellass, J. Monthy, David Pettus, Gene Pitzer, Sandra Pollan, P. Sherrell, Gerald Slagle, Aaron Spell, R. Taylor, R. Trenbath, K. Trevett, Cathy West, I. Yao, Melissa Yarborough, and others whose names did not make the records but who participated with groups from the Houston Archeological Society, the 1984 seventh-grade Gifted and Talented class from Clear Lake Middle School, two groups from The University of St. Thomas in Houston under the direction of Fr. Ed Bader, and several local residents.

Special thanks go to Anne Fox and Georgiana Greer for help in the analysis of the ceramics, David Crowley, M. W. and Jean Speights for help in identification of the buttons, Eric Kneupper for identification of the firearm cartridges, Nia Becknel, of the University of Houston School of Architecture, for her analysis of the construction of the house and cistern, Judy Courtwright, Barbara Feiner, Vicki Coleman, and Joanna Burch, of the Brazosport Art League, for the excellent drawings, and Jay Luce and Restwood Memorial Park, Inc. for access to the property.

REFERENCES

Albert, A. H.
1973 *Record of American Uniform & Historical Buttons*. Boyertown Publishing Co., Boyertown, Pennsylvannia

Ambler, R. J.
1967 Three Prehistoric Sites Near Cedar Bayou, Galveston Bay Area. State Building Commission Archeological Program, *Report* No. 8.

Aten, L. E.
1971 Archaeological Excavations at the Dow-Cleaver Site, Brazoria County, Texas. Texas Archaeological Salvage Project, The University of Texas at Austin, *Technical Bulletin* No. 1.

Barnes, F. C.
1976 *Cartridges of the World.* Rev. 3rd Ed., DBI Books Inc., Northfield, Ill.

Berlet, S. W. G.
1917 Jared Ellison Groce. *Southwestern Historical Quarterly* XX:358–68.
1921 Groce And Kindred Families. Unpublished manuscript, Texas State Archives, Austin.
1971 *Autobiography of a Spoon, 1828-1956.* La Belle Printing Co., Beaumont.

Creighton, J. A.
1975 *A Narrative History of Brazoria County*. Library Binding Co., Waco.

Cushion, J. P.
1980 *Handbook of Pottery and Porcelain Marks*. Faber & Faber Ltd., London.

Daughters of the American Revolution of Texas
1965 *A List of Old Brazoria County Cemeteries During or before 1900.*

Dean, P.
1984 *Official Identification Guide to Pottery and Porcelain.* The House of Collectibles Inc., Orlando.

Dixon, J. E.
1987 *Amphibians and Reptiles of Texas.* Texas A&M University Press, College Station.

Fox, A. A., J. E. Ivey, and J. C. Markey
1981 Cultural Resource Survey, Freeport Harbor. Texas (45-foot) Navigation Improvement Project, Brazoria County, Texas. Center for Archaeological Research, The University of Texas at San Antonio, *Archaeological Survey Report* No. 107.

Fox, A. A.
1986 Archaeological Investigations at Historic Sites in the Choke Canyon Reservoir, Southern Texas. Center for Archaeological Research, The University of Texas at San Antonio, *Choke Canyon Series,* Volume 12.

Gallo, J.
1985 *Nineteenth and Twentieth Century Yellow Ware.* Heritage Press, Richfield Springs, New York.

Godden, G. A.
1967 *British Pottery and Porcelain, 1790–1850.* A. S. Barnes and Co., New York.

Graber, H. W.
1987 *A Terry Texas Ranger.* State House Press, Austin.

Groce, Capt. W. W.
1916 Major General John A. Wharton. *Southwestern Historical Quarterly* XIX: 271–8.

Hale, L. E.
1942 Groces And Whartons of Early Texas. Unpublished Ph.D. dissertation, The University of Texas, Austin.

Hill, J. D.
1987 *The Texas Navy.* State House Press, Austin, Texas, originally published by University of Chicago Press in 1937.

Holley, M. A.
1965 *Mary Austin Holley, The Texas Diary, 1835–1838.* The University of Texas Press, Austin.

Hubbs, C.
1982 *A Checklist of Texas Freshwater Fishes.* Texas Parks and Wildlife Department, Austin.

Hughes, E., and M. Lester
1981 *The Big Book of Buttons.* Boyerstown Publishing Co., Boyerstown, Pennsylvania.

Hume, I. N.
1970 *A Guide to Artifacts of Colonial America.* Alfred A. Knopf, New York.

Jackson, J. K.
1986 Archeological Investigations at Little Campus Restoration Project, Austin, Texas. *Bulletin of the Texas Archeological Society* 55:1–27.

Kelso, W. M.
1984 *Kingsmill Plantations, 1619-1800, Archaeology of Country Life in Colonial Virginia.* Academic Press, Orlando.

Kovel, R., and T. Kovel
1986 *Kovel's New Dictionary of Marks.* Crown Publishers, New York.

Kramig, K. L.
1967 History of Eagle Island And Calvit-Herndon Plantations of Brazoria County, Texas. Unpublished manuscript, Clute Public Library, Clute, Texas.

Labadie, James, K. A. Brown, A. A. Fox, S. P. Nesmith, P. S. Storch, D. Turner, S. Van der Veer, and A. J. Winkler
1986 La Villita Earthworks (41BX677): San Antonio, Texas. A Preliminary Report of Investigations of Mexican Siege Works at the Battle of the Alamo. Center For Archaeological Research, The University of Texas at San Antonio, *Archaeological Survey Report* No. 159.

Livingston, L. E.
n.d. Eagle Island And Her Residents. The Whartons and Groces under Four Flags. Brazoria County Historical Survey Committee, Family Records, File 9, Brazoria County Library, Angleton, Texas.

Mallouf, R. J., D. E. Fox, and A. K. Briggs
1973 An Assessment of the Cultural Resources of Palmetto Bend Reservoir, Jackson County, Texas. Texas Historical Commission and Texas Water Development Board, *Archeological Survey Report* No. 11.

Moir, R.
1987 Paper presented at the annual meeting of the Texas Archeological Society, Waco.

Munsey, Cecil
1970 *The Illustrated Guide to Collecting Bottles.* Hawthorn Books, New York.

O'Connell, Polly

1959 *The Brazosport Facts.* Freeport, Texas:

August 23: Eagle Island - A Gift to a Bride.

August 24: Eagle Island - Life on the Plantation.

August 25: Eagle Island - A Gracious Way of Life Begins.

August 26: Eagle Island - Texas Revolt Begins.

August 27: Eagle Island - Tragedy Strikes.

August 28: Eagle Island - Civil War Aftermath.

August 29: Eagle Island - Conclusion.

Platter, A. A.

1961 Educational, Social, and Economic Characteristics of the Plantation Culture of Brazoria County, Texas. Unpublished Ph.D. dissertation in Education, The University of Houston.

Pollan, J. T., Jr.

1984 Location of the Earliest Wharton Family Cemetery at the Eagle Island Plantation. *La Tierra*, Journal of the Southern Texas Archaeological Association 11(4):2–12.

1986 Yellow Ware Cuspidore. *Brazosport Archaeological Society Newsletter* 6(2):3–4.

Ray, W. S.

1970 *Austin Colony Pioneers.* Pemberton Press, Austin.

Schmidly, D. J.

1983 *Texas Mammals East of the Balcones Fault Zone.* Texas A&M University Press, College Station.

Sears, Roebuck, & Co.

1968 *1897 Sears Roebuck Catalogue Reproduction.* Chelsea House Publishers, New York.

Smith, J. L.

1990 Elisha Maxey. *Brazosport Archaeological Society Newsletter* 9(11):1–3.

Strobel, A. J.

1926 *The Old Plantations And Their Owners of Brazoria County, Texas.* Union National Bank, Houston.

Terres, J. K.

1980 *Encyclopedia of North American Birds.* Alfred A. Knopf, New York.

Toulouse, J. H.

1971 *Bottle Makers and Their Marks.* Thomas Nelson, New York.

U.S. Census Bureau

1850 Schedule 2—Slave Inhabitants in the County of Brazoria,Texas. *Federal Population Schedule, Seventh Census of the United States, The State of Texas Brazoria County, 1850,* Washington, D.C.

1860 Schedule 2—Slave Inhabitants in the County of Brazoria, Texas. *Federal Population Schedule, Eighth Census of the United States, The State of Texas Brazoria County, 1860,* Washington, D.C.

U.S. Department of Agriculture, Soil Conservation Service

1981 *Soil Survey of Brazoria County.* Texas National Cooperative Soil Survey.

Wetherbee, J.

1985 *A Second Look at White Ironstone.* Wallace-Homestead Book Co., Lombard, Illinois.

White, G.

1966 *The 1840 Census of the Republic of Texas.* Pemberton Press, Austin.

Williams, P.

1978 *Staffordshire Romantic Transfer Patterns, Cup Plates and Early Victorian China.* Fountain House East, Jeffersontown, Kentucky.

1986 *Staffordshire II Romantic Transfer Patterns, Cup Plates and Early Victorian China.* Fountain House East, Jeffersontown, Kentucky.

The Goldsmith Site (41WD208): Investigations of the Titus Phase in the Upper Sabine River Basin, Wood County, Texas

Timothy K. Perttula, Bob D. Skiles, and Bonnie C. Yates

ABSTRACT

Salvage and test excavations at the Goldsmith site (41WD208), on Dry Creek in the Upper Sabine Basin of East Texas, yielded significant information on a Late Caddoan Titus phase house site with an associated trash midden and cemetery. On the basis of similarities in material culture and stylistic ceramic motifs, the site may be but one in a cluster of comparable and contemporaneous sites nearby that are considered part of the Three Basins subcluster. Single homestead/farmsteads are the most common type of Late Caddoan settlements in the Upper Sabine Basin. However, the scrutiny of professional and avocational archeologists has been concentrated on the cemeteries associated with the homesteads and has overlooked sites such as Goldsmith, which also hold considerable potential for the investigation of Late Caddoan subsistence systems, local and regional settlement patterns, and changes in sociopolitical organization.

INTRODUCTION

The Goldsmith site, a Late Caddoan Titus phase hamlet in the Upper Sabine River Basin, Wood County, Texas, was discovered in the fall of 1984 when a service road was cut through the area to a well pad in the Quitman Oil Field. During construction of the well platform, which had been built up from fill dirt bulldozed from a deep road cut, disturbed archeological materials were found, and a local collector reported that large fragments of ceramic vessels had been found on the surface.

On close examination of the cut, the collector found a pottery vessel in situ in the bank. Subsequent digging by the collector exposed nine more pottery vessels and two greenstone celts that were in an ENE-WSW-oriented burial pit. As is typical for Caddoan burials excavated in the highly acidic, sandy soils of the Piney Woods, no traces of human bone were preserved in the burial pit. Other burials or clusters of pottery vessels were removed in random potholing by unknown individuals who dug in an area about a meter north of the first burial; these discoveries stimulated a spate of pothunting at the site. Within a few days, a 10-meter-wide area around the first burial and a nearby midden had been pockmarked by dozens of potholes.

Skiles made a reconnaissance of the site more than a month after the initial disturbances in order to assess the condition and character of the archeological deposits. At that time, it was noted that the roadcut had bisected a small, dense midden deposit about 30 meters to the southeast of the area where the ceramic vessels and burials had been disturbed (Figures 1, 2). Many potholes had been dug along the edges of the midden, but, because of a large pile of trees that had been put there when the roadway was cleared, most of the midden was protected by its inaccessibility.

Pothunting apparently subsided after the initial discoveries. However, in the interest of preserving the midden and remaining cemetery areas, the owner of the property agreed to try to curb further vandalism by installing a locked gate and *No Trespassing* signs on the road to the site. Unfortunately, though, within the month many additional potholes had been dug in the cemetery area and the midden, and it became clear that the site could not be adequately protected or preserved by these measures. Considering the likelihood that the site would be destroyed by uncontrolled pothunting, due in part to its ready accessibility, it was decided to recover as much data on the site as was possible in lieu of preservation. These limited investigations, in which Dr. James Bruseth, then Director of the Archaeology Research Program at Southern Methodist University, played an integral role by devising a field strategy and encouraging the work, were carried out in January and September 1985, by Skiles and Perttula, with volunteer assistance from Mr. Robert Turbeville and Ms. Peggy Trachte.

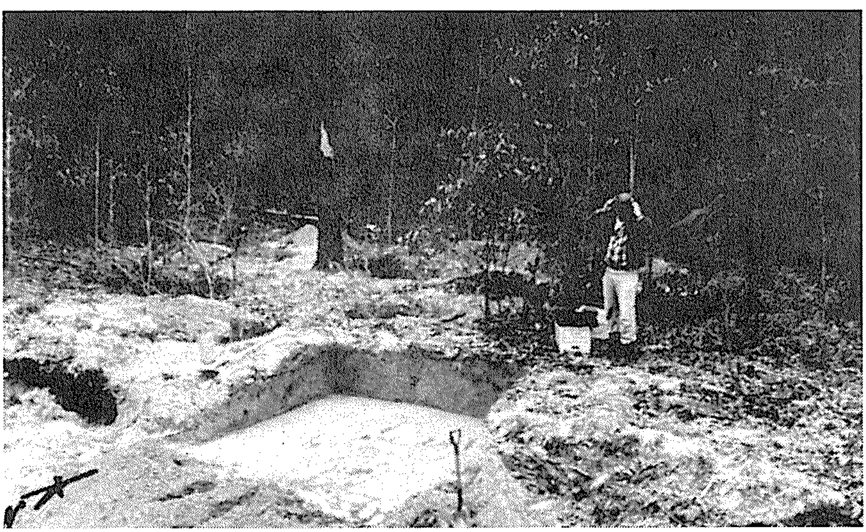


Figure 1. The cemetery area at the Goldsmith Site (41WD208).

Figure 2. The midden area at the Goldsmith Site.

NATURAL SETTING

The Goldsmith site is on Dry Creek, a permanent tributary of Lake Fork Creek, in the western part of the Gulf Coastal Plain of Texas. The floodplain of Lake Fork Creek is about 7 km downstream from the site, and it is 20 km further from the floodplain to the confluence of Lake Fork Creek with the Sabine River in south-central Wood County. The headwaters of Dry Creek and its tributaries are 5 to 10 km to the north-northwest of Goldsmith; the creek flows generally southward from Coke, Texas to its confluence with Lake Fork Creek due south of the town of Quitman, Texas (Figure 3).

Three major biotic communities have been recognized on the western part of the Gulf Coastal Plain in East Texas: the Oak-Hickory or Post Oak Savannah, the Blackland Prairie, and the Oak-Hickory-Pine forest or Piney Woods (Blair 1950). The Post Oak Savannah is a narrow southwest-northeast-trending belt of woodland that appears to mark a natural transition zone between the more xeric (drier) Blackland Prairie to the west and the Oak-Hickory-Pine Forest to the east (Küchler 1964). The Goldsmith site is within the modern boundary of the Piney Woods.

The Piney Woods consist of medium tall to tall deciduous trees with shortleaf and loblolly pines; they are typically on upland fine sandy loam soils with adequate moisture storage. In some cases, the presence of pine represents a subclimax vegetational association or fire disclimax (Gould 1969). Poorly drained soils in the biotic community may create a favorable habitat for prairie, dominated by big bluestem, little bluestem, switchgrass, and Indiangrass (Marietta and Nixon 1984).

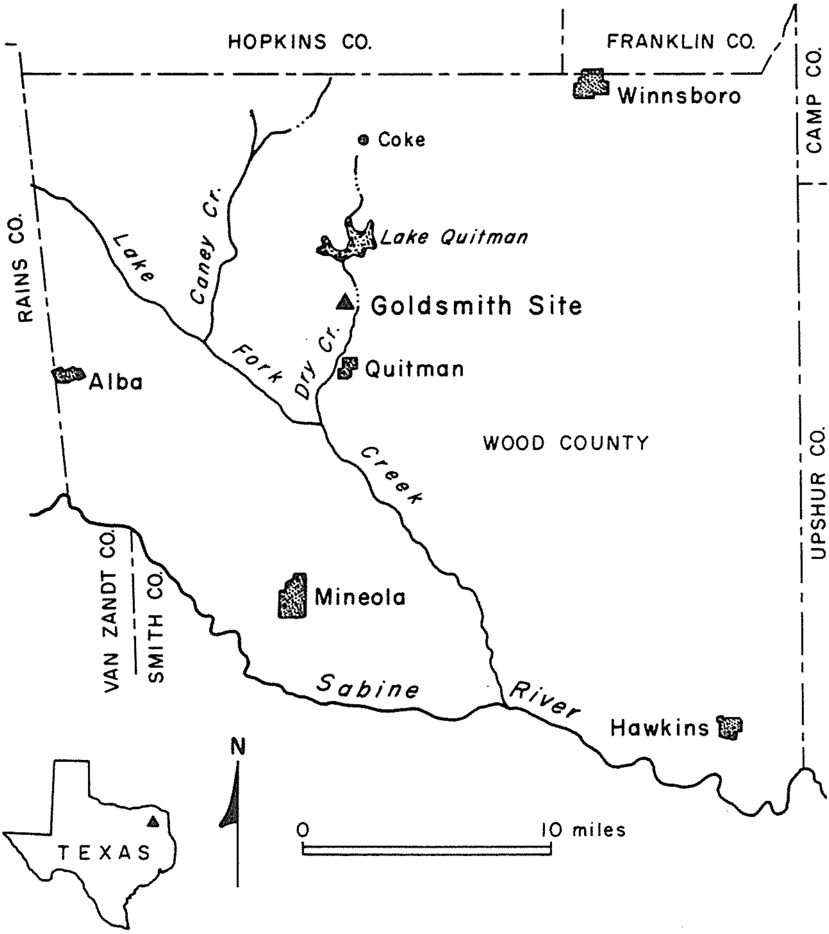


Figure 3. Map of Wood County, Texas, showing the location of the Goldsmith site.

The Sabine River and its tributary floodplains form bottomland communities of hardwood and swamp forests. Basic components of the floodplain hardwood forests are sweetgum, water oak, overcup oak, willow oak, and cottonwood. Other trees commonly found in the alluvial floodplain are green ash, black willow, American elm, river birch, and American hornbeam (U.S. Army Corps of Engineers 1975). Swamp forests on the floodplain have overstories of black tupelo, elm, overcup oak, and green ash. These areas are inundated, except during periods of prolonged drought. This swamp forest is most extensive in the floodplain of the Sabine River, but patches of it also grow on the very wet tributary creekbottoms (e.g., Nixon et al. 1983).

The East Texas part of the western Gulf Coastal Plain is within the Austroriparian province defined by Blair (1950). Included in the 47 species of mammals, 39 species of reptiles, and 17 species of amphibians are many that reach the limits of their ranges in the southeastern United States. Exploitable species have been generally summarized by Thurmond (1981:Table 2), Bruseth and others (1977:Tables 4, 5), and, for the Big Cypress and Upper Sabine basins, by Espey, Huston and Associates, Inc. (1984).

The climate of the Upper Sabine River Basin is humid, with average winter temperatures of 8°C (47°F) and summer temperatures of 28°C (83° F); droughts are not uncommon. The first freeze in winter usually comes between mid-November and December 1, and the last freeze, in mid-March (Arbingast et al. 1973:19). Mean annual precipitation varies from about 115 to 125 mm in the Upper Sabine Basin (*Texas Almanac* 1986). Periods of maximum rainfall come in the spring and fall seasons.

East Texas paleoenvironmental and climatic conditions are poorly known, and only limited evidence of past environments has been acquired that is pertinent to reconstructing the Late Holocene (2000–200 years B.P.) environmental setting at the Goldsmith site (e.g., Bryant and Holloway 1985). Preliminary analyses of Late Holocene pollen samples suggest a dry-moist-dry episodic pattern in the Late Holocene comparable to the Northeast Oklahoma data from the Cross Timbers, Osage Savannah, and Cherokee Prairie districts (Hall 1982; Reid and Artz 1984). Pine, in particular, becomes one of the major constituents of the pollen record at Ferndale Bog in Southeast Oklahoma about 1000 B.P., invading the area at about 1800 B.P. (Albert 1981). Pollen records from the Buck Creek Marsh in the Big Sandy Creek basin of Wood County suggest that pine invaded the valley between 1810 and 1130 B.P. and was the dominant overstory species by about A.D. 500 (Holloway 1987).

Dendroclimatic reconstructions are more specific than pollen records in determining proxy climatic data from the last 500 years and have the potential to be extended to the period between 1,000 and 5,000 years ago (Stahle, Cook, and White 1985). Drought reconstructions using annual tree ring chronologies from old-growth baldcypress indicate that there were many wet and dry spells comparable to twentieth century events between about A.D. 1500 and 1700, the estimated range of time when the Goldsmith site was occupied. In particular, droughts of more than 10 years have been estimated around A.D. 1555, 1570, 1595, and 1670, separated by wetter periods around 1540, 1600, 1620, and 1665 (Stahle, Cleaveland and Hehr 1985:Figure 3b). The period between A.D. 1549 and 1577 has been suggested as representing the worst June drought in the past 450 years (Stahle, Cleaveland and Hehr 1985:532). The variation and intensity of climatic fluctuations is of singular importance to the Late Caddoan inhabitants of the Goldsmith site because of their presumed dependence upon maize agriculture as a subsistence base (Perttula et al. 1983:96).

The Goldsmith site is on the edge of an upland landform overlooking the Dry Creek floodplain. A relict channel of Dry Creek, called Blue Lake by local residents, runs along the base of the steep upland slope about 100 meters southeast of the site. Blue Lake is a permanent water source that has never completely evaporated even in the hottest and driest summers (H. B. Goldsmith, personal communication).

PREVIOUS RESEARCH AND CULTURAL SETTING

Archeological research in the Caddoan area, of which the Upper Sabine Basin is a part, has a lengthy history that is impractical to summarize here (see Story 1978; Webb 1978). The reader is referred to Perttula et al. (1986:35–59) for an overview of the history of previous archeological research investigations in the Upper Sabine River Basin.

In the immediate vicinity of the Goldsmith site, the University of Texas conducted investigations between 1930 and 1934, led by A. T. Jackson, M. M. Reese, and A. M. Wilson. The fieldwork concentrated primarily around Quitman in the Dry Creek and Lake Fork Creek basins (Reese 1931; Wilson and Jackson 1930). Eighty-two sites were identified, 12 of which were the subject of burial excavations and midden and structural mound trenching (Table 1). Several of the sites, particularly J. H. Reese (41WD2) and L. L. Winterbauer (41WD6), closely resemble Goldsmith in ceramic assemblages and community/settlement patterning, and all three are now recognized as generally contemporaneous Titus phase occupations. What was evident even in research sponsored by the University of Texas was the concentration of archeological sites in the Dry Creek-Little Dry Creek basins, a situation that has not been altered since in the years of archeological research conducted in Wood County.

Not until the 1950s did Late Caddoan settlements in the area around Quitman receive renewed attention. In 1959 Robert Turbeville, an avocational archeologist in Mineola, Texas, excavated 15 burials from a Titus phase cemetery at 41WD19 on Dry Creek, 1.2 km west-southwest of Goldsmith. This led to further work by Turbeville in Wood County at 41WD44 and 41WD206, Titus phase middens and cemeteries on Dry and Muddy creeks, 0.6 and 2.5 km north and northeast of Goldsmith, respectively (Figure 4). This work has provided significant information on Late Caddoan settlement patterns in the Upper Sabine River Basin (Skiles et al. 1980).

In 1975, Southern Methodist University's Archaeology Research Program began fieldwork in the proposed Lake Fork Reservoir on Lake Fork Creek and tributaries in Wood, Rains, and Hopkins counties, about 25 to 40 km from Goldsmith. Several of the sites chosen for excavation in 1976, 1978, and 1979 had Late Caddoan components, including the Glen (41WD524), Gilbreath (41WD538), Killebrew (41WD495), Sandhill (41WD108), and Spoonbill (41WD109) sites (Bruseth et al. 1977:127–138; Bruseth and Perttula 1980, 1981).

Sites of this period were classified as components of the Forest Hill phase, a local manifestation of the Titus phase in the Caney Creek drainage system (Bruseth and Perttula 1981:142). The only absolute date obtained on a Forest Hill phase

Table 1. Excavations of Titus Phase Sites in Wood County, Texas by The University of Texas, 1930 to 1934

Location	Site	Features	Estimated Period of Occupation
Little Dry Cr.	J. H. Reese (41WD2)	Trash midden, 3 burials	Late Caddoan, Titus phase
Little Dry Cr.	Earl Jones (41WD3)	Midden mound	Late Caddoan, Titus phase
Lake Fork Cr.	L. L. Winterbauer (41WD6)	Trash midden, Dog burials	Late Caddoan, Titus phase
Dry Creek	A. N. Vickery (41WD11)	Mound	Uncertain
Little Dry Cr.	M. E. Day (41WD10)	Trash midden, Dog burials	Late Caddoan, Titus phase
Brushy Creek	Minnie Garrison (41WD16)	Trash midden, Mound	Early Caddoan and Late Caddoan, Titus phase

settlement is a radiocarbon date of A.D. 1470±80 (TX-3473, uncorrected) (J. Bruseth, personal communication) from the nearby Steck site (41WD529) midden.

As an adjunct to the fieldwork in Lake Fork Reservoir, several sites in the Lake Fork Creek Basin outside the project area have been investigated by Southern Methodist University. The Steck (41WD529), Burks (41WD52), and Pine Tree (41WD51) sites have well-preserved Late Caddoan habitation features and both faunal and floral remains that have provided useful comparative information for understanding the Late Caddoan archeological record in the Upper Sabine River Basin (Hockensmith 1977; Perttula et al. n.d.).

INVESTIGATION OF THE CEMETERY AREA

We decided to concentrate our work at the Goldsmith site first on the cemetery area (Figure 5), because most of the surreptitious digging had been done there, and more vandalism was anticipated. The midden was at least partially protected by the trees that were piled upon it.

We probed the cemetery area systematically on a closely spaced grid before any excavating, in order to locate any remaining burials and to plan future work. Pothunters were so active that it was not deemed advisable to leave burials partly excavated, and, since the amount of work planned had to be limited in accordance with our resources, a stainless steel "whip antenna" about 2 meters long was used to probe randomly in the areas directly adjacent to the first burial

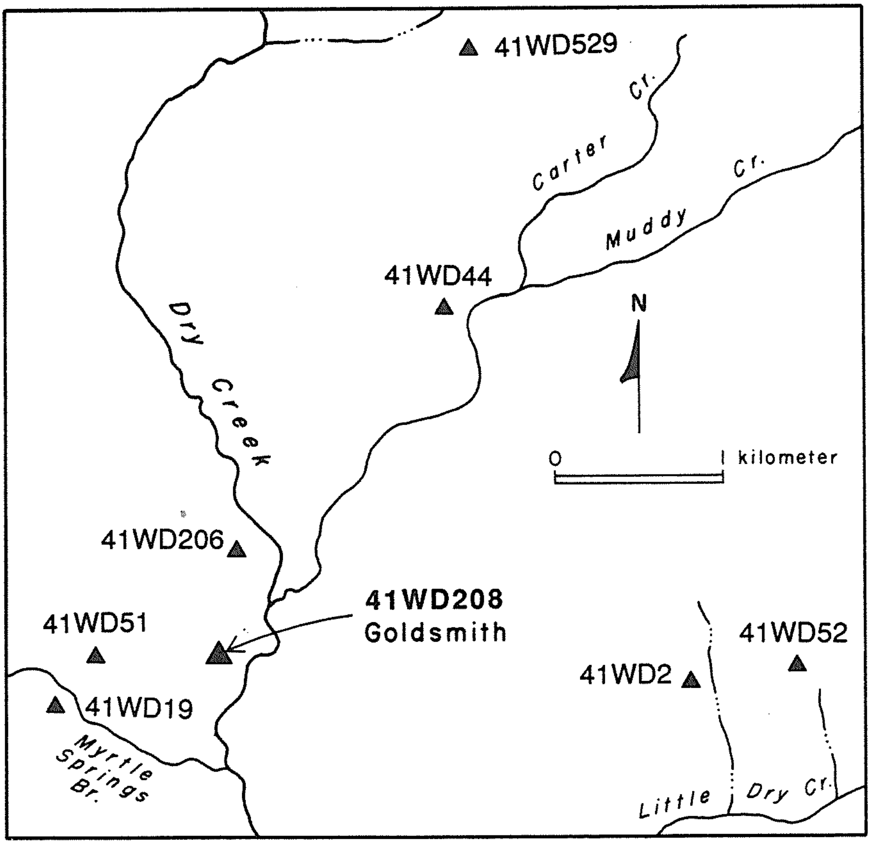


Figure 4. Map of the Dry Creek Basin showing the location of the Goldsmith and other Late Caddoan Titus phase sites.

removed by the collector. This was simply a test to ascertain the suitability of the soil for probing, but within 15 minutes a ceramic vessel was detected about 2 meters northeast of the first burial removed by the collector. A shovel test about 30 cm in diameter was excavated to a depth of about 1 meter to confirm the existence of the vessel. Further concentrated probing revealed a subsurface declivity in the clayey sand B-horizon that was a pit feature oriented generally east-west with several other vessels in it. In this area the A-horizon is a tan sand about 80 cm thick, and the underlying B-horizon subsoil is a mottled yellow clayey sand.

A 2.40-by-2.40-meter unit was centered over the burial pit and pottery vessels of Burial No. 1 (Figure 6). After removing pothole backdirt piles from the surface, the unit was excavated by shovel skimming in about 2.5-cm-thick levels. No pit outline was detected in the light tan, coarse loamy sand A-horizon until just above the B-horizon at about 78 cm below the surface. The upper parts of several vessels

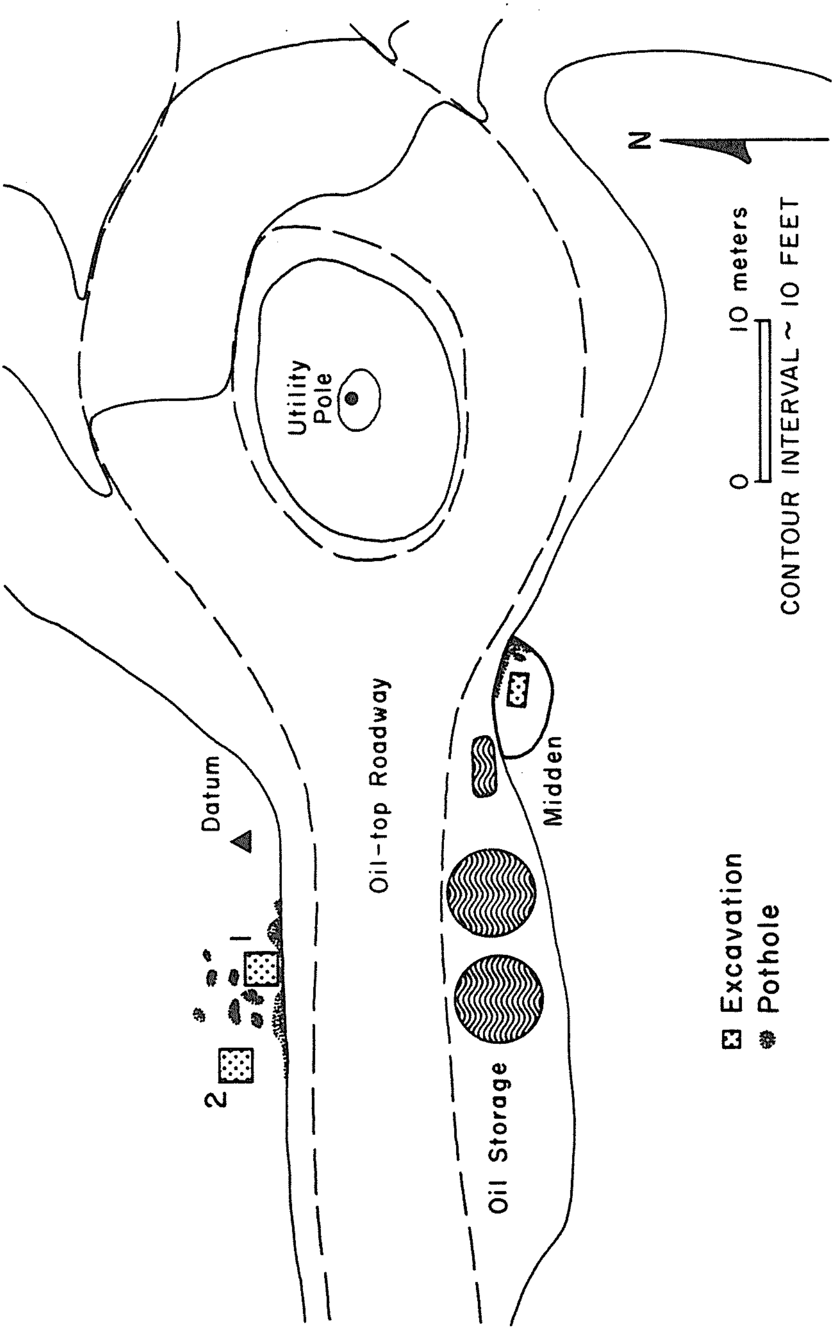


Figure 5. Topographic sketch map of the Goldsmith site.

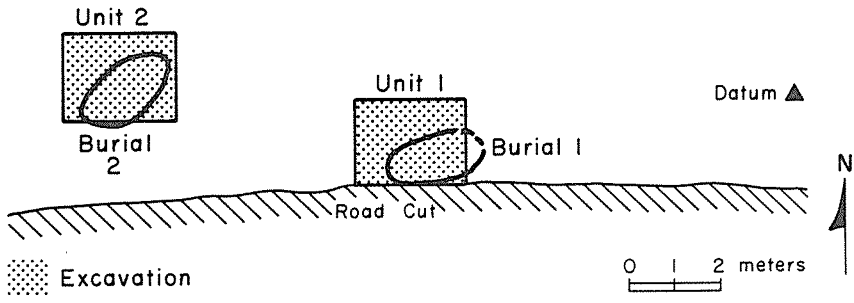


Figure 6. Plan of excavations in the cemetery area.

were also reached at this level. The bottom of the burial pit extended 35 cm into the B-horizon subsoil (Figure 7).

The burial pit, which measures 1.85 by 1.00 meters, contained seven ceramic vessels distributed over the chest area and along each side of the individual (Figure 8). No traces of bone were noted, but on the basis of several studies of Late Caddoan Titus phase mortuary patterning (Thurmond 1981; Turner 1978; Bell 1981) it was assumed that the individual was placed in extended, supine position and oriented with the feet to the west. With the burial were seven vessels: one Harleton Applique jar (Vessel 1), four Ripley Engraved carinated bowls (Vessels 2–4, 6), one Nash Neck-Banded jar (Vessel 5), and a single Wilder Engraved bottle (Vessel 7). A large part of Vessel 4 had been freshly broken and was missing. Several recently broken sherds from a large red-slipped Ripley Engraved carinated bowl were underneath the remaining fragments of Vessel 4. This corner of the burial pit apparently had been recently disturbed, although the nature of the disturbance could not be determined.

After Burial No. 2, about 5 meters west-northwest of Burial No. 1 (see Figure 6), was located, a 2-by-2-meter unit was laid out over the burial pit. No burial pit outline could be detected until, at 70 cm below the present ground surface, the B-horizon, into which the burial extended about 10 cm, was reached. The burial pit measured 2.25 by 1.15 meters, and was oriented NE-SW (Figure 9). Again, no bone was preserved in the pit, but it is assumed that the head was oriented roughly toward the northeast in conformance with Burial No. 1 and all known adult Titus phase burials in the Dry Creek drainage.

Grave goods were distributed irregularly throughout the Burial No. 2 pit below presumed shoulder level. Two greenstone celts were in the pelvic area, and a group of four arrowpoints (three Maud and one Bassett type), and an engraved ceramic elbow pipe with a flaring bowl, were between the legs at about the knee level (see Figure 9). Two roughly shaped tools of locally available ferruginous sandstone were at the feet; these may have been used as digging tools in the preparation of the burial pit. Another group of four Maud arrowpoints was placed along the left (east) edge of the burial pit. A possible Talco arrowpoint was recovered on the B-horizon

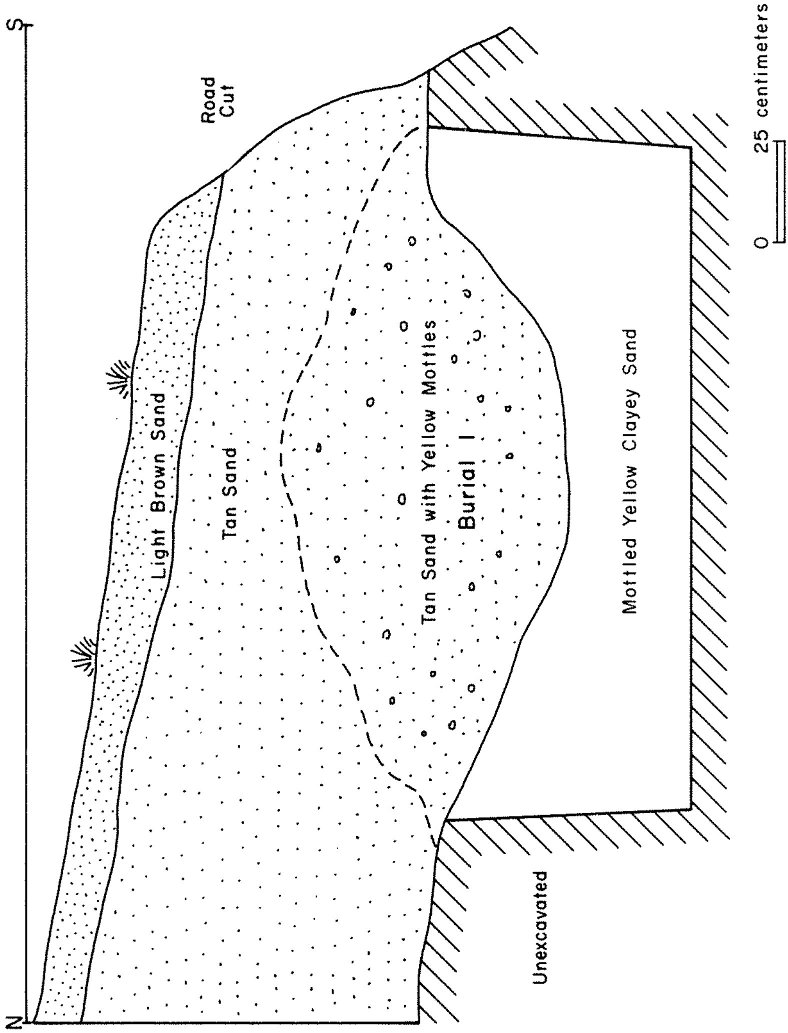


Figure 7. Profile of the west wall of Unit 1 showing the mottled fill in the Burial 1 pit.

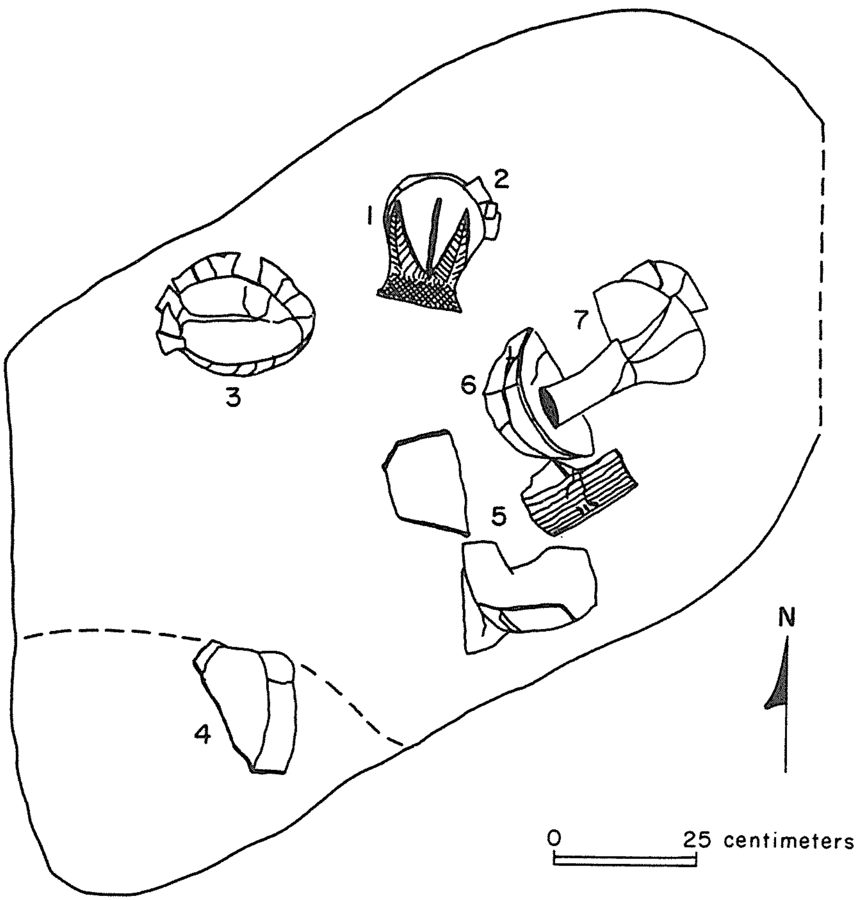


Figure 8. Plan of Burial No. 1, showing locations of grave goods. Numbers refer to vessels listed in Table 9.

contact level only 50 cm outside the burial pit, and a Maud arrowpoint was found on backdirt from the burial pit. Both are assumed to be displaced from Burial No. 2 (Table 2).

All of the pottery vessels in Burial No. 2 were substantially complete except for Vessels No. 5 and 6. These two vessels had apparently been stacked or nested near the feet, and were crushed when a large tree root grew through them, for large parts of these vessels are missing. Vessels were in the shoulder and feet areas of the burial pit.

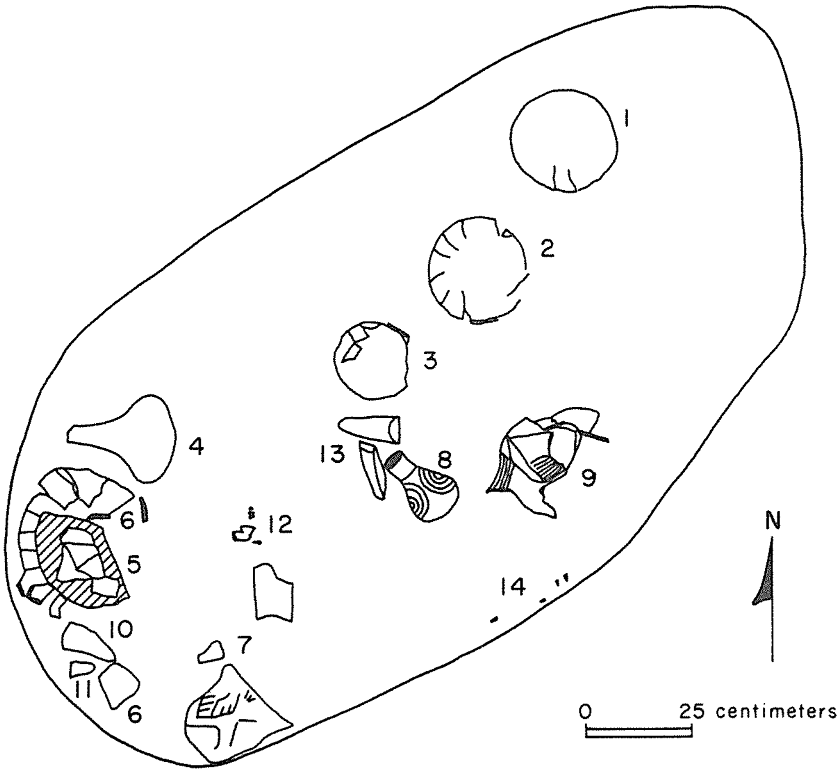


Figure 9. Plan of Burial Pit 2, showing locations of Grave Goods. Numbers 1–9 refer to vessel numbers listed in Table 11. Numbers 10 and 11 are ferruginous sandstone tools, Number 12 refers to an engraved flaring bowl ceramic elbow pipe and four arrowpoints, Number 13, to two greenstone celts, and Number 14, to four Maud arrowpoints.

Cemeteries of the Dry Creek Drainage

Cemeteries of the Dry Creek drainage are usually small in size, averaging 10 individuals (subadults and adults) each; children were placed in pits below house floors. Cemeteries in Dry Creek are small when compared to Late Caddoan cemeteries along Big Cypress Creek and its tributaries (Turner 1978; Thurmond 1981). Burials are single, extended inhumations with burial goods—ceramic vessels, petaloid celts, ceramic elbow pipes, and arrow points—at the sides,

Table 2. Contents of Burial No. 2 at the Goldsmith Site

1 Engraved ceramic elbow pipe	2 Ferruginous sandstone tools
5 Ripley Engraved carinated bowls	2 Greenstone celts
1 Wilder Engraved bottle	8 Maud arrowpoints
1 Taylor Engraved bottle	1 Talco arrowpoint
2 Nash Neck-Banded jars	1 Bassett arrowpoint

shoulders, and about the heads of the individuals. Ceramic vessels used as grave goods include not only locally manufactured Ripley Engraved, Wilder Engraved, McKinney Plain, and Maydelle Incised, but also wares such as Avery Engraved and Simms Engraved that may have been manufactured on the Red River and exchanged with Titus phase groups in the Upper Sabine River Basin (Thurmond 1985:193).

The small size of the cemeteries, their demographic profiles of roughly equal adult male and female representation, few adolescents, and no children, plus limited evidence for internal rank differentiation, all are indicative of the type of mortuary population expected in family units occupying a household for only a short period of time (Rose 1984:240; Shafer 1981:156). Burials in the household cemeteries occur as single interments in patterned arrangements of burials oriented and placed by spacing considerations that are duplicated in cemeteries from each of the Titus phase spatial clusters (e.g., Thurmond 1981, 1985).

According to Thurmond (1981:455–456),

> adolescents were buried with more offerings than children or infants, and with fewer offerings than adults. The graves of males often contain clusters of arrowpoints in patterns suggesting quivers of arrows, and those of females contain polishing stones or more numerous pottery vessels. Items of exotic material . . . are extremely rare. The occurrence of graves containing very large numbers of artifacts is also quite limited.

In the absence of identifiable skeletal remains from the Goldsmith site, the grave goods suggest that Burial No. 1 was probably an adult female and Burial No. 2 was an adult male. However, without a body of data on grave goods associations in cases where skeletal material permits determination of age and gender, this can be considered only the merest suggestion.

Because grave goods at Goldsmith are comparable to those in more intensively investigated Titus phase cemeteries (Table 3), mortuary practices are probably the same throughout the Cypress Cluster, as noted earlier by Thurmond (1981). Included in the total of artifacts at the Goldsmith site are data from a local collector on a third burial that had been exposed in the road cut. That burial contained one small plain jar, one large utility jar with incised lines at the rim/body juncture, five

Ripley Engraved bowls, one Simms-like bowl form, a plain compound bowl similar in shape to some of the Avery Engraved and Ripley Engraved forms noted in the Dry Creek basin (e.g., Suhm and Jelks 1962: Plates 2B, 64, 65), and one greenstone celt.

Table 3. Grave Goods From Four Titus Phase Cemeteries

Site	Mean No. Ceramic Vessels Per Burial	Mean No. Projectile Points Per Burial	Mean No. Total Speci-mens	Burials	Reference
Tuck Carpenter	9.2	4.34	14.8	44	Turner 1978
Taylor	8.3	5.09	14.5	71	Thurmond 1981
Alex Justiss	7.3	6.88	15.4	25	Bell 1981
Goldsmith	8.66	3.33	13.7	3	This report

TEST EXCAVATIONS AT THE GOLDSMITH SITE TRASH MIDDEN

Test excavations were conducted at the Goldsmith site trash midden in an attempt to obtain a controlled sample of artifacts and ecofacts associated with the nonmortuary life of the people who used the cemetery. Midden excavations in Titus phase occupations in the Upper Sabine River Basin are still rather limited, compared to cemetery excavations, but they are obviously a necessary priority in attempts to arrive at a balanced understanding of Titus phase lifeways.

The midden, which was estimated to cover about a 50-square-meter area, had been partially disturbed by road construction and illegal digging, and many sherds, fragments of bone and mussel shell, and charcoal flecks were noted on the backdirt of the potholes.

The goals of the test excavations were (1) examine the subsurface context of the archeological deposit and assess its integrity, (2) obtain stratigraphic artifactual data, and (3) find in situ ceramic sherds of suitable size for thermoluminescence dating. Only a few areas in the midden were accessible for test excavations because of pothunter disturbances along the midden edge exposed in the roadcut. However, an area near the roadcut that was outside these disturbed areas and did not require extensive clearing (see Figures 2 and 5) was chosen, and two 1-by-1-meter units were cleared and excavated in arbitrary 10-cm levels to 40 to 50 cm below the surface.

Stratigraphy and Character of the Midden

Stratigraphy was relatively simple in the midden (Figure 10). Exposed first was a 9-to-14-cm thick, gray, organic-rich A-horizon plow zone in which cultural materials, particularly ceramic artifacts, occur in quantity. Underlying the plow zone is a dark gray to black (10YR3/2-10YR2/2) charcoal- and ash-mottled midden deposit 12 to 23 cm thick. The midden contains extensive amounts of ceramics and bone, as well as charred nutshells and fragments of freshwater mussel shell. Ceramics in the midden are larger than in the plow zone, but are not necessarily more common by number or weight. The densest accumulation of cultural materials is at the base of the midden, which is extensively disturbed by rodent krotovinas (burrows) and root action as well. A thermoluminescence sample of a Ripley Engraved bowl with a scroll motif was recovered from 28 cm below the surface in the midden, but a date could not be obtained because the sherd had anomalous fading (e.g., Aitken 1985:54–59). The midden rests on a gray-yellow sand subsoil in which cultural materials are quite common; sterile deposits were not reached in these limited test excavations.

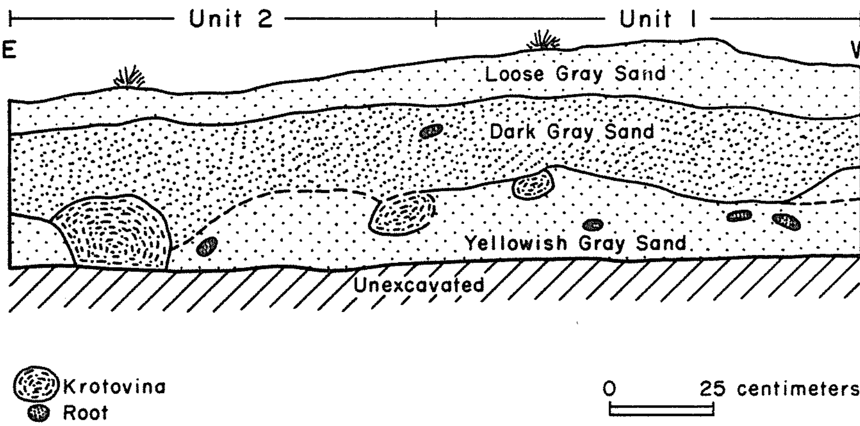


Figure 10. Stratigraphic profile in the midden at the Goldsmith site.

Zooarcheological Remains in the Upper Sabine Basin

Zooarcheological assemblages recovered from the Taddlock (41WD482) and Steck (41WD529) sites in the Upper Sabine Basin document the fact that considerably heterogenous faunal populations were present about A.D. 1000 to 1600 (Perttula and Bruseth 1983; Perttula et al. 1983). Recovered from Taddlock were faunal elements from 16 species of mammals, 12 species of birds, 8 species of reptiles or amphibians, and 9 species of fish. Several of the bird species were not permanent East Texas residents, including the pied-bill grebe, green-wing teal, and yellow-shafted flicker, but the majority of the animals recovered from Taddlock are year-round inhabitants of East Texas. The habitat range of species indicates that most animals were associated with an open oak-hickory forest with many grassland areas, which is to be expected, since the Taddlock site is in the Post Oak Savannah (Perttula and Bruseth 1983:11). The most common species represented at Taddlock are deer, racoon, beaver, squirrel, jackrabbit, opossum, turkey, carp sucker, fresh-water drum, and catfish. Similar arrays of exploitable species can be expected in the Dry Creek basin, since both the Piney Woods and discrete stands of pine are typically faunal-poor habitats, and the majority of species hunted would be in upland hardwoods and bottomland forests.

Dog was recovered at the Steck site in the Piney Woods (Perttula et al. 1983) and was an important component of prehistoric and historic hunting forays in the region (Yates 1986). Bear and bison, utilized historically by Caddoan peoples in East Texas (Swanton 1942:134–137), were present in the western part of the Gulf Coastal Plain. Bison were never very common in the East and North Texas prairies, however, until the late 1700s (see Flores 1985:114), and there is no concrete evidence of the exploitation of bison in the Upper Sabine Basin until the eighteenth century (Lorrain 1967:Table 11).

Faunal Remains in the Goldsmith Site Midden

Faunal remains were common throughout the Goldsmith site midden deposit, averaging 143 elements per m^3. Species identified are white-tailed deer, dog, pocket gopher, turkey, and land turtle. In character, the faunal assemblage from Goldsmith resembles that recovered from the nearby Steck site, a single component Late Caddoan occupation (Perttula et al. 1983:Table 4).

All of the six identified deer elements are burned or charred and represent parts of the carcass that have very little meat (i.e., the distal metapodial, a calcaneum with butcher marks, astragalus, and phalanx I). These elements are lower leg bones that may have sustained fire damage when exposed to roasting of a hind leg. Long-bone fragments of deer-sized mammals constitute the majority of the unidentified faunal elements, and 83 percent of these are also burned. Only two deer are indicated in the small sample: an adult individual, represented by the lower leg bones and a vertebral fragment, and an immature individual represented by a scapula fragment that was also burned.

The canid remains indicate three individuals. Each identified element is from an individual of a different age group based on skeletal development. A fetal or neonatal canid is represented by an unburned left distal humerus, an immature but older dog is identified by an unfused proximal metapodial (burned), and a small but fully adult individual is represented by an unburned lumbar vertebra. None of these elements is directly assignable to the domestic dog, but dog remains have been recorded in burials from several Late Caddoan sites in Wood County, including Steck, L. L. Winterbauer, M. E. Day, Pine Tree Farm, and the Dog site (Hockensmith 1977; Wilson and Jackson 1930; Robert Turbeville, personal communication).

Two elements—a left coracoid process and a left tarsometatarsus—of a single wild turkey (*Meleagris gallopavo*) were recovered in the midden; both elements have been burned. Based on the size of the coracoid process it seems likely that the turkey was a small female; turkey-size burned and unburned faunal elements were also noted in the zooarcheological assemblage.

One box turtle (*Terrapene* sp.) is represented by 14 elements, 10 of which have been burned. Both carapace and plastron fragments were recovered in the midden. The pocket gopher (*Geomys bursarius*) is represented by a relatively complete and unburned skull; this individual, a burrowing animal, is probably the result of postoccupational intrusion.

Mussel shell and gastropods were present throughout the midden in small quantities; the mussel shells, most likely procured from Dry Creek, were primarily fragmented valves that cannot be identified to species.

Floral Remains

Charred hickory and pecan nutshells were observed in the coarse-screened (quarter-inch) debris. Flotation samples were not obtained during this phase of excavations, but would be essential to an accurate characterization of the paleobotanical assemblage at the Goldsmith site (e.g., Perttula et al. 1983).

Artifact Assemblage in the Midden and Burials

Considering the limited extent of the investigations at the Goldsmith site, a substantial amount of cultural debris was recovered in the midden deposits and burials. Plain and decorated sherds were especially common, but lithic debris and ecofactual remains were also present throughout the midden (Table 4), and whole vessels and complete, unbroken stone tools were found in the burials.

Lithic Artifacts

A small lithic assemblage of unmodified debris, fire-cracked rock, and several modified or completed tools has been recovered from the midden. Lithic tools and debris occur at a density of about 80 artifacts/m^3, which is low compared to Archaic and Early Caddoan occupations in the Upper Sabine River Basin. Other Late Caddoan assemblages in the basin, however, share this functional/technological characteristic with the Goldsmith site (see Bruseth and Perttula 1981:Table 6-4; Perttula 1984). Most of the lithic debris and fire-cracked rock is probably associated with a Late Archaic occupation rather than with the Titus phase occupation, since lithic artifacts are scarce in Late Caddoan sites in the Upper Sabine River Basin.

The lithic debris is dominated by raw materials that are locally available, including Ogallala quartzite from upland gravel sources. Other quartzites constitute 7.6 percent of the assemblage, and cherts, another 9.1 percent. Chert raw materials are gray, tan, and brown cherts of local origin, and a creamy white chert of unknown provenience. This white chert, with discernible black inclusions, closely resembles the Frisco chert (Banks 1984:85) that comes from the Arbuckle Mountains of southeastern Oklahoma and is available as close as the gravels of the Red River below the mouths of the Blue River and Clear Boggy Creek in Lamar and Fannin counties, Texas. Inspection of Frisco chert from Marshall County, Oklahoma, in

Table 4. Distribution of Cultural Materials From the Goldsmith Site Midden

Context	Lithic Debris	Tools	FCR*	Fauna	Mussel Shell Fragments	Gastropods	Charred Nutshells	Plain Sherds	Decorated Sherds	Burned Clay/ Daub	N
Surface	9	3	1	3	2	-	-	11	2	1	32
Unit 1,											
0-10 cm	9	-	-	10	4	1	1	53	10	11	99
10-20 cm	6	-	-	17	-	4	-	23	11	2	63
20-30 cm	4	-	-	18	5	1	4	37	14	-	83
30-40 cm	10	1	2	28	3	1	-	59	22	1	127
Unit 2,											
0-10 cm	7	-	-	5	2	-	1	22	6	1	44
10-20 cm	7	1	1	9	3	-	1	17	2	2	43
20-30 cm	7	1	-	10	4	3	3	20	10	-	58
30-40 cm	7	-	2	14	4	1	1	39	10	1	79
TOTALS	66	6	6	114	27	11	11	281	87	19	628

*FCR = Fire-cracked rock.

collections at the Oklahoma Archeological Survey confirmed the similarity. This raw material is found in a number of assemblages, primarily of Middle-Late Archaic attribution, in the Upper Sabine River Basin (Perttula et al. 1986).

Eighty-two percent of the lithic debris consists of noncortical tertiary elements; only one primary element (cortex covering the entire dorsal surface) and 11 secondary elements (cortex present on the dorsal surface of the piece) were noted. The high frequency of tertiary elements and the small size of the lithic debris indicate that tool maintenance and resharpening activities are primarily responsible for the composition of the lithic debris assemblage. This is consistent with the probable functional nature of the Late Archaic occupation at Goldsmith.

Tools identified from the surface and the midden excavations are one ferruginous sandstone mano, one quartzite hammerstone, one unifacially modified piece made of a local gray chert, one chert straight-stemmed dart point (or projectile point/knife), and two arrowpoints. The dart point is a resharpened implement, possibly of the Yarbrough type (Johnson 1962). The arrowpoints, manufactured of local cherts from the Uvalde gravels, resemble the Maud and Bassett types common in the Titus phase, and were also recovered in Burial 2 (Figure 11, c–n).

In Burial No. 2 were found eight Maud, one Talco, and one Bassett arrowpoint (Table 5). A few pieces of lithic debris were also recovered in the burial fill, including five chert (four of which were noncortical), one Ogallala quartzite (a cortical element), two quartzite (one of which is a cortical element), and one ferruginous sandstone cortical element. In shovel skimming above Burial No. 1, a Gary *variety Camden* (see Schambach 1982:Table 7.2) projectile point was found (Figure 11, A), together with a single, small (less than 4 cm long and wide) quartzite burned rock, five tertiary elements of chert (two of which have use-wear patterns), and a fragment of a pitted hematite stone. None of this lithic material found while excavating Burials No. 1 and 2 seems definitely relatable to the Titus phase occupation at the Goldsmith site.

The two celts from Burial No. 2 were made by pecking and/or flaking large cobbles of greenstone (a siliceous shale lithic raw material available only in the Ouachita Mountains of southeastern Oklahoma [Banks and Winter 1975:27]), then grinding and polishing the face and bit of the tool. They have tapered poll ends, convex bit profiles with angles between 65 and 75 degrees, and bit widths ranging from 4.6 to 5.1 cm. The celts (Figure 12, A, B) are 9.8 cm and 12.6 cm long and resemble the Type I and II celts defined at the Roitsch (Sam Kaufman) site in Red River County (Ferring 1969:88–89); Type II celts were the most common type at Lake Fork Reservoir Caddoan sites (Bruseth and Perttula 1981). The ferruginous sandstone tools are cobble-sized pieces of raw material that have been minimally shaped by percussion-flaking along the edges of the piece (Figure 12, C, D). Some cortex remains on both tools, but only remnants are visible on the circular, more extensively worked example. No use-wear can be seen along the worked edges to indicate that they might be digging tools.

The high frequency of the use of local lithic raw materials, the recovery of Archaic Period projectile points (including those found by collectors), the presence

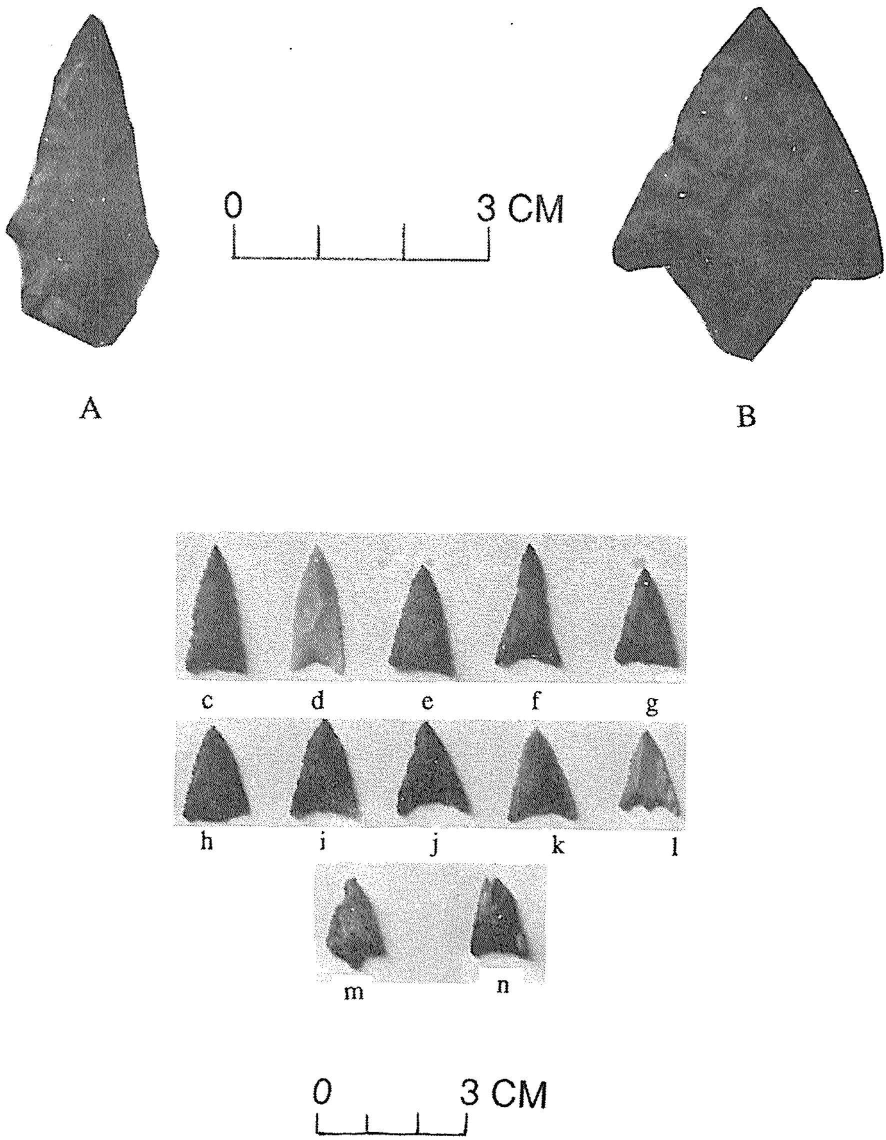


Figure 11. Chipped stone tools from the Goldsmith site.

of fire-cracked rock, and the appearance of a Frisco-like white chert in a nonburial context all point primarily to an Archaic age. Middle and Late Archaic assemblages in Lake Fork Reservoir, 20 km to the west, are notable for the use of local materials

Table 5. Projectile Point Attribute Data.

Context	Max. Length	Max. Width	Max. Thick-ness	Blade Length	Blade Width	Haft Length	Haft Width	Serra-ted	Heat Treated	Raw Material	Type
Unit 1, Level 4	17.0	10.5	2.5	14.5	10.5	2.5	3.0			Gray chert	Bassett
Unit 2, Level 2	-	10.2	2.5	-	10.2	-	10.2			Black-gray chert	Maud
Burial No. 2	16.5	11.0	1.3	16.0	11.0	0.5	2.0	+		Gray chert	Bassett
Burial No. 2	26.1	10.5	2.0	26.1	10.5	-	10.5	+	+	Chalcedony	Talco
Burial No. 2	20.2	11.8	2.8	20.2	11.8	-	11.8	+		Ogallala quartzite	Maud
Burial No. 2	20.2	12.9	3.3	20.2	12.9	-	12.9	+		Red-gray quartzite	Maud
Burial No. 2	26.0	12.6	2.2	26.0	12.6	-	12.6			Red quartzite	Maud
Burial No. 2	19.0	12.8	2.7	19.0	12.8	-	12.8	+	+	Chalcedony	Maud
Burial No. 2	18.5	12.2	2.5	18.5	12.2	-	12.2	+		Ogallala quartzite	Maud
Burial No. 2	27.0	11.0	3.0	27.0	11.0	-	11.0	+		Ogallala quartzite	Maud
Burial No. 2	23.0	11.8	2.9	23.0	11.8	-	11.8	+		Red quartzite	Maud
Burial No. 2	19.1	13.1	3.0	19.1	13.1	-	13.1	+		Gray quartzite	Maud
Surface	39.0	19.2	9.0	30.2	19.2	8.8	14.3			Ogallala quartzite	Yarbrough
Above Burial # 1	42.5	31.8	6.5	32.5	31.8	10.0	14.0	+		Ogallala	Gary

+ = present

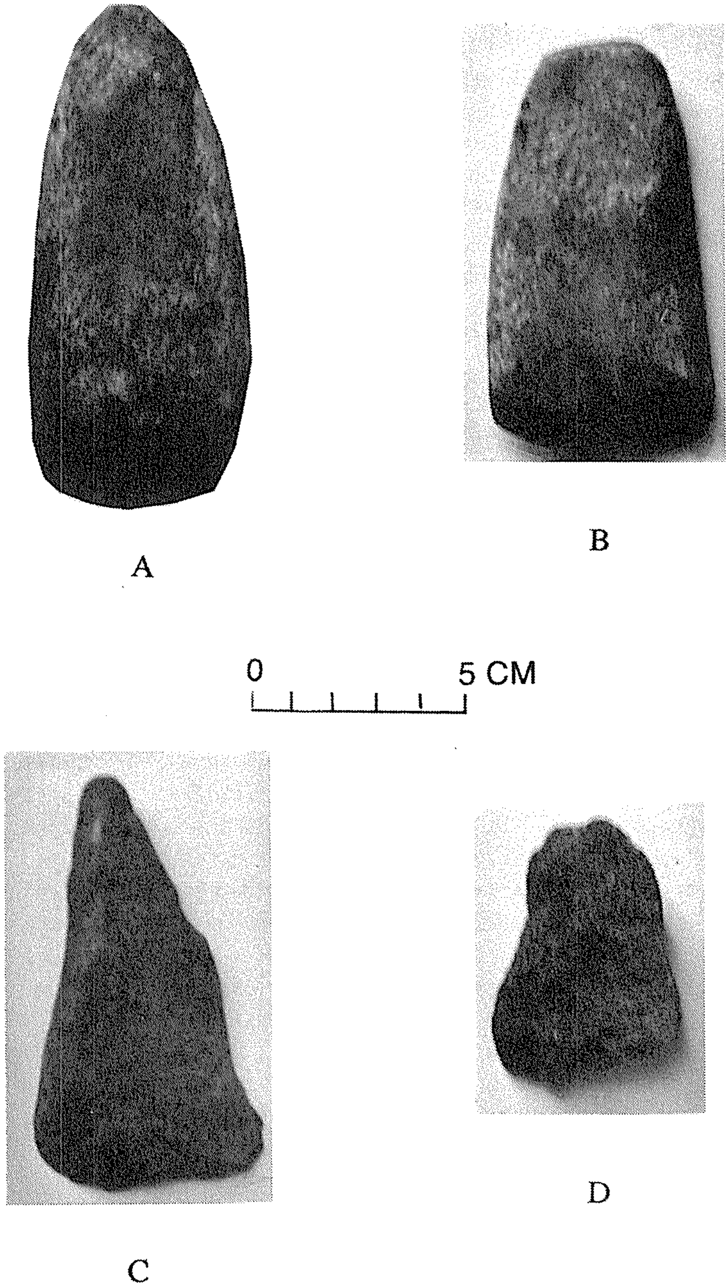


Figure 12. Celts and ferruginous sandstone tools from Burial No. 2.

in the reduction and production of lithic tools (Bruseth and Perttula 1981:Table 6-9; Perttula 1984:Table 7.3), particularly in comparison to Caddoan assemblages dating between A.D. 1000 and 1400. Densities of fire-cracked rocks decrease noticeably after about A.D. 800 in the same set of sites. The Frisco-like white chert has been identified in Early Archaic to Late Archaic contexts in several sites in the Big Sandy Creek basin east of the Goldsmith site (Perttula et al. 1986), most noticeably in putative Early and Middle Archaic components at the Trammell Crow Pond site (41WD185). The Frisco-like white chert is not a common raw material in the Big Sandy Creek basin, but its periods of use may well aid in the chronological ordering of Archaic assemblages in the absence of datable materials.

Ceramic Artifacts

Ceramic sherds are the most common artifacts in the Goldsmith midden, occurring in quantities of as many as 460 sherds/m^3. Considering this estimated density, the midden probably contains about 9,000 sherds, all probably deposited within a relatively short time span.

Three hundred sixty-eight sherds have been recovered from the midden or its surface (Table 6). Grog-tempered sherds comprise 93 percent of the assemblage, followed by grog/grit-tempered sherds (3 percent), and grog/bone and bone-tempered specimens (2 percent). Five sherds have no discernible temper. These differences in temper correspond to those in Late Caddoan occupations at Lake Fork Reservoir and in the Dry Creek basin in Wood County. Bone is most commonly used as an aplastic in Early Ceramic period and Early Caddoan period occupations, ranging between 7 and 70 percent in ceramic assemblages at Lake Fork Reservoir (Bruseth and Perttula 1981:Table 5-7). At the Steck site, bone temper was present in only 0.5 percent of the sherds, whereas bone was noted in 0.3 percent of the sherds from the contemporaneous Late Caddoan Pine Tree Farm site (J. E. Bruseth, personal communication, April 1987).

Inspection of cross sections of grog-tempered sherds suggests that more finely crushed grog is used almost exclusively in Ripley Engraved vessels, and occasionally in the manufacture of Nash Neck-Banded or LaRue Neck-Banded jars. The coarser paste with grog/grit temper is confined to sherds of the utility ware types Harleton Appliqué, Karnack Brushed-Incised, and McKinney Plain (Suhm and Jelks 1962) with appliqué, or brushing/appliqué. These paste differences presumably relate to technological and functional variability in the way these kinds of vessels were made and designed to be used (e.g., Steponaitis 1984:85–114).

Decorated sherds comprise 24 percent of the ceramic assemblage and are dominated by engraving, neck banding, and various forms of appliqué (Table 7). Roughly 80 percent of the 34 rims are decorated, which is an additional measure of the pervasiveness of decorated vessels in the Titus phase occupation at the Goldsmith site.

All of the engraved sherds with rolled or folded rims characteristic of the Titus phase lip treatment on carinated bowls are identified as Ripley Engraved (Figure

Table 6. Ceramics From the Goldsmith Site Trash Midden

	RIM AND DECORATED SHERDS					PLAIN BODY SHERDS				BASE	N
Context	Grog	Grog/ grit	None	Bone	Grog/ bone	Grog	Grog/ grit	Grog/ bone	Bone	Grog	
Surface	2					9	2				13
Unit 1											
0-10 cm	8	2	1		1	47		1*	2	1	63
10-20 cm	11					22				1	34
20-30 cm	15					36					51
30-40 cm	18	2	1	2		58*					81
Unit 2											
0-10 cm	5	3				19*				1	28
10-20 cm	1		1			16	1				19
20-30 cm	9		1			20*					30
30-40 cm	7	2	1		1	38					49
TOTAL	76	9	5	2	2	265	3	1	2	3	368

* Red-slipped sherds are included in this category.

Table 7. Distribution of Decorated and Rim Sherds from the Goldsmith Site Trash Midden

Context	Plain Rim	Incised	Incised/ Appliqué	Brushed- Appliqué	Brushed	Punctate- Incised/ Appliqué	Punctate	Punctate- Incised	Appliqué	Neck- Banded	Engraved	N
Surface						1					1	2
Unit 1												
0-10 cm	2							1	1	1	7	12
10-20 cm		1			2					1	7	11
20-30 cm	1	1			2				1	6	4	15
30-40 cm	1		1	1	1		1		1	4	13	23
Unit 2												
0-10 cm	2						1		3		2	8
10-20 cm									1		1	2
20-30 cm		1								5	4	10
30-40 cm	1				2				2	2	4	11
TOTAL	7	3	1	1	7	1	2	1	9	19	43	94

13). Stylistic motifs are generally difficult to determine because the sherds are so small, but motifs that could be identified include the scroll, scroll and circle, and the interlocking horizontal scroll (Thurmond 1985: Figure 3). These motifs are common in Three Basins subcluster sites of the Titus phase defined recently by Thurmond (1985:193).

Other treatments of the engraved sherds include a red hematite slip (see Ferring and Perttula 1987) on both interior and exterior surfaces (4.7 percent of the engraved sherds), and the painting of engraved lines with hematite and kaolin (9.3 percent of the sherds). Only 2.2 percent of the plain body sherds have a red hematite slip.

Neck-banded sherds are derived from everted rim LaRue or Nash Neck-Banded jars (Figure 14, c–e, h). Surface treatment of the neck-banded jars includes both smoothed rim coils and regularly crimped rim coils. The partially smoothed neck-banded sherds are tempered with fine grog paste; the remainder have been tempered with a much coarser grog. The neck-banded sherds comprise 22 percent of the decorated sherds, compared to engraved sherds, which comprise 49 percent of the decorated sherds. Sherds were designated LaRue/Nash Neck-Banded because it was not possible to differentiate the neck-banded sherds consistently according to the criteria proposed by Suhm and Jelks (1962:93, 111).

The high frequency of neck-banded sherds from the Goldsmith site is comparable with other Titus phase occupations in the Dry Creek and Little Dry Creek localities of the Three Basins subcluster, including the Steck and J. H. Reese sites (Hockensmith 1977; Wilson and Jackson 1930). However, this comparability is not duplicated at the Caney Creek localities in the Lake Fork Creek drainages (Bruseth and Perttula 1981; Thurmond 1985), where only 3 to 11 percent of the decorated sherds from the different middens at the Killebrew and Gilbreath sites have neck bands (Table 8).

Appliquéd sherds are probably derived from the McKinney Plain and Harleton Appliqué utility wares (Figure 14, f, g). The appliqué on plain rims usually consists of fillets and nodes that are placed so they divide the rims of large jars into quarters. The appliqué fillets are placed vertically from just below the lip to halfway to the rim-body juncture. Multiple inverted fillets (Figure 14, g) are also characteristic of locally produced McKinney Plain (see Bruseth and Perttula 1981:Figure 5-8a, c); these are placed directly below the lips of the vessels. Appliqué also is used in combination with incised, brushed, and punctated decorations on Maydelle Incised, Karnack Brushed-Incised, and Harleton Appliqué types of the Titus phase (Suhm and Jelks 1962:65, 85, 103).

Brushed sherds are infrequent in sites of the Three Basins subcluster. At the Goldsmith site, only 8 percent of the decorated sherds are brushed; at the Swauano Creek and Big Cypress Creek subclusters they account for 40 to 60 percent of the utility vessels (e.g., Thurmond 1985:193). However, brushing is much more common in the Dry Creek locality during the Titus phase than it is in the Caney Creek locality 10 to 15 km to the west (Table 8). At Goldsmith, brushing is both vertical and horizontal, with vertical brushing of the body most frequent. One

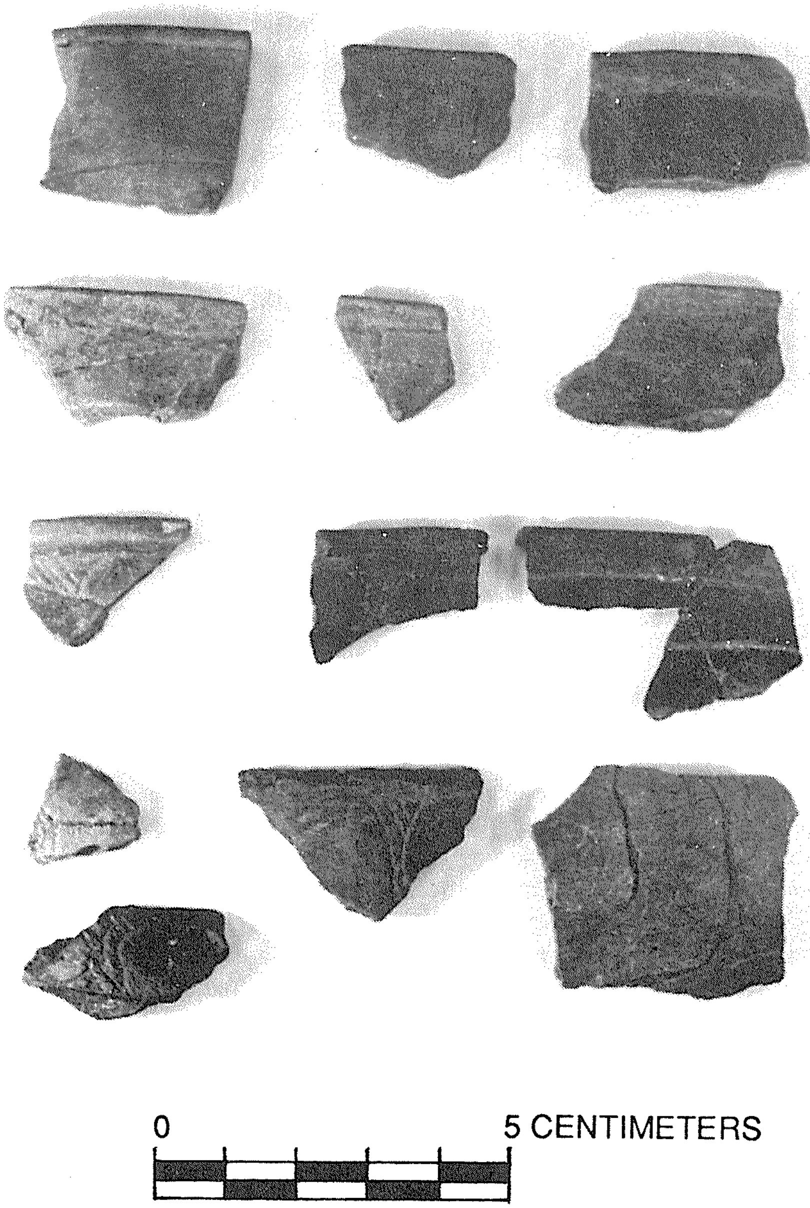


Figure 13. Engraved sherds from the Goldsmith site midden.

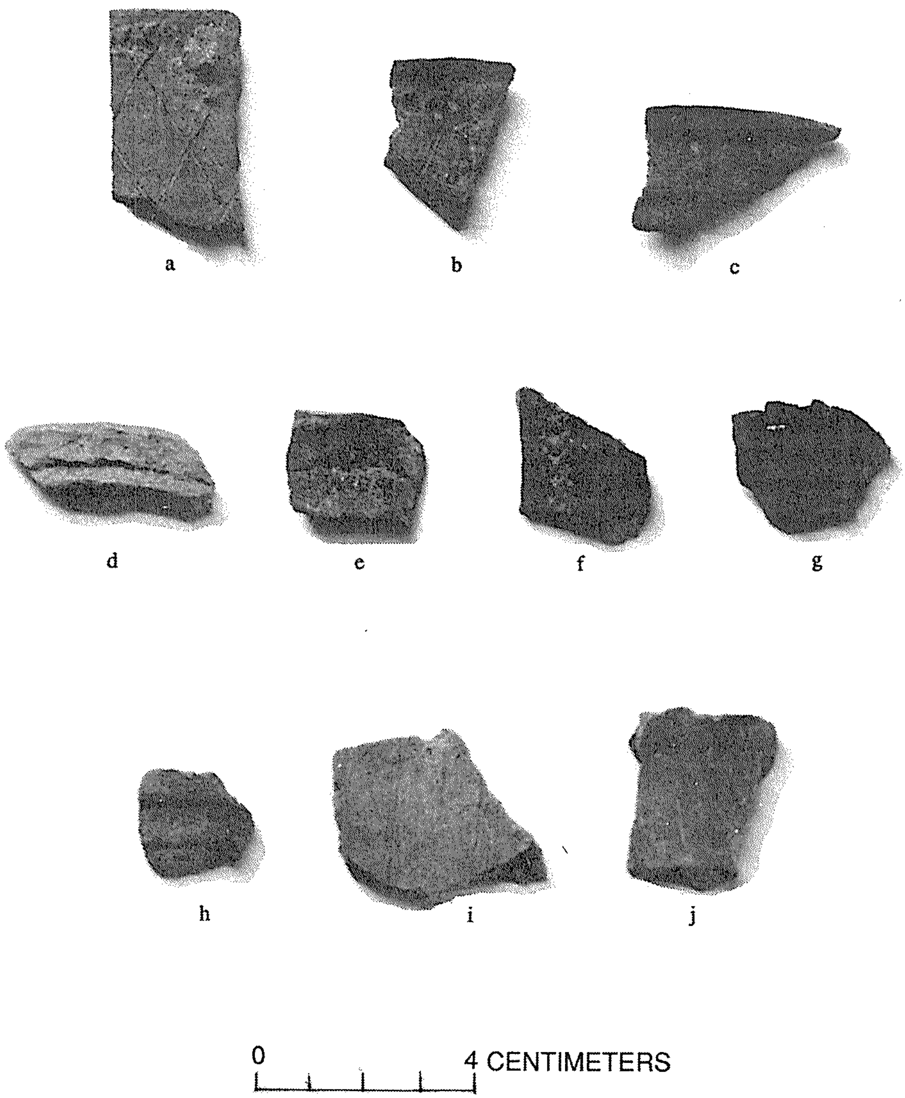


Figure 14. Neck-banded, appliqué, brushed, incised, and punctated sherds from the Goldsmith midden.

Table 8. Relative Percentages of Decorative Treatments at Late Caddoan Sites in the Dry Creek and Caney Creek Localities of the Upper Sabine River Basin.

Decorative Method	DRY CREEK LOCALITY				CANEY CREEK LOCALITY		
	Burks	Steck	Goldsmith	Pine Tree	Gilbreath, A/B	Killebrew, D	Killebrew, B
Engraving	32.7	54.6	49.5	45.7	50.0	51.5	41.5
Neck Banding	9.0	19.5	21.8	29.5	0	3.0	11.2
Appliqué	6.2	11.0	10.3	20.1	15.8	15.1	15.1
Brushing	22.5	7.7	8.0	0.8	0	0	0
Incision	20.8	3.4	3.4	3.9	13.2	27.3	17.0
Punctation	6.5	3.9	2.3	0	18.4	3.0	13.2
Total Decorated	677	698	87	129	38	33	53

Karnack Brushed-Incised sherd was identified from the midden; the other sherds from the midden are body sherds from Bullard Brushed, Maydelle Incised, and Harleton Appliqué utility jars.

Punctated and incised sherds are derived from the Maydelle Incised type (Figure 14 a, b). The incised motifs are predominantely cross-hatched bands on the rims. Nodes and horizontal rows of stick and fingernail punctations are associated with the incised lines on the rim band. Bodies of these Maydelle Incised vessels, which include everted rim jars and carinated bowls (relatively uncommon), range from plain to brushed (see Suhm and Jelks 1962:103).

The sixteen vessels found in Burials No. 1 and 2 comprise eight Ripley Engraved carinated bowls, one Harleton Appliqué jar, two Wilder Engraved bottles, one Taylor Engraved bottle, three Nash Neck-Banded jars, and a carinated bowl of typical Ripley Engraved form, but decorated only with a single engraved line on the vessel interior (Table 9). All of the vessels are grog tempered, but the amount of grog added to the paste is variable in and among the different types. Polished brown and black is the most common color, and none of the vessels has been slipped. White and red pigments have, however, been applied to the engraved designs on seven of the eight Ripley Engraved bowls, and on one of the Wilder Engraved bottles.

The Ripley Engraved carinated bowls have been divided into two size groups: (1) small, with orifice diameters less than 16 cm or heights less than 9 cm (Figure 15, D, E; Figure 16, H, I); and (2) large, with orifice diameters greater than 25 cm and vessel heights between 13 and 18 cm (Figure 15, F, G; Figure 16, A). Decorative motifs vary within the two groups, although the scroll and circle (Thurmond 1985:Figure 3) is the most common bowl-rim motif (Figure 17). This motif is present on 63 percent of the Ripley Engraved bowls, and the nested triangle, interlocking scroll, and continuous scroll motifs account for the remainder of the assemblage (Table 9). The frequency of these motifs is consistent with Thurmond's (1985:193) description of the Three Basins subcluster of the Titus phase. At the nearby J. H. Reese site, the scroll and circle motif is most common in the large vessel sample (at the Texas Archeological Research Laboratory) from the cemetery excavated by A. T. Jackson, followed by the continuous scroll, interlocking scroll, and a single example of the pendant triangle motif (Vessel No. 6).

A single example of Wilder Engraved (see Suhm and Jelks 1962:Plate 78M for an example from the J. H. Reese site) was found in each burial at the Goldsmith site. These are rather squat bottles with narrow, tapering necks (Figures 15, B and 16, C), decorated on the bodies with engraved spirals with hooked, excised arms. Vessel No. 7 in Burial No. 1 has red pigment in the engraved lines. Wilder Engraved is considered a local resident pottery type of the Three Basins subcluster (Thurmond 1985), although it is relatively uncommon compared to Ripley Engraved.

A black polished Taylor Engraved bottle with a spool neck and a flaring lip (Figure 16, D) was recovered from Burial No. 2. Engraved spirals cover the entire body. The Goldsmith example is very similar to Taylor Engraved bottles from the

Table 9. Vessel Attribute Observations

Vessel No.	Form[1]	Diameter (cm)	Orifice Height (cm)	Thickness (mm)	Lip Profile[2]	Temper[3]	% Complete	Type and Decorative Motif[4]	Comments
					BURIAL No. 1				
1	J	15.3	22.0	5.5	R	G	100	Harleton Appliqué	
2	CB	26.5	18.0	6.5	R- RO	G	95	Ripley Engraved nested triangle	
3	CB	25.5	13.8	6.0	R-RO	G	95	Ripley-scroll & circle	
4	CB	25.0	13.0	8.0-8.5	R-RO	cG	50	Ripley-scroll & circle	
5	J	26.2	28.5	6.5	R-RO	cG	95	Nash Neck-Banded	This jar has extensive soot deposits on the vessel exterior.
6	CB	16.1	8.3	5.2	R-RO	cG	95	Ripley-scroll & circle	
7	BT	5.5	25.0	3.4	R	fG	99	Wilder Engraved	Main body diameter is 16.7 cm

BURIAL No. 2

1	CB	27.7	14.0	5.5	R-RO	G	95	Ripley-scroll & circle	This vessel has three earlier probe holes in the base and body.
2	CB	18.0	8.0	4.0	RO	fG	95	Ripley	There is an interior engraved line at the carination of this vessel.
3	CB	15.5	9.0	4.0	R	G	95	Ripley-continuous scroll	
4	BT	4.5	24.0	5.0	N/A	cG	99	Wilder Engraved	Main body diameter is 20.0 cm The lip has been broken or ground down prior to its inclusion as a a grave good.

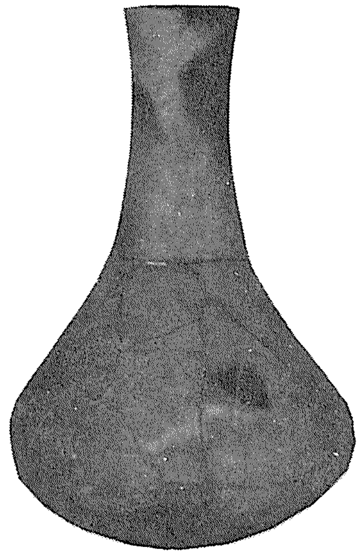
Table 9. Continued

Vessel No.	Form[1]	Diameter (cm)	Orifice Height (cm)	Thickness (mm)	Lip Profile[2]	Temper[3]	% Complete	Type and Decorative Motif[4]	Comments
BURIAL 2, continued									
5	CB	26.5	18.0	6.5	R-RO	G	95	Ripley-interlocking scroll	
6	CB	30.0	14.5	5.0	R-RO	G	60-70	Ripley-scroll & circle	The height is an estimate only because of partial completeness
7	J	16.5	20.4	7.0	R-RO	G	99	Nash Neck-Banded	
8	BT	6.1	19.4	4-5	F	fG	100	Taylor Engraved	Main body diameter is 15.0 cm. This vessel has a spool neck in addition to a flaring lip profile

9	J	17.7	18.9	6.0	R-RO	G	95	Nash Neck-Banded

[1]J = Jar; CB = Carinated bowl; B = Bottle
[2]R = Rounded; R-RO = Rounded and rolled out; F = Flaring
[3]G=Grog; cG = coarse grog; fG = fine grog
[4]See Suhm and Jelks (1962) for typological definitions of Harleton Appliqué (65-66), Ripley Engraved (127-130); Nash Neck-Banded (111-112);Wilder Engraved (155-156); and Taylor Engraved (149-152). Ripley Engraved bowl-rim motifs follow Thurmond (1985:Figure 3).

A, Burial 1, Vessel 1



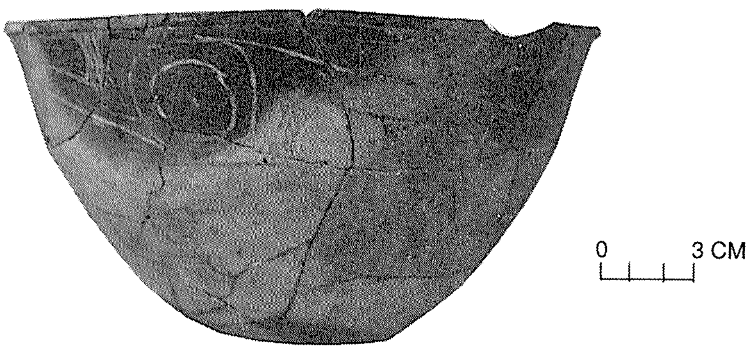
B, Burial 1, Vessel 7

C, Burial 1, Vessel 5

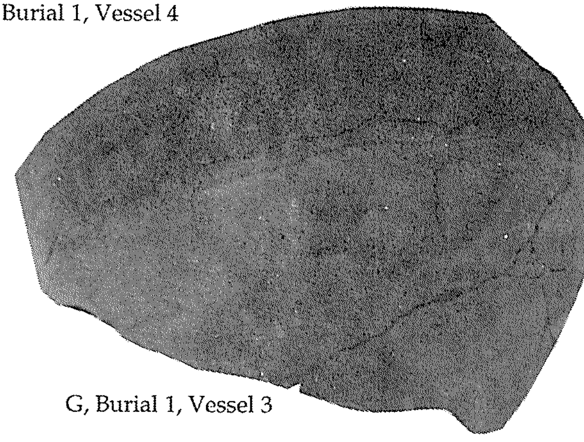
Figure 15. Ceramic vessels A–G from Burial No. 1

D, Burial 1, Vessel 2

E, Burial 1, Vessel 6



F, Burial 1, Vessel 4



G, Burial 1, Vessel 3

Figure 15, Continued.

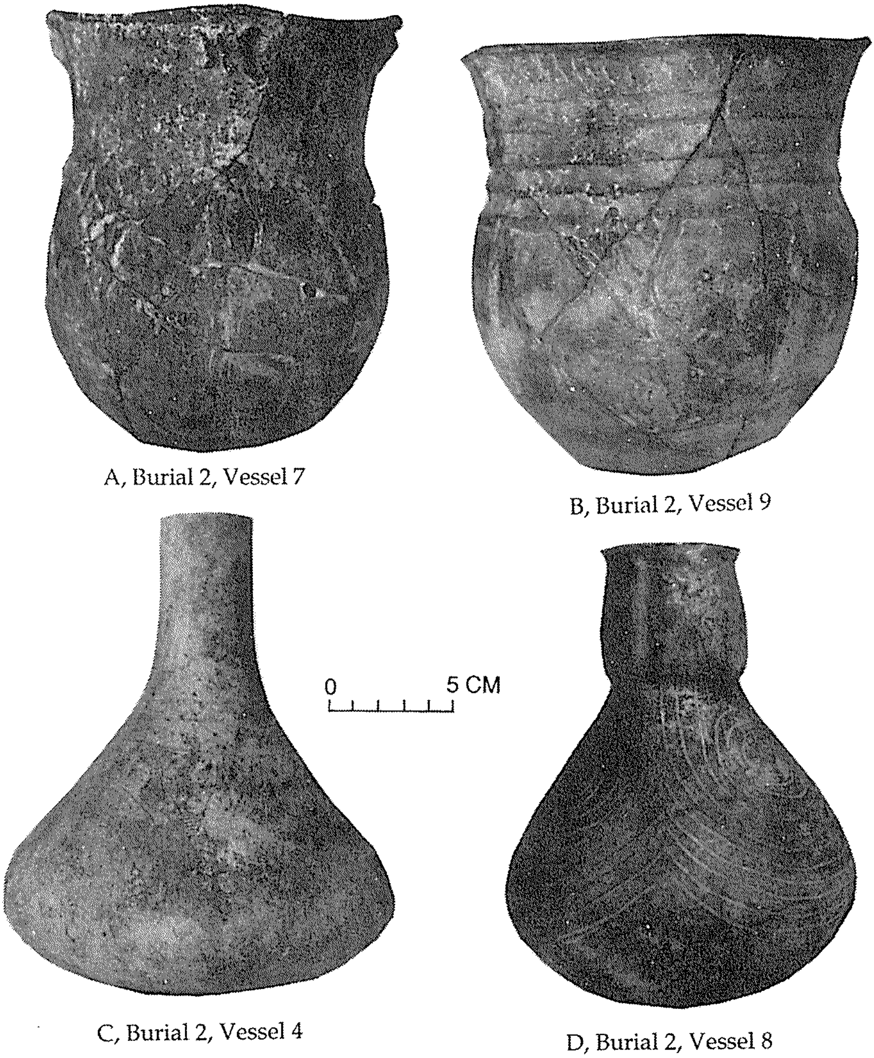
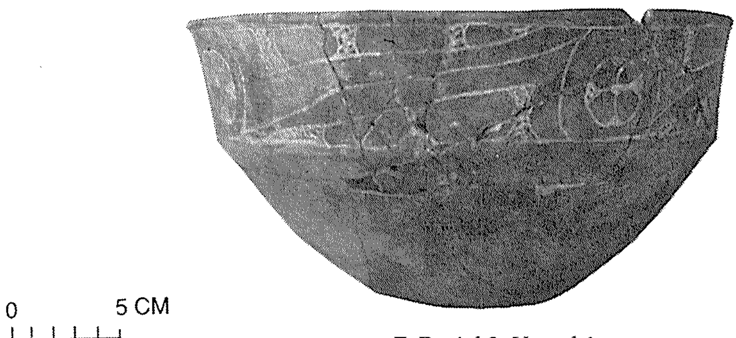
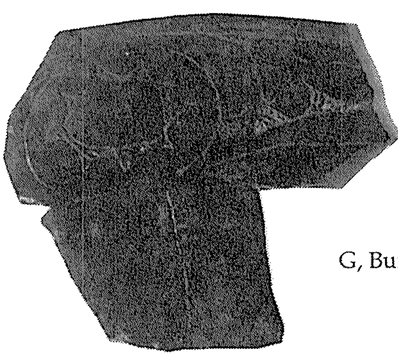


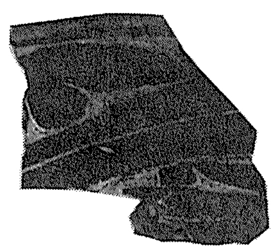
Figure 16. Ceramic vessels A–G from Burial No. 2.

E, Burial 2, Vessel 5



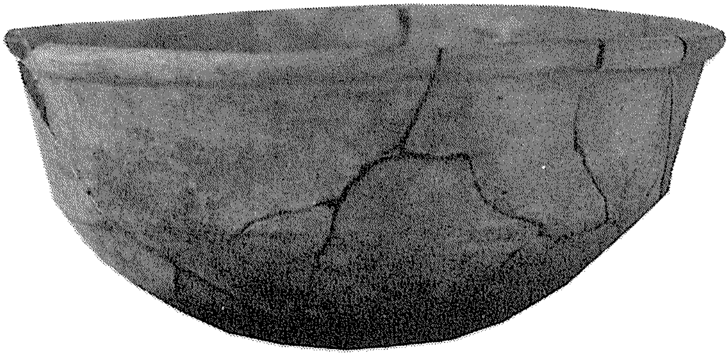
F, Burial 2, Vessel 1



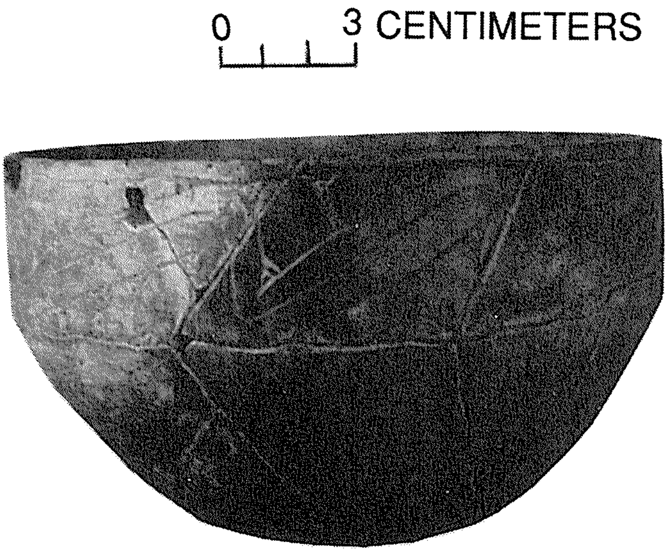


G, Burial 2, Vessel 6

Figure 16, Continued.



H, Burial 2, Vessel 2



I, Burial 2, Vessel 3

Figure 16, Continued.

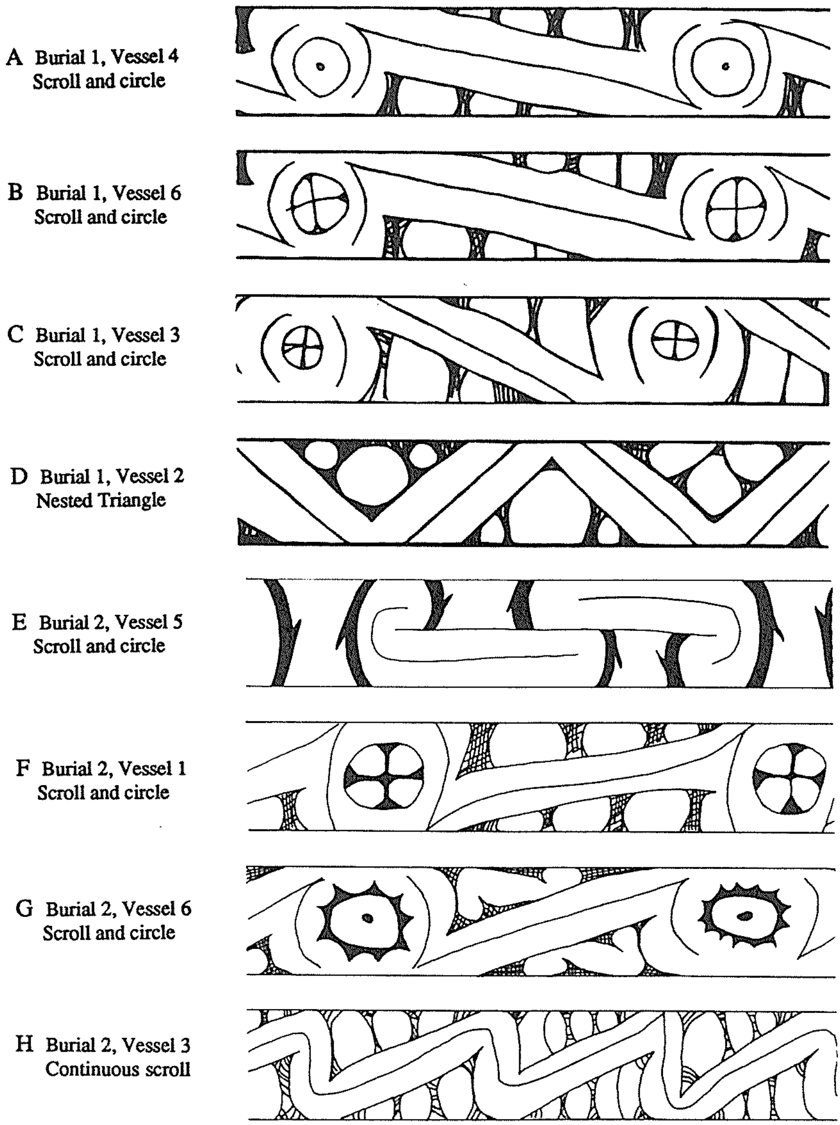


Figure 17. Motifs on Ripley Engraved carinated bowls from Burials No. 1 and 2.

Culpepper site in Hopkins County, Texas (Scurlock 1962:Figure 7 a, b). At that site, Taylor Engraved occurs in association with vessels of Ripley Engraved, Womack Engraved, Simms Engraved, Hodges Engraved, and Avery-like Engraved.

The Harleton Appliqué jar (Figure 15, A) from Burial No. 1 has soot deposits and organic residue on both interior and exterior vessel surfaces, probably from use over an open fire (e.g., Hally 1986) before it was put into the grave. The rim of the vessel has single rows of punctations at the lip and at the rim/body juncture, separated by cross-hatched incised lines. On the body are four incised "herringbone" motifs; these are adjacent to sets of vertical appliqué that run from the rim/body juncture to near the base.

There are two distinct varieties of Nash Neck-Banded represented in the vessels from the Goldsmith site. The first has appliquéd fillets on the upper body, as well as appliquéd parentheses at the top of the rim (Figure 15, C); the second has appliquéd chevrons on the upper body. Both are found on vessels from Burial No. 2 (Figure 16, A, B), which have vertical appliquéd fillets on the bodies, and appliquéd nodes or lugs at the tops of the rims. Similar neck-banded and appliquéd vessels and sherds have been recovered at the J. H. Reese site and from several sites on Caney Creek in the Lake Fork Reservoir (Bruseth and Perttula 1981:Table 5-10).

Vessel 2 from Burial No. 2 is a polished, carinated bowl of similar shape to Ripley Engraved vessels, with a well-defined rounded and rolled lip. It is not decorated, however, except for a single engraved line on the interior of the vessel at the rim/body juncture or carination (Figure 16, H).

Short-stemmed and short-bowled elbow pipe forms have been found in Late Caddoan archeological sites in the Quitman area (Jackson 1933:71 and Plate 16). The elbow pipe from the Goldsmith site has been decorated by two horizontal engraved panels on the bowl, and by two engraved lines on the stem (Figure 18). Both sets of engraved lines were filled with white pigment, but the pigment is poorly preserved. The pipe stem is 37 mm long, and the bowl is 23 mm high. The lip profiles for both bowl and stem holes are flattened; the lips are from 3 to 5 mm thick. Grog temper was used as an aplastic in the sandy paste and, although weathered, the pipe appears to have been polished. The bowl diameter is about 37 mm; the exterior stem diameter is only 25 mm, and the interior stem hole is about 4 mm in diameter.

Daub and Burned Clay

Small eroded pieces of daub and burned clay were recovered from the surface of the disturbed trash midden and from the test excavations. Both categories of fired clay are relatively amorphous, but pieces identified as daub, unlike the burned clay, have stick and grass impressions. The daub is assumed to be pieces of clay-plastered wall and thatch, probably from a burned structure. The burned clay may be of the same origin, although that is difficult to ascertain without more contextual information from the site as a whole.

Only five pieces of daub and fourteen pieces of burned clay have been identified from the trash midden. Since ninety percent of these pieces come from the top 20 cm of the midden deposits, including the disturbed plow zone (see Table 4), any burning, and hence accumulation of daub/burned clay, took place at the end of the deposition of the midden rather than at the beginning of the occupation when the

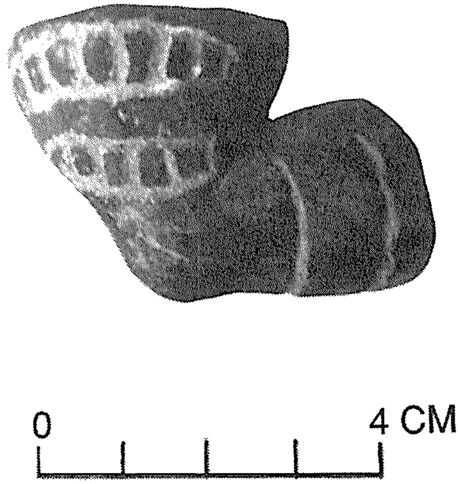


Figure 18. Elbow pipe from Burial No. 2.

midden began to accumulate. The impressed daub specimens resemble those identified from Late Caddoan Titus phase contexts at the Killebrew site, Midden A (Bruseth and Perttula 1981:98), where it seemed likely that narrow-bladed grasses were used for thatching on the house walls.

Summary of the Midden

The overall composition of the Goldsmith site trash midden ceramic assemblage compares favorably with that from the Steck site 2.5 km northeast (Hockensmith 1977) in the relative ranking and frequency of the decorative categories (Table 8). From this information, it is possible to infer that the Steck and Goldsmith sites are probably contemporaneous, within ±25 to 50 years, manifestations of a Titus phase occupation in the Dry Creek locality. Ceramic assemblages in the Caney Creek locality are different, but, because of the lack of absolute dates for the Late Caddoan Period in the Upper Sabine Basin (Perttula et al. 1987), it cannot be determined yet whether this is a result of temporal and/or social differences (e.g., Thurmond 1985). On the basis of the stylistic motifs on Ripley Engraved in the Caney Creek locality (see Bruseth and Perttula 1981:Figure 5-7), it is suspected that these ceramic variations in vessel decorations denote different social groups that reflect generally contemporaneous Titus phase occupations. Based on the one radiocarbon date from the Steck site, it is estimated that the Goldsmith occupation took place from between A.D. 1400 at the earliest to about 1550 to 1600 at the latest.

CONCLUSIONS

Late Caddoan Titus phase sites are common in the Wood County part of the Upper Sabine Basin, primarily in the Dry Creek and Caney Creek drainages and along Lake Fork Creek between the confluences of these two creeks (Skiles et al. 1980:Figure 6; Thurmond 1985:Figure 6). The settlements are distributed almost exclusively along tributaries and headwater areas rather than along major streams. In the Caney Creek drainage, Titus phase sites are known at least as far north as the Attaway site (41HP15) near Como. Similar Late Caddoan settlement patterns are apparent in Harrison and Rusk counties on creeks like Hatley Creek in the South Hallsville Mine Project (LaVardera 1985), Martin Creek (Clark and Ivey 1974), and Potters Creek directly to the north (Webb et al. 1969). Thurmond (1981:Table 54) has documented settlement locations for the Titus phase in the Cypress Creek basin that also emphasized intermediate and minor-sized basins, including headwater areas adjacent to springs.

There is no apparent settlement hierarchy in the local Titus phase, although occupations at the Steck and M. W. Burks (41WD52) sites (Perttula et al. n.d.) may represent large settlements (cf., Thurmond 1981:100). Possible substructural mounds in the Dry Creek and Lake Fork Creek basins at the J. D. Conger (41WD8) and A. N. Vickery (41WD11) sites trenched by A. T. Jackson in the early 1930s may date to this period, but that work yielded little cultural and stratigraphic information. If these possible substructural mounds are of Late Caddoan age, it is possible that they represent local civic-ceremonial centers like McKenzie [41WD55] (Granberry 1985) in the Upper Sabine Basin that date before A.D. 1500 (Story 1981:149; Thurmond 1981:Table 52).

The basic type of Titus phase site in the Three Basins subcluster is a small settlement of one to several homesteads or farmsteads. These are marked by trash and household middens that must have been deposited during an occupational episode of at most 20 to 50 years (see Good 1982). The character, extent, and content of local Late Caddoan trash middens (Table 10) reflect a basic similarity not only in the length and type of occupation, but also in the activities relating to refuse disposal at that time.

The house at the Goldsmith site was probably destroyed by the road construction, since it was probably located between the trash midden and the cemetery. It is also unfortunate that an accurate estimate of the number of burials in the cemetery cannot be made since ideally,

> the relative duration of the hamlets (settlements) can be measured by the number of graves in the cemeteries and relative temporal placement of each hamlet can be determined by seriating mortuary assemblages [Shafer 1981:156].

The ecofactual remains from trash middens would contribute important subsistence information on the Titus phase if a larger, statistically reliable sample could be obtained (e.g., Grayson 1984; Jones et al. 1983). This could be accomplished

Table 10. Comparison of Late Caddoan Trash Middens

Site	Area (m^2)	Volume (m^3)	% Sample	Estimated Midden Content: Ceramic Sherds	Lithic Artifacts	Bone Debris
Goldsmith	49	19.6	4.1	9000	1500[1]	3000
Steck	81	24.0	22.7	9200	900	2500
Killebrew midden D	180	36.10	5.0	9700	3900	+[2]

[1]Counts are probably inflated because of Archaic Period occupations at the site.
[2]Faunal materials are not quantified in Bruseth and Perttula (1981).

with the excavation of about 20 to 40 percent of the midden (4 to 8 m^3) if the faunal densities from our work at the Goldsmith site are representative.

Subsistence remains with interpretive significance for the Titus phase are still limited to the Steck site (Perttula et al. 1983), although well-preserved remains are known at several other sites that have as yet received little professional attention. Floral evidence suggests that the tropical cultigen maize (*Zea mays* L.) is a dietary staple, and beans (*Phaseolus vulgaris*) were also an important food source. Nuts and seeds available in local environmental settings were also gathered, but may have been of less importance in the Titus phase than they were between about A.D. 1000 and 1400 (Crane 1982; Perttula and Bruseth 1983). Vertebrate species identified from the trash midden at the Steck site include deer, turkey, cottontail, jackrabbit, squirrel, and beaver, as well as several dog burials. Turtle and fish remains were also present but were relatively uncommon compared to the mammals and birds (Perttula et al. 1983); deer and turkey were the dominant species at the Steck site.

The Late Caddoan archeological sites in the Dry Creek and Caney Creek drainages of the Lake Fork basin have been included in the recently defined Cypress Cluster, which is thought to be

> the archeological manifestation of a series of social groups banded together in a socio-political structure analogous to and at least partially contemporaneous with that of the Hasinai to the south and the Kadohadacho to the northeast. Four subclusters . . . are believed to represent the individual component groups comprising this affiliated group [Thurmond 1985:196].

The Three Basins subcluster comprises Titus phase occupations on Caney and Dry creeks in the Upper Sabine River Basin, and headwater areas of Little Cypress, Big Cypress, and White Oak creeks. More recently, sites attributable to the Three Basins subcluster have been identified in the Big Sandy Creek valley (Perttula et al. 1986). The suggested dating of the Cypress Cluster to between A.D. 1600 and 1700 (Thurmond 1985:192) is as yet untested by absolute dating methods. A corrected date of A. D. 1470±80 from the Steck site may mean that the Three Basins subcluster developed at an earlier date than is consistent with current chronological frameworks for the Cypress Cluster. Obtaining thermoluminescence and radiocarbon dates from sites such as Goldsmith or Steck is vital to the acquisition of new information on the development of the Cypress Cluster and the Titus phase. The primary units of analysis—the hamlet cemeteries—limit to some extent the precision and reliability of diachronic analyses in the Titus phase. The likelihood or possibility of frequent shifting of settlements on a generational basis suggests that a large number of sites would be identified within the four subclusters that are actually sequent to (rather than contemporaneous with) other known sites. Synchroneity between and within subclusters is much more difficult to demonstrate with a series of archeological components in this situation than are intraphase diachronic changes.

Nevertheless, the definition of the Cypress Cluster, an archeological unit with specific implications for the recognition of sociopolitical groupings, indicates that Late Caddoan sites in the Upper Sabine River Basin can be studied within an analytical framework superseding basic settlement patterning questions. This is because recognition of the Cypress Cluster is an initial attempt in East Texas archeology to relate archeological units to regionally meaningful sociocultural variables that have specific archeological implications (e.g., Thurmond 1985). If differences between the Dry Creek and Caney Creek localities have more than temporal significance, that is, if they represent archeological manifestations of contemporaneous constituent groups (Story and Creel 1982) within the Three Basin subcluster, sites such as Goldsmith will be important contextual units for investigation in further studies of Late Caddoan prehistory. Their short occupation spans, their potential for developing close-order and fine-scale seriations, and the possibility of obtaining economic information at an analytically useful level (the individual farmstead or homestead), are ideal for investigating intraregional and interregional settlement, sociopolitical organization, and adaptive variability between about A.D. 1400 and 1700. The individual farmstead or homestead is the most common type of Late Caddoan settlement in the Upper Sabine Basin, but one that until recently has received little professional archeological scrutiny. Hypotheses about the formation, development, and eventual disintegration of Late Caddoan sociopolitical groupings in East Texas can be evaluated, where appropriate, with the type of Late Caddoan archeological record known to exist at sites such as Goldsmith throughout the Dry and Caney Creek localities.

Attempting to model archeological contemporaneity for the Titus phase as a whole will certainly require a more comprehensive chronological data base than now exists if sociopolitical interpretations and considerations of adaptation are to be seriously considered, for as Story (1981:152) has pointed out,

> certainly the Caddoan area is neither environmentally or culturally homogenous. Different processes could have been in operation simultaneously and it must be established, not assumed, that the sequence of cultural change in one locale applies to another.

We hope our research at the Goldsmith site will contribute to a better understanding of the Three Basins subcluster of the Titus phase in the Dry Creek basin of East Texas, and serve to initiate more systematic and long-term research on Late Caddoan archeology in the Upper Sabine Basin and throughout East Texas.

ACKNOWLEDGEMENTS

We are grateful for the cooperation and assistance of several people during the work at the Goldsmith site. The owners of the site, the Goldsmith family, permitted access and shared our concern that the site be protected if possible. We especially thank Gene Goldsmith, Dr. J. Paul Goldsmith, and H. B. Goldsmith. James E. Bruseth helped with the access negotiations and facilitated the initial work. He also provided information about the Steck and Pine Tree Farm site ceramic assemblages that proved useful in the Goldsmith analysis. Mr. Craig Lacy and Mr. Robert Turbeville assisted Skiles in gathering information about the site after its initial exposure, and Ms. Peggy Trachte provided support during the excavations in the poison-ivy-covered midden. We also thank Mr. Gerald Blow for drafting the maps. Dr. C. Reid Ferring helped considerably in the editing of the manuscript, and in improving its structure, but we remain responsible for the content and final form of the paper.

REFERENCES CITED

Aitken, M. J.

1985 *Thermoluminescence Dating*. Academic Press, London.

Albert, L. E.

1981 Ferndale Bog and Natural Lake: Five Thousand Years of Environmental Change in Southeastern Oklahoma. *Studies in Oklahoma's Past* No. 7. Oklahoma Archeological Survey, Norman.

Arbingast, S. A., L. G. Kennamer, R. H. Ryan, J. R. Buchanan, W. L. Hezlap, T. G. Jordan, C. T. Granger, and C. P. Zlatkovich.

1973 *Atlas of Texas*. Bureau of Business Research, The University of Texas at Austin.

Banks, L. D.

1984 Lithic Resources and Quarries. In: *Prehistory of Oklahoma*, edited by R. E. Bell, pp. 65–95. Academic Press, New York.

Banks, L. D., and J. Winter

1975 The Bentsen-Clark Site, Red River County, Texas: Preliminary Report. Texas Archeological Society, *Special Publication* No. 2.

Barnes, V. E. (Project Director)

1965 *Geologic Atlas of Texas, Tyler Sheet.* Bureau of Economic Geology, The University of Texas at Austin.

Bell, M.

1981 The Alex Justiss Site: A Caddoan Cemetery in Titus County, Texas. Texas State Department of Highways and Public Transportation Highway Design Division *Publications in Archaeology* Report No. 21. Austin.

Blair, W. F.

1950 The Biotic Provinces of Texas. *Texas Journal of Science* 2:93–117.

Bruseth, J. E., and T. K. Perttula

1980 *Archaeological Research at Lake Fork Reservoir: Excavations at the Howle Site and Site Testing.* Archaeology Research Program, Southern Methodist University, Dallas.

1981 Prehistoric Settlement Patterns at Lake Fork Reservoir. *Texas Antiquities Permit Series, Report* No. 2. Texas Antiquities Committee, Austin, and Southern Methodist University, Dallas.

Bruseth, J. E., J. T. Bagot, K. M. Banks, and M. A. McKinley

1977 Archaeological Research at Lake Fork Reservoir: Site Inventory and Assessment. Southern Methodist University, Archaeology Research Program, *Research Report* No. 87. Dallas.

Bryant, V. M., and R. G. Holloway

1985 A Late Quaternary Paleoenvironmental Record of Texas: An Overview of the Pollen Evidence. In: *Pollen Records of Late-Quaternary North American Sediments*, edited by V. M. Bryant and R. G. Holloway, pp. 39–70. American Association of Stratigraphic Palynologists Foundation, Dallas.

Clark, J. W., and J. E. Ivey

1974 Archeological and Historical Investigations at Martin Lake, Rusk and Panola Counties, Texas. The University of Texas at Austin, Texas Archeological Survey, *Research Report* 32.

Crane, C. J.

1982 Plant Utilization at Spoonbill, an Early Caddo Site in Northeast Texas. *Midcontinental Journal of Archaeology* 7:81–97.

Espey, Huston and Associates, Inc.

1984 The Cultural Resources Investigations at the Henry W. Pirkey Power Plant and South Hallsville Lignite Mine Transportive Systems Re-Route, Harrison County, Texas. Espey, Huston and Associates, Inc., *Document* No. 83434, Austin.

Ferring, C. R.
1969 Pecked and Ground Stone. In: Archaeological Investigations at the Sam Kaufman Site, Red River County, Texas, edited by S. A. Skinner, R. K. Harris, and K. M. Anderson. Southern Methodist University, *Contributions in Anthropology* No. 5, Dallas.

Ferring, C. R., and T. K. Perttula
1987 Defining the Provenance of Red-Slipped Pottery from Texas and Oklahoma by Petrographic Methods. *Journal of Archaeological Science* 14:437–456.

Flores, D. L. (editor)
1985 *Journal of an Indian Trader: Anthony Glass and the Texas Trading Frontier, 1790–1810*. Texas A&M University Press, College Station.

Good, C. E.
1982 Analysis of Structures, Burials, and other Cultural Features. In: The Deshazo Site, Nacogdoches County, Texas, Volume I, edited by D. A. Story, pp. 51–112. *Texas Antiquities Permit Series*, No. 7. Texas Antiquities Committee, Austin.

Gould, F. W.
1969 Texas Plants: A Checklist and Ecological Study. *Texas A&M University, Miscellaneous Papers*, College Station.

Granberry, D.
1985 Eight C-14 Dates from the McKenzie Mound, 41WD55. *The Record*, Newsletter of the Dallas Archaeological Society 40(2):4–9.

Grayson, D. K.
1984 *Quantitative Zooarchaeology*. Academic Press, New York.

Hall, S. A.
1982 Late Holocene Paleoecology of the Southern Plains. *Quaternary Research* 17:391–407.

Hally, D. J.
1986 The Identification of Vessel Function: A Case Study from Northwest Georgia. *American Antiquity* 51:267–293.

Hockensmith, C. L.
1977 The Steck Site: A Titus Focus Midden, Wood County, Texas. Paper presented at the 1977 Caddo Conference, Natchitoches, Louisiana.

Holloway, R. G.
1987 Pollen Analysis of Sediment Core from Buck Creek Marsh, Wood County, Texas. In: Introduction to the Richland Creek Archaeological Project, edited by J. E. Bruseth and R. W. Moir. Appendix A, Volume I of the *Richland Creek Technical Series*. Archaeology Research Program, Southern Methodist University, Dallas.

Jackson, A. T.
1933 Some Pipes of East Texas. *Bulletin of the Texas Archeological and Paleontological Society* 5:69–86.

Johnson, L., Jr.
1962 The Yarbrough and Miller Sites of Northeastern Texas, with a Preliminary Definition of the LaHarpe Aspect. *Bulletin of the Texas Archeological Society* 31:141–284.

Jones, G. T., D. K. Grayson, and C. Beck
1983 Artifact Class Richness and Sample Size in Archaeological Surface Assemblages. In: Lulu Linear Punctated: Essays in Honor of George Irving Quimby, edited by R. C. Dunnell and D. K. Grayson. University of Michigan, *Anthropological Papers of the Museum of Anthropology,* No. 72:55–73, Ann Arbor.

Küchler, A. W.
1964 Potential Natural Vegetation of the Conterminous United States. *American Geographical Society Special Publication* 36. New York.

LaVardera, L. T.
1985 *Backhoe Trenching at 41HS282, South Hallsville Project, Harrison County, Texas.* North American Consultants, Inc., Dallas.

Lorrain, D.
1967 Animal remains. In: The Gilbert Site, edited by E. B. Jelks. *Bulletin of the Texas Archaeological Society* 37:225–243.

Marietta, K. L., and E. S. Nixon
1984 Vegetation of an Open, Prairie-Like Community in Eastern Texas. *Texas Journal of Science* 36:25–34.

Nixon, E. S., R. L. Ehrhart, S. A. Jasper, J. S. Neck, and J. R. Ward
1983 Woody, Streamside Vegetation of Prairie Creek in East Texas. *Texas Journal of Science* 35:205–213.

Perttula, T. K.
1984 Patterns of Prehistoric Lithic Raw Material Utilization in the Caddoan Area: The Western Gulf Coastal Plain. In: Prehistoric Chert Exploitation—Studies from the Midcontinent, edited by B. M. Butler and E. E. May. Southern Illinois University-Carbondale, Center for Archaeological Investigations, *Occasional Paper* 2:129–148.

Perttula, T. K., and J. E. Bruseth
1983 Early Caddoan Subsistence Strategies, Sabine River Basin, East Texas. *Plains Anthropologist* 28:9–21.

Perttula, T. K., B. D. Skiles, B. C. Yates, and J. E. Bruseth
n.d. Archaeological Investigations at the Burks Site (41WD52), a Late Caddoan Occupation in Wood County,Texas. MS in preparation.

Perttula, T. K., C. J. Crane, and J. E. Bruseth
1983 A Consideration of Caddoan Subsistence. *Southeastern Archaeology* 1:89–102.

Perttula, T. K., B. D. Skiles, M. B. Collins, M. C. Trachte, and F. Valdez, Jr.
1986 "This Everlasting Sand Bed": Cultural Resources Investigations at the Texas Big Sandy Project, Wood and Upshur Counties, Texas. Prewitt and Associates, Inc., *Reports of Investigations* No. 52, Austin.

Perttula, T. K., R. R. Turbeville, and B. D. Skiles
1987 New Thermoluminescence and Radiocarbon Dates from the Upper Sabine River Basin, East Texas. *Texas Archeology* 31(2):7–9.

Reese, M. M.
1931 Report on Miscellaneous Sites in Wood County, Texas. MS on file, Texas Archeological Research Laboratory, Austin.

Reid, K. C., and J. A. Artz
1984 Hunters of the Forest Edge: Culture, Time, and Process in the Little Caney Basin. Oklahoma Archeological Survey, *Studies on Oklahoma's Past* No. 13, Norman.

Rose, J. C.
1984 Bioarchaeology of the Cedar Grove Site. In: Cedar Grove: An Interdisciplinary Investigation of a Late Caddo Farmstead in the Red River Valley, edited by N. L. Trubowitz. *Arkansas Archeological Survey, Research Series* No. 23:227–256. Fayetteville.

Schambach, F. F.
1982 An Outline of Fourche Maline Culture in Southwest Arkansas. In: Arkansas Archeology in Review, edited by N. L. Trubowitz and M. D. Jeter. *Arkansas Archeological Survey, Research Series* No. 15:132–197. Fayetteville.

Scurlock, J. D.
1962 The Culpepper Site, A Late Fulton Aspect Site in Northeast Texas. *Bulletin of the Texas Archeological Society* 32:285–316.

Shafer, H. J.
1981 Archaeological Investigations at the Attaway Site, Henderson County, Texas. *Bulletin of the Texas Archeological Society* 52:147–179.

Skiles, B. D., J. E. Bruseth, and T. K. Perttula
1980 A Synthesis of the Upper Sabine River Basin Culture History. *The Record*, Newsletter of the Dallas Archaeological Society 36(1):1–12.

Stahle, D. W., E. R. Cook, and J. W. C. White
1985 Tree-Ring Dating of Baldcypress and the Potential for Millennia-Long Chronologies in the Southeast. *American Antiquity* 50:796–802.

Stahle, D. W., M. K. Cleaveland, and J. G. Hehr

1985 A 450-Year Drought Reconstruction for Arkansas, United States. *Nature* 316:530–532.

Steponaitis, V. P.

1984 Technological Studies of Prehistoric Pottery from Alabama: Physical Properties and Vessel Function. In: *The Many Dimensions of Pottery: Ceramics in Archaeology and Anthropology,* edited by S. E. Van Der Leeuw and A. C. Pritchard, pp. 79–127. Universiteit van Amsterdam, Amsterdam.

Story, D. A.

1978 Some Comments on Anthropological Studies Concerning the Caddo. In: *Texas Archeology: Essays Honoring R. King Harris,* edited by K. D. House, pp. 46–68. Southern Methodist University Press, Dallas.

1981 An Overview of the Archaeology of East Texas. *Plains Anthropologist* 26:139–156.

1985 Adaptive Strategies of Archaic Cultures of the West Gulf Coastal Plain. In: Prehistoric Food Production in North America, edited by R. I. Ford. University of Michigan, *Anthropological Papers of the Museum of Anthropology,* No. 75:19–56. Ann Arbor.

Story, D. A., and D. Creel

1982 The Cultural Setting. In: The Deshazo Site, Nacogdoches County, Texas, Volume I, edited by D. A. Story, pp. 20–34. *Texas Antiquities Permit Series* No. 7. Texas Antiquities Committee, Austin.

Suhm, D. A., and E. B. Jelks

1962 Handbook of Texas Archeology: Type Descriptions. *Texas Archeological Society Special Publication* No. 1 and *Texas Memorial Museum Special Publication* No. 4.

Suhm, D. A., A. D. Krieger, and E. B Jelks

1954 An Introductory Handbook of Texas Archeology. *Bulletin of the Texas Archeological Society* 25.

Swanton, J. R.

1942 Source Material on the History and Ethnology of the Caddo Indians. *Bureau of American Ethnology Bulletin* 132. Washington, D.C.

Texas Almanac

1986 A. H. Belo Corporation, Dallas.

Thurmond, J. P.

1981 Archeology of the Cypress Creek Drainage Basin, Northeastern Texas and Northwestern Louisiana. Master's thesis, Department of Anthropology, The University of Texas at Austin.

1985 Late Caddoan Social Group Identification and Sociopolitical Organization in the Upper Cypress Basin and its Vicinity, Northeastern Texas. *Bulletin of the Texas Archeological Society* 54:185–200.

Turner, R. L.
1978 The Tuck Carpenter Site and its Relation to Other Sites within the Titus Focus. *Bulletin of the Texas Archeological Society* 49:1–110.

U.S. Army Corps of Engineers, Fort Worth District
1975 Carl L. Estes Lake, Sabine River, Texas: Draft Environmental Statement. U.S. Army Corps of Engineers, Fort Worth District.

Webb, C. H.
1978 Changing Archaeological Methods and Theory in the Trans-Mississippi South. In: *Texas Archeology: Essays Honoring R. King Harris*, edited by K. D. House, pp. 19–45. Southern Methodist University Press, Dallas.

Webb, C. H., F. E. Murphey, W. G. Ellis, and H. R. Green
1969 The Resch Site, 41HS16, Harrison County, Texas. *Bulletin of the Texas Archeological Society* 40:3–106.

Wilson, A. M., and A. T. Jackson
1930 Reconnaissance in Wood County, Texas, August 10 to 24, 1930: Field Notes. MS on file, Texas Archeological Research Laboratory, The University of Texas at Austin.

Yates, B. C.
1986 Vertebrate Faunal Remains. In: French-Indian Interaction at an 18th Century Frontier Post: The Roseborough Lake Site, Bowie County, Texas by Kathleen Gilmore. North Texas State University, Institute of Applied Sciences, *Contributions in Archaeology* No. 3:107–131, Denton.

Archeological Investigations at the Mingo Site, Bandera County, Texas

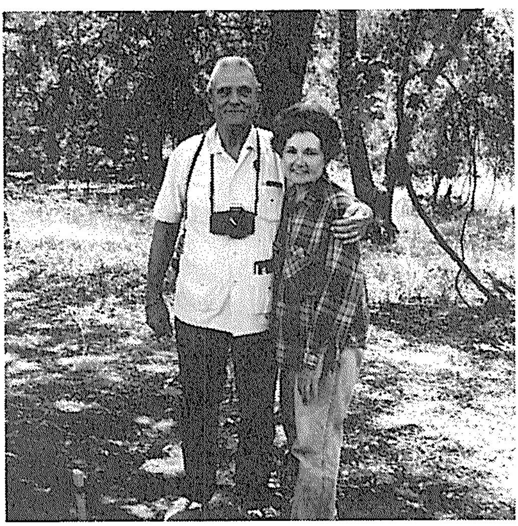
Brett A. Houk and Jon C. Lohse

ABSTRACT

In the summer of 1990, members of the Texas Archeological Society conducted excavations at the Mingo Site (41BN101) in the Sabinal Canyon as part of their summer field school. An initial survey of the site during the previous summer (Maslyk 1990,1993) indicated the presence of Transitional Archaic to Late Prehistoric occupations associated with a small burned rock midden. Excavations confirmed a Late Prehistoric component and provided evidence of an earlier Transitional Archaic component. The artifacts recovered, including Late Prehistoric Sabinal, Edwards, and Scallorn arrowpoints, as well as Transitional Archaic Frio and Fairland dart points, supported the preliminary conclusions.

DEDICATION

This paper is dedicated to the memory of Kenneth Mingo (shown below with Mrs. Mingo in a photograph by the authors). His enthusiasm and daily presence at the excavations enriched the field school experience of everyone working at the Mingo site (41BN101). He will be missed.



INTRODUCTION

During the 1989 Summer Field School of The University of Texas at Austin, Paul Maslyk led a student survey team that recorded and mapped the Mingo site (41BN101), about 2.5 km (1.5 miles) from the junction of Mill Creek and the Sabinal River in southern Bandera County. The team made an inventory of the landowners' surface collection, which included chipped stone artifacts, several Late Prehistoric arrowpoints, and Late to Transitional Archaic dart points. Because there was apparently a Late Prehistoric component associated with the midden, the site, which is a small burned rock midden, was excavated during the 1990 Texas Archeological Society Summer Field School.

Under the direction of Dr. Thomas R. Hester, who was assisted by several graduate students from The University of Texas at Austin, the field school crew excavated several prehistoric and historic sites, and recorded and mapped other sites in their general survey of the valley. Excavations at the Mingo site were directed by the authors, Houk and Lohse; Roy Dickinson, of the Texas Archeological Society, was area supervisor.

ARCHEOLOGICAL BACKGROUND

A great many prehistoric sites have been recorded and excavated in the Sabinal River valley, a large number of which have one or more burned rock middens. For most of these, including the Mingo site, the typology-based Central Texas chronology established by Suhm, Krieger, and Jelks (1954) provided the temporal framework. This chronology has undergone revisions and additions (Suhm and Jelks 1962; Weir 1976; Prewitt 1981; Turner and Hester 1985), including division into categories based, in part, on technological changes made by the indigenous population as they adapted to their environment. These categories are the Paleoindian period, which lasted roughly from 9200 B.C. to 6000 B.C.; the Archaic period, which is further divided into Early (6000 B.C.–2500 B.C.), Middle (2500 B.C.–1000 B.C.), Late (1000 B.C.–300 B.C.), and Transitional (300 B.C.–A.D. 700) phases; the Late Prehistoric period, which lasted from A.D. 700 to A.D. 1600; and, finally, the Historic period, which covers the time since European settlement (Turner and Hester 1985). Prewitt (1974) has called the Transitional Archaic phase the Terminal Archaic.

Within the past several years, many investigations of burned rock middens in Central and South Central Texas have been made (see Prewitt 1991), and some middens excavated in the Sabinal Canyon in Uvalde and Bandera counties have helped clarify the formational processes of these enigmatic cultural features.

In the 1930s to 1940s, The University of Texas at Austin and the Works Progress Administration (WPA) jointly excavated sites in the region, many of which had Late Prehistoric components (files at the Texas Archeological Research Laboratory [TARL]). However, they drew few conclusions from this work, except for Huskey's classification of middens into types A and B, according to size and types of projectile points (Huskey 1935). Type B sites yield Late Prehistoric arrowpoints ("bird points"), and each generally has only one burned rock midden (Huskey 1935). In the vicinity of Sabinal Canyon the Heard Schoolhouse site, 41UV86 (Goode 1991), and the Mingo site fall into this category. Other burned rock midden sites, such as the Blue Hole site (41UV159, Mueggenborg 1991), La Jita (Hester 1971; Huebner 1990), the Kincaid Rockshelter (Collins 1990), and 41BN8, in southern Bandera County (Patterson 1974) have both Late Prehistoric and substantial Archaic associations, and some even have Paleoindian components.

The 1989 Summer Field School of The University of Texas at Austin and the 1990 TAS Field School, both under the direction of Thomas R. Hester, did perhaps the most intensive work on burned rock middens in the area, at the Smith site (41UV132), La Jita (41UV21), and at other sites in the canyon (Hester 1990; Houk and Lohse 1990; Maslyk 1990; Mueggenborg 1990, 1991; Smith and Hageman 1990). Not all the sites excavated were exclusively Late Prehistoric, but the evidence from those that had Late Prehistoric components can add a great deal to the understanding of the formation processes of Huskey's (1935) type B sites (Goode 1991).

GEOGRAPHICAL SETTING

The Mingo site (41BN101) is in southern Bandera County, just east of the Sabinal River (Figure 1). The site is on an alluvial terrace formed by depositional action of the Sabinal River and Mill Creek, one of its major tributaries some 200 meters to the south. The Sabinal River valley is in the southern part of the Edwards Plateau, just north of the Balcones Escarpment (Mear 1953). The erosional action of the Sabinal River has produced a fertile valley that has cut through the Cretaceous limestones that cap the Edwards Plateau and into limestones of the Glen Rose Formation (Bureau of Economic Geology 1982; Mear 1953; Hensell et al. 1977). In some places, the hills rise some 60 to 90 meters (200 to 300 feet) above the Sabinal (Mear 1953).

This part of the Edwards Plateau is a well-dissected plateau where narrow ridges and small mesas—remnants of the original plateau surface—remain (Hensell et al. 1977). This diverse geographic region supports a wide variety of flora and fauna. Blair (1950) includes the Sabinal River valley in the Balconian biotic province, in which Mexican cedar (or juniper), Texas oak, and stunted live oak trees abound. Other less populous species are interspersed in the generally thick undergrowth of the region, which includes prickly pear cactus, pecan, elm, and mesquite trees, and native grasses such as side-oats grama, hairy grama, Indian grass, buffalo grass, and several varieties of wild rye (Maslyk 1993; Van Auken et al. 1981). Some of the animals seen near the Mingo site are white-tailed deer, raccoons, opossums, jackrabbits, and many birds, rodents, lizards, and snakes.

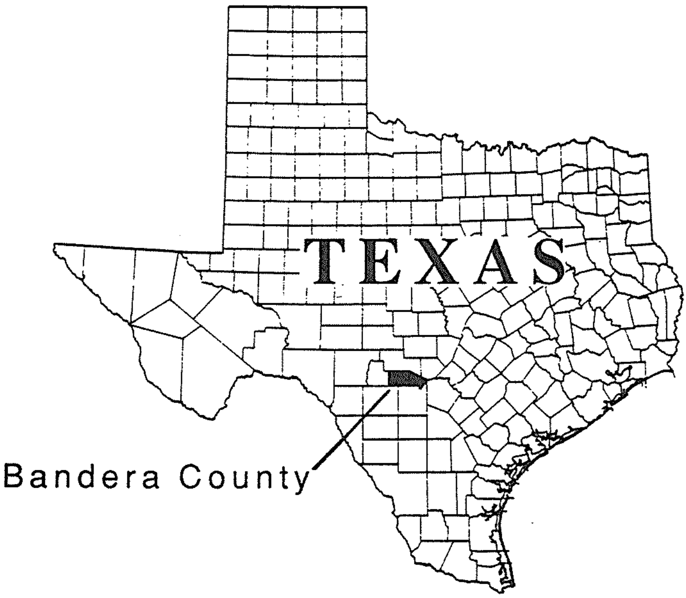


Figure 1. Map of Texas showing the location of Bandera County. The Mingo site is in the southwest corner of the county.

THE SITE

The surface of most of the Mingo site area (Figure 2) has been heavily disturbed by the bulldozing of small cedar and oak trees and by the burning of the cleared underbrush. The extent of subsurface disturbance resulting from these activities was not precisely determined. Furthermore, the earth from a 10-to-30-cm-deep trench excavated by a bulldozer before our work began was deposited in a single mound, some 2 to 3 meters in diameter and 1.5 meters high (Figure 3). As a result of this clearing, the plants in the immediate vicinity consist of only a few stunted oaks and junipers, a single black walnut tree, and a carpet of native grasses.

Another probable contribution to disturbance at the site is a shallow seasonal wash that runs along the west boundary of the site and drains into Mill Creek (Figure 4). According to the landowners, this intermittent gully carries water only every three to four years, but may have been responsible for surface erosion of the site since its abandonment.

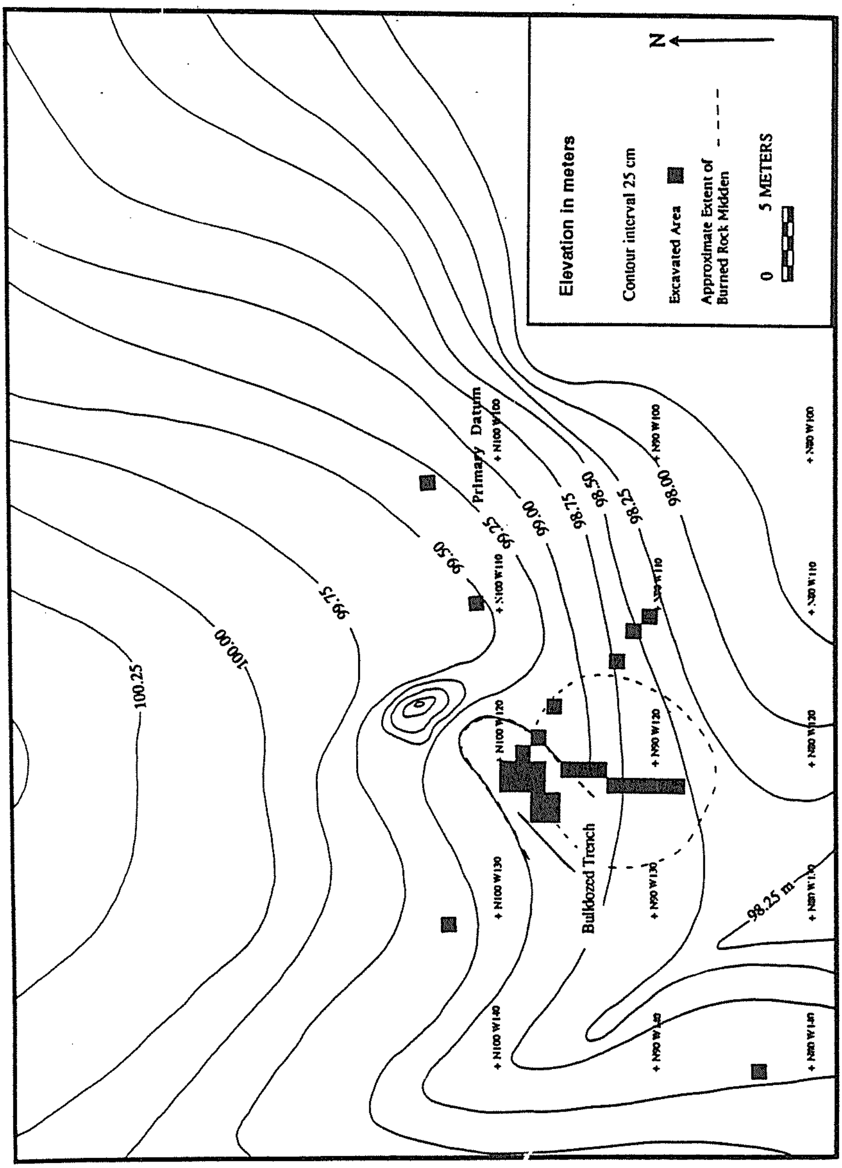


Figure 2. Topographic map of the Mingo site showing excavation units and the approximate extent of the burned rock midden.

Figure 3. Photograph showing the bulldozed trench (foreground) and mound at the Mingo site, with (from left to right) Norma Hoffrichter, Ken Mingo, Jon Lohse, and Brett Houk in the foreground (photograph by Kurt Harrell).

EXCAVATION METHODOLOGY

Before the start of the TAS Field School in June1990, a crew of students from The University of Texas at Austin mapped the site, using a transit, and laid out north-south and east-west base lines for excavation units. The first units laid out (Figure 5) were intended to determine the extent of the site and the midden and to identify, if possible, the transitional zone between its Late Archaic and Late Prehistoric components. All subsequent units were opened in accordance with this excavation strategy.

A 2-by-2-meter grid was laid out; units were identified by the coordinates representing the distance of the southeast corner of the unit from the datum point (N100 W100). Each 2-meter unit was subdivided into quadrants, designated according to location in the unit, e.g., N100/W100/NW, which allowed the excavators to maintain horizontal control. Further control in the units was assured by measuring the distance of each significant artifact or feature from the north and east walls of the unit, thereby establishing coordinates that indicated the exact horizontal location of the artifact or feature in relation to the datum point.

Members of the TAS Field School arrived at the site several days later and started excavating units in arbitrary 10-cm levels, except for a 1-by-4-meter test

Figure 4. View looking south down the small wash west of the midden (photograph by Brett A. Houk).

trench to the south, which was excavated according to natural stratigraphy in order to determine the extent of the burned rock deposit. In order to maintain vertical control, for each 2-by-2-meter unit a starting elevation was established, which was tied into the site's contour map by transit. The elevations of the unit floors, as well as all significant artifacts and features, were measured from the starting elevation of each unit. In this way it was possible to compare absolute vertical proveniences of units regardless of their starting elevations.

All material excavated from the units was passed through a quarter-inch screen; chert debitage and snails were saved and bagged according to unit and level. Burned rocks were saved and weighed when work was finished in the level where they were found. Formal artifacts such as projectile points, and pieces of chipped or ground stone that showed signs of use, were cataloged separately and assigned unique item numbers (see "Artifacts," below).

STRUCTURE OF THE SITE

Excavation and surface inspection have shown that the burned rock midden is small (Figure 2) and has less burned rock than have larger middens such as the Blue Hole site (Mueggenborg 1991). In N92/W120/SW the midden reached its maximum

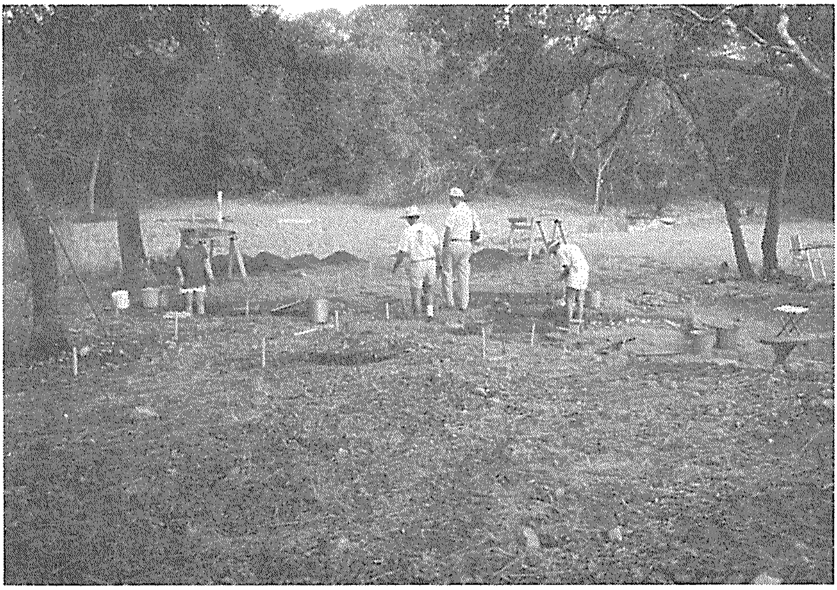


Figure 5. Photograph of the Mingo site showing excavation units. Left to right, Lynda Cockburn, Brett A. Houk, Thomas R. Hester, and Norma Hoffrichter (photograph by Kurt Harrell).

thickness of 50 cm, with a burned rock density of nearly 600 kg/m^3. A 4-by-1-meter trench was extended southward from this unit to determine the southern limits and thickness of the burned rock deposit. The trench was excavated in natural levels; Level 1 consisted of humus, Level 2 consisted of burned rock, and Level 3, directly overlying the bedrock, consisted of brown clay. The midden's thickness decreased south of N92/W120/SW to about 30 cm. Two Edwards points and one Scallorn point were recovered from the burned rock level of the trench; no artifacts were recovered from Level 3.

The burned rock in units north of the N92 line and west of the W120 line rested on bedrock, with no intervening layer of clay. In the bulldozed trench, the burned rock densities of all except the westernmost units were extremely low (see below). The matrix in the trench was a hard-packed, sandy loam—directly above the limestone bedrock—containing cultural material throughout.

In summary, the burned rock midden at the Mingo site is about 15 m in diameter and only as much as 50 cm deep. The original northernmost extent of the midden is unknown because 10 to 30 cm of material was stripped off in the bulldozed trench. It is clear from the profiles that the midden did not extend to its north edge of the trench. Diagnostic arrowpoints were found in the burned rock layer, but no internal stratification could be seen in the midden.

FEATURES

Two features were noted below the bulldozed trench during the excavations; no features were found in the midden.

Feature 1: From Level 3 of N98/W120/SE and N96/W120/NE, consisting of two grinding slabs (Unique Items [UIs] 134 and 135). The largest (UI 135) was centered in N98/W120/SE, Level 3 and the other (UI 134) lay in Level 3 on the border between N98/W120/SE and NE (Figure 6). UI 134 is a roughly circular limestone slab with one smooth face—presumably the result of grinding—and a pecked circular depression on the other face. Incised lines in this depression are of unknown origin. A Fairland dart point (UI 132) was directly beneath this grinding slab.

Feature 2: N96/W122/SW, Level 1. Excavators noted an unusually high concentration of chert debitage in the first 10 to 20 cm of this unit. Additionally, two flake cores were recovered in situ, and two others were found on the screen. Eight of the 13 cores recovered from the site were found in the 2-meter-square unit N96/W122. The highest debitage count (477 pieces) came from all three levels of N96/W122/SW and the second highest total debitage weight (1488.9 grams) came from these levels. The highest debitage weight was recovered from N96/W122/SE.

These totals are somewhat misleading because they did not come from equal amounts of excavated material. Conversion of debitage counts and weights to densities for each unit makes a less biased comparison possible. The highest debitage count density is 2,320 pieces/meter^3 and the highest debitage weight density is 12,425 g/meter^3. Both are from N96/W122/NE. The southwest quadrant of N96/W122, where the feature was recognized during excavations, has the second highest debitage count density at 1,590 pieces/meter^3; the second highest debitage weight density (5,279 g/meter^3) is from the northeast quadrant of the same 2-meter unit.

In summary, Feature 2 contains a large amount of chert debitage and many flake cores. The feature probably was a flint-knapping location centered in the area of N96/W122. Evidence for this is found in the comparatively high densities of chert debitage across the northeast, southeast, and southwest quadrants, and in the number of cores found in the northwest (three) and the southwest (five) quadrants of the unit. When debitage count density is correlated with distance from the activity area, a negative correlation (r=-.65) results, indicating an inverse relationship between debitage density and distance from the activity area. Distance from the feature was calculated by measuring from the grid point N97/W123 to the center of each excavation unit in a 14-meter radius.

MATERIAL REMAINS

The materials described here are chipped and ground stone artifacts (called Unique Items [UI]), chert debitage, land snails, charcoal, bone, and fossilized marine shell. As stated earlier, burned rock was not collected for further study, but was weighed during excavation.

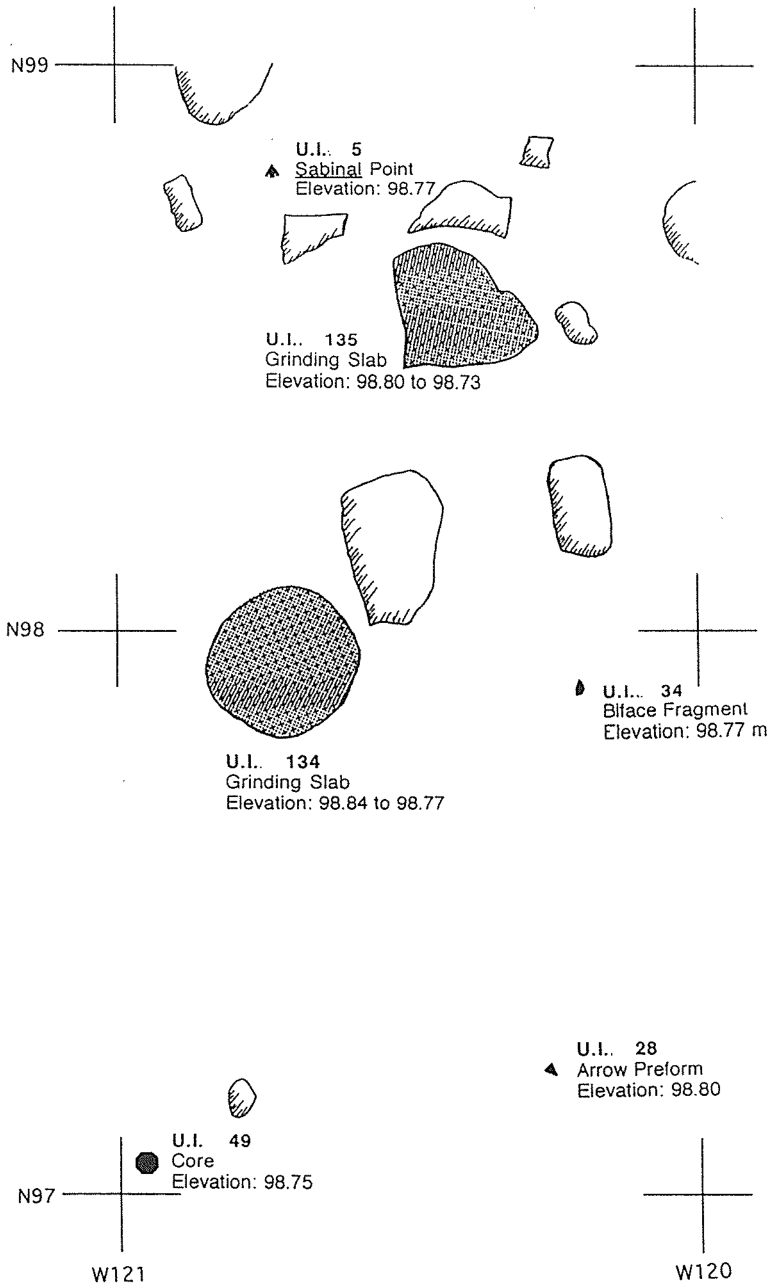


Figure 6. Map of units N98/W120/SE (above) and N96/W120/NE (below), Level 3 (98.80–98.70 cm) of the Mingo site (41BN101), showing Feature 1—two grinding slabs (UIs 134 and 135). Unlabeled objects are burned rocks.

Artifacts

Both chipped stone and ground stone artifacts were recovered at 41BN101. Based on form and, when understood, function, these categories can be further subdivided, and each category and its subdivisions is discussed below. All bifacial UIs have been identified and measured (Table 1).

Chipped Stone Artifacts

All of the chipped stone artifacts from the Mingo site are made of chert. The quality of the chert is highly variable, ranging from very fine to coarse grained. Each chipped stone artifact was measured along the following dimensions (when present): Length (L); Maximum Width (MW); Maximum Thickness (MT); Stem Length (SL); Stem Width (SW); and Neck Width (NW); each specimen was also weighed. All measurements are in millimeters, and all weights are in grams. For each subcategory or type, the range of variation in each dimension is shown. Numbers in parentheses directly following a dimension abbreviation (for example, L(3)) indicate the number of specimens used to determine the range. Numbers appear in parentheses only when one or more specimens were excluded due to incomplete measurements. Dimensions in parentheses—L:10.00–(20.00)—indicate that an incomplete measurement from a damaged specimen was used to establish the range.

Bifaces

Chipped stone artifacts that have had flakes removed from both faces are classified as bifaces. This category is further subdivided into arrowpoints, dart points, and other bifaces.

Arrowpoints (45 specimens): The largest category of artifacts recovered.

Edwards (6 specimens: UIs 15, 36, 70, 87, 104, and 142; Figure 7, a, b): All six of these specimens are essentially complete. The lateral edges range from convex to slightly concave. All six specimens have deeply divided stems, curving downward on all but UI 36. The stem of UI 36 curves slightly upward. The stem of UI 104 is nearly 2 mm wider than the blade of the point, suggesting that the point was possibly reworked while still hafted. Two other specimens (UIs 15 and 70) also show evidence of having been reworked. Although the Edwards arrowpoints are generally among the largest, the specimens from the Mingo site are small when compared to the range described by Sollberger (1967) when he defined the type. The Mingo specimens are closely similar in size to the Edwards points recovered at La Jita by Hester (1971).

Dimensions: L(3): 21–(31.75); MW: 12.85–(19.65); MT: 2.75–4.40; SL(5): 3.80–7.20; SW(1):16.75; NW: 5.75–8.75.

Sabinal (2 specimens: UIs 5 and 120; Figure 7, d, e): The Sabinal arrowpoint was first proposed as a new local type by Hester (1971) at the La Jita site.

Table 1. Bifacial Unique Items

Unique Item		Maximum	Maximum	Maximum	Stem	Stem	Neck	
No.	Description	Length	Width	Thickness	Length	Width	Width	Weight
1	Frio point	26.85	11.50	5.20	5.85	14.70	11.10	2.1
2	Unidentified arrowpoint (distal)	(27.95)	(13.80)	2.90	(5.15)	(5.85)	3.65	(0.8)
3	Scallorn point (proximal)	(26.10)	14.15	3.55	5.70	11.25	5.70	(1.3)
5	Sabinal point	(19.80)	21.65	2.95	5.85	6.90	5.60	(1.0)
6	Unidentified arrowpoint (medial)	(18.95)	(11.85)	(3.65)				(0.8)
8	*Preform, arrowpoint*	32.10	18.15	3.70		7.80		(2.2)
9	Unidentified arrowpoint (distal)	(28.50)	(11.75)	3.40	(4.30)	(5.15)	4.75	(0.9)
10	Preform, arrowpoint	30.75	25.65	7.75				4.4
12	Angostura point, reworked	(47.05)	21.25	6.90		7.80	8.95	(7.8)
14	Unidentified arrowpoint (distal)	(17.10)	(12.55)	2.60	(3.30)	(4.80)	4.55	(0.5)
15	Edwards point	(17.20)	(16.45)	3.30	(5.90)	(1.20)	8.75	(0.7)
16	Biface fragment (distal)	(45.50)	(44.00)	11.90				(20.4)
17	Biface fragment (medial)	(11.95)	20.60	5.70				(2.7)
19	Stemmed dart point (proximal)	(22.70)	18.10	5.20	7.50	12.70	11.30	(2.4)
22	Preform, arrowpoint (proximal)	(21.95)	(20.25)	(2.90)				(2.2)
24	*Frio point*	(36.70)	17.15	5.95	7.30	(16.20)	12.60	(3.6)
25	Unidentified arrowpoint (distal)	(14.20)	(12.70)	(3.10)				(0.3)
27	Scallorn point	(20.55)	(14.00)	3.00	5.65	(1.79)	5.30	(0.8)
28	Preform, arrowpoint	35.50	17.10	3.45				1.6
29	Biface	49.10	24.35	6.80	13.55	13.85	19.75	9.0

30	Preform, arrowpoint	27.50	12.75	3.70		12.70		1.1
31	Unidentified arrowpoint (distal)	(14.90)	(10.60)	(3.10)				(0.4)
33	Preform, arrowpoint	(35.20)	(23.30)	8.30				(4.5)
34	Biface fragment (proximal)	(30.95)	(30.90)	(8.60)				(8.7)
36	Edwards point	(19.10)	12.85	2.75	3.80	(9.85)	6.10	(0.6)
37	Scallorn point (proximal)	(18.95)	16.30	3.40	5.95	7.50	4.75	(0.8)
38	Biface fragment (medial)	(35.50)	(25.75)	(7.20)				(18.0)
39	Preform, arrowpoint	(25.20)	(18.50)	(4.30)				(1.8)
40	Unidentified arrowpoint (medial)	(13.05)	(9.70)	(3.35)				(0.3)
41	Unidentified arrowpoint (distal)	(13.30)	(9.10)	(2.80)				(0.3)
45	Unidentified arrowpoint (distal)	(23.90)	(10.70)	2.20			3.60	(0.4)
47	*Scallorn point*	22.20	(11.65)	3.90	6.35	(7.10)	4.85	(0.8)
51	Scallorn point	30.50	13.70	4.10	6.70	8.85	5.60	1.1
52	Unidentified arrowpoint (medial)	(16.10)	(14.20)	3.25	(5.20)	(5.95)	5.15	(0.6)
53	Biface fragment	(35.85)	(46.10)	11.10				(22.6)
55	Unidentified arrowpoint (distal)	(18.15)	(11.10)	(3.10)				(0.5)
56	Biface	52.90	30.10	11.10				15.5
57	Biface fragment	(36.05)	(43.80)	(12.45)				(22.4)
58	Scallorn point	23.15	(12.30)	2.20	5.90	(6.50)	4.55	(0.4)
59	Biface	52.30	29.50	18.00				12.0
61	Preform, arrowpoint (proximal)	(17.40)	(21.50)	3.42				(1.7)
65	*Biface fragment (medial)*	(39.60)	(27.15)	(7.00)				(7.4)
67	*Unidentified arrowpoint (distal)*	(16.10)	(10.15)	(2.15)				(0.3)
69	Scallorn point (proximal)	(15.10)	18.80	2.65	5.30	7.75	6.40	(0.7)
70	Edwards point	21.00	14.45	3.90	5.75	(10.90)	7.20	(0.7)

Table 1. — Continued

Unique Item		Maximum	Maximum	Maximum	Stem	Stem	Neck	
No.	Description	Length	Width	Thickness	Length	Width	Width	Weight
71	Scallorn point (proximal)	(14.15)	(15.20)	2.65	3.60	5.50	5.05	(0.4)
73	Unidentified arrowpoint (distal)	(17.25)	(8.10)	(2.00)				(0.3]
75	Scallorn point	(23.30)	15.00	3.85	5.75	11.10	6.90	(1.2)
76	Biface fragment (distal)	(71.85)	(36.80)	17.10	(2.75)	(16.85)	(23.20)	(16.7)
77	Biface	(23.25)	17.35	3.10				(1.2)
79	Scallorn point (proximal)	(13.00)	(14.50)	2.80	4.40	7.30	6.50	(0.4)
81	Preform, arrowpoint	(33.80)	16.85	4.80	1.15	10.35	10.35	(2.1)
83	Preform, arrow	32.30	23.83	6.15		21.45		2.9
86	Frio point	28.80	21.30	4.80	6.35	26.10	21.30	3.7
87	Edwards point	(31.75)	(19.65)	3.30	6.35	(7.30)	5.75	(0.9)
91	Biface	60.90	38.65	16.55				34.3
92	Preform, arrowpoint	30.50	(20.40)	3.25				(1.6)
93	Biface fragment (medial)	(30.50)	(27.30)	(7.05)				(4.9)
94	Unidentified arrowpoint (distal)	(28.00)	18.60	3.35	(0.90)	(5.20)	5.20	(0.8)
95	Biface	68.20	32.90	14.05				24.8
97	Biface fragment (distal)	(60.45)	(42.45)	(8.65)				(19.6)
98	Biface fragment (distal)	(31.20)	(23.45)	(4.65)				(3.5)
101	*Biface fragment (distal)*	73.05	34.70	15.55				29.5
103	Preform, arrowpoint	39.50	23.00	6.60				5.7
104	Edwards point	(19.90)	14.45	3.10	7.00	16.75	6.05	(0.6)

116	Preform, arrowpoint (proximal)	(17.90)	20.50	3.50				(1.3)
119	Preform, arrowpoint (proximal)	(26.55)	15.20	3.70				(1.5)
120	Sabinal point	(30.50)	(16.55)	3.20	6.20	6.50	5.10	(1.2)
121	*Biface fragment (medial)*	(45.45)	(36.35)	8.75				(13.9)
122	Scallorn point	29.00	13.30	4.40	7.25	12.55	10.30	1.5
125	Unidentified arrowpoint (distal)	(22.05)	(11.95)	(2.75)				(0.6)
126	Preform, arrowpoint (proximal)	(23.25)	23.20	(5.30)				(3.4)
128	Unidentified arrowpoint	29.90	10.95	3.20	3.25	2.40	3.35	0.9
129	Preform, arrowpoint	(18.90)	17.80	3.90				(1.0)
130	Scallorn point	(14.70)	(13.25)	2.35	4.85	(3.85)	5.15	(0.4)
132	Fairland point	(35.65)	24.15	6.45	9.20	19.50	14.05	(5.2)
133	Preform, arrowpoint (proximal)	(19.55)	16.75	4.45				(1.5)
136	Biface fragment (distal)	40.00	32.55	5.75				7.5
139	Unidentified arrowpoint	(22.20)	(12.10)	3.40	(4.45)	(6.15)	6.80	(0.7)
140	Unidentified arrowpoint (distal)	(15.00)	(9.35)	(3.70)				(0.5)
142	Edwards point	29.60	14.75	4.40	7.20	(8.20)	6.00	(1.1)
143	Scallorn point	34.90	10.05	3.30	4.65	(9.15)	4.40	(0.9)
144	Unidentified arrowpoint (medial)	(19.25)	(15.40)	2.80		(6.75)	(6.75)	(0.7)
146	Scallorn point (proximal)	(25.70)	13.50	3.40	8.20	12.05	4.50	(1.0)
148	Biface fragment (distal)	(37.10)	(28.80)	(4.80)				(4.1)
152	Preform, arrowpoint	30.60	(19.05)	4.70				(2.4)
158	Unidentified arrowpoint (distal)	(20.85)	(14.18)	(5.00)				(1.2)
159	Biface fragment (distal)	(16.15)	(17.75)	(4.35)				(1.0)
160	Preform, arrowpoint (proximal)	(20.90)	21.10	4.40				(2.2)
161	Preform, arrowpoint (proximal)	(22.05)	16.80	3.00				(2.6)

Table 1. — Continued

Unique Item		Maximum	Maximum	Maximum	Stem	Stem	Neck	
No.	Description	Length	Width	Thickness	Length	Width	Width	Weight
162	Unidentified arrowpoint (distal)	(14.60)	(8.90)	(2.20)				(0.3)
163	Preform, arrowpoint (proximal)	(23.90)	21.40	5.90				(2.8)
164	Unidentified arrowpoint (distal)	(13.40)	(6.15)	(2.20)				(0.2)
166	Scallorn point (proximal)	(9.16)	(17.04)	3.41	(9.16)	17.04		(0.50)
167	Biface fragment (distal)	(20.83)	(22.60)	5.00				(1.60)

Notes: Burned artifacts in italics.
Incomplete measurements in parentheses.

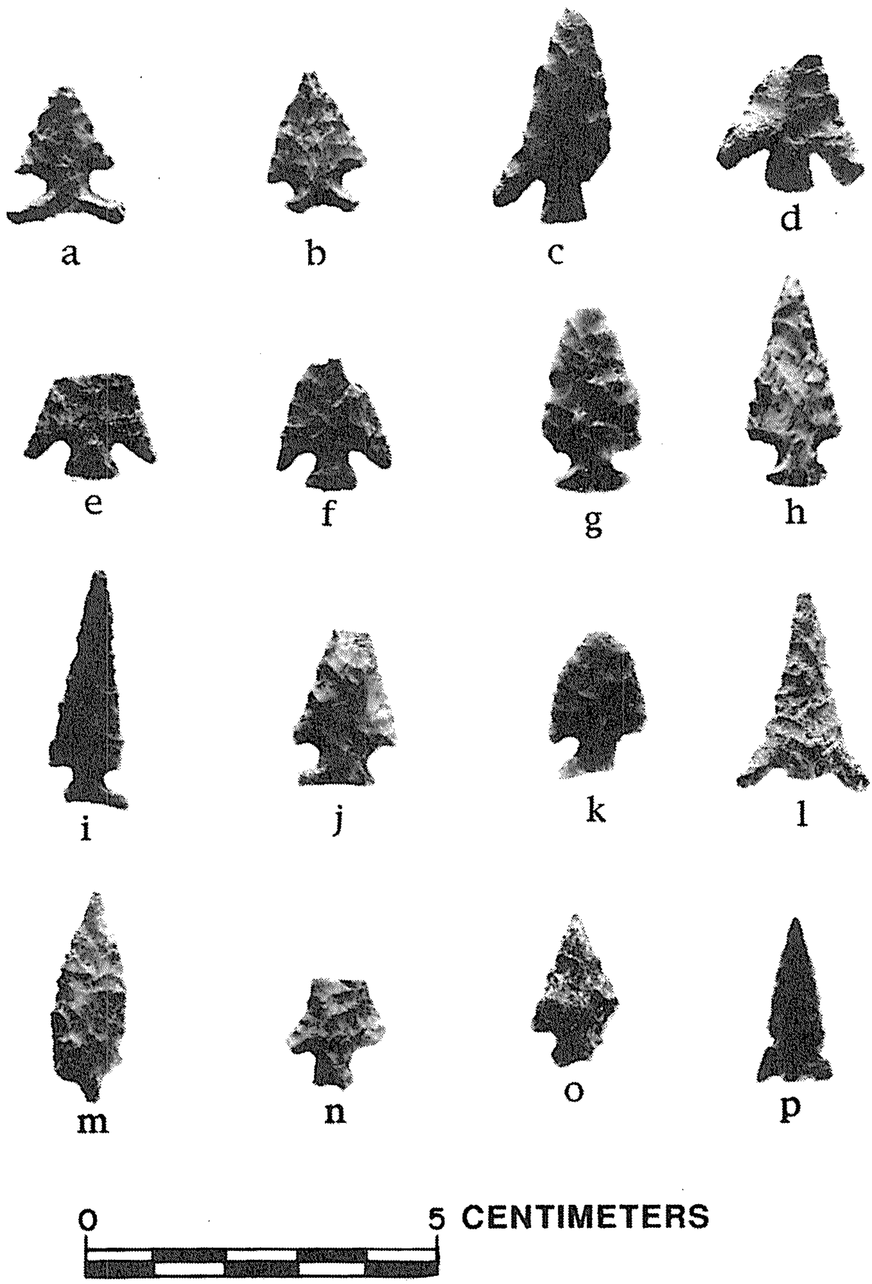


Figure 7. Arrowpoints: a, b, Edwards; c, d, Sabinal; e-k, Scallorn; 1-p, Miscellaneous (photographed by Dan Julien).

Sabinal points have since been recovered at 41BN33, the Rainey site (Henderson n.d.), a stratified sinkhole 3 km northeast of the Mingo site. The two specimens from the Mingo site are triangular with concave lateral edges and heavy, outward-flaring barbs that curve slightly upward. Neither of these specimens is complete; both are proximal fragments, and one (UI 120) has a broken shoulder barb. UI 5 has squared-off, bulbous barbs, but the one barb on UI 120 tapers to a point; both have expanding stems. The base of UI 5 is convex, but UI 120 has a straight base. The longest specimen (UI 120) is 30.50 mm long. The specimen (UI 5) with both barbs intact is 21.65 mm wide. The other dimensions are complete for each specimen.

Dimensions, MT: 2.95–3.20; SL: 5.85–6.20; SW: 6.50–6.90; NW: 5.10–5.60.

Scallorn (15 specimens: UIs 3, 27, 37, 47, 51, 58, 69, 71, 75, 79, 122, 130, 143, 146, and 166; Figure 7, i–k): Eight of these are essentially complete specimens. Seven specimens are proximal fragments. The lateral edges of the essentially complete points range from slightly concave to slightly convex. The stems are corner-notched, and most specimens have well-barbed shoulders. Three specimens (UIs 58, 143, and 146) have serrated edges. The corner-notched stems are all expanding. The bases vary from slightly convex to moderately concave (UI 143). UI 146 is only slightly worked on one edge. UI 122 is a crude, wide-stemmed specimen that may not be complete. One specimen (UI 47) is burned. These specimens closely resemble the Scallorn points found at 41BL104 and described by Sorrow, Shafer, and Ross (1967).

Dimensions, L(5): 22.20–34.90; MW(8): 10.05–18.80; MT: 2.20–4.40; SL: 3.60–(9.16); SW(10): 5.50–17.04; NW: 4.40–10.30. WT(2): 1.1–1.5.

Miscellaneous Arrowpoints (10 specimens: UIs 2, 9, 14, 25, 45, 52, 94, 128, 139, and 144; Figure 7, l–p): These specimens have damaged stems, making it impossible to accurately classify them into any of the above categories. Two of these arrowpoints show evidence of having been reworked after their stems were broken. UI 45 has been side notched above the original shoulders, and UI 128 has been reworked at its base to form a narrow contracting stem. Two specimens are serrated (UIs 9 and 94). Additionally, UI 94 has heavy, outwardly flaring barbs reminiscent of Sabinal points.

Dimensions, L(5): (17.10)–29.90; MW(3): (23.90)–(28.00); MT(7): 2.20–3.40.

Arrowpoint Fragments (12 specimens): Two medial arrowpoint fragments, one a partial stem and shoulder fragment (UI 40), were recovered. Ten distal arrowpoint fragments were also recovered, all with straight to slightly convex lateral edges.

Arrowpoint Preforms (21 specimens): Most of these specimens are similar to the small "overall retouch bifaces" described by Lukowski (1987). They are subdivided according to form.

Triangular (12 specimens: UIs 28, 30, 61, 81, 83, 92, 116, 119, 126, 133, 161, and 163; Figure 8, a–g): Five of these are substantially complete; seven are proximal fragments. The bases and lateral edges are straight to slightly convex, and most—except for UI 119, which has been retouched only along the edges on one side—have been substantially reworked by pressure flaking on both surfaces. Three specimens (UIs 28, 30, and 81) closely resemble what others have called Fresno points (Highley et al. 1978). Turner and Hester (1985:174) believe that many points previously called Fresno may actually be preforms.

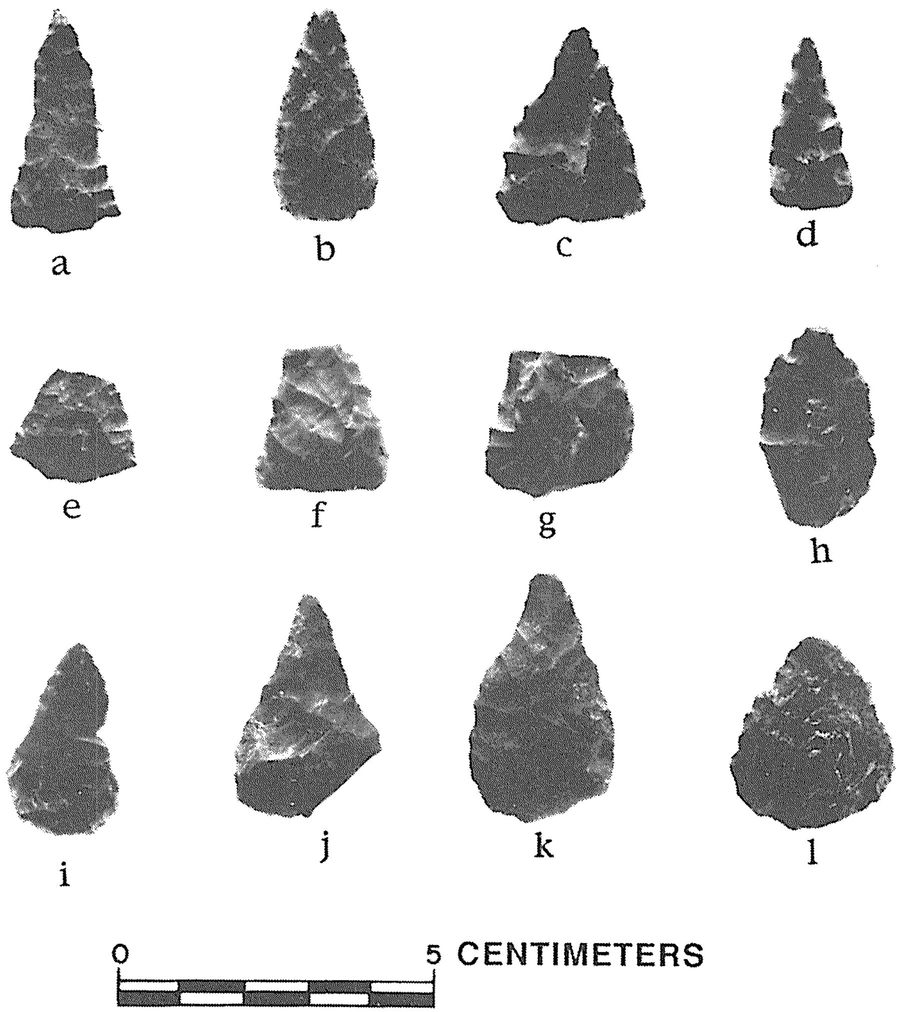


Figure 8. Arrowpoint preforms: a–g, Triangular; h, Ovate; i–l, Pointed Ovate (photographed by Dan Julien).

Dimensions, L(5): 27.50–35.50; MW: 15.20–23.85; MT: 3.00–6.15; WT(2): 1.1–1.6.

Ovate (1 specimen: UI 8; Figure 8, h): This specimen is badly burned and pot-lidded. The lateral edges are convex and there are no distinct corners, so the base cannot be defined.

Dimensions: L: 32.10; MW: 18.15; MT: 3.70; WT: 2.2.

Pointed Ovate (4 specimens: UI s 10, 33, 103, and 152; Figure 8, i–l): These four specimens have convex bases; their lateral edges vary from convex to concave and form points at their distal ends.

Dimensions, L: 30.60–39.50; MW(3): 23.00–25.65; MT: 4.70–7.75; WT(2): 4.4–5.7.

Miscellaneous Preform Fragments (5 specimens: UIs 22, 39, 129, 160, and 167): These five fragments do not fit into the previously described categories, so they are described individually:

UI 22: A medial fragment with only part of its base; one side has only minor retouch.

UI 39: This distal fragment of poor quality material is also only slightly worked on one face. Its lateral edges are slightly convex.

UI 129: A slightly rounded, very small, roughly triangular specimen that may be a reworked arrowpoint fragment.

UI 160: A proximal fragment with a convex base that has been retouched on one face to form a steep angle.

UI 167: A distal biface fragment, classified as an arrowpoint preform because of its small size. Its lateral edges are convex and meet to form a point.

Dart Points (6 specimens)

Angostura (1 specimen: UI 12; Figure 9, f): This, the only Late Paleoindian point from the site, is a proximal fragment, heavily patinated, with a straight base and well-ground basal edges extending 19 mm up the edges. The point has been recurved at the distal end, and the tip has been snapped off. The point was possibly reworked into a drill and then broken (Thomas R. Hester, personal communication, October 1991),

Dimensions, L: (47.05); MW: 21.25; MT: 6.90; WT: (7.8).

Fairland (1 specimen: UI 132; Figure 9, d): A proximal dart fragment with large, shallow side notches, a deeply concave base, and slightly convex lateral edges. This specimen is similar to the Frio points recovered from the site.

Dimensions, L: (36.65); MW: 24.15; MT: 6.45; SL: 9.20; SW: 19.50; NW: 14.05; WT: (5.2).

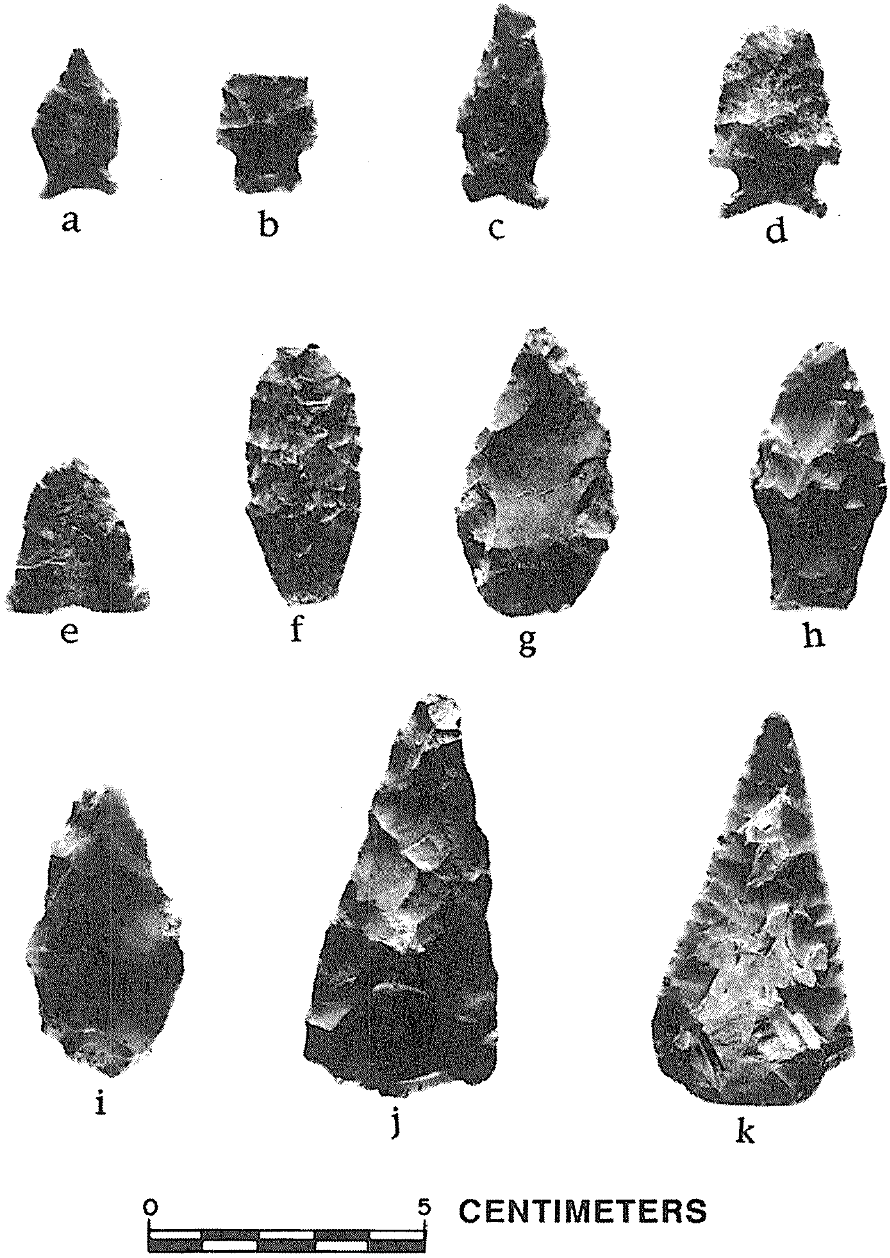


Figure 9. Dart points and bifaces: a, c, e, Frio; b, Stemmed Dart Point; d, Fairland; f, Reworked Angostura; g, i, Large Pointed Ovate; h, Miscellaneous Stemmed Biface; j, k, Large Triangular (photograph by Dan Julien).

Frio (3 specimens: UIs 1, 24, and 86; Figure 9, a, c, e): All of these specimens have been heavily reworked and have a great deal of variation in their bases. All are side notched, but UI 86 has been substantially reworked so the stem is 4.80 mm wider than the blade. The lateral edges of UIs No 1 and 24 are concave, forming a point on UI 1. UI 24 has been badly heat fractured, and the tip is missing. The lateral edges of heavily patinated UI 86 are convex, and the distal end is rounded.

Dimensions, L: 26.85–(36.70); MW: 11.50–21.30; MT: 4.80–5.95; SL: 5.85–7.30; SW(2): 14.70–26.10; NW: 11.10–21.30; WT(2): 2.1–3.7.

Unclassified Dart Point (1 specimen: UI 19; Figure 9, b): The final dart point is a proximal fragment of an expanding stemmed dart point with a slightly expanding stem, slightly convex base, weak shoulders, and straight lateral edges—it does not fit into any previously described categories for the region, although it is similar to the Darl type (Suhm and Jelks 1962; Wesolowsky et al. 1976).

Dimensions, L: (22.70); MW: 18.10; MT: 5.20; SL: 7.50; SW: 12.70; NW: 11.30.

Other Bifaces (19 specimens)

The remaining bifacial specimens, grouped here according to form, cannot be classified into previously described artifact or tool types. Where forms are similar to those used by Lukowski (1987), his names have been used.

Large Ovates (1 specimen: UI 16): An ovate biface with convex lateral edges and base, a section of which is broken off.

Dimensions, L: (45.50); MW: (44.00); MT: 11.90.

Large, Pointed Ovates (4 specimens: UIs 34, 56, 59, and 91; Figure 9, g, i). Three of these specimens are complete, and one (UI 34) is a proximal fragment. All four specimens have convex lateral edges and bases; UI 56 is plano-convex in cross section, and the other three specimens are biconvex. All four specimens are relatively crude; UI 91 has the least retouch, and UI 34 has the most. The ventral side of UI 59 is only partially retouched, and the dorsal face of UI 91 is almost completely covered by cortex. The first three specimens may be early stage arrowpoint preforms (Thomas R. Hester, personal communication). These three complete specimens range in length from 1.58 to 1.77 times their widths.

Dimensions, L: 52.30–60.90; MW: 29.50–38.65; MT: 11.10–18.00; WT: 12.0–34.3.

Large Triangular (3 specimens: UIs 76, 101, and 136; Figure 9, j, k): All of these specimens have convex bases. UI 76, which has slightly convex lateral edges and is patinated, is probably a reworked dart point. Flake scars over the patination suggest that the piece has been reworked. UI 101 has slightly convex edges with numerous step and hinge fractures along their margins. UI 136 is a much smaller specimen, exhibiting only minor retouching on its ventral face and straight to slightly concave lateral edges. UI 101 may be a dart point preform; UI 136 may be an early stage arrowpoint preform.

Dimensions, L: 40.00–73.05; MW: 32.55–34.70; MT: 5.75–15.55; WT: 7.5–29.5.

Miscellaneous Bifaces (3 specimens: UIs 29, 77, and 95; Figure 9, h): These specimens do not fit into the previously described categories. UI 29 is a stemmed biface that has been reworked, as evidenced by new flake scars over patination. It has a contracting stem, a straight base, and convex lateral edges, and most likely is a reworked dart point. UIs 77 and 95 are both secondary flakes, retaining cortex on their bifacially retouched ventral faces.

Miscellaneous Biface Fragments (11 specimens): These specimens, which cannot be placed in any of the previously described categories, are subdivided into three categories: distal, medial, and unknown. No proximal fragments were recovered.

Distal Fragments (4 specimens: UIs 97, 98, 148, and 159): All have convex lateral edges. UI 98 has been burned, and one face of UI 148 is lightly patinated.

Medial Fragments (5 specimens: UIs 17, 38, 65, 93, and 121): Two (UIs 65 and 121) have been burned, and UI 93 appears to have been reworked at the distal end, possibly into a drill, then broken by a snap fracture.

Amorphous Fragments (2 specimens: UIs 53 and 57): These could be classified as either proximal or distal fragments. UI 53 is an oval fragment that was broken by end shock. It is characterized by generally crude percussion flaking with some fine retouch and microflaking along its edges, except for the one formed by the fracture. Both UIs 53 and 57 were apparently broken by end shock, but UI No 57 has no fine retouch along its edges.

Unifaces.

Five specimens with retouch on only one face were recovered from the Mingo site.

Utilized Flake-Blade (1 specimen: UI 21): A secondary flake that is more than twice as long as it is wide. The lateral margins, except for several centimeters that still have cortex, have been modified by use-wear.

Dimensions, L: 44.50; MW: 21.55; MT: 5.95; WT: 6.3.

Serrated Flake (1 specimen: UI 62): A triangular flake fragment serrated along one lateral edge.

Dimensions, L: (22.05); MW: (19.65); MT: (8.80); WT: (1.9).

Utilized and Modified Flakes

The chipped stone assemblage at 41BN101 includes chert flakes that have either been utilized or have had some sort of minor retouch or modification along one or more of their lateral (cutting) edges.

Modified Flakes (6 specimens): UIs 7, 18, 48, 74, 102, and 113): For reasons that are not clear, these specimens have been modified by retouch. UIs 48, 72, and 113 appear to be fragments of larger unifaces. Since the edge-wear was not analyzed, there is no basis for classifying them as scrapers.

Utilized Flakes (24 specimens): Flakes that had use-wear along one or more margins were classified as Unique Items. This category includes seven secondary flakes, 15 tertiary flakes, and two flake fragments that do not have bulbs of percussion or platforms. Three of the flakes—one secondary and two tertiary—had been burned.

Cores

The 14 cores, made of chert of varying quality, can be classified into two categories.

Unidirectional Prepared Platforms (2 specimens: UIs 49 and 150): Cores in this category are described by Lukowski (1987) as having prepared striking platforms from which flakes are removed in one direction. The platforms are prepared by removing one or more flakes. UI 49 has multiple platforms, and UI 150 has a single platform.

Dimensions, ML: 71.05–71.10; MW: 58.45–2.45; MT: 31.05–65.10; WT: 149.4–561.4.

Multidirectional Platforms (12 specimens): These cores have multiple platforms from which flakes been struck in different directions. UIs 4 and 112 appear to be exhausted cores.

Dimensions, ML: 60.65–97.50; MW: 42.15–82.10; MT: 31.05–5.10; WT: 86.2–390.6.

Ground Stone Artifacts

Ground stone artifacts are the second class of artifacts recovered during excavations at the Mingo site. All are of limestone. The dimensions for the mano are in millimeters and grams; for the grinding slabs, in centimeters and kilograms.

Mano (1 specimen: UI 20): This artifact is a small limestone cobble, circular in outline and oval in cross section. One surface is flat and shows evidence of grinding.

Dimensions (in millimeters and grams), ML: 82.75; MW: 79.55; MT: 37.05; WT: 345.1.

Grinding Slabs (2 specimens: UIs 134 and 135; Figure 10, a, b): Both were associated with Feature 1 and are large slabs of limestone. UI 134 is roughly circular. One surface has been smoothed slightly by grinding; the other has an oval depression about 13 cm by 10 cm, presumably made by grinding or pecking. Small linear grooves have been worn into the depression, running perpendicular to its long axis; how these grooves, or cuts, were made is unknown. UI 135 is a broken limestone cobble, slightly thicker and heavier than UI 134. Only one side has evidence of use—a shallow, oval depression made by grinding. This area is about 16 cm by 7 cm.

Dimensions, UI 134 measures 29 by 27.4 cm, is 6.5 cm thick, and weighs 5.9 kg; UI 135 measures 23 by 22.3 cm, is 7.5 cm thick, and weighs 5 kg.

Other Materials Recovered

Snails

Snail shells were collected from all units, and four species of snail were recognized. The most common was *Rabdotus* (1,002 specimens); other species were *Helicina* (526), *Polygyra* (36), and *Euglandina* (12). All but three of the *Euglandina* specimens came from N90/W110/NW, Level 2. The distribution of *Rabdotus* and *Helicina* is discussed below.

Faunal Remains

Only a single piece of burned bone was recovered from 41BN101; it is tentatively identified as a long bone fragment from a deer, but is too small to be classified conclusively. This virtual absence of faunal material could be due first, and most likely, to the soil at the Mingo site, which is not conducive to good faunal preservation, and second, to an absence of a significant amount of faunal material at the site when it was occupied.

Fossilized Marine Shell

A single fragment of a fossilized oyster shell (species unidentified) was recovered; it weighs 12.9 g, was recovered from N98/W120/SW, Level 3, and is unmodified.

Charcoal

Three samples of charcoal and ashy soil were collected from units in the bulldozed trench, but none of the samples was clearly associated with any features or artifacts, and no radiocarbon analysis was made. The samples were taken from: N98/W120/NE, Level 3; N96/W122/NW, Level 3; and N96/W120/NW, Level 2.

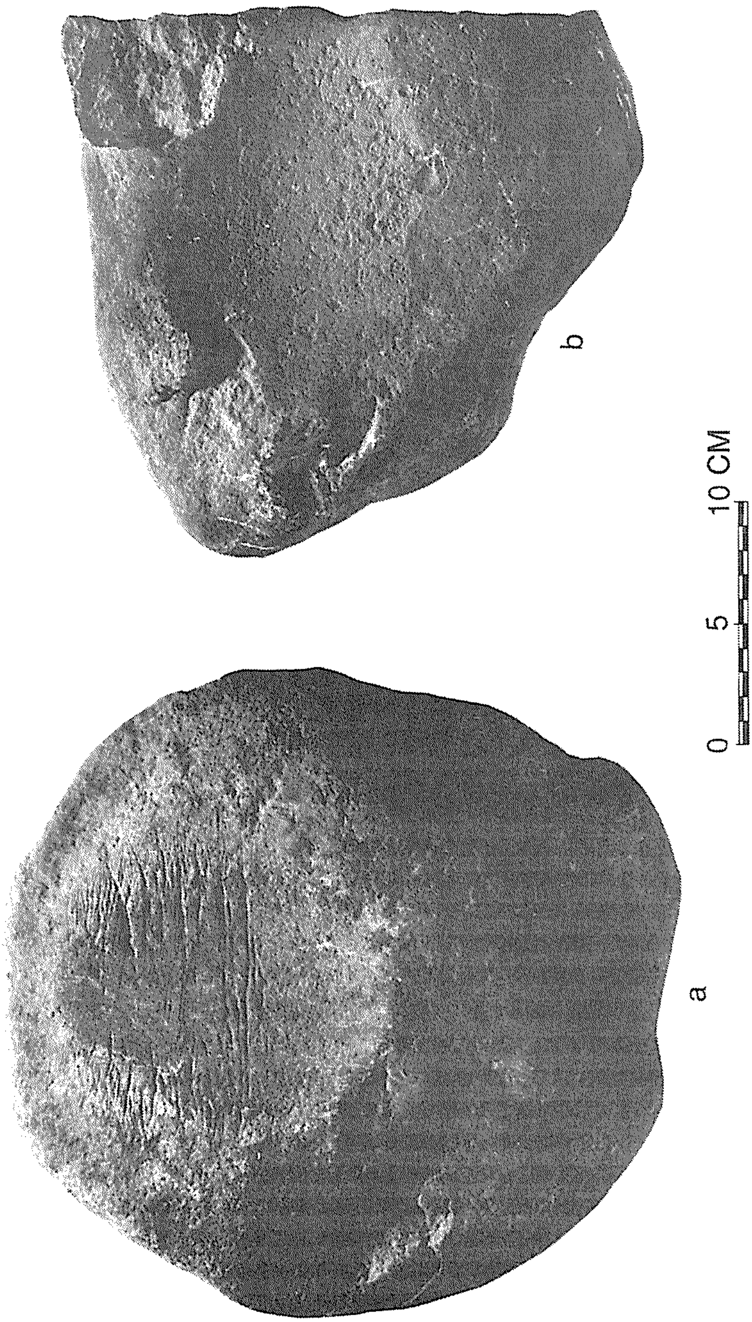


Figure 10. Grinding slabs: a, UI 134; b, UI 135 (photograph by Dan Julien).

Table 2. Debitage Analysis

Unit	Level	Debitage Counts: Primary	Secondary	Tertiary	Biface Thinning	Chip	Burned Chip	Chunk	Total
N096 W120 NE	1	0	0	0	1	3	0	0	4
N096 W120 NE	2	4	14	26	2	12	15	15	88
N096 W120 NE	3	3	15	11	4	21	31	12	97
N096 W120 NW	1	4	10	13	3	20	8	5	63
N096 W120 NW	2	42	35	52	11	30	27	17	214
N096 W120 NE	3	12	14	17	4	19	10	9	85
N096 W122 NE	1	1	14	13	18	71	38	77	232
N096 W122 NW	1	1	14	25	3	19	10	37	109
N096 W122 NW	2	6	8	13	2	3	5	5	42
N096 W122 NW	3	4	4	6	1	0	0	6	21
N096 W122 SE	1	1	24	29	2	56	22	19	153
N096 W122 SE	2	7	16	17	7	16	15	15	93
N096 W122 SE	3	0	2	5	0	9	9	3	28
N096 W122 SW	1	6	31	54	13	113	49	16	282
N096 W122 SW	2	5	20	16	4	29	13	40	127
N096 W122 SW	3	4	2	9	14	21	14	4	68
N098 W120 NE	1	1	7	6	2	11	15	15	57
N098 W120 NE	2	0	2	2	4	6	3	27	44
N098 W120 NE	3	0	0	1	1	4	1	0	7
N098 W120 NW	1	3	9	8	2	12	10	1	45
N098 W120 NW	2	14	9	17	4	36	9	3	92
N098 W120 SE	1	1	1	2	0	5	1	1	11
N098 W120 SE	2	8	12	11	12	9	9	6	67
N098 W120 SE	3	1	17	16	6	31	9	12	92
N098 W120 SW	1	2	8	3	6	16	10	6	51
N098 W120 SW	2	1	21	23	6	42	73	22	188
N098 W120 SW	3	0	9	10	2	12	12	21	66

Debitage

The debitage that had been counted and weighed was sorted into flakes and detritus, and totalled for each unit (Table 2). These categories were further subdivided.

Chert Debitage

Chert debitage, which consists of flakes (pieces of material removed from a larger mass of material by the application of force, each with a striking platform and a bulb of percussion at the proximal end [Crabtree 1982]) and detritus (pieces of chert that have neither platforms nor bulbs of percussion), was collected, counted, and weighed from each unit and level in the bulldozed trench. In all, 4,105 pieces were recovered during excavations at the Mingo site. A portion of this debitage was analyzed further.

Flakes

Primary Flakes result from the removal of cortex from a chert core. At least 75 percent of the dorsal surface of a primary flake is covered with cortex.

Secondary Flakes have more than 1 percent and less than 75 percent of their dorsal surfaces covered with cortex.

Tertiary Flakes have no cortex on either surface.

Biface Thinning Flakes are flakes removed during the thinning of bifaces, and are characterized by "lipped" striking platforms; they have been called "lipped flakes" in other excavation reports (Hester 1971; Wesolowsky et al. 1976).

Detritus

Detritus is made up of *chips* (small fragments of flakes without bulbs of percussion or platforms), *burned chips* (chips that have been heat-fractured or "pot lidded"), and *chunks* (large pieces of chert with no bulbs of percussion or platforms).

The debitage from 26 levels, which was analyzed and sorted into the seven categories (Table 2), totals 2,358 pieces, about 57 percent of all debitage collected. The ratios between these categories differ little from level to level. When the levels

Table 3. Debitage Categories as Percentages of Total Debitage for Units in the Bulldozed Trench

	Elevation Range (in meters)			
Debitage Category	**99.0–98.9**	**98.9–98.8**	**98.8–98.7**	**98.7–98.6**
Primary	4.76*	5.31	5.58	6.84
Secondary	15.15	11.98	16.26	6.84
Tertiary	13.85	17.15	16.58	17.09
BFT	6.06	5.11	4.93	12.82
Chip	29.00	26.82	22.17	25.64
Burned Chip	19.05	17.36	15.76	19.66
Chunk	12.12	16.27	18.72	11.11

*Percentage

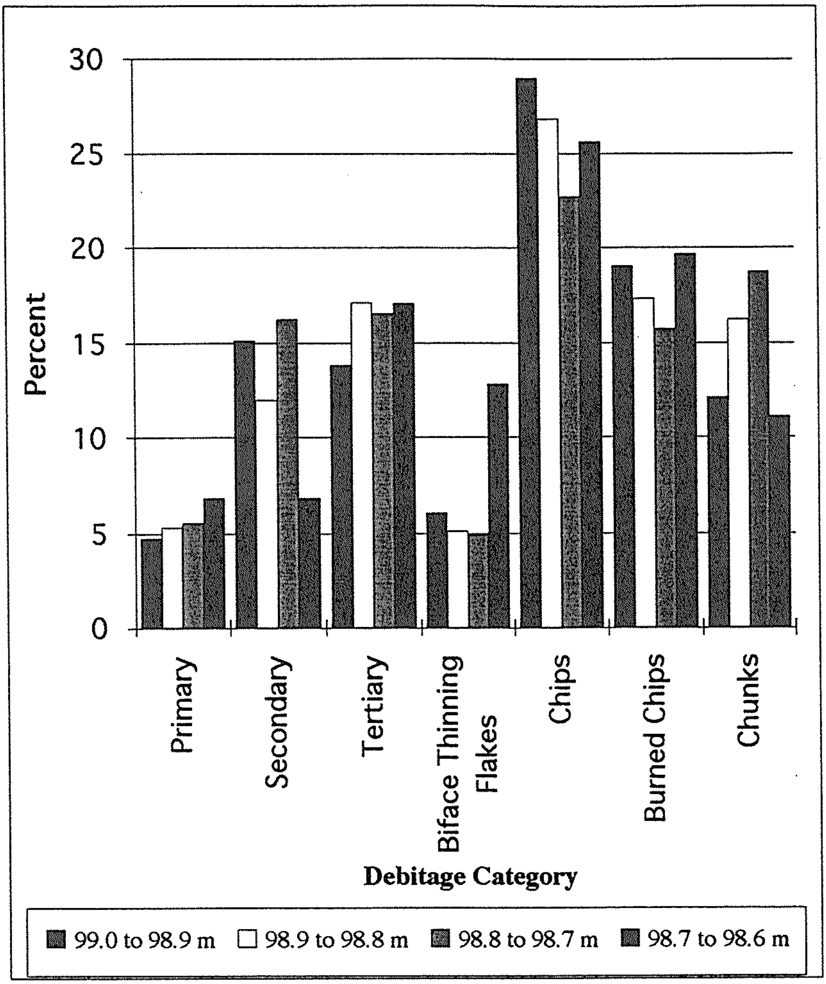


Figure 11. Graph showing percentages of debitage from units in the bulldozed trench by category for each elevation range.

are translated into elevation ranges and each debitage category is converted to a percentage of the total debitage for each range, this relationship becomes clear (Table 3, Figure 11). The data for the deepest elevation range (98.7 to 98.6 cm) represent a sample of only 117 pieces. The differing ratios reflected in this elevation range may not be significant because of the small sample size.

The analysis of the debitage from the units in the bulldozed trench makes it clear that all stages of lithic reduction were being performed at the site. The low frequency of biface thinning flakes may be due, in part, to the use of quarter-inch screens, which do not retain small pieces of debitage.

The small number of primary flakes found in each level may indicate that initial reduction of chert cobbles may have been done at the site of procurement. Wesolowsky et al. (1976) reached similar conclusions for the Jetta Court site (41TV151) and the La Jita site (41UV21), based on the low frequency of primary flakes in assemblages from those sites.

A comparison of the frequency of debitage categories between the units in the vicinity of Feature 2 and the remaining units reveals some interesting differences. The most notable differences (Figure 12) are the higher percentages of primary, secondary, and tertiary flakes from units not associated with Feature 2 and the higher percentage of chips and chunks from units in the vicinity of Feature 2. The higher proportion of chunks and chips, which, in many cases, may actually be core fragments, may be related to the distribution of cores across the site. More than 60 percent of the cores recovered from the site were found in the four units of N96/W122, the area of Feature 2. The large number of cores and the high percentages of chips and chunks from N96/W122 leads to the hypothesis that secondary stages of core reduction were performed in the area of Feature 2. The relatively lower frequencies of primary, secondary, and tertiary flakes from the area of Feature 2 may indicate that after these forms were struck from cores, they were moved to another part of the site for further reduction or utilization.

Unfortunately, from this region there are no other Transitional Archaic or Late Prehistoric sites for which a detailed debitage analysis has been done. This makes intersite comparisons impossible.

DISTRIBUTION OF MATERIALS

The landowners' bulldozed trench, which cuts through part of the site, makes the discussion of distribution problematic. Because the top 10 to 30 cm of soil was stripped off by the bulldozer, it is impossible to make meaningful comparisons of excavation levels in the trench with those outside the trench. Comparing elevations is also problematic because the midden is concentrated on a slope. Therefore, for discussions of distribution of materials, it is necessary to divide the site into the units in the trench and the units outside the trench. Elevation ranges can be used in discussions of the vertical distribution of artifacts for units in the trench, but for units in the midden, where the starting surface elevations varied according to the natural slope of the site, excavation levels rather than elevation ranges must be compared (Table 4).

Distribution of Artifacts

Arrowpoints

The vertical distribution of arrowpoints in the trench (Figure 13) does not suggest stratification by type. Edwards points are found in the deepest levels of the units, but there is a great deal of mixing in the uppermost elevations. Edwards points occur below, above, and at the same elevation as both Sabinal and Scallorn

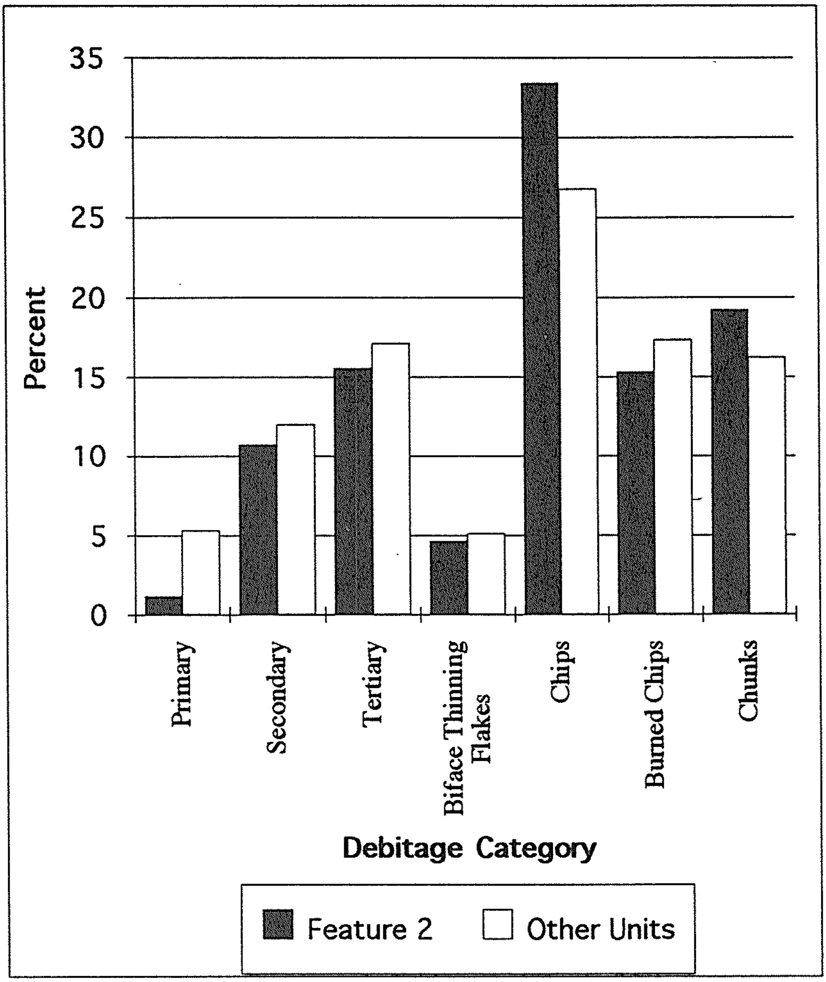


Figure 12. Comparison of debitage percentages for each debitage category from the two areas in Feature 2 (N096/W122) and other units in the bulldozed trench at the elevation range of 98.9–98.8 m.

points, although they should occur in deeper contexts than either of those point types (Lukowski 1987). It can be concluded, therefore, that either the deposits have been mixed, or all three point types were being used simultaneously.

The only identifiable point type found in the deepest levels of units outside the trench is Scallorn (Figure 14); the only Edwards specimen recovered there was in Level 2, together with one Sabinal and three Scallorn specimens.

Table 4. Provenience of Unique Items

Unique Item					Provenience	
No.	Identification	Unit	Level	Elevation	North	West
1	Frio point	N098 W120 SE	1	98.91	N98.86	W120.23
2	Unidentified arrowpoint (distal)	N098 W120 SE	1	98.90	N98.63	W120.40
3	Scallorn point (proximal)	N098 W120 NW	1	(98.90)	—	—
4	Utilized flake (tertiary)	N098 W120 SE	2	98.80	N98.28	W120.20
5	Sabinal point	N098 W120 SE	3	98.77	N98.82	W120.74
6	Unidentified arrowpoint (medial)	N098 W120 NW	2	(98.88)	—	—
7	Modified flake	N098 W120 NW	2	98.81	N99.33	W121.00
8	*Preform, arrowpoint*	N098 W120 SE	2	—	—	—
9	Unidentified arrowpoint (distal)	N096 W122 SE	1	98.85	N96.31	W122.87
10	Preform, arrowpoint	N096 W122 SE	1	—	—	—
11	Core, multidirectional	N096 W122 SE	1	98.81	N96.75	W122.60
12	Angostura point, reworked	N096 W122 SE	1	98.85	N96.37	W122.30
14	Unidentified arrowpoint (distal)	N096 W122 SE	1	98.82	N96.70	W122.90
15	Edwards point	N096 W120 NE	2	98.85	N97.32	W120.85
16	Biface fragment (distal)	N096 W122 SE	2	98.78	N96.17	W122.52
17	Biface fragment (medial)	N096 W122 SE	2	—	—	—
18	Modified flake	N096 W122 SE	2	98.78	N96.80	W122.80
19	Stemmed dart point (prox.)	N092 W120 NE	1	98.87	N93.93	W120.82
20	Mano	N096 W122 SE	2	98.78	N96.94	W122.74
21	Uniface, prismatic blade	N096 W122 SE	2	98.74	N96.30	W122.81
22	Preform, arrowpoint (prox.)	N098 W120 SW	1	(98.90)	—	—

23	Utilized flake (?)	N096 W116 SE	2	99.26	N96.75	W116.63
24	*Frio point*	N092 W120 NE	1	—	—	—
25	Unidentified arrowpoint (distal)	N098 W120 SW	2	(98.87)	—	—
27	Scallorn point	N098 W120 SW	2	(98.89)	—	—
28	Preform, arrowpoint	N096 W120 NE	3	98.80	N97.34	W121.24
29	Biface	N092 W120 SW	2	98.76	N92.18	W120.24
30	Preform, arrowpoint	N096 W116 SE	3	(99.10)	—	—
31	Unidentified arrowpoint (distal)	N092 W120 SW	2	98.76	N92.83	W121.70
32	Utilized flake (tertiary)	N092 W120 SW	2	98.72	N92.68	W121.62
33	Preform, arrowpoint	N098 W120 SW	2	98.88	N98.46	W121.26
34	Biface fragment (prox.)	N096 W120 NE	3	98.77	N97.91	W120.20
35	Utilized flake (secondary)	N096 W122 SW	1	98.81	N96.34	W123.55
36	Edwards point	N098 W120 SW	2	(98.88)	—	—
37	Scallorn point (prox.)	N096 W116 SE	4	99.08	N96.68	W116.07
38	Biface fragment (medial)	N096 W122 SW	1	98.82	N96.25	W123.81
39	Preform, arrowpoint	N098 W120 SW	2	98.87	N98.80	W121.60
40	Unidentified arrowpoint (medial)	N092 W120 SW	2	(98.73)	—	—
41	Unidentified arrowpoint (distal)	N092 W120 SW	2	—	—	—
42	Utilized flake (tertiary)	N102 W132 NE	1	(99.16)	—	—
44	Core, unidirectional	N096 W122 SW	1	98.82	N96.53	W123.94
45	Unidentified arrowpoint (distal)	N098 W120 SW	2	98.86	N98.75	W121.84
46	Core, multidirectional	N096 W122 SW	1	98.79	N96.66	W123.42
47	*Scallorn point*	N096 W122 SW	1	(98.79)	—	—
48	Modified flake	N096 W122 SW	1	98.85	N96.06	W123.84
49	Core, multidirectional	N096 W120 NE	2	98.75	N97.05	W120.95

Table 4.—Continued

Unique Item					Provenience	
No.	Identification	Unit	Level	Elevation	North	West
51	Scallorn point	N092 W120 SW	3	(98.66)	—	—
52	Unidentified arrowpoint (medial)	N096 W122 SW	2	98.76	N96.22	W123.15
53	Biface fragment	N096 W122 SW	2	98.70	N96.32	W123.41
54	Core, multidirectional	N096 W122 SW	2	98.72	N96.28	W123.76
55	Unidentified arrowpoint (distal)	N098 W120 SW	2	(98.82)	—	—
56	Biface	N098 W120 NE	1	98.90	N99.15	W120.80
57	Biface fragment	N098 W120 NE	1	98.93	N99.35	W120.15
58	Scallorn point	N098 W120 SW	2	98.80	N98.56	W121.48
59	Biface	N096 W122 NW	1	98.94	N97.55	W123.40
60	Core, multidirectional	N096 W122 NW	1	98.95	N97.56	W123.80
61	Preform, arrowpoint (prox.)	N096 W122 NW	1	(98.95)	—	—
62	Uniface, serrated flake	N096 W118 NE	2	99.10	N97.55	W118.54
65	*Biface fragment (medial)*	N098 W120 SW	2	98.84	N98.82	W121.20
67	*Unidentified arrowpoint (distal)*	N098 W120 NE	2	98.87	N99.13	W120.30
68	Utilized flake (tertiary)	N096 W118 NE	2	99.04	N97.33	W118.36
69	Scallorn point (prox.)	N096 W118 NE	2	—	—	—
70	Edwards point	N096 W122 SW	3	98.62	N96.66	W123.72
71	Scallorn point (prox.)	N092 W120 NE	3	(98.63)	—	—
72	Utilized flake (?)	N096 W122 NW	1	98.83	N97.72	W123.48
73	Unidentified arrowpoint (distal)	N092 W120 NE	3	(98.63)	—	—

74	Modified flake	N096 W122 NE	1	(98.89)	—	—
75	Scallorn point	N096 W122 NW	1	98.93	N97.87	W123.79
76	Biface fragment (distal)	N092 W120 SW	4	98.60	N92.85	W121.27
77	Biface	N096 W122 NE	1	98.91	N97.87	W122.20
78	Utilized flake (tertiary)	N098 W120 NE	3	98.78	N99.49	W120.53
79	Scallorn point (prox.)	N096 W118 NE	3	(98.90)	—	—
80	Core, multidirectional	N096 W122 NW	1	98.81	N97.42	W123.73
81	Preform, arrowpoint	N096 W122 NE	1	98.88	N97.81	W122.22
82	Core, multidirectional	N096 W122 NW	1	98.97	N97.02	W123.72
83	Preform, arrowpoint	N096 W122 NW	1	(98.95)	—	—
86	Frio point	N094 W120 NE	1	98.85	N95.21	W120.69
87	Edwards point	N096 W122 NW	2	98.79	N97.46	W123.29
88	Utilized flake (tertiary)	N094 W120 NE	1	98.89	N95.43	W120.90
89	Utilized flake (tertiary)	N094 W120 NE	1	98.85	N95.53	W120.13
90	Utilized flake (tertiary)	N094 W120 NE	1	—	—	—
91	Biface	N096 W122 NW	2	98.71	N97.58	W123.43
92	Preform, arrowpoint	N096 W122 NE	1	98.91	N97.62	W122.83
93	Biface fragment (medial)	N096 W122 NW	2	98.71	N97.08	W123.37
94	Unidentified arrowpoint (distal)	N098 W120 NE	3	98.78	N99.32	W120.54
95	Biface	N094 W120 NE	1	98.82	N95.08	W120.85
97	Biface fragment (distal)	N096 W122 NW	2	98.80	N97.72	W123.87
98	*Biface fragment (distal)*	N092 W120 SW	4	98.55	N92.73	W121.66
100	Utilized flake (secondary)	N098 W120 SW	3	98.74	N98.58	W121.30
101	Biface fragment (distal)	N092 W120 SE	4	98.62	N92.87	W121.85
102	Modified flake	N094 W120 NE	2	98.75	N95.59	W120.14

Table 4.—Continued

Unique Item					Provenience	
No.	Identification	Unit	Level	Elevation	North	West
103	Preform, arrowpoint	N094 W120 NE	2	98.75	N95.59	W120.38
104	Edwards point	N096 W122 NW	3	98.68	N97.31	W123.69
106	Utilized flake (secondary)	N094 W120 NE	2	98.73	N95.96	W120.15
108	Utilized flake (tertiary)	N096 W122 NW	3	98.82	N97.90	W123.90
109	Core, multidirectional	N094 W120 NE	2	98.83	N95.77	W120.13
110	Utilized flake (secondary)	N096 W122 NW	3	98.81	N97.90	W123.90
112	Core, multidirectional	N096 W120 NW	2	98.83	N97.46	W121.38
113	Modified flake	N096 W122 NE	1	98.84	N97.25	W122.17
115	Utilized flake (tertiary)	N094 W120 SE	1	(98.81)	—	—
116	Preform, arrowpoint (prox.)	N096 W120 NW	2	98.81	N97.41	W121.36
117	Core, multidirectional	N098 W118 SW	1	98.86	N98.40	W119.95
119	Preform, arrowpoint (prox.)	N096 W120 NW	2	(98.80)	—	—
120	Sabinal point	N094 W120 SE	2	98.73	N94.38	W120.38
121	*Biface fragment (medial)*	N094 W120 SE	2	98.78	N94.87	W120.43
122	Scallorn point	N096 W120 NW	2	98.83	N97.31	W121.28
123	Utilized flake (tertiary)	N098 W118 SW	1	98.89	N98.85	W119.69
124	Utilized flake (secondary)	N096 W120 NW	2	98.80	N97.12	W121.47
125	Unidentified arrowpoint (distal)	N094 W120 SE	3	(98.75)	—	—
126	Preform, arrowpoint (prox.)	N098 W118 SW	1	—	—	—
127	Utilized flake (tertiary)	N094 W120 SE	3	98.71	N94.95	W120.56

128	Unidentified arrowpoint	N096 W120 NW	2	—	—	—
129	Preform, arrowpoint	N098 W118 SW	2	—	—	—
130	Scallorn point	N096 W120 NW	3	98.79	N97.20	W121.36
132	Fairland point	N096 W120 NE	3	98.72	N97.98	W120.80
133	Preform, arrowpoint (prox.)	N096 W120 NW	3	98.75	N97.80	W121.30
134	Metate	N096 W120 NE	3	98.84	N97.70	W120.75
135	Metate	N098 W120 SE	3	98.80	N98.55	W120.40
136	Biface fragment (distal)	N090 W120 NW	1	—	—	—
137	Utilized flake (tertiary)	N088 W120 NW	1	—	—	—
138	Utilized flake (secondary)	N088 W120 NW	1	—	—	—
139	Unidentified arrowpoint	N088 W120 SW	1	—	—	—
140	Unidentified arrowpoint (distal)	N088 W120 SW	1	—	—	—
141	*Utilized flake (secondary)*	N088 W120 SW	1	—	—	—
142	Edwards point	N090 W120 NW	2	—	—	—
143	Scallorn point	N090 W120 NW	2	—	—	—
144	Unidentified arrowpoint (medial)	N090 W120 NW	2	—	—	—
146	Scallorn point (prox.)	N090 W120 SW	2	—	—	—
148	Biface fragment (distal)	N094 W120 NE	2	—	—	—
149	Core, multidirectional	N096 W122 SW	1	—	—	—
150	Core, unidirectional	N096 W122 SW	1	—	—	—
152	Preform, arrowpoint	N096 W122 SW	1	—	—	—
155	Core, multidirectional	N092 W112 SW	4	—	—	—
157	Utilized flake (tertiary)	N092 W120 NE	1	—	—	—
158	Unidentified arrowpoint (distal)	N094 W120 SE	1	—	—	—
159	Biface fragment (distal)	N092 W120 SW	5	—	—	—

Table 4. (Continued)

Unique Item					Provenience	
No.	**Identification**	**Unit**	**Level**	**Elevation**	**North**	**West**
160	Preform, arrowpoint (prox.)	N096 W122 NW	1	—	—	—
161	Preform, arrowpoint (prox.)	N096 W122 NW	1	—	—	—
162	Unidentified arrowpoint (distal)	N098 W120 SW	2	—	—	—
163	Preform, arrowpoint (prox.)	N096 W122 SW	2	—	—	—
164	Unidentified arrowpoint (distal)	N096 W122 NE	1	—	—	—
165	*Utilized flake (tertiary)*	N096 W120 NW	1	—	—	—
166	Scallorn point (prox.)	N096 W122 SE	2	—	—	—
167	Biface fragment (distal)	N096 W122 SE	2	—	—	—

Note: Burned artifacts are in italics.
Elevations in parentheses are approximate.

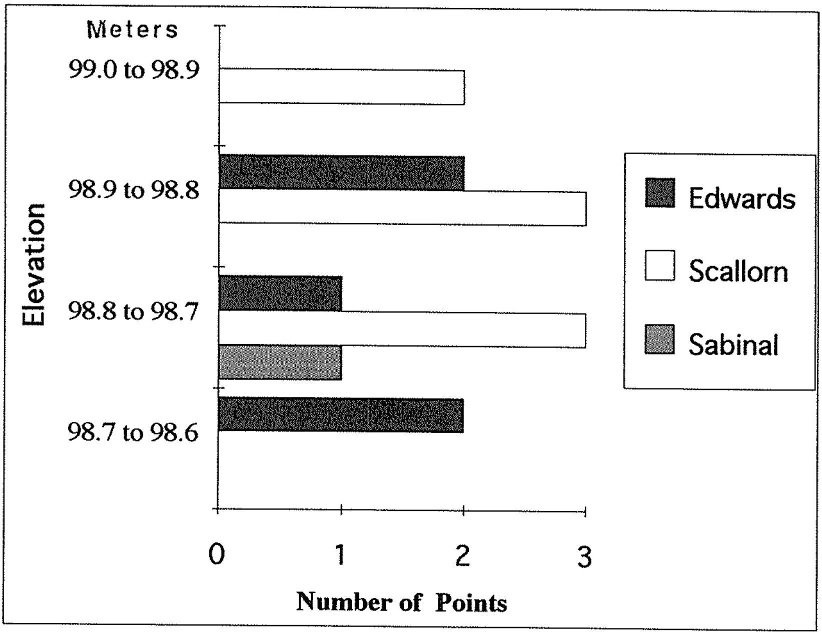


Figure 13. Graph showing vertical distribution of arrowpoints in the bulldozed trench.

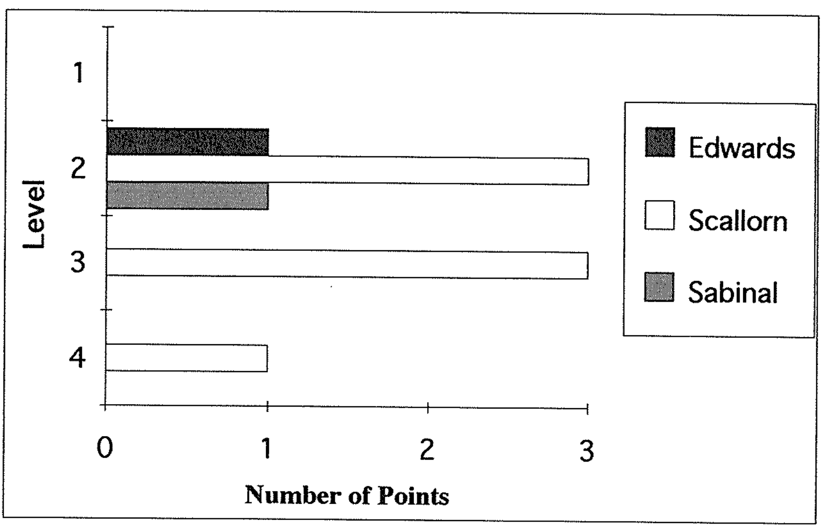


Figure 14. Graph showing vertical distribution of arrowpoints in the burned rock midden.

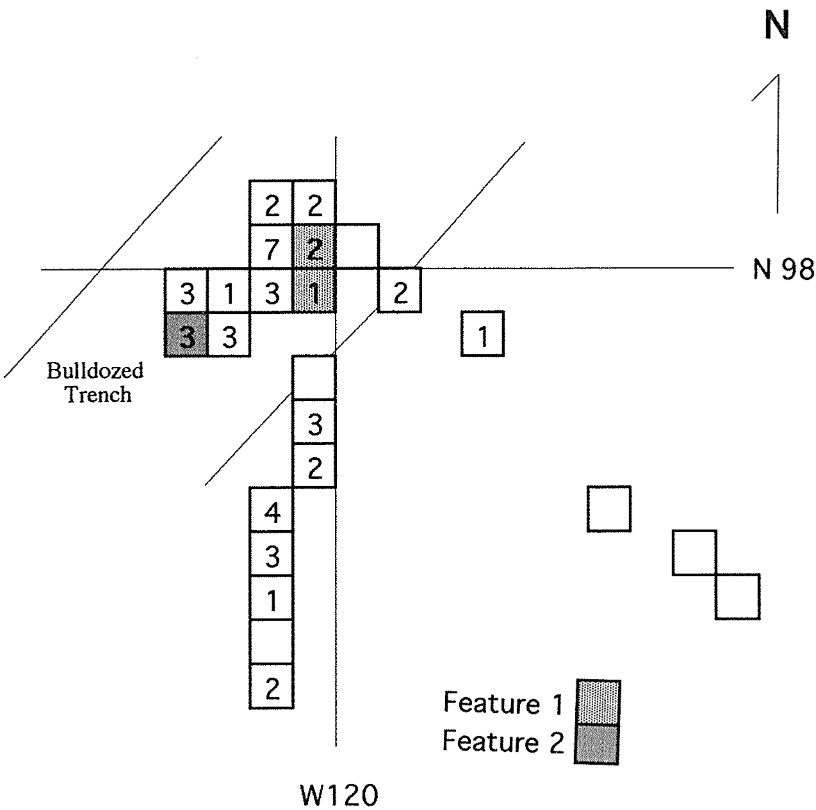


Figure 15. Plan showing the horizontal distribution of arrowpoints in the trench and in the midden.

In general, arrowpoints were found in units in both the trench and the midden (Figure 15), although the most notable pattern is the concentration of preforms in units in the trench. Of the 22 artifacts identified as preforms, 10 (45 percent) were recovered from N96/W122, the area of Feature 2. Twenty (91 percent) of the 22 preforms came from the trench. Not including preforms (Figure 16), 27 (60 percent) of the 45 arrowpoints were in the trench.

Dart Points

Six dart points were recovered (Figure 17). One, a reworked Angostura, is not included in this discussion because it is clearly an imported artifact, out of its temporal context. Of the other five points, four came from the highest level of their excavation units. One Fairland point (UI 132) was found directly below a grinding slab in Feature 1 and was only 2 cm above bedrock.

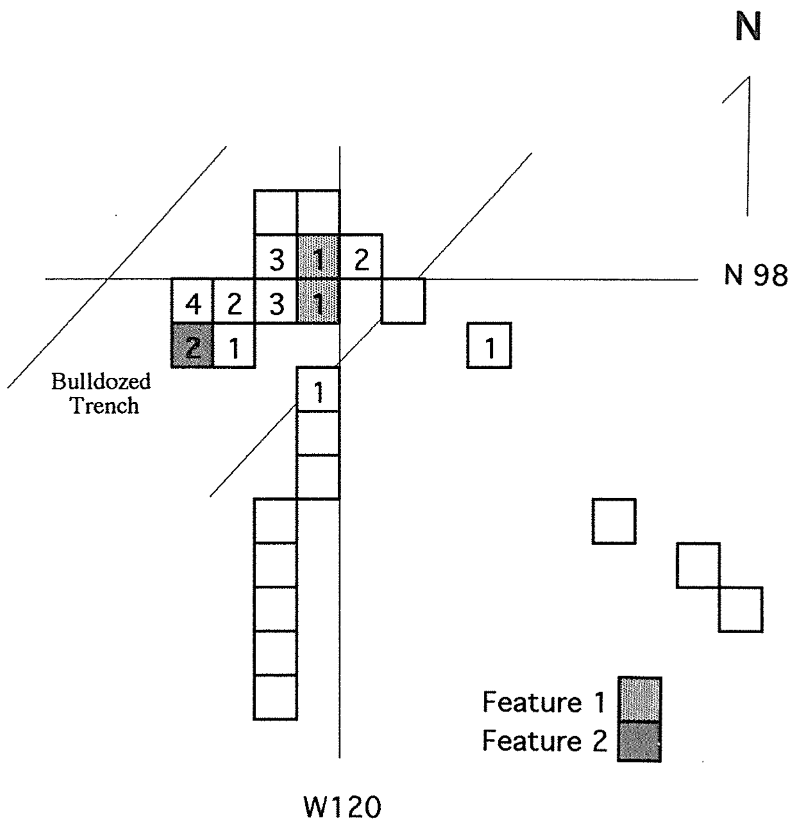


Figure 16. Horizontal distribution of arrowpoint preforms in the trench and in the midden.

Bifaces

No noteworthy patterns are apparent in the vertical distribution of bifaces in and outside the trench (Figures 18, 19). Three of the six complete bifaces came from the vicinity of Feature 2, in N96/W122 (Figure 19). Another complete biface was found in the bulldozed trench, and two were in units outside the trench. Ten biface fragments were collected from units in the trench; seven of these from the vicinity of Feature 2 (Figure 20). Seven fragments were found in units outside of the trench; four from N92/W120/SW (Figure 21).

Cores

In the bulldozed trench, the concentration of cores between 98.90 and 98.80 meters elevation corresponds with the elevation of Feature 2. Horizontally (Figure 22), the concentration of cores is in the bulldozed trench; specifically in unit N96/W122, the area of Feature 2.

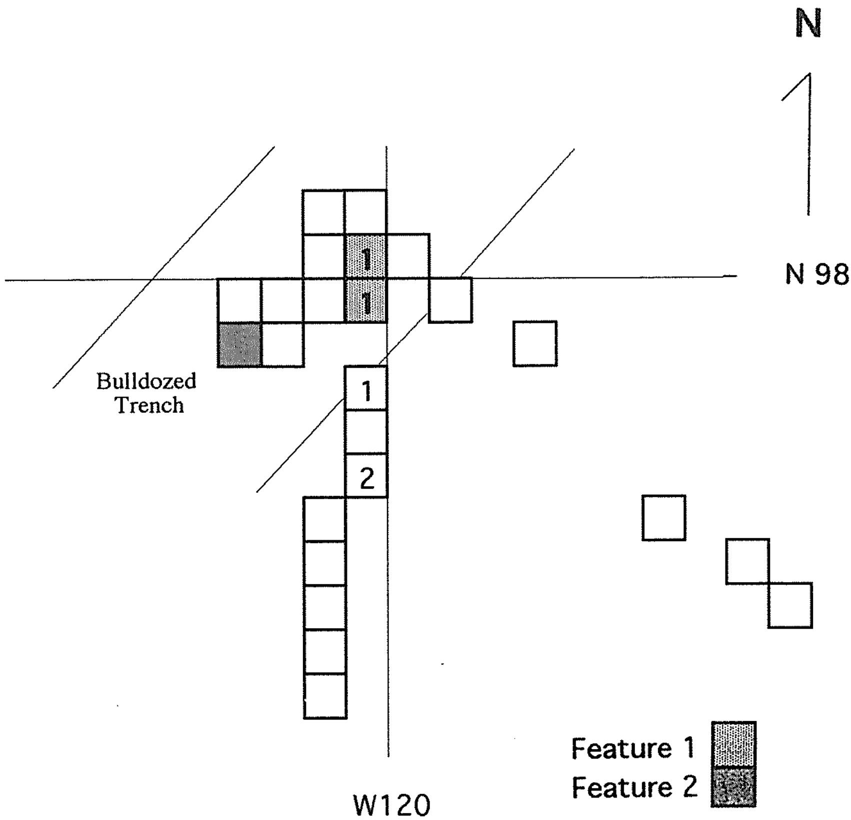


Figure 17. Horizontal distribution of dart points.

Debitage

The highest concentrations of debitage are found in units in the bulldozed trench. Figure 23 shows the horizontal distribution of debitage by density (number of pieces/m^3) for each unit.

Distribution of Burned Rock

The densest concentration of burned rock occurs in N90/W120/NW (Figure 24), where the average density for all the excavated levels is 724 kg/m^3. The lowest density occurs in N98/W120/SE and is 7 kg/m^3.

The relatively high burned rock densities found in N96/W122 are surprising because they occur in the bulldozed trench in the vicinity of Feature 2. They are two to three times as high as the burned rock densities in other units in the bulldozed trench.

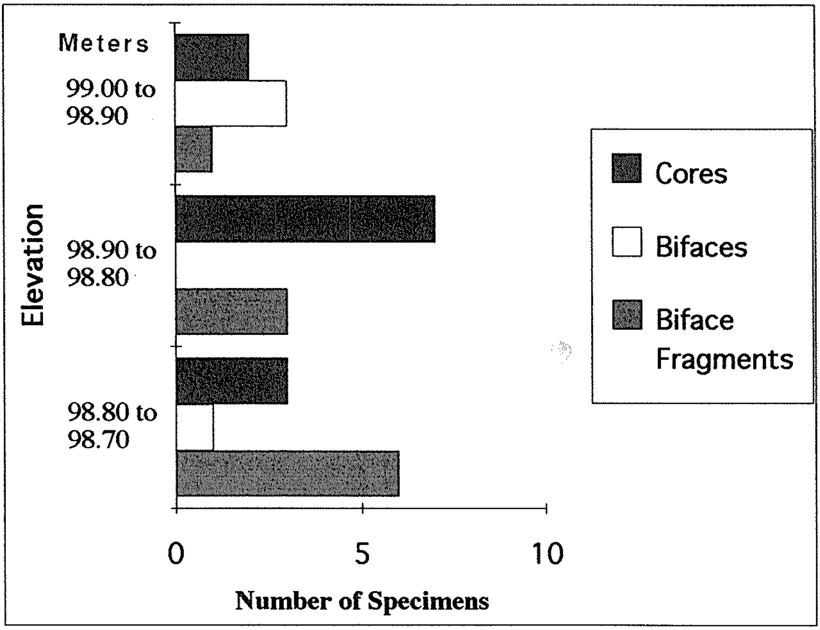


Figure 18. Graph showing vertical distribution of bifaces, biface fragments, and cores in the trench.

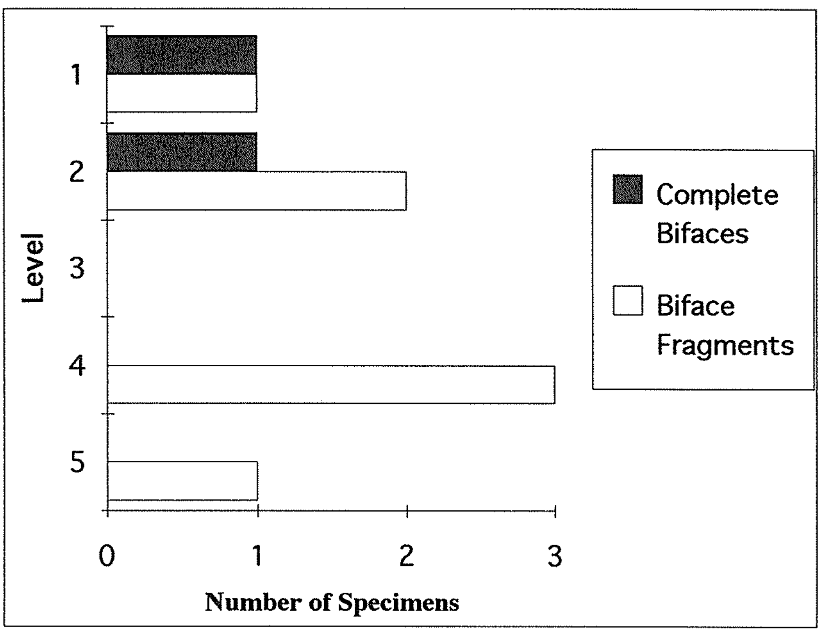


Figure 19. Graph showing vertical distribution of bifaces and biface fragments in the midden.

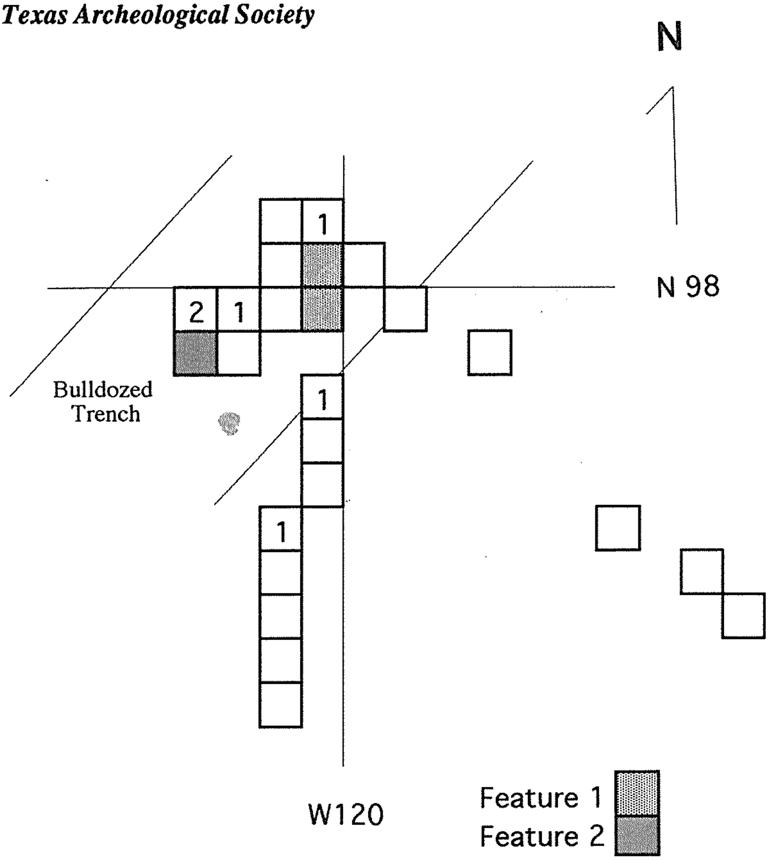


Figure 20. Plan showing horizontal distribution of bifaces.

At the Blue Hole site, 41UV159, Mueggenborg (1991) noted an inverse relationship between the amount of burned rock and the amount of debitage. A similar analysis of the Mingo site data does not show any strong correlation between burned rock density and either debitage count density (r=.024) or debitage weight density (r=.066).

Distribution of Snails: *Rabdotus* and *Helicina*

There is an increase in *Rabdotus* density in units in the bulldozed trench, and a similar trend is seen for *Helicina* snails (Figures 25, 26). However, *Helicina* density does not correlate with *Rabdotus* density (r=.00967), and there is also no strong correlation between burned rock density and either *Rabdotus* density (r=-.097) or *Helicina* density (r=-.212).

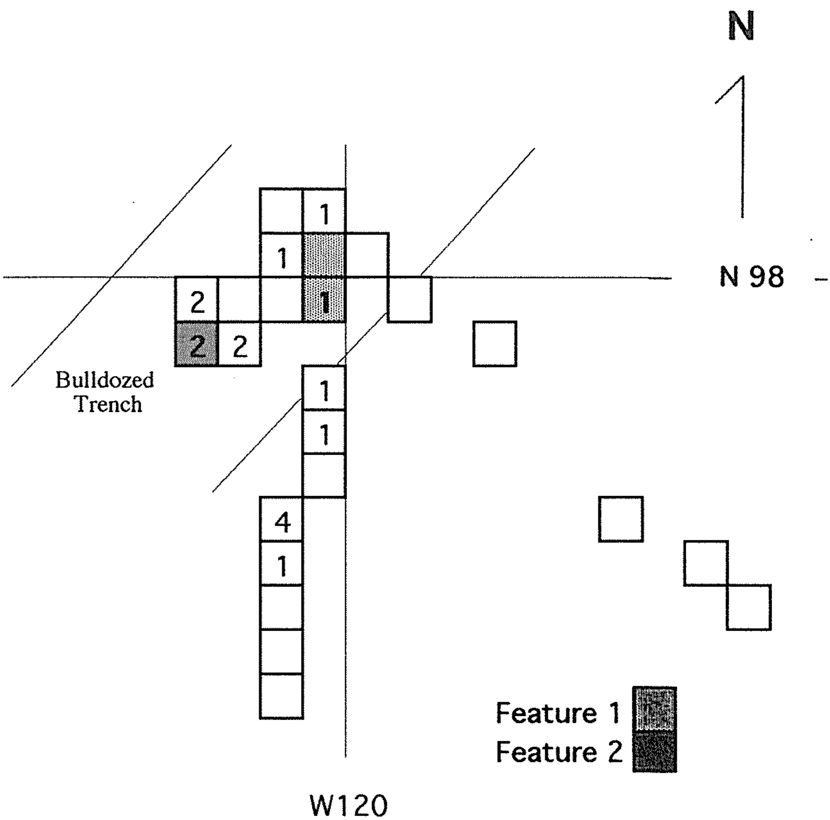


Figure 21. Plan showing horizontal distribution of biface fragments.

DISCUSSION

Although units in the bulldozed trench accounted for only 33.63 percent of the site's excavated volume, they contributed 61.51 percent of the debitage, 64.79 percent of the unique items, and 91 percent of the arrowpoint preforms recovered. Units in the burned rock midden comprised 44.88 percent of the total excavated volume but only 35.67 percent of the total debitage. The units in the trench had a total of 152.6 kg of burned rock, but units outside the trench had 804.23 kg of burned rock. Two factors could account for these differences: first, the sample is biased because the top levels in the trench, which may have contained a significant amount of burned rock, were stripped off by the bulldozer; second, the units in the trench differ fundamentally in their composition, indicating that different activities led to their formation. This second hypothesis can

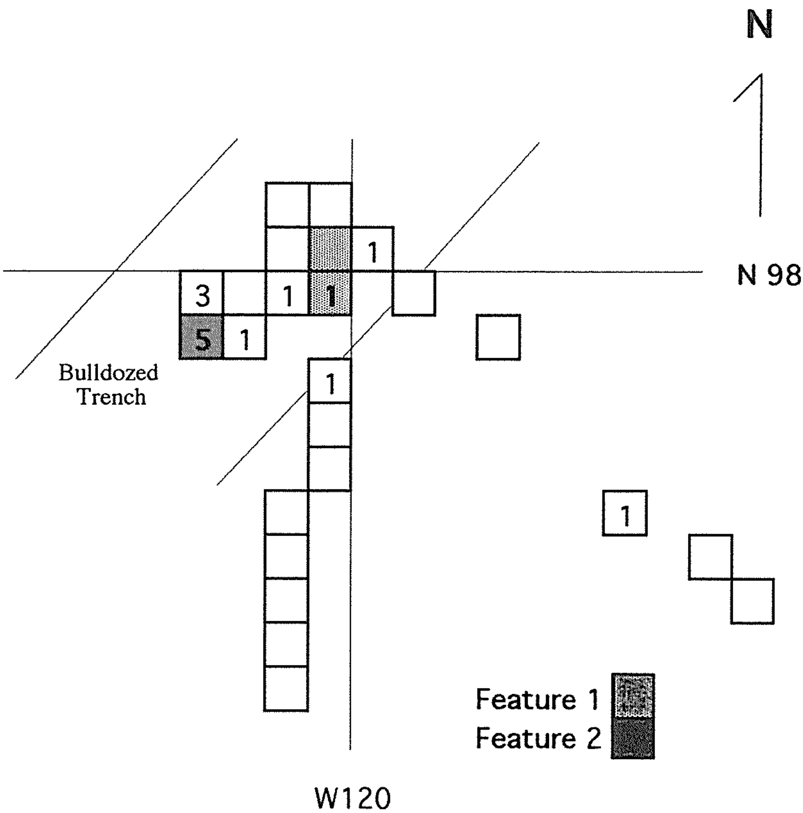


Figure 22. Plan showing horizontal distribution of cores.

be true only if the bulldozed trench corresponds with the northern extent of the burned rock accumulation. In other words, this hypothesis can be proven only if—because they lie to the north of the midden and not beneath it—the units in the trench do not contain significant amounts of burned rock. It is likely that the scatter extended over part of the trenched area because it can be seen in the south profile. It does not, however, show up in the north profile, indicating that the scatter terminated within the boundaries of the trench. The original extent of the burned rock can never be fully known. Most units in the trench have little burned rock, but the westernmost units have burned rock densities comparable to units in the scatter.

CONCLUSIONS

The limited excavations carried out at the Mingo site by the TAS members are an important contribution to our understanding of south central Texas pre-

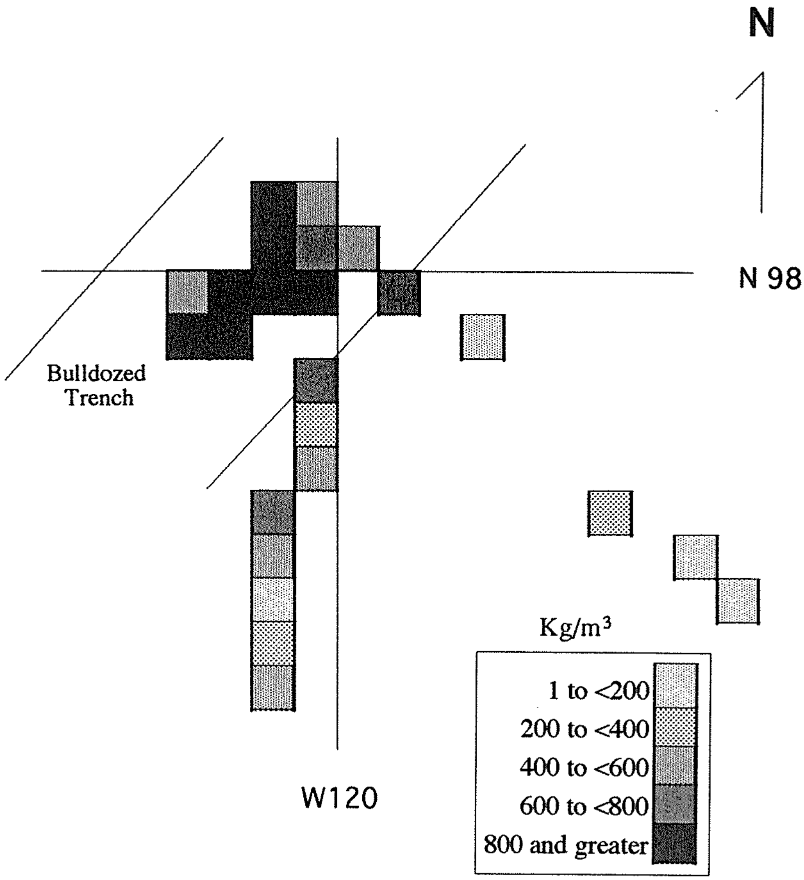


Figure 23. Plan showing horizontal density of debitage (No./m³) by unit.

history. At the time of excavation, the site consisted of a small burned rock midden and an adjoining area containing two identified archeological features. The site contained predominantly Late Prehistoric arrowpoints and several Transitional Archaic dart points. The exact relationship of the features to the burned rock midden was not established due to the removal of an unknown amount of the midden by bulldozer prior to excavation. It is hypothesized—based on the increase in debitage density in units in the bulldozed trench relative to the density in units in the midden, and also on the profiles of the trench walls—that the midden did not extend completely across the trenched area.

All of the diagnostic arrowpoints recovered are from the Austin phase of the Late Prehistoric period. No Perdiz points, ceramics, or bison bone were recovered, suggesting that occupation at the site ceased prior to the Toyah phase. Occupation at the site possibly began in the Late Archaic or Transitional Archaic, based on the presence of one Fairland and three Frio points among the several diagnostic dart points.

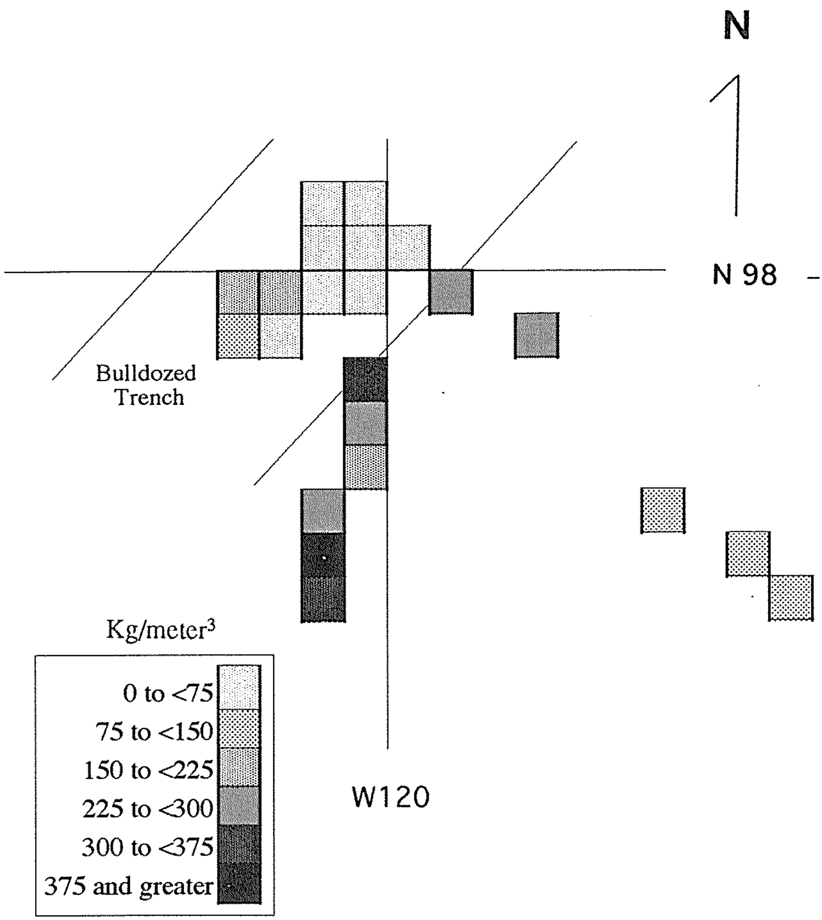


Figure 24. Plan showing horizontal distribution of burned rock, given as densities (kg/m³) of selected units.

The presence of diagnostic arrowpoints throughout the burned rock midden and in each excavated level of the deposits in the bulldozed trench (Figures 13, 14), suggest that the two areas of the site were formed contemporaneously. A purely Archaic origin for the midden can not be ruled out without absolute dates, but it seems unlikely that the formation of the midden began any earlier than the Transitional Archaic (ca. 300 B.C.), with the greater part of the midden accumulating during the Austin phase (A.D. 700 to 1200) of the Late Prehistoric.

The discovery of two grinding slabs and one mano suggest that the processing of plant material was an important part of the subsistence strategy of the occupants of the site. Henderson (n.d.) proposed that the Austin phase inhabitants of the

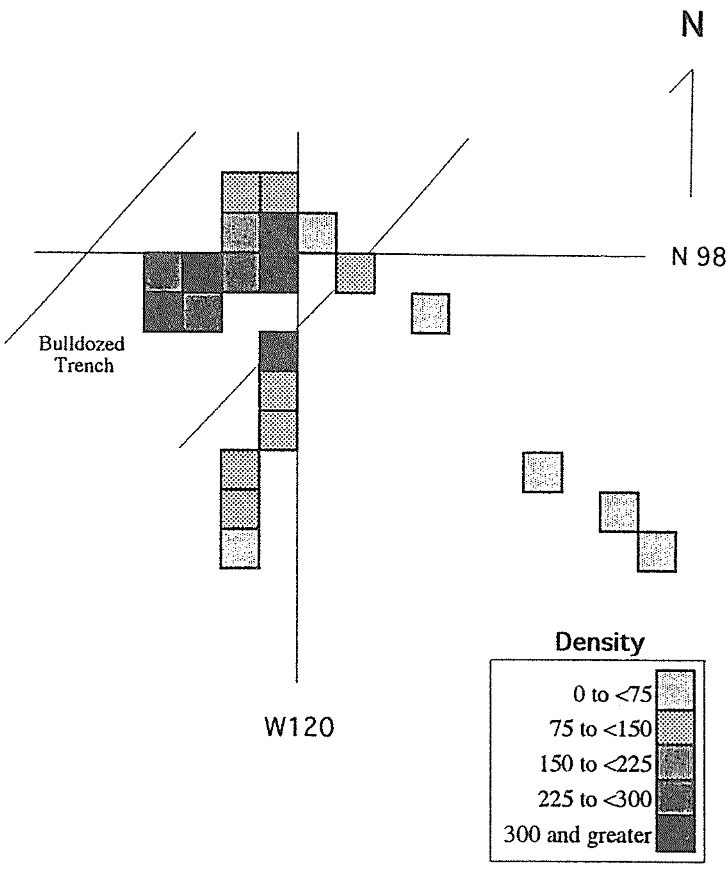


Figure 25. Plan showing horizontal distribution of *Rabdotus* as densities (No./m^3) in selected units.

Rainey Sinkhole also relied heavily on the processing of plant material for their subsistence.

In form and in artifact assemblage, the Mingo site bears a striking resemblance to the Heard Schoolhouse site (41UV86) as described by Goode (1991). Like the Mingo site, 41UV86 contained a small burned rock midden, 15 m in diameter with a maximum depth of 60 cm (Goode 1991:72). More diagnostic projectile points were recovered at 41UV86 than at the Mingo site, but the assemblages are remarkably similar. Both sites lacked Toyah phase arrowpoints, and they contained Edwards, Sabinal, and Scallorn points in greater numbers than they did dart points. At both sites, most of the artifacts were recovered north

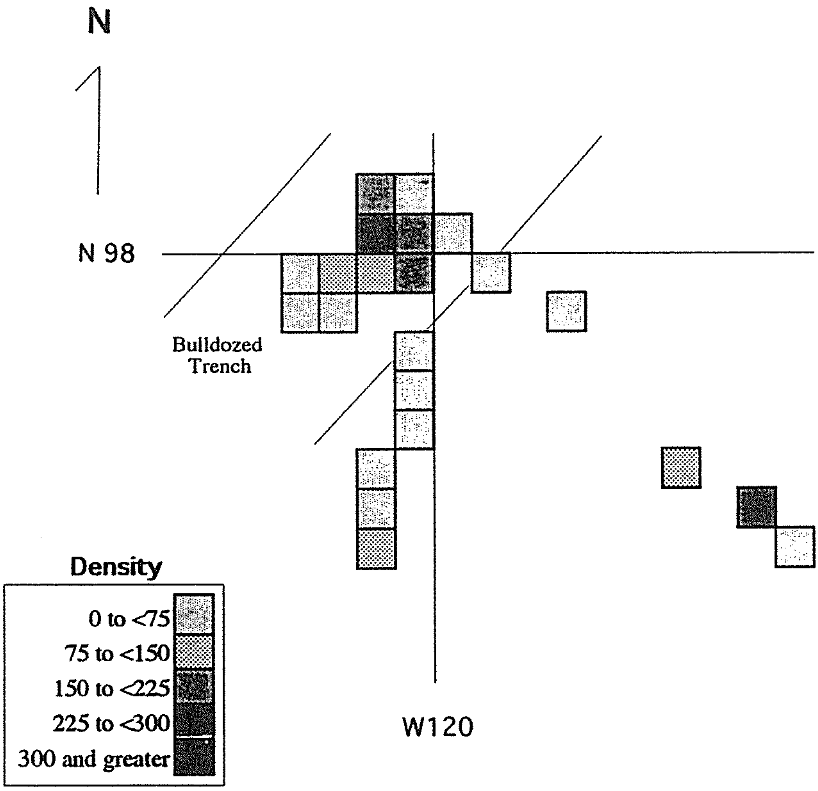


Figure 26. Plan showing horizontal distribution of *Helicina* as densities (No./m^3) in selected units.

of the midden. This may be a coincidence, or it may indicate that the sites are examples of similar formational processes.

Goode (1991) identified a central hearth at 41UV86, but no such feature was recognized at the Mingo site. Like the Mingo site, 41UV86 contained very little faunal material, and Goode (1991) speculates that plant processing may have been a significant contributing factor to the formation of the midden. The two grinding slabs recovered at the Mingo site suggest that processing of vegetal matter took place during part of the site's occupation.

Unfortunately, the artifacts at 41UV86 and at the Honey Creek site (41MS32), which is apparently similar, have not yet been examined in detail (Goode 1991). In a somewhat cursory examination of the dart points from 41UV86 and 41MS32, Goode (1991:82) describes "a small side-dart point . . . [which] . . . resembles Frio and Ensor and is the kind of point common in the Late/Transitional Archaic" from 41MS32, and states that a similar point was recovered at 41UV86. At the Blue Hole site, Mueggenborg (1991) noted that of his four varieties of Frio/Ensor points, Group 2 was found almost exclusively in excavation levels containing Late Prehistoric arrowpoints. Interestingly, Henderson (n.d.), although referring to them as arrowpoints, describes two projectile points from the Rainey site that seem to be very similar to the points discussed by Goode and to Mueggenborg's Group 2 Frio/Ensor points.

The Rainey site, 41BN33, is a sinkhole that was excavated by the Texas Department of Highways and Transportation in 1978 (Henderson n.d.) and is only 3 km northwest of the Mingo site. The site was well stratified and carefully excavated, allowing Henderson (n.d.) to examine the stratigraphic relationships of Edwards, Perdiz, Sabinal, and Scallorn points. Henderson (n.d.:634) divided the deposits into Lower Austin, Upper Austin, and Toyah phase occupations. The Lower Austin phase zones contained only Edwards points, except for one Sabinal point in the latest occupational lens and two expanding-stemmed arrowpoints in the earliest lens. The Upper Austin phase zones contained Sabinal and Scallorn points in the earliest lens, Edwards and Scallorn in the middle lens, and Edwards points in the latest lens (Henderson n.d.: 634).

The two expanding-stemmed arrowpoints found in the earliest lens in association with an Edwards point appear to be similar, at least in outline and size, to the Transitional Archaic dart points recovered at the Mingo site, particularly to Frio points UI 1 and 24. Although Henderson (n.d.:514) states that the two points bear "some resemblance to the Figueroa dart point type," the weak shoulders and concave base of the outline of the one specimen that was included in a rough draft of the Rainey site report looks more like a Fairland or Frio point. It is possible that dart points and arrowpoints were coeval for some time during the Transitional Archaic and/or early Late Prehistoric periods in Bandera and surrounding counties. Zone VII at the Rainey site (Henderson n.d.), the Heard Schoolhouse site, the Honey Creek site (Goode 1991), the Blue Hole site (Mueggenborg 1991), and the Mingo site are examples of sites where this relationship may have existed. Henderson (n.d.: 630) notes that "it is tempting to suggest that a new phase be defined on the basis of crude dart-point-like, expanding-stemmed arrowpoints and that this phase represents the transitional period between the Late Archaic and the Late Prehistoric Periods." Turner and Hester (1985:49) have recognized the Transitional Archaic, beginning around 300 B.C. and ending with the advent of the Late Prehistoric in A.D. 700. This period is marked by primarily Frio, Ensor, and Fairland dart points in south-central Texas (Turner and Hester 1985). Excavation of small sites like 41BN33 and 41BN101 may make it possible to identify even more discrete periods of time, such as one in which dart points and arrowpoints were being used simultaneously.

The Edwards has long been thought to be perhaps the first arrowpoint type to appear in the Edwards Plateau region of Central Texas (Sollberger 1967; Hester 1978; Mitchell 1978, 1982); it is clearly the earliest arrowpoint at the Rainey site, but the stratigraphic order of point types at the Mingo site is not clear. Two Edwards points were the only identifiable arrowpoints recovered from the deepest elevations in the bulldozed trench (Figure 13), but Scallorn points were the only identifiable arrowpoints recovered from the two deepest levels of the burned rock midden (Figure 14). Edwards, Sabinal, and Scallorn points were found in Level 2 of the midden and between 98.8 and 98.7 meters in the bulldozed trench.

The Late Prehistoric component at Scorpion Cave (41ME7) in Medina County included 88 Edwards points and only 16 Scallorn points (Highley 1978:150). Beasley (1978) reported on excavations at a site in northeastern Bandera County that had a similar ratio of Edwards to Scallorn points. At the Rainey site, 11 of the 17 identified points were Edwards, and only four were Scallorn points (Henderson n.d.). The ratio at the Mingo site is reversed: 15 Scallorn points and only six Edwards points were recovered. The implications of the differences in these artifact assemblages are unclear, but might be clarified by further investigation of the stratigraphic relations and the geographical distribution of the various Austin Phase arrowpoints.

Excavations of small sites such as 41BN101 should be an integral part of future research in Central Texas. They may provide useful analogies for the identification of activity components at larger sites (Dillehay 1973), and they may have discrete temporal components. This in turn may allow for the refinement of local and regional point type chronologies. Small burned rock middens with largely Late Prehistoric arrowpoints, represented by the Mingo site, sites described by Goode (1991), and sites excavated in the 1930s by Huskey (1935), may be manifestations of a distinct cultural innovation that is currently poorly understood.

ACKNOWLEDGEMENTS

The authors thank Thomas R. Hester and the TAS for the opportunity to excavate and report on 41BN101. The cooperation of the landowners, their assistance, and their kindness were greatly appreciated. We cannot thank Mrs. Mingo enough for her support, friendship, and generosity during our two weeks at 41BN101, and our gratitude is also extended to Roy Dickinson for his assistance and advice as the TAS area supervisor. Finally, we are indebted to the 25 participants in the 1990 TAS Field School who made the excavations possible; their patience and energy were invaluable.

REFERENCES CITED

Beasley, T. S.
1978 A Site with Edwards Points in Bandera County, Texas. *La Tierra* 5(4):23–31.

Blair, W. F.
1950 The Biotic Provinces of Texas. *The Texas Journal of Science* 2(1):93–116.

Collins, M. B.

1990 Archeological Sequence at Kincaid Rock Shelter, Uvalde County, Texas. In: *Transactions of the 25th Regional Archeological Symposium for Southeastern New Mexico and Western Texas*:25–32. Midland Archeological Society, Midland, Texas.

Dillehay, T. D.

1973 Small Archeological Site Investigations for Interpretation of Site Activites. *Bulletin of the Texas Archeological Society* 44:169–177.

Goode, G. T.

1991 Late Prehistoric Burned Rock Middens in Central Texas. In: *The Burned Rock Middens of Central Texas: An Archeological Symposium*, edited by T. R. Hester, pp. 71–93. Studies in Archeology 13. Texas Archeological Research Laboratory, The University of Texas at Austin.

Henderson, J.

n.d. Excavations at the Rainey Site, a Late Prehistoric Sink Hole Site in Bandera County, Texas. Texas State Department of Highways and Public Transportation, Publications in Archaeology, Report 33. Unpublished manuscript.

Hensell, J. L., G. W. Dittmar, and F. Taylor

1977 *Soil Survey of Bandera County, Texas.* United States Department of Agriculture. Soil Conservation Service, in Cooperation with the Texas Agricultural Experiment Station.

Hester, T. R.

1971 Archeological Investigations at the La Jita Site, Uvalde County, Texas. *Bulletin of the Texas Archeological Society* 42:51–148.

1978 Notes on the Edwards Arrowpoint Type. *La Tierra* 5(4):21–22.

1990 Summary of Archeological Investigations by the Texas Archeological Society Field School, Utopia, Texas, 1990. *Texas Archeology* 34(3).

Highley, L., C. Graves, and G. Judson

1978 Archeological Investigations at Scorpion Cave (41ME71), Medina County, Texas. *Bulletin of the Texas Archeological Society* 49:139–198.

Houk, B. A., and J. C. Lohse

1990 Excavations at the Mingo Site. Paper presented at the Texas Archeological Society Annual Meeting, Dallas.

Huebner, J. A.

1990 1990 Excavations at La Jita. Paper presented at the Texas Archeological Society Annual Meeting, Dallas.

Huskey, V.

1935 An Archeological Survey of the Nueces Canyon of Texas. *Bulletin of the Texas Archeological and Paleontological Society* 7:104–114.

Johnson, L., Jr., D. A. Suhm, and C. D. Tunnell (editors)
1962 *Salvage Archaeology of Canyon Reservoir: The Wunderlich, Footbridge and Oblate Sites.* Bulletin of the Texas Memorial Museum 5, Austin.

Lukowski, P. D.
1983 *Archaeological Investigations along the Leona River Watershed, Uvalde County, Texas.* Center for Archaeological Research, The University of Texas at San Antonio, Archaeological Survey Report 126.

Maslyk, P. M.
1990 Survey of the Sabinal River Valley in Bandera and Uvalde Counties, Texas. Paper presented at the Texas Archeological Society Annual Meeting, Dallas.

1993 Prehistoric Settlement Patterns in the Sabinal Valley, Uvalde and Bandera Counties, Texas. Unpublished M.A. thesis. The University of Texas at Austin.

Mear, C. E.
1953 Quaternary Geology of the Upper Sabinal Valley, Uvalde and Bandera Counties, Texas. Unpublished M.A. thesis, The University of Texas at Austin.

Mitchell, J. L.
1978 The Turtle Creek Phase: An Initial Late Prehistoric Component in Southern Texas. *La Tierra* 5(4):32–45.

1982 The Sabinal Point. *La Tierra* 9(4):1-6.

Mueggenborg, H.
1990 Excavations at the Blue Hole Site. Paper presented at the Texas Archeological Society Annual Meeting, Dallas, Texas.

1991 Excavations at the Blue Hole Site, Uvalde County, Texas, 1990. Unpublished M.A. thesis, The University of Texas at Austin.

Patterson, L. W.
1974 A Multiple Rock Midden Site. *La Tierra* 1(3):10–13.

Prewitt, E. R.
1974 *Archeological Investigations at the Loeve-Fox Site, Williamson County.* Texas Archeological Survey, Research Report 49.

1981 Cultural Chronology in Central Texas. *Bulletin of the Texas Archeological Society* 52:65–89.

1991 Burned Rock Middens: A Summary of Previous Investigations and Interpretations. In: *The Burned Rock Middens of Central Texas: An Archeological Symposium,* edited by T. R. Hester, pp. 25–32. Studies in Archeology 13. Texas Archeological Research Laboratory, The University of Texas at Austin.

Smith, L. L., and J. B. Hageman
1990 Excavations at the Smith Site. Paper presented at the Texas Archeological Society Annual Meeting, Dallas.

Sollberger, J. B.
1967 A New Type of Arrowpoint with Speculations as to its Origins. *The Record* 23(3):12–22.

Sorrow, W. M., H. J. Shafer, and R. E. Ross
1967 *Excavations at Stillhouse Hollow Reservoir*. Papers of the Texas Archeological Salavage Project 11. The University of Texas, Austin.

Suhm, D. A., and E. B. Jelks
1962 *Handbook of Texas Archeology: Type Descriptions*. Texas Archeological Society, Special Publications 1, and Texas Memorial Museum, Bulletin 4.

Turner, E. S., and T. R. Hester
1985 *A Field Guide to Stone Artifacts of Texas Indians*. Texas Monthly Press, Austin.

Van Auken, O. W., A. L. Ford, and J. L. Allen
1981 An Ecological Comparison of Upland Deciduous and Evergreen Forests of Central Texas. *American Journal of Botany* 68(9):1249–1256.

Wesolowsky, A. B., T. R. Hester, and D. R. Brown
1976 Archaeological Investications at the Jetta Court Site (41TV151), Travis County, Texas. *Bulletin of the Texas Archeological Society* 47:25–88.

Experiments in Pictograph Replication

Emery C. Lehnert

ABSTRACT

Several informal experiments were conducted to replicate endangered or vandalized prehistoric pictographs in the Lower Pecos Region. Various animal fats and plant oils seem to work well as emulsion binders to facilitate painting on porous limestone, and some paints also seem to harden the limestone, and thus may have served to help preserve the pictographs. More research is needed to improve our understanding of the prehistoric painting process and to learn more about how these unique pictographs can be properly preserved and replicated.

INTRODUCTION

When the Amistad Dam Project was begun in Val Verde County, Texas, on the International border between the United States and Mexico, new interest was sparked in the extensive Indian wall paintings, ranging from Paleoindian to Late Prehistoric age, in shallow shelters in cliffs and canyons that would be inundated by the lake. Similar sites were also known in the canyons of the Lower Pecos and Devils rivers and the Rio Grande just above the maximum lake level. Turpin (1991) has suggested a Middle Archaic age for the Pecos River Art Style, and believed it flourished in the San Felipe period, between 3000 and 4000 years ago; she has also demonstrated recently that the Lower Pecos Region extends further southward into northern Coahuila, Mexico (Figure 1) than had been previously realized.

The dry climate of this semiarid desert country has been responsible for the preservation of these enigmatic paintings, even though many of them are on the walls of open rock shelters. Some of the sites are now lost under the waters of Lake Amistad, and many others are readily available to boaters, so vandalism has become quite a problem (Labadie 1989). The natural exfoliation of the shelter walls appears to have been accelerated by the moisture from the lake; lake water evaporates into the air and condenses in the many cracks in the limestone walls and ceilings, detaching small flakes.

REPLICATION EXPERIMENTS

In an effort to preserve a record of these interesting paintings and in order to learn more about how and with what substances they were painted, I have been painting miniatures of various prehistoric wall paintings on small limestone slabs obtained from the strata in which the rock shelters are located. I use pigments dug

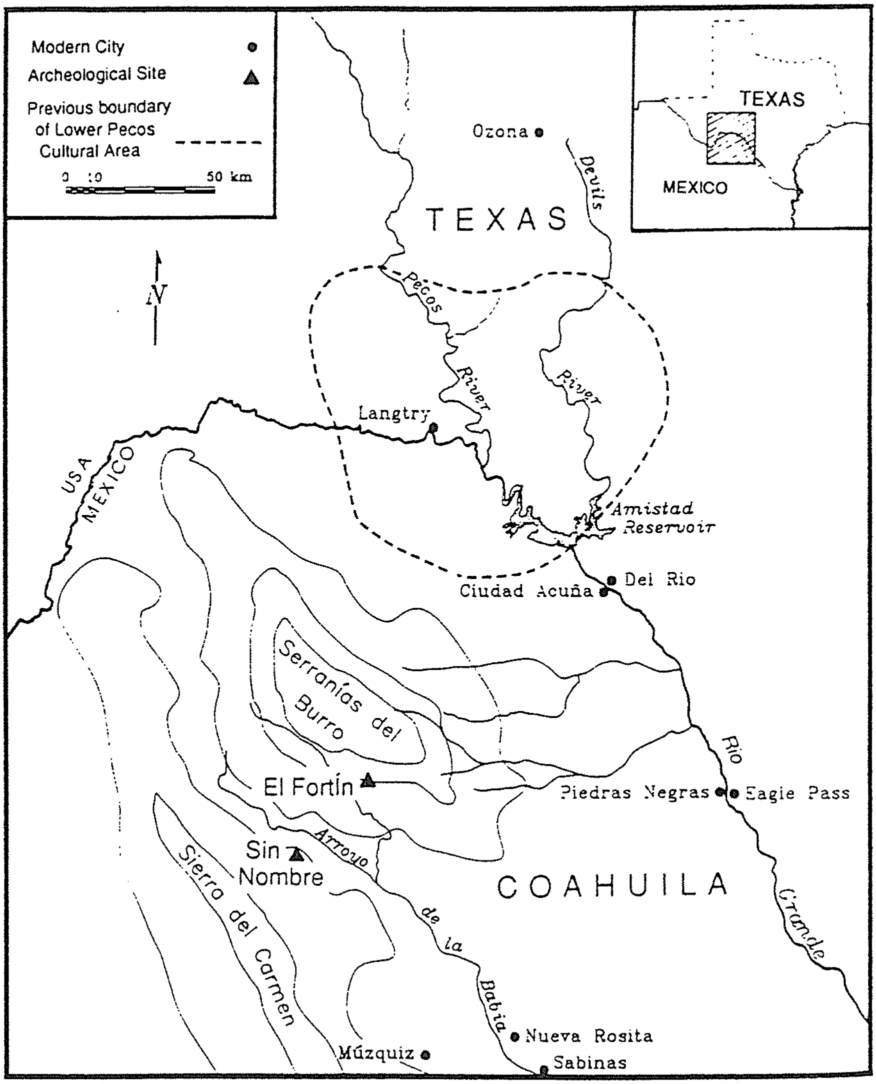


Figure 1. Map of the Lower Pecos Region of Texas and Mexico showing sites in the northern part of Coahuila (Turpin 1991:Figure 1; map reproduced by courtesy of S. A. Turpin and the Texas Archeological Research Laboratory).

from the same or similar sources as those used by the Indians, and have experimented with a variety of substances as emulsion binders.

Emulsion Binders

Among the various substances that were available to these prehistoric people for the manufacture of paint were: water, oily animal and bird fats, oils obtained from seeds, fish, or reptiles; eggs from wild birds in season, and juices from plants such as prickly pear *(Opuntia* var.) or leather stem *(Jatropha dioica)*. There is sound archeological evidence that these early Indians ate deer, antelope, buffalo, raccoon, beaver, muskrat, goose and ducks (Dibble 1967), and they may have used the fat from these animals and birds in emulsion binders for their paint (David S. Dibble, 1983 personal communication).

Beaver *(Castor canadensis)*, a very good source of easily obtainable oily fat, were abundant (and are still present) along the Rio Grande and the Pecos and Devils rivers. They were utilized to a great extent by the early Indians, as is evidenced by the quantity of both beaver, muskrat *(Ondatra gibethicus)*, and other mammal bones found in the occupation debris in caves such as Arenosa Shelter (Dibble, 1967 and 1985 personal communication).

The fat of the beaver forms a coat or layer 2 or more inches thick under its skin, and it is also abundant in the body cavity. Beaver fat, which is very greasy and oily, is so easily rendered that it is possible to squeeze out large quantities of oily liquid from a handful of fat. The fat of the raccoon *(Proycon lotor)* and of the muskrat *(Ondatra zibethicus)* is like beaver fat but is not found in such great quantities. In order to render the most oily fat from the beaver and similar animals the Indians might have hung the parts of the animal to be rendered in skin bags on wooden frames or put them in a tightly woven basket in a hole in the mud along a stream or river. They would have covered the animal parts with water and cooked them, causing the fats and oils to liquefy and float to the top, where they would have skimmed them off (Black Hawk, Koosharіam Paiute, 1966 personal communication).

It would have been possible for these people to grind sunflower seeds and other seeds high in oil content in stone mortars, then to separate out the oil by heating them in containers such as mussel shells on the coals of a fire.

Fish also contain a fairly high proportion of oil, primarily in their heads and eggs. The Indians could have gotten quantities of small fish by using wild gourd vines and green gourds *(Cucurbita foetidissima)* in season, or lechuguilla *(Agave lechuguilla)*, or black walnut hulls *(Juglans nigra)* as piscicides (there is some ethnographic evidence of fish poisoning by the Tarahumara Indians of western Chihuahua, Mexico). The toxic properties of these plants would have killed the fish so they could be dipped up and cooked whole in the same way beaver fat was cooked. The boiling process would release the fats in the fish and they would be skimmed from the surface.

Other sources of emulsion binders could have been fat from turtles and the intestinal tracts of snakes, both rendered in the same way as the fish; bird eggs also could have been used in season.

The juices in the leaves of certain plants such as the leaves of the Spanish dagger *(Yucca torreyi)* could also have been utilized. Juice is obtained from the yucca leaves by heating them in hot coals till they soften, then wringing them out as you would a dishrag. This juice is a clear, rather viscous liquid that takes colored pigments readily. The leather stem *(Jatropha dioica)*, also known in

Mexico as *Sangre de Dragón,* which means blood of the dragon, has sap in its roots that, although it is clear at first, gradually turns blood red on exposure to air and sunlight.

However, Indians of that time probably were as much opportunists as we are today and would have used the easiest obtainable substances, which would have been the oily fat renderings of the beaver, raccoon, or muskrat.

Tests and Observations

The shelters containing many of the Archaic Indian camp sites in the Amistad Lake area are in the thick-bedded, quite permeable Cretaceous limestone known as the Buda Formation. Water passes through the limestone quite easily, and seeps and springs in the caves carry other minerals that coat and stain the nearby cave walls.

While utilizing various paint emulsion binders, it was observed that the lighter oil- and grease-based paints appear to be carried into the pores of the rock surface more easily than are egg, plant juice, or heavy "suet" type paints. The capillary spaces and pores in the rock surface serve as the route for entry until the pigment fills the pores completely.

Red hematite is abundant in the Lake Amistad area; when ground to a powder and mixed with boiling hot rendered deer suet this mixture, in its liquid form, makes a good paint.

Vegetable fiber brushes were made from Narrow Leaf Yucca *(Yucca thompsoniana)* and Sotol leaves *(Dasylirion leiophyllum).* Archeological evidence of the use of Sotol leaf brushes has been reported from the Shumla Caves (Martin 1933). Brushes were made by chewing the ends of the leaves and scraping the soft tissues off of the fibers. It is very necessary to use these types of brushes with the hot animal fats since these plant fibers are stiffer and do not shrivel up from contact with the boiling hot fat as animal hair brushes do.

These early people had no ceramics, so they would have had to put the suetlike mixture in shells of fresh water mussels on coals in the fire, or melt it by boiling so the color could be mixed into it. When the suet is in its hot melted state, it takes the pigment well and makes good paint; however, it cools quickly. Melted deer suet, after being mixed with colored pigments, cooled, and hardened, makes a very serviceable crayon. The Indians could have rolled the cooling suet into a ball or made a lump of it as a type of crayon. The use of black manganese ore in a similar fashion at the Shumla Caves was also reported by Martin (1933).

Sunflower seed oil, the next substance tested, carried the pigment well and produced the kind of edge feathering so evident in many of the pictographs where the color along the edge of the painted line fades into the rock rather than remaining sharp.

An interesting effect is that this paint also hardens the surface directly underneath it. The oil base evidently carries the pigment into the rock pores until the pores are full, apparently making the area beneath the paint more dense than the unpainted surface. For example, the unpainted limestone is very soft and was easily scraped with a steel putty knife, but it took a tremendous amount of pressure to scrape the surface color off the painted sections. When the surface color had been removed, a "ghost" image remained in the stone, and the area beneath the ghost was so hard that a steel scraper would not remove it all, and the slab had to be split again to get down to a greaseless surface. In some prehistoric sites, such ghost images are found on the canyon walls. Possibly they have resulted from natural weathering, during which windblown dust and sand removed the colored pigments and left the ghost behind.

The absorption of the oil or grease carrying the pigment into the pores of the limestone may have helped preserve the pictographs on these cave walls, especially the ones that are covered with soot, charcoal, or spray paint. Ron W. Ralph and Kay Sutherland (1973) have outlined the steps taken with commercial cleansers to remove the spray paint, charcoal, and soot, without apparent harm to the pictographs. However, the hard rock at the Hueco Tanks differs greatly from the soft limestone of the Lower Pecos area.

Further work should be done here, following Ralph's and Sutherland's procedures, to see if the same results can be obtained on pictographs on the Lower Pecos limestone, but great care should be taken lest the chemicals in the cleaning agents remove the color from the rock pores or damage the pores of the rock surface. Some work was done along these lines by Silver in 1985 at Panther Cave, but more should be attempted (Silver 1985).

The ground or near-surface temperatures in the canyons during the summer are often above 110° F. Such heat, over a period of time, will warm both the walls inside the rock shelters and those of the cliff outside.

In an attempt to see if this heating contributed to the durability of the pictographs, the slabs of limestone with the paintings on them were placed in a standard electric oven set at 100° F for 10 to 15 minutes. The heating apparently sets the paint into the rock, so heating does have some bearing on the durability of the painted surface. This may explain why colors in pictographs that seem to be of the same type and age, range from dim to bright. It could be that all other conditions—weathering, emulsion binders, and abrasion by the elements—were equal, but that the dim pictographs were painted in the winter when the rock was cool, so the paint did not soak in so readily as it did when the rocks were warm.

Red ocher is the most abundant pigment found in this area; yellow ocher can be found in some places in thin layers between the thicker layers of limestone, and black manganese ore can be found in the upper Cretaceous gravels around Shumla Bend on the Pecos River. These are the three colors most used by the prehistoric people in painting the pictographs.

Michael Zolensky (1982) ran some tests on the pigments taken from pictograph paint in the Seminole Canyon State Park and found that many chemical elements were common to all of the paint samples tested.

Since the black pigment was found only in certain small areas, I decided to seek another source for the black color. Charcoal, the most easily obtained black substance, when mixed with animal fat or egg white, did not produce a lasting black paint; powdered charcoal tends to clump and does not mix evenly throughout the medium.

CONCLUSION

It is hoped that the information obtained in these informal experiments will be of use in further understanding prehistoric painting techniques and that some of the methods and materials used here may be of value in replicating pictographs for museum exhibits. Further experiments to test methods of cleaning, preserving, and stabilizing replicated rock art panels are needed before any work is done on the vandalized originals.

REFERENCES CITED

Dibble, D. S.
1967 *Excavations at Arenosa Shelter; 1965–66.* The University of Texas at Austin, Texas Archeological Survey Project.

Labadie, J. H.
1989 The Parida Cave Conservation Project 1987. *Bulletin of the Texas Archeological Society* 59(for 1988):83–109.

Martin, G. C.
1933 Archeological Explorations of the Shumla Caves. *Witte Museum Bulletin* 3. Witte Memorial Museum, San Antonio.

Ralph, R. W., and K. Sutherland
1973 Pictograph Conservation at Hueco Tanks State Historical Park. Presentation at Hueco Tanks State Historical Park, April 22, 1973.

Silver, C.
1985 The Rock Art of Seminole Canyon State Historical Park: Deterioration and Prospects for Conservation. *Texas Parks and Wildlife Department Contract Report,* Contract 340-299, Austin.

Turpin, S.
1991 Sin Nombre and El Fortín: Pecos River Style Pictographs in Northern Mexico. *Bulletin of the Texas Archeological Society* 60 (for 1989):267–281.

Zolensky, M.
1982 Analysis of Pigments from Prehistoric Pictographs, Seminole Canyon State Historical Park. In: Seminole Canyon, The Art and The Archeology, edited by S. Turpin. The University of Texas at Austin, Texas Archeological Research Laboratory *Report* 83.

The Archeology of Inland Southeast Texas: A Quantitative Study

Leland W. Patterson

ABSTRACT

This summary of the archeology of Inland Southeast Texas is based on computerized data base information from 182 published sites, and provides an overview of the current status of research on the prehistory of this subregion. Many of the conclusions are the same as in previous studies, but they are now supported more fully by quantitative data.

INTRODUCTION

It has been noted (Patterson 1988a) that the published data base for the archeology of Southeast Texas is now sufficiently large to support detailed studies and summaries of this region and its subregions. Unless the total published data base is used, resulting studies will be more impressionistic than rigorous. This is a quantitative summary of the archeology of Inland Southeast Texas, using a computerized data base and all of the generally available published literature for archeological sites in the subregion.

Inland Southeast Texas as defined here covers 21 counties (Figure 1), the same area used previously by the author for summary articles (Patterson 1979a, 1983) and a bibliographic series (Patterson 1986a) for Southeast Texas as a whole. Coastal margin sites, mainly *Rangia* shell middens, are not included in this current data base, but a separate data base for coastal margin sites may be developed in the future.

For the study of geographic distributions of artifact types, Inland Southeast Texas has been divided into three zones.

Eastern Zone: San Jacinto, Liberty, Chambers, Polk, Hardin, Jefferson, Jasper, Newton, Orange, and Tyler counties.

Central Zone: Grimes, Walker, Montgomery, Harris, and Galveston counties.

Western Zone: Wharton, Washington, Austin, Fort Bend, Brazoria, and Waller counties.

The data base for this study covers 182 published sites. A breakdown of sites by county can be made for 16 of the 21 counties (Table 1), but there are no publications for Inland type sites in Chambers, Galveston, Jefferson, Newton, and Orange counties, all of which border the coastal margin. There are 52 published sites in the Western Zone, 95 in the Central zone, and 35 in the Eastern Zone. The publications cover 43 excavated sites, 9 sites with data from both excavation and surface collections, and 130 sites with data only from surface collections.

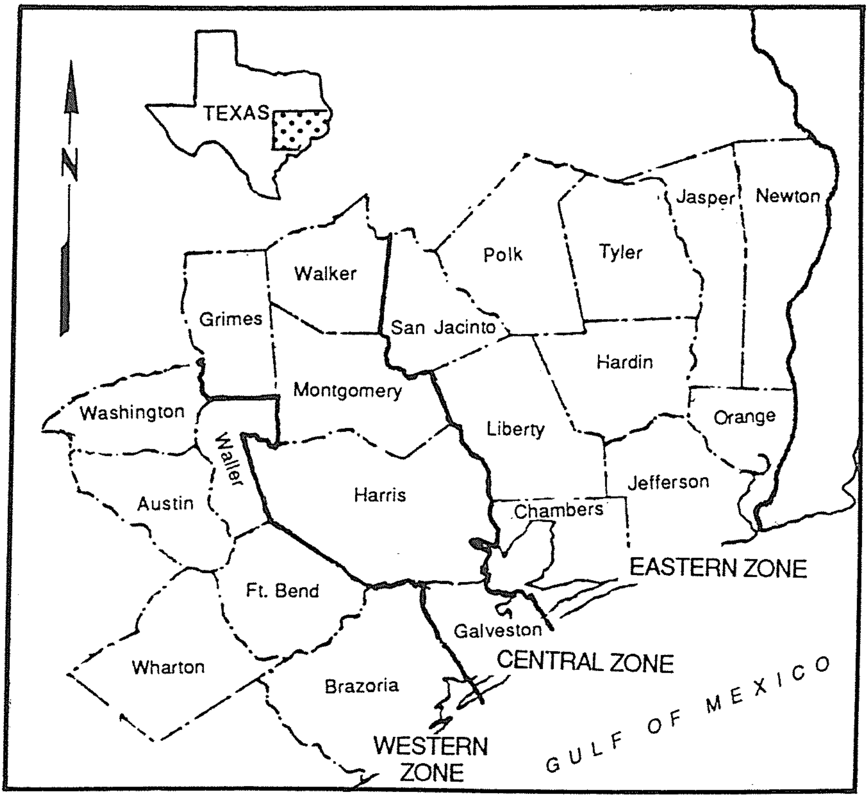


Figure 1. Map showing the geographic subregions of Inland Southeastern Texas

Every county in this subregion has some recorded sites for which no details have been published, so there is a need for more publication of recorded sites that have enough diagnostic data to justify publication; recorded archeological sites are often identified only by nondiagnostic materials such as chert flakes.

It can be seen (Table 1) that there has been no uniformity in archeological work in Inland Southeast Texas; the need for uniformity should be considered when planning future regional research. The pattern of archeological work in this subregion is a result of somewhat random selection; that pattern reflects where sites have been discovered, where contract archeology covering construction projects has been performed, and where members of the Houston Archeological Society have been able to do work.

The literature on Inland Southeast Texas has grown to a level where it is no longer possible to rely on memory or on a few published examples for research conclusions. For many archeological subjects in this geographic area, the entire body of published literature should be considered quantitatively; this approach requires tabulation of data. Once the decision has been made to tabulate large

Table 1. Summary of Published Sites by County

County		Number of Inland Sites
Austin		9
Brazoria		4
Fort Bend		15
Grimes		1
Harris		87
Hardin		1
Jasper		3
Liberty		14
Montgomery		5
Polk		10
San Jacinto		5
Tyler		2
Walker		2
Wharton		16
Waller		5
Washington		3
	TOTAL	182

amounts of data, the necessity for use of a computer is obvious. More time is required to enter data into a computer than would be needed simply to do a manual tabulation, but the computer data base has the advantage of making it possible (1) to produce new summaries easily, with revised and additional data, (2) to make complex queries quickly and easily, and (3) to make final printed tabulations easily.

Some summary articles have been published on the overall archeology of Southeast Texas (Patterson 1979a, 1983), but only the coastal margin of this region has been the subject of a detailed study (Aten 1983). This paper strives to make a detailed summary of the archeology of Inland Southeast Texas generally available.

The available data indicate that Inland Southeast Texas has been occupied for about 12,000 years, and detailed archeological data are available for occupation sequences dating since about 10,000 years ago in this subregion. The entire prehistory of Inland Southeast Texas is of a hunting and gathering lifeway. Technological changes occurred within this framework, but a rather stable settlement pattern seems to have been established.

Data are now available for the study of several topics relating to the archeology of Inland Southeast Texas: chronology, technological change, geographical distribution of artifact types, settlement patterns, and subsistence patterns. Some investigators tend to favor use of data from excavated sites, but all data from both excavated sites and surface collections must be considered if studies are to be complete.

This summary of data synthesizes several subjects for published sites in Inland Southeast Texas, but the detailed tabulation of data from each site and a corresponding publication list are too large for inclusion here. A separate report with a complete printout of the detailed data base will be published separately as a report of the Houston Archeological Society.

METHODOLOGY AND DATA BASE

This study has used all of the generally available published literature on archeological sites in this subregion. Some contract archeology reports have not been considered, since they are not always readily available. It would be useful if detailed abstracts of scientific data from contract archeology work were generally available (Patterson 1979b), since archeological data that are not generally available are essentially lost data. Even though unpublished site data from the Texas Archeological Research Laboratory (TARL) files were used for a previous summary of the Southeast Texas region (Patterson 1979a:Table 1), only published data are included in this study, since unpublished data generally do not contain enough detail to warrant the effort of tabulation. In any event, a substantial data base has been developed for this study.

Use of a computerized data base is ideal for this type of investigation; in this specific case, the Paradox relational data base program has been used with an IBM 50Z computer (a computer with a hard disk is advisable for this type of work). A relational data base allows linking of tables for complex queries; archeological site numbers are the link between tables in this specific data base.

The computerized data base used here has 12 tables: basic site data, projectile points (3 tables), ceramics, radiocarbon dates, lithic tools, general lithics, terrestrial faunal remains, aquatic faunal remains, miscellaneous artifacts and features, and mortuary data. Noncomputerized tabulation has been used for some artifact types with low frequencies.

CHRONOLOGY AND DEMOGRAPHY

The chronological periods used here are those used in a previous regional summary (Patterson 1979a). A few radiocarbon dates are available, but, in general, time periods have been established for each site on the basis of key projectile point and ceramic types. The small amount of data on the Early Paleoindian period has been discussed previously (Patterson 1979a, 1983) and will not be considered further here. This paper is concerned mainly with the details of the archeology of about 10,000 years in this subregion, from the start of the Late Paleoindian period until the start of the Historic Indian period.

The Late Paleoindian period is represented by San Patrice, Early Notched, Early Stemmed, Angostura, Plainview, Meserve, and Scottsbluff dart points. The Early Archaic period is represented by Carrollton, Trinity, and Bell points. The Middle Archaic is represented by Bulverde and Pedernales points, although some Gary and Kent points are also present. The Late Archaic and Early Ceramic periods share several projectile point types, including Gary, Kent, Ellis, Ensor, Yarbrough, Palmillas, and Darl. A few sites have Goose Creek Stamped pottery from the Early Ceramic period (Aten 1983:Figure 14.1); the Early Ceramic period in this region is represented by dart points and ceramics but no bifacial arrowpoints (unifacial arrowpoints may be present). The Late Prehistoric period has ceramics and bifacial arrowpoints, and some Historic Indian sites have glass and metal artifacts. For many of the published sites, estimates of time periods involved are those of the authors. A summary of projectile points for each time period already has been published (Patterson 1983:Table 1).

A summary of chronological data shows the time ranges and number of sites in Inland Southeast Texas for each time period, and a relative population factor is shown for each time period (Table 2). The relative population factor is the number of sites in a time period divided by the number of years in a period times 100 (Figure 2). The results for Inland Southeast Texas are similar to those of a previous study (Patterson 1986b) that used another data set, showing a rapid population increase in the Late Archaic and Early Ceramic periods and some population decrease in the Late Prehistoric. A complete explanation of population dynamics in this region has not yet been developed, but the relative population data given here are more complete than those in the previous study (Patterson 1986b) because data are now available for the Late Paleoindian and Early Archaic periods.

Table 2. Summary of Chronological Data

Period	Time Range Years BP	Length, Years	Number of Sites	Relative Population Factor*
Late Paleoindian	10,000-7000	3000	58	1.9
Early Archaic	7000-5000	2000	33	1.7
Middle Archaic	5000-3500	1500	70	4.7
Late Archaic	3500-1900	1600	104	6.5
Early Ceramic	1900-1400	500	120	24.0
Late Prehistoric	1400-500	900	125	13.9
Historic Indian	After 500	—	6	—

* The Relative Population Factor is the number of sites in a time period divided by the number of years in that period times 100.

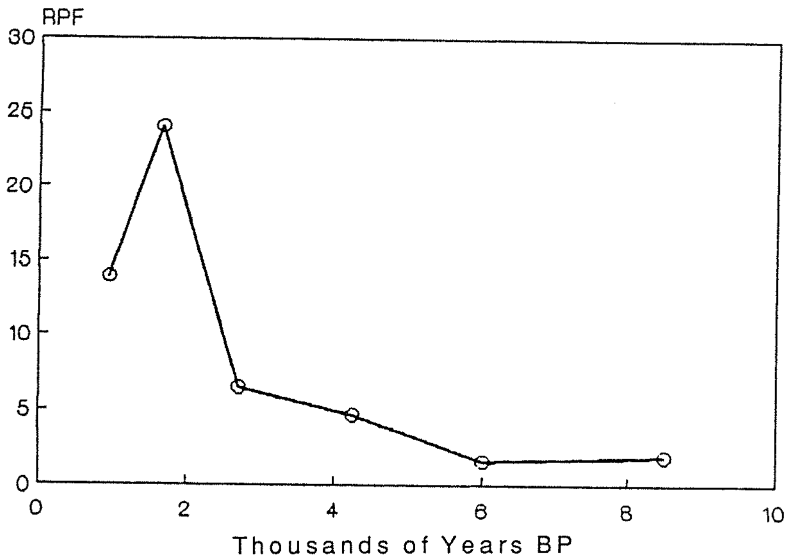


Figure 2. Chart showing the relative population changes of Inland Southeast Texas.

Settlement Patterns

It has been known for some time that most prehistoric sites in Inland Southeast Texas were along the banks of streams and small lakes, and that the number of sites with occupation components in multiple time periods evidence stable settlement patterns in this subregion over long periods of time (Patterson 1983).

For 16 sites in this study, occupation components have been identified for all time periods from Late Paleoindian to Late Prehistoric. This number increases to 27 if sites where the Early Archaic period is not firmly identified are included. Only 49 sites (27 percent) of the 182 sites in this study represent only a single time period, and more than half of the sites (73 percent) have occupation components from two or more time periods. These data indicate that there were stable settlement patterns with repeated use of sites in this region, in spite of the fact that prehistoric Indians here were generally nomadic.

Radiocarbon Dates

As noted above, most of the chronological placement of artifact types for Inland Southeast Texas is based on excavated artifact sequences and the chronology of artifact types in adjacent regions. Because of the small amount of data available on absolute dates for this subregion, only broad-range chronological periods have been considered. The starting dates for pottery and standardized bifacial arrowpoint types in Inland Southeast Texas are based on radiocarbon dating from sites on the coastal margin (Aten 1983).

Most radiocarbon dates published for Inland Southeast Texas are from counties in the Western Zone (Table 3), and these few radiocarbon dates do cover the complete time range of the Late Paleoindian through the Late Prehistoric periods. In general, chronological placement of artifact types found in radiocarbon-dated excavated levels has been consistent with previous estimates of the time periods involved (Patterson 1983:Table 1). Radiocarbon dates in Table 3 for site 41PK69 were added after other summaries were made, so this site is not included in the general statistics.

Table 3. Radiocarbon Dates from Inland Southeast Texas

Site	Date. (Years BP)	Sample Number	Time Period	Reference
41AU1	4530±80	Shell Dev. 8205-B1173	Middle Archaic	Fleming 1960
41AU36	4120±100	TX-2453	Middle Archaic	Hall 1981:49
	3270±70	TX-2127	Late Archaic	"
	2460±70	TX-2451	Late Archaic	"
	1650±70	TX-2452	Early Ceramic	"
41AU37	1070±60	TX-2125	Late Prehistoric	Hall 1981:103
	440±70	TX-2126	Late Prehist./Hist.	"
41AU38	450±70	TX-2065	Late Prehist./Hist.	Hall 1981:122
41FB34	5210±110	I-15510	Early Middle Arch.	Patterson 1989
41FB37	6690±120	I-15206	Early Archaic	Patterson 1988c
	6490±120	I-15333	Early Archaic	"
41PK69	6240±80		Early Archaic	Ensor & Carlson 1988
	4000±110		Middle Archaic	"
41WH19	9920±530	AA-298	Late Paleoindian	Patterson et al. 1987
	365±80	SI-6455	Early Historic	"

There is an obvious need for more radiocarbon dating in this subregion in order to refine chronological sequences. This should be an important goal to be considered in planning regional research. Excavation of more well-stratified sites is needed for establishment of more detailed chronological sequences, but, unfortunately, well-stratified sites are not common in this subregion.

Projectile Points

Data for Early Paleoindian Clovis and Folsom projectile point types are not considered in this paper because only a few specimens have been found in Inland Southeast Texas. A summary of Clovis point data has been published for the overall region (Patterson 1986c), and only one Folsom point has been reported (Patterson et al. 1987). The possibility of notched projectile points starting in the Early Paleoindian period has also been noted previously (Patterson and Hudgins 1985; Patterson et al. 1987). There is now a significant published data base for projectile point types in Inland Southeast Texas for all time periods after about 10,000 years ago, and a summary of these data is presented below.

Inland Southeast Texas has been divided into three zones for this study (Figure 1) because, as previously noted, there are east-west gradients in the concentrations of some projectile point types (Patterson 1983:Table 1, 1988b). Data summarized here show significant concentration gradients for geographical distributions of projectile point types in all prehistoric time periods. Inland Southeast Texas is a border area for technological traditions of the southern Great Plains and the woodlands of the Southeast (Jennings 1974:Figure 1.1).

The geographical distributions of early dart point types in this region (Table 4) shows that the Great Plains Paleoindian tradition is represented by Plainview, Angostura, Scottsbluff, and Meserve points; there is a definite east-west gradient for concentrations of Plainview and Angostura points. As would be expected, the highest concentrations of these point types are in the west. The eastern Paleoindian tradition is represented by San Patrice and Early Notched points; there is a decrease in frequency of San Patrice points to the west, and the frequency of Early Notched points seems to decrease eastward, a fact that is unexpected for this essentially eastern point type. This paradox may be due to the fact that the Early Notched point type has only recently been recognized in Inland Southeast Texas (Patterson and Hudgins 1985). Not much data is available for the distribution of Early Stemmed points, although this point type seems to occur with a higher frequency to the west in this region.

Webb, Shiner, and Roberts (1971) have shown that San Patrice and Early Notched points are found at the same site in Louisiana. In Inland Southeast Texas, 35 percent of sites with San Patrice points also have Early Notched points.

In the Early Archaic period, the Bell point of Central Texas is found in the Western and Central Zones of Inland Southeast Texas. Carrollton and Trinity points are found most frequently in the Central Zone, and the Wells point has a fairly uniform geographic distribution in this region.

In the Middle Archaic period, the Pedernales point of Central Texas is also found in Inland Southeast Texas with a significant east-west concentration gradient. As expected, most Pedernales points are found in the western half of Inland

Table 4. Early Dart Point Type Distributions

	ZONE							
	WESTERN		CENTRAL		EASTERN		TOTAL	
	Number		Number		Number		Number	
Point Type	Points	Sites	Points	Sites	Points	Sites	Points	Sites
	Paleoindian							
Plainview	28	13	28	9	0	0	56	22
Early Notched	41	9	35	12	3	2	79	23
Early Stemmed	11	3	6	3	0	0	17	6
San Patrice	15	5	48	17	42	12	105	34
Angostura	10	7	10	8	1	1	21	16
Scottsbluff	2	2	1	1	1	1	4	4
Meserve	1	1	3	2	1	1	5	4
	Early/Middle Archaic							
Bell	4	4	8	7	0	0	12	11
Carrollton	5	4	36	12	8	3	49	19
Trinity	1	1	15	7	0	0	16	8
Wells	6	5	4	4	5	2	151	11
	Middle Archaic							
Bulverde	31	13	57	14	43	17	131	44
Bulverde-like	26	5	3	2	0	0	29	7
Pedernales	56	18	14	11	1	1	71	30
	Middle/Late Archaic							
Morhiss	3	3	1	1	1	1	5	5
Williams	11	7	17	11	21	8	49	26

Southeast Texas. Determination of the distribution of Bulverde and Bulverde-like points in the Middle Archaic period poses a problem. As previously noted (Patterson 1988b), Bulverde-like points in Inland Southeast Texas may have evolved from classic Bulverde morphology, with Bulverde-like points often lacking the diagnostic wedge-shaped stem. Since the attributes of Bulverde and Bulverde-like points overlap, a definite conclusion cannot be made at this time on the geographic distributions of these similar point types in Inland Southeast Texas.

Morhiss and Williams points seem to occur during some parts of the Middle and Late Archaic periods in Inland Southeast Texas. The Williams point has a fairly uniform distribution throughout this region, but data on the Morhiss point are insufficient to support any conclusions.

The distributions of later dart point types (Table 5) show that the Late Archaic period is represented by several dart point types in Inland Southeast Texas. Gary and Kent points are major types for this period, but do not have much value for chronological placement, since they were made from the Middle Archaic through the Late Prehistoric (Hall 1981; Patterson 1983). Later Gary and Kent points tend to be smaller (Patterson 1980); they are distributed throughout this region, but are somewhat more numerous in the Eastern and Central Zones. Gary and Kent points form a series with overlapping attributes. Eighty percent of published sites with Kent points also have Gary points, and 66 percent of sites with Gary points also have Kent points.

Several other dart point types tend to be found with Gary and Kent points in the Late Archaic and Early Ceramic periods, including Ellis, Ensor, Palmillas, Yarbrough, and Darl types. Seventy-seven percent of sites with Yarbrough points, 74 percent of sites with Palmillas points, 74 percent of sites with Ellis points, 71

Table 5. Later Dart Point Type Distributions

	ZONE							
	WESTERN		CENTRAL		EASTERN		TOTAL	
	Number		Number		Number		Number	
Point Type	Points	Sites	Points	Sites	Points	Sites	Points	Sites
Gary	106	24	774	45	1080	33	1960	102
Kent	100	23	375	32	659	29	1134	84
Ellis	26	14	49	15	134	21	209	50
Ensor	36	13	15	6	69	19	120	38
Palmillas	17	7	84	15	118	24	219	46
Yarbrough	42	16	56	17	132	18	230	51
Darl	19	9	23	9	56	12	98	30
Triangular	12	5	7	4	3	3	22	12
Leaf Shaped	3	2	22	13	2	1	27	16
Travis	12	6	1	1	0	0	13	7
Marcos	7	6	3	2	0	0	10	8
Fairland	10	4	1	1	0	0	11	5
Pontchartrain	1	1	2	1	10	5	13	7
Evans	0	0	0	0	44	2	44	2
Lange	4	4	0	0	28	1	32	5
Motley	0	0	0	0	4	2	4	2

percent of sites with Ensor points, and 77 percent of sites with Darl points also have Gary and Kent points.

In the Late Archaic and Early Ceramic periods, several Central Texas dart point types that are found in the Western and Central Zones of Inland Southeast Texas, including Travis, Marcos, and Fairland types, have not been found in the Eastern Zone. Several Louisiana dart point types from the Late Archaic are found in Inland Southeast Texas. Evans and Motley points are found only in the Eastern Zone. The Pontchartrain point occurs mainly in the Eastern Zone, but a few specimens have been found in the Central and Western Zones.

Uniform classification of dart point types has caused this study a few problems, since published reports reflect the judgment of the individual investigators. In a few cases, obvious misclassifications have been corrected. Also, I am a "lumper" not a "splitter" for projectile point classification. For this study, Dawson points have been reclassified as Kent, Neches River side-notched as Ensor, Godley have been reclassified as Yarbrough, and Shumla have been reclassified as Bell. Classification of projectile point types here is generally consistent with previous classification studies (Suhm and Jelks 1962; Turner and Hester 1985).

Bifacial arrowpoints represent the Late Prehistoric and Historic Indian periods, although unifacial arrowpoints do occur earlier (Patterson 1980). A summary of arrowpoint distributions in Inland Southeast Texas (Table 6) shows that the chronologies of various arrowpoint types are poorly known. Radiocarbon dates establish the appearance of bifacial arrowpoints at about A.D. 600 (Aten 1983:306) in this region, but excavations (Patterson 1980) and surface collections (Patterson 1982) show that unifacial arrowpoints do occur significantly earlier; Cuney and Bulbar Stem arrowpoints have been associated with Historic Indian sites (Hudgins 1982).

As noted previously (Patterson 1986d), data from excavations show that Perdiz points, especially numerous in the Central and Eastern Zones (Table 6), were the dominant arrowpoint type throughout the Late Prehistoric in Inland Southeast Texas. Other arrowpoint types were used at some time in the Late Prehistoric in this region. The Scallorn arrowpoint, an early Central Texas arrowpoint type, was introduced to Inland Southeast Texas sometime after the Perdiz point. Scallorn points are found in much smaller numbers than the Perdiz point in Inland Southeast Texas. As expected, the Scallorn point has an east-west concentration gradient in this region, with the highest concentration to the west. Fresno, Edwards, Cuney, and Bulbar Stem arrowpoints also have distribution gradients with highest concentrations to the west in this region.

Some arrowpoints have highest frequencies to the east, including Catahoula, Alba, Bonham, and Bassett. Friley, Colbert, Livermore, Washita, and Maud arrowpoints have been found only in the Eastern Zone; the Livermore classification in a published report is problematical.

The geographical areas of distribution of distinctive functional artifact types such as projectile point and ceramic types represent areas of influence of technological

Table 6. Arrowpoint Type Distributions

	ZONE							
	WESTERN Number		CENTRAL Number		EASTERN Number		TOTAL Number	
Point Type	Points	Sites	Points	Sites	Points	Sites	Points	Sites
Perdiz	56	20	282	35	374	32	712	87
Scallorn	52	16	46	17	9	5	107	38
Catahoula	2	2	81	19	112	24	195	45
Alba	4	4	17	10	269	29	290	43
Bassett	0	0	2	2	25	7	27	9
Fresno	34	3	4	3	1	1	39	7
Cuney	34	3	0	0	3	2	37	5
Leaf Shaped	0	0	1	1	0	0	1	1
Edwards	4	4	2	2	0	0	6	6
Bonham	0	0	1	1	35	3	36	4
Bulbar Stem	10	2	0	0	0	0	10	2
Unifacial	3	2	155	18	7	1	165	21
Friley	0	0	0	0	27	10	27	10
Colbert	0	0	0	0	14	4	14	4
Livermore?	0	0	0	0	17	1	17	1
Washita	0	0	0	0	1	1	1	1
Maud	0	0	0	0	1	1	1	1
Guerrero	1	1	0	0	0	0	1	1

traditions not necessarily tied to limited social groups. The outer geographical boundaries of the distribution of a technological tradition can be influenced by variables such as cultural preferences, movements of groups, trade, and transfer of band members. In any event, the distribution gradients for the concentrations of artifact types in Inland Southeast Texas seem to reflect increasing or decreasing influences of different technological traditions, sometimes even representing Southeastern or southern Great Plains influences. Some technological traditions can have wide geographic distributions—e.g., the Clovis point tradition found throughout most of the United States or the San Patrice-Hardaway Late Paleoindian point tradition found throughout the entire southeastern United States (Justice 1987:Map 14).

Ceramics

A summary of distributions of ceramic types in Inland Southeast Texas (Table 7) shows that ceramic types are not too useful for establishing chronological sequences in this subregion. Aten (1983 Figure 14.1) has published a ceramic type sequence for the Galveston Bay area that has only limited use for Inland studies; the ceramic classification used here generally follows Aten's (1983) typologies.

Goose Creek Plain sandy paste pottery is the dominant type in all zones of Inland Southeast Texas. This type was probably made throughout the entire time span of ceramics in this region (see Aten 1983:Figure 14.1). Goose Creek Incised

Table 7. Ceramic Type Distributions

	ZONE							
	WESTERN Number		CENTRAL Number		EASTERN Number		TOTAL Number	
Pottery Type	Sherds	Sites	Sherds	Sites	Sherds	Sites	Sherds	Sites
Goose Creek Plain	1754	33	7608	55	10114	9	19476	97
Goose Creek Incised	21	8	77	17	114	5	212	30
Goose Creek Stamped	0	0	8	4	0	0	8	4
Conway	22	5	122	9	0	0	144	14
Rockport Plain	4835	2	2	2	5	1	4842	5
Rockport Decorated	3220	4	0	0	0	0	3220	4
Bone Tempered	74	11	139	9	180	6	393	26
San Jacinto Plain	133	7	107	12	501	7	741	26
San Jacinto Incised	2	2	5	3	126	5	133	10
Tchefuncte	0	0	2	2	0	0	2	2
Lace Holes	1	1	28	7	9	1	38	9
Marksville Stamped	0	0	0	0	5	1	5	1
Caddo	1	1	16	3	206	5	223	9

pottery is not common, at about 1 percent of all Goose Creek pottery, and a few sites have Conway pottery, which is like Goose Creek except that it has coarse sand. On at least some sites, there is a question as to whether the coarse sand was intentionally added as temper or occurred naturally in the clay. A few sherds of Goose Creek Stamped pottery, which Aten (1983:Figure 14.1) classifies as an Early Ceramic period type, have been found in the Central Zone.

Rockport Plain (with or without asphalt coating) and Rockport Asphalt Decorated pottery are found in significant quantities at a few sites in the Western Zone of Inland Southeast Texas. This seems to indicate occasional Inland occupations by Indians from the adjacent coastal margin. A few asphalt coated sherds have been classified as Rockport in the Central and Eastern Zones.

Bone-tempered pottery occurs in all zones but is not very common. At one excavated site in Harris County (Patterson 1980), bone tempered pottery seems to appear in the Early Ceramic period, unlike the Galveston Bay area, where bone tempered pottery is a Late Prehistoric type (Aten 1983:Figure 14.1).

San Jacinto grog (sherd) tempered pottery is not common at Inland sites in this region, but it does occur in all zones. Aten classifies San Jacinto pottery as a Late Prehistoric type on the coastal margin. Presence of this pottery type at a few Inland sites may indicate occasional occupations of the Inland area by Indians from the coastal margin or, possibly, transfer of women to Inland groups. San Jacinto Incised pottery is much less common than San Jacinto Plain. A few sherds were found at sites in Austin, San Jacinto, and Polk counties that had both grog and bone tempering.

A few sherds of early Tchefuncte and Marksville Stamped pottery types of Louisiana have been found in Inland Southeast Texas. These are a possible indication of technological influences from Louisiana in the early days of pottery-making in Inland Southeast Texas. Marksville Stamped has been found only in the Eastern Zone adjacent to Louisiana, and the two specimens of Tchefuncte found in the Central Zone may not be correctly identified, since Tchefuncte is classified mainly by the contorted consistency of the paste.

A few specimens of Caddo pottery types have been found at sites on the northern edge of Inland Southeast Texas, mainly in Montgomery, Polk, and San Jacinto counties, indicating that the northern edge of Inland Southeast Texas was probably the southern limit of significant Caddo influences in the Late Prehistoric period.

It has been noted previously that Late Prehistoric sites tend to have less pottery than Early Ceramic sites in Inland Southeast Texas (Patterson 1976, 1980). In this study, 21 sites with only Late Prehistoric components average 16 sherds per site compared to 210 sherds per site at 100 sites that have both Early Ceramic and Late Prehistoric components. This is another indication that pottery was used less during the Late Prehistoric than during the Early Ceramic period. The decline in the use of ceramics in the Late Prehistoric might be a reflection of a more mobile lifestyle (Patterson 1979a, 1983).

Lithic Tools

Formal chipped stone tool types are not numerous on most sites in Inland Southeast Texas (Table 8); unretouched utilized flakes are the most common tools in most lithic collections in this region. Only 30 percent of the 182 published sites in the data base have scrapers, 12 percent have bifacial knives, 25 percent have gravers, 10 percent have unifacial perforators, and 13 percent have bifacial perforators (drills). Other formal tool types occur in even lower frequencies.

Inset blades (Table 8) may have been used as compound arrowpoint elements, much as they were used in the Eurasian Mesolithic (Patterson 1982:19-22).

Table 8. Lithic Tool Type Distributions

	ZONE							
	WESTERN		CENTRAL		EASTERN		TOTAL	
	Number		Number		Number		Number	
Tool Type	Tools	Sites	Tools	Sites	Tools	Sites	Tools	Sites
Scraper	294	15	433	36	45	3	772	54
Notched tool	0	0	39	12	2	1	41	13
Denticulate	10	4	19	10	0	0	29	14
Bifacial knife	18	8	272	11	58	2	348	21
Graver	59	12	223	31	22	3	304	46
Scraper-graver	9	1	2	2	0	0	11	3
Uniface perforator	11	2	91	16	1	1	103	19
Biface perforator	54	10	49	9	40	4	143	23
Stemmed scraper	3	2	2	2	0	0	5	4
Chopper	6	3	79	5	3	1	88	9
Gouge	1	1	0	0	1	1	2	2
Corner tang	4	3	0	0	0	0	4	3
Inset blade	0	0	146	9	5	1	151	10

Combination scraper-gravers and stemmed scrapers tabulated here seem to be associated with the Late Paleoindian period. Scraper-gravers are common in Paleoindian lithic assemblages (Irwin and Wormington 1970) and were found in the Late Paleoindian excavation levels of site 41WH19 in Wharton County (Patterson et al. 1987). Webb, Shiner, and Roberts (1971) have reported stemmed side-notched scrapers at a Late Paleoindian site in Louisiana, and a stemmed side-notched scraper was found in the Late Paleoindian excavation level at Site 41FB42 in Fort Bend County (L. W. Patterson, notes).

General Lithics

A tabulation of general lithics from sites in Inland Southeast Texas (Table 9) shows that small flakes measure less than 15 mm^2 and large flakes are over 15 mm^2. The main reason for tabulating lithic flakes here is to show that fewer than half of the reports on sites in this subregion have quantitative data on lithic flakes, making it clear that the details of lithic manufacturing are poorly reported for many sites.

Table 9. General Lithic Type Distributions

	ZONE							
	WESTERN Number		CENTRAL Number		EASTERN Number		TOTAL Number	
Lithic Type	Items	Sites	Items	Sites	Items	Sites	Items	Sites
Small flake	23843	20	35983	56	0	0	59826	76
Large flake	12551	23	24216	62	2245	2	39012	87
Large blade	55	3	105	15	0	0	160	18
Small blade	29	4	1146	36	22	1	1197	41
Blade core	5	2	122	19	0	0	127	21
Misc. core	331	11	187	23	45	1	563	35
Heat treating	—	8	—	35	—	1	—	44
Exotic flint	—	4	—	3	—	0	—	7
Hammerstone	37	9	126	17	32	4	195	30
Chert cobble	125	3	89	10	0	0	214	13

Large prismatic blades (more than 15 mm wide) are not numerous and seem to be associated mainly with early occupation periods. Sixty-one percent of sites with large blades have Paleoindian components.

As noted previously (Patterson 1973), several sites in this subregion have industries for the manufacture of small prismatic blades (less than 15 mm wide). Small prismatic blades can be made fortuitously as well as purposefully, but many of the sites tabulated here have polyhedral blade cores as well as small blades, thus demonstrating a purposeful manufacturing process. Small blades were used to manufacture unifacial perforators, inset blades, unifacial arrowpoints (Patterson 1973, 1982), and sometimes blanks for the manufacture of bifacial arrowpoints.

The main lithic raw materials in this region are chert cobbles and petrified wood pieces found in the alluvial deposits in drainage basins of rivers such as the Brazos; large numbers of chert cobbles and miscellaneous chert cores are not found on most archeological sites in this subregion. General types of chert cores were reported in only 19 percent of published sites, and chert cobbles were reported in only 7 percent of published sites (Table 9). This indicates that primary reduction was commonly done at the source of the raw material, in order to make the lithic materials easy to transport. Primary reduction at the source also permitted testing for selection of high quality materials.

Heat treating of lithic materials to be used for the manufacture of dart points was widespread. Only 24 percent of published sites showed that heat treating was used, but many site reports did not consider heat treating at all. Heat treating may not have been used as much for petrified wood as it was for chert. The area with the lowest incidence of heat treating (the Eastern zone) corresponds to the area of highest use of petrified wood for dart points. Exotic flint from the Edwards Plateau has been found in small quantities in a few sites.

Small numbers of hammerstones are found throughout this subregion. In some cases, favorite hammerstones may have been curated by Indians and taken from site to site. Most hammerstones are of quartzite, but a few are of limestone, which is a good material for use as a soft percussor for bifacial thinning.

Faunal Remains

Faunal preservation is generally poor at sites in Inland Southeast Texas, due to acidic soil conditions. However, terrestrial faunal remains have been reported at 44 sites (Table 10) and aquatic faunal remains at 26 sites (Table 11); there are enough data to provide a fairly good picture of faunal subsistence patterns in this subregion. As noted previously (Patterson 1983), Indians in the Southeast Texas region were rather omnivorous, utilizing many types of small and large animals, probably according to availability on a day-to-day basis. At a few sites with freshwater shell middens, including site 41FB37 (McClure 1987), preservation of faunal remains has been good. However, preservation of floral remains in this region is practically nonexistent.

Deer and turtle were the most commonly used faunal food resources; bison was utilized when available. As Dillehay (1974) has noted, bison was generally available only during certain times on the Southern Plains. Data from excavated sites in this region support Dillehay's statement (Wheat 1953; Patterson et al. 1987). All data on faunal remains, from the earliest at 10,000 years ago (Patterson et al. 1987) to more recent times (Hall 1981) indicate a broad-based faunal subsistence pattern over the entire period of prehistoric habitation of Inland Southeast Texas.

The use of freshwater shellfish is neither geographically nor chronologically uniform in this subregion. Apparently, availability of significant quantities of shellfish was limited to certain local areas and to certain time periods. Along the San Bernard River, the greatest use of shellfish was during the Archaic period, with enough shell at some sites for classification as shell middens. The oldest radiocarbon date for a shell midden in this area is 6690±120 years BP (Patterson 1988c). Of the 22 sites with reported freshwater shellfish remains,

Table 10. Summary of Terrestrial Faunal Remains from 44 Sites

Species	Number of Sites	Percent of Sites
Deer	31	70
Land turtle	31	70
Snake	5	11
Rat	5	11
Land bird	7	16
Bison	14	32
Rabbit	13	30
Gopher	8	18
Skunk	3	7
Mouse	2	5
Raccoon	5	11
Opossum	9	20
Badger	2	5
Antelope	4	9
Squirrel	3	7
Beaver	3	7
Bear	2	5
Mink	1	2

17 are in the Western Zone, 4 are in the Central Zone and 1 is in the Eastern Zone.

Among other aquatic faunal resources used were alligator, pond turtle, frog, and several types of fish. The shark teeth and stingray spines found at Inland sites are from marine species of the coastal margin that were imported to Inland sites for nonutilitarian uses.

Miscellaneous Artifacts and Features

Among the miscellaneous items from sites in Inland Southeast Texas (Table 12) are fired clayballs, found at 31 sites; clayballs formed definite hearth features at five sites. Purposely made clayballs generally are rounded and are uniformly fired on all surfaces. These artifacts, which are generally associated with cooking, are found in sites in Inland Southeast Texas of all prehistoric time periods (Patterson 1986e).

Hearths were reported at 12 sites in this subregion: five sites had hearth features made of clayballs, three sites had stone hearths, one site had a hearth made of

Table 11. Summary of Aquatic Faunal Remains from 26 Sites

Species	Number of Sites
Clam	22
Alligator	6
Water bird	4
Pond turtle	7
Gar	13
Miscellaneous fish	8
Frog	6
Shark teeth	2
Catfish	7
Drum	6
Bass	3
Bowfin	5
Sunfish	1
Stingray spines	1

clayballs and caliche pieces, and for hearths at three sites little specific information is available except for the presence of baked soil and traces of charcoal. Hearths made of clayballs were found in all zones, but hearths made of stone were found only in the Western Zone, where there are outcrops of sandstone.

Pieces of asphalt, which were found at seven sites, occurring randomly in all zones, were used to haft projectile points and to coat pottery. Sandstone pieces that could have been used as abraders were found at 14 sites in all three zones. At two other sites, sandstone pieces were definitely classified as abraders. In addition, grooved stone pieces that are sometimes classified as shaft straighteners were reported at six sites. Manos were reported at nine sites, and metates were reported at nine sites, but manos and metates were not always found together as complete grinding sets.

Ornamental items such as beads, pendants, and incised bone were found most often at burial sites; five of the seven sites with beads were burial sites. Three sites had bone beads, one site had shell beads, two sites had shell and bone beads, and one site had shell and stone beads. The stone beads found at one site (41FB42, L. W. Patterson, notes) were made of exotic materials. Boatstones made of exotic materials were found at four burial sites, all in the Western Zone. Incised bone objects were found at five sites in the Western Zone; four of these sites had burials and the other site had a possible burial. Pendants were found at seven sites, but shell pendants were found at only four burial

Table 12. Distributions of Miscellaneous Artifacts and Features

Item	Number of Sites	Number of Items
Clayball	31	18426
Hearth	12	
Clayball hearth	5	
Stone hearth	3	
Clayball-caliche hearth	1	
Unspecified hearth	3	
Red ochre	13	169
Asphalt	7	
Sandstone	14	
Incised bone	5	
Grooved stone	6	6
Mano	9	14
Metate	9	46
Beads. total sites	7	
Shell beads	4	
Bone beads	5	
Stone beads	1	
Pendant		
Stone pendant	3	
Shell pendant	3	
Bone pendant	1	
Bone tool	8	
Atlatl weight (Bannerstone)	3	4
Boatstone	4	
Fishhook	1	
Bone projectile point	3	
Bone needle	1	

sites—one of these sites also had ground stone pendants (gorgets) made of exotic materials. One pendant was found at each of three sites that did not have burials, made of chert, sandstone and bone.

Some types of artifacts are rather rare in this subregion. Four atlatl weights (bannerstones) of exotic ground stone materials were found on three sites. Fishhooks and bone needles were found at one site, bone tools were reported at eight sites, and bone projectile points at three sites. The low frequency of functional bone items is due at least in part to poor preservation.

Mortuary Data

The data on mortuary features at sites in this data base are not intended to be used for detailed studies of mortuary practices in this region, but rather as a general guide to the extent of data available on various burial types, locations, and time periods for Inland Southeast Texas (Table 13). The computer data base also has entries for burial configuration.

Table 13. Summary of Inland Mortuary Sites

Site	Nos. of Burials	Grave Goods?	Violent Death?	Disease?	Zone	Time Period
41WH14	11	yes	yes	yes	W	Archaic
41AU1	NA	yes			W	Archaic?
41WH39	31	yes			W	Archaic
41AU36	238	yes	yes	yes	W	Archaic/post-ceramic
41FB13	19	yes			W	Archaic
41AU55	3	yes			W	Archaic
41FB42	4	yes	yes		W	Archaic
41AU37	9	yes		yes	W	Archaic/post-ceramic
41WH19	1			yes	W	Post-ceramic
41HR5	4				C	NA
41HR7	3				C	NA
41PK8	3				E	NA

Most of the available mortuary data is for the Western Zone. Two small burial groups have been reported in the Central Zone (Harris County) and one small burial group has been reported in the Eastern Zone (Polk County). A single post-ceramic burial has been reported at a site in the Western Zone (Wharton County). All other burial data in the Western Zone are for multiple burials.

The only sites containing significant grave goods are in the Western Zone. These sites are associated with an Archaic period burial tradition as noted by Hall (1981) and Highley et al. (1988:Figure 1), involving elaborate grave goods, often made of exotic materials. Hall (1981) has shown that grave goods decrease significantly in post-ceramic burials. Grave goods from sites in the Archaic burial tradition of the Western Zone include items such as large corner-tang bifaces, boatstones, incised bone objects, shell, bone and stone beads, stone and shell pendants, shark teeth, and stingray spines. The Western Zone burial tradition implies a higher degree of social organization than is apparent in other zones in

Inland Southeast Texas. The only other elaborate burial tradition in this region is a postceramic tradition found on the coastal margin (Aten 1983). It could be postulated that this higher degree of social organization was supported by its location in an area of good natural food resources between the Colorado and Brazos rivers.

EXTERNAL RELATIONSHIPS

Data for prehistoric external relationships of this subregion are of two types: one type is a broad technological tradition such as projectile point and pottery types; the other type is of a short-term nature and involves evidence of long-range exchange systems using exotic materials. Broadly distributed technological traditions have been discussed above, especially in relation to the Eastern Woodlands and Southern Plains technological traditions.

Evidence for long-range exchange of materials within this region is found mainly as grave goods of the Archaic burial tradition of the Western Zone. Shell beads, shell pendants, shark teeth, and stingray spines are indications of contacts with the coastal margin. Hall (1981) has discussed the widespread geographic distribution of shell ornaments. The large corner-tang bifaces found in the Western Zone seem to have come from Central Texas, which is the center of concentration of this type of artifact (Turner and Hester 1985:210).

There is a possibility that ground stone objects found in the Western Zone Archaic burial tradition represent part of the widespread Poverty Point Culture exchange system described by Webb (1982:68). Boatstones, bannerstones, tubular stone beads, and stone gorgets found in the Western Zone are well known artifact types in the Poverty Point Culture (Webb 1982:Figures 28, 29). The Poverty Point Culture is well known for both long-range trade and a lapidary manufacturing industry. It has been noted that the Poverty Point Culture has most of the dart point types found in Inland Southeast Texas (Patterson 1975). Counter exchange from Texas with the Poverty Point Culture may have involved lithic raw materials and finished chipped stone items such as projectile points.

Bone fishhooks found at site 41AU1 in Austin County (Duke 1982:6) are similar in both form and manufacturing methods to Archaic fishhooks found at the Horn Shelter No. 2 site in Central Texas (Redder 1985:Figure 8).

Major river systems may have served as cultural exchange routes, promoting contacts between regions. Inland Southeast Texas has several major rivers that run from the north or northwest: the Colorado, Brazos, San Jacinto, Trinity, Neches, and Sabine rivers. The Colorado and Brazos river systems seem to have been important as routes for contacts between Southeast and Central Texas, but there are few artifact types that could show contacts between Northeast and Inland Southeast Texas in the same manner that projectile point and flint types show contacts between Central and Inland Southeast Texas. This is probably because the technological traditions of Northeast and Inland Southeast Texas are fairly similar, except for the Caddo Culture.

DISCUSSION

This summary of a data base for Inland Southeast Texas presents a good general picture of the current status of research in this subregion. For example, more details are now available on geographic distributions of artifact types to represent technological traditions. Enough data are now available to support research on several topics concerning the archeology of this subregion that have not yet been addressed in detail. As mentioned above, the complete current data base will be published, and it will be revised as new data become available.

In general, previous conclusions made in summaries of the Southeastern Texas region (Patterson 1979a, 1983) are supported by the more detailed information now available in this data base. For example, previous conclusions on population dynamics and the decline of pottery use in the Late Prehistoric still seem to be valid. Some aspects of the prehistory of this subregion, such as faunal subsistence and general settlement patterns, are now fairly well outlined, although the nature of seasonal patterns remains poorly understood. More detailed chronologies need to be developed here for artifact types, in order to make it possible to address several other research problems in more detail.

The amount of data available on the archeology of Inland Southeast Texas is especially impressive when it is noted that most of these data have been developed in only the last 20 years, and at a minimum expenditure of public funds; few of the publications for sites in this data base are dated before 1970.

Regardless of any regional research planning that is done, professional work in this subregion will probably continue under the vagaries of contract work carried out in connection with construction projects. This means that the types of sites and geographic areas will not be closely coordinated with any regional research plan. It is hoped that more contract work will be done in the future on well-stratified sites. The development of more detailed chronological sequences and more geographically uniform data should be major goals in future regional research planning. The role of avocational archeologists will continue to be important in this region, especially for research involving sites on private land (Patterson 1988d:380). Well over half of the publications for Inland Southeast Texas sites have been written by avocational archeologists.

SUMMARY

This paper has presented a quantitative summary of a data base for published archeological sites of Inland Southeast Texas. It is hoped that this summary and the detailed data base, which will be published separately, will be useful for research in this region and for the orientation of Inland Southeast Texas in the general prehistory of Texas. Since this data base will be revised as new data become available, there should be no time limitation on its value. Because of the large amounts of data available, a tabulated data base has become an essential tool for regional research planning, execution, and synthesis.

REFERENCES CITED

Aten, L. E.
1983 *Indians of the Upper Texas Coast.* Academic Press, New York.

Dillehay, T. D.
1974 Late Quaternary Bison Population Changes on the Southern Plains. *Plains Anthropologist* 19(65):180–196.

Duke, A. R.
1982 The Goebel Site (41AU1) An Archaic-Neo-American Site in Austin County, Texas. *Houston Archeological Society Journal* 72:5–7.

Ensor, H. B., and D. L. Carlson
1988 The Crawford Site (41PK69), Central Trinity River Highlands, Polk County, Texas. *Texas Department of Highways and Public Transportation, Contract Reports in Archeology, Report No. 4.*

Fleming, C. B.
1960 A Radiocarbon Date from Goebel Midden, Austin County. *Bulletin of the Texas Archeological Society* 31:330.

Hall, G. D.
1981 Allens Creek: A Study in the Cultural Prehistory of the Lower Brazos River Valley, Texas. *Texas Archeological Survey Research Report* No. 61.

Highley, C. L., J. A. Huebner, J. H. Labadie, R. J. Leneave, and R. R. Harrison
1988 Salvage Archaeology at the Brandes Site (41AU55), Austin County, Texas. *La Tierra* 15(3):6–19.

Hudgins, J. D.
1982 Historic Indian Site in Wharton Co., Texas. *Houston Archeological Society Journal* 74:2–7.

Irwin, H. T., and H. M. Wormington
1970 Paleo-Indian Tool Types in the Great Plains. *American Antiquity* 35(1):24–34.

Jennings, J. D.
1974 *Prehistory of North America.* McGraw Hill, New York.

McClure, W. L.
1987 Faunal Analysis of 41FB37. *Houston Archeological Society Journal* 89:1–6.

Patterson, L. W.
1973 Some Texas Blade Technology. *Bulletin of the Texas Archeological Society* 44:89–111.

1975 The Poverty Point Culture, as Seen from Southeastern Texas. *Louisiana Archaeology* 2:153–162.

1979a A Review of the Prehistory of the Upper Texas Coast. *Bulletin of the Texas Archeological Society* 50:103–123.

1979b Comments on Publication in Contract Archeology. *American Society for Conservation Archaeology Newsletter* 6:29–30,

1980 The Owen Site, 41HR315: A Long Occupation Sequence in Harris County, Texas. *Houston Archeological Society, Report* No. 3.

1982 Initial Development of the Bow and Arrow in the Southern United States. *La Tierra* 9(2):18–26.

1983 Prehistoric Settlement and Technological Patterns in Southeast Texas. *Bulletin of the Texas Archeological Society* 54:253–269.

1986a Bibliography of the Prehistory of the Upper Texas Coast. *Houston Archeological Society Special Publication No.* 6.

1986b Prehistoric Population Dynamics of Southeastern Texas. *Bulletin of the Texas Archeological Society* 57:117–121.

1986c Site 41HR571, A Long Prehistoric Sequence in Harris Co., Texas. *Houston Archeological Society Journal* 85:15–18.

1986d Additional Data from Site 41HR293, Harris Co., Texas. *Houston Archeological Society Journal* 86:11–13.

1986e Fired Clayballs in Southeast Texas. *La Tierra* 13(4):20–22.

1988a The Status of Research on the Prehistory of Southeast Texas. Paper presented at the Texas Archeological Society Annual Meeting, Houston, Texas.

1988b Technological Interactions in Central and Southeast Texas. *Houston Archeological Society Journal* 90:18–22.

1988c Radiocarbon Dates from 41FB37, Fort Bend Co., Texas. *Houston Archeological Society Journal* 91:20–21.

1988d Avocational Archaeology in the United States. *Plains Anthropologist* 33(121):377–384.

1989 Early Dates for the Pedernales Point. *La Tierra* 16(1):28–30.

Patterson, L. W., and J. D. Hudgins

1985 Paleoindian Occupations in Wharton County, Texas. *Bulletin of the Texas Archeological Society* 56:155–170.

Patterson, L. W., J. D. Hudgins, R. L. Gregg, and W. L. McClure

1987 Excavations at Site 41WH19, Wharton County, Texas. *Houston Archeological Society*, Report No. 4.

Redder, A. J.

1985 Horn Shelter Number 2: The South End: A Preliminary Report. *Central Texas Archeologist* 10:37–65.

Suhm, D. A., and E. B. Jelks

1962 Handbook of Texas Archeology: Type Descriptions. *Texas Archeological Society, Special Publication* No. 1.

Turner, E. S., and T. R. Hester
1985 *A Field Guide to Stone Artifacts of Texas Indians*. Texas Monthly Press, Austin.

Webb, C. H.
1982 The Poverty Point Culture. *Geoscience and Man* 17, Second Edition, Revised.

Webb, C. H., J. L. Shiner, and E. W. Roberts
1971 The John Pearce Site (16CD56): A San Patrice Site in Caddo Parish, Louisiana. *Bulletin of the Texas Archeological Society* 42:1–49.

Wheat, J. B.
1953 The Addicks Dam Site. *Bureau of American Ethnology, Bulletin* 154:143–252.

A Flexed Burial From Llano County, Texas

Leland C. Bement

ABSTRACT

A semiflexed burial was salvaged from a roadcut at site 41LL356 near Sandy Creek in Llano County, Texas, during the spring of 1987. Two superimposed hearths lay above the burial. A dart point associated with the skeleton places it in the Late Archaic period, but a radiocarbon date (1200±60 BP) from charcoal in a hearth directly above the burial indicates the Late Prehistoric period. There is a stratigraphically consistent relationship between the burial, which contains an Ensor dart point of the Twin Sisters phase (1750–1400 years BP) and the lower hearth dated to the Austin Phase (1250–650 BP). The second hearth, 60 cm above the dated feature, probably belongs to a later Austin Phase occupation tentatively dated to about 770 BP based on the deposition rate of 0.18 cm per year calculated from the radiocarbon-dated hearth..

SITE SETTING

Site 41LL356 is a terrace site along the right (south) bank of Sandy Creek in Llano County, Texas (Figure 1). No cultural materials are exposed on the terrace surface to indicate the presence of the site, but a road cut into the terrace at a ford of the creek exposed the deeply buried cultural remains, consisting of rock concentrations and a single burial.

The burial was discovered by an avocational archeologist who noticed the top of a skull eroding from the roadcut. Upon notification of the find, the landowner became concerned that the skeleton might be vandalized and requested that professional archeologists remove the burial. The site was subsequently designated 41LL356 by the Texas Archeological Research Laboratory (TARL) of The University of Texas at Austin.

SALVAGE RECOVERY AND RESULTS

Excavations were performed by Dr. Solveig A. Turpin and Leland C. Bement, of TARL, and Mark Denton, of the Texas Antiquities Committee on April 16, 1987. The salvage recovery of this burial revealed hearth construction and burial practices attributable to Late Archaic and Late Prehistoric inhabitants along Sandy Creek.

Methods and Techniques

Excavation began with the placement of a 1.5x1.5-meter shovel-dug unit over the exposed cranial vault. Every eighth shovel load was screened through quarter-

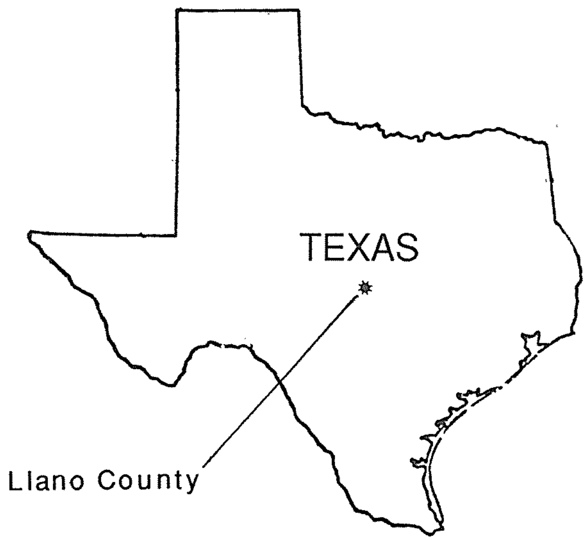


Figure 1. Map showing location of Llano County.

inch hardware cloth, except in levels where cultural materials and features were uncovered. In these levels all shovel loads were screened.

Cultural Stratigraphy

Initial recovery of materials intrusive to the fine grained, sandy silt alluvial deposits was at a depth of 1.1 meters below the surface, where fist-sized cobbles of gneiss were uncovered (Figure 2). A light scatter of chert flakes was uncovered from 1.2 to 1.4 meters below the surface. Also at 1.4 meters was Hearth 1, consisting of three burned cobbles and charcoal-mixed sand that defined a circular pit 50 cm in diameter and 10 cm deep (Figure 2). There was insufficient charcoal for a radiocarbon date.

At 1.8 meters below surface, the tops of large rocks were hit, and subsequent cleaning exposed Hearth 2, an arc of stones that bisected the excavation unit into east and west halves. Forty large stones (the largest 25 cm x 30 cm x 15 cm) were stacked two high and three wide. Charcoal lumps and fire-hardened clay defined a 15 cm deep pit on the west side of the stone alignment. Burned and unburned chert flakes were common both in and out of the feature. Charcoal sufficient for five radiocarbon dates was collected; however, only one sample was run, rendering an uncorrected age of 1200±60 years BP (Tx-5756) (S. Valastro, personal communication). This date, when calibrated using the Stuiver and Reimer (1986) calibration, provides a one standard deviation (sigma) range from 1256 to 1013 years BP, assigning this occupation to the Neo-Archaic Austin phase as defined by Prewitt (1981:75) in Central Texas. The arc of stones comprising this feature continues into both north

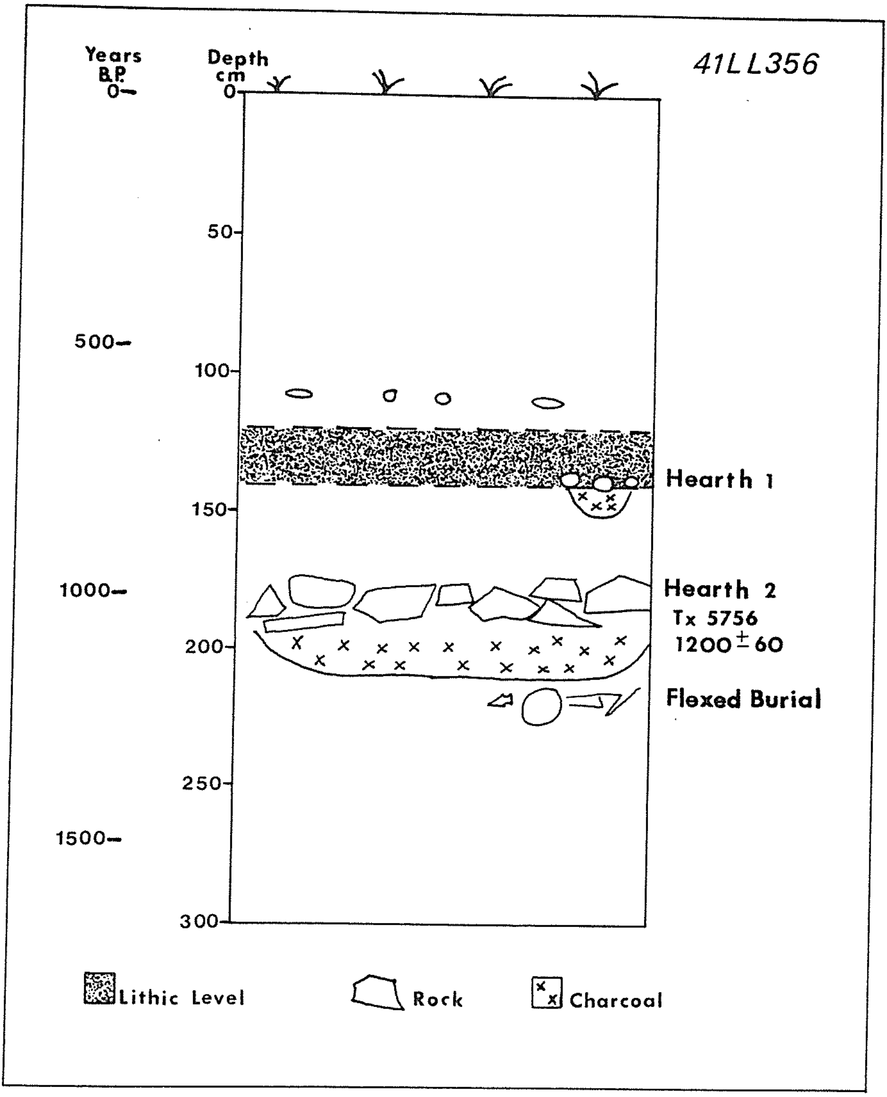


Figure 2. Profile drawing of the excavation at 41LL356.

and south walls of the unit and reemerges in the cut bank, giving the feature a diameter of more than 2 meters. The exact configuration could not be determined due to the damage to the hearth caused by road construction.

The burial lay at 2.2 meters below the surface (Figure 2), and the skeleton was totally exposed (Figure 3).

Based on the known depth of Hearth 2 and the radiocarbon age, a rate of deposition for this terrace was calculated. Using the calibrated radiocarbon date

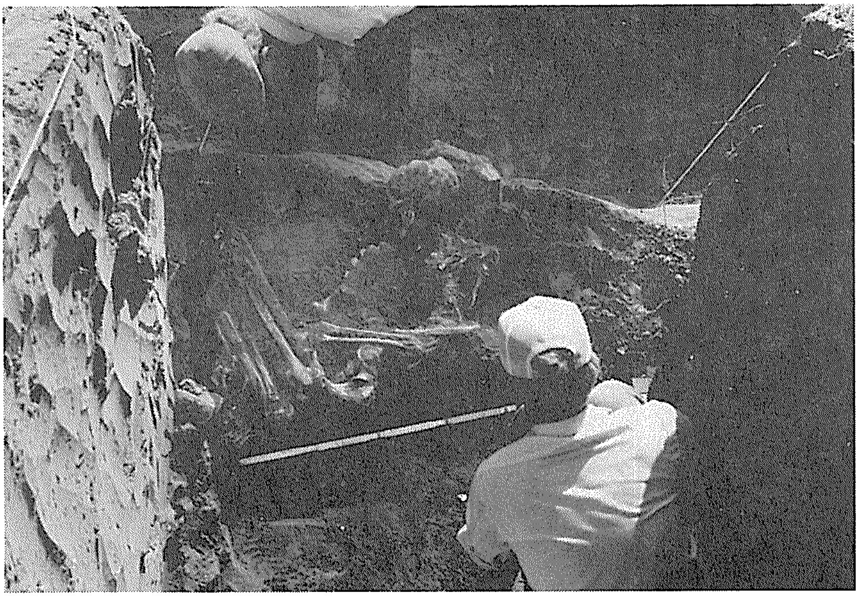


Figure 3. Photograph of the burial in situ, site 41LL356, Llano County, Texas.

mean of 1134 BP and a depth below the surface of 2.0 meters, the rate of deposition is 0.18 meters per year. This rate of terrace deposition provides a means of estimating the age of the other cultural levels. When this calculation is applied to the Hearth 1 level, an estimated age of 780 years is obtained. Such age estimates are only tentative, since not only does each flood deposit a different amount of alluvium, but also the individual flood episodes could not be differentiated in the fine grained silts of this terrace.

Skeletal Data

The burial is that of a 35–45-year-old male, 168 cm (5 feet 6 inches) tall. The skeleton was semiflexed, lying on the right side. The skull faced south, although the long axis of the burial is more SE to NW. The left arm lay across the side with the hand on the abdomen; the right arm parallelled the torso, and the hand curled along the thigh. Most of the bones were highly fractured, and only the skull, which rested on a gneiss slab, and the right humerus could be removed intact. This was accomplished by applying spray foam, which hardened to form a supportive case around the bones (Figure 4) (Bement 1985:371).

Noted pathological conditions include two pea-sized depressions in the left parietal and occipital area of the skull, probably the result of infectious lesions. The teeth of this individual are evenly worn, except for the first maxillary molar on each side (Figure 4). Here, wear has reduced the occlusal surface to the roots, splitting

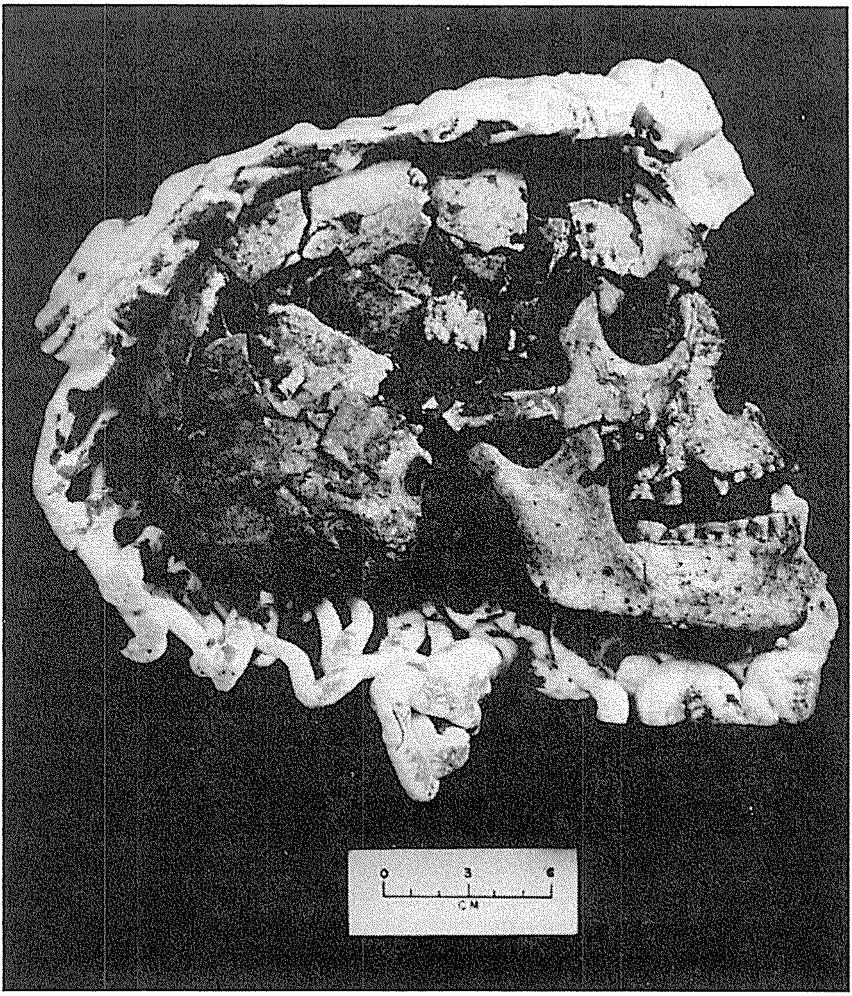


Figure 4. Closeup photograph of the skull jacketed in foam for protection.

each molar into two separate but apparently viable toothlets. The incidence of caries is low, and no teeth have been lost.

Ensor Dart Point

An Ensor dart point was uncovered along the dorsal side of the spine opposite the lower thoracic vertebrae (Figure 3). This dart point was made from a large flake of tan chert, the ventral surface of which is apparent on one face. The blade of the point has been reworked, giving it an asymmetrical outline (Figure 5). Sharpening of the tip has drawn the edge toward one surface and has enhanced the curve of the entire specimen. Shoulders are square to sloping, the stem is formed by broad side-notches, and the base is extremely thinned. This specimen is aligned with the Ensor type because of the broad side-notching. The point is 5.3 cm long, 2.6 cm wide, and 0.7 cm thick.

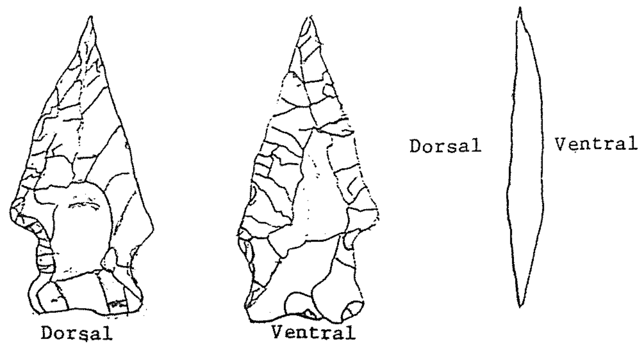


Figure 5. Ensor dart point recovered with burial from 41LL356, Llano County, Texas.

DISCUSSION

The skeletal material was in a state of poor preservation, since all but the small, compact bones of the hands and feet were fractured in situ. Postburial deformity is amply demonstrated in the skull, where vertical pressures compressed the facial region through fracturing and slippage of the eye orbits, bridge of the nose, and maxilla midline.

In addition to disturbances related to overburden pressures, the left rib cage and humerus were dislodged—the humerus was totally removed, either by rodent action or as a consequence of the construction of Hearth 2. Although the burned soil and charcoal lens in Hearth 2 mark the floor of the pit above the skeletal material, it is likely that during initial scooping in construction of the pit, the rib cage was disturbed without being recognized as part of a human skeleton. Thus, the hearth was constructed and fired.

This burial is significant because it adds to the sparse data we have on Late Archaic mortuary practices in the Llano County area. No exploratory tests were performed to determine if the site contains other graves. This burial follows the general trend in Central Texas during the Late Archaic period of isolated flexed interments (Prewitt 1981:81). The cause of death of this individual could not be determined, but it is possible that the dart point was embedded in the body at the time of death and came to rest where it was unearthed as a result of later disturbance from construction of the Late Prehistoric hearth.

All skeletal materials have been donated to the Texas Archeological Research Laboratory, The Univerity of Texas at Austin, to be preserved for detailed study together with other burials from the Central Texas Region.

ACKNOWLEDGMENTS

Special recognition is extended to Mr. and Mrs. Ted Franklin and family and Mr. and Mrs. Frank Poplin for their concern and interest in preserving the prehistoric heritage of Llano County. Gratitude is also expressed to MD Enterprises of Austin, Texas, for contributing the money for the radiocarbon assay. Field supplies and laboratory space were provided by the Texas Archeological Research Laboratory, The University of Texas at Austin.

REFERENCES

Bement, L. C.
1985 Spray Foam: A New Bone Encasement Technique. *Journal of Field Archeology* 12(3):371–372.

Prewitt, E. R.
1981 Cultural Chronology in Central Texas. *Bulletin of the Texas Archeological Society* 52:65–89.

Stuiver, M., and P. J. Reimer
1986 Computer Program for Radiocarbon Age Calibration. *Radiocarbon* 28:1022–1030.

The Foreshaft Socket Drill

Roy E. Padgett

ABSTRACT

A broad group of Archaic and Late Prehistoric lithic artifacts are commonly categorized as drills. Some of these can be distinguished as a separate class that probably functioned as socket drills used to drill out atlatl and arrow foreshaft sockets. There is very little discussion in the literature as to why these types of drills were crafted or how they were used. An attempt is made here to define this class of artifact and to put these drills in their proper perspective. Also included is a discussion of the use and advantage of the foreshaft.

INTRODUCTION

All of the shafted weapons used by prehistoric Indians—the spear, lance, atlatl dart, arrow, and harpoon—could have had foreshafts. In most of the discussion that follows, the atlatl is used as the prime example, but the conclusions apply as well to other foreshafted implements.

Such foreshafts are not limited to any time bracket in the contiguous United States, since they can date from the time of Early Man until the last arrow flew in the Indian wars. Also, the foreshaft has no geographic limitation, since its use ranged from coast to coast at a time when there were no Mexican or Canadian borders. Flint artifacts that I suggest are socket drills used to prepare foreshaft sockets have been recovered from sites dating to the Paleoindian (Blaine et al. 1968), Archaic (Forrester 1964), Neo-American (Richards 1971), Late Prehistoric (Wyckoff 1973), and Historic (Schneider 1969) periods. The first documented historic contact of Europeans with Indians using foreshafted atlatls in the United States was in the Cabeza de Vaca saga in 1528. The last recorded account of atlatl use by Indians was from the DeSoto expedition in 1541. It seems that the bow and arrow had completely replaced the atlatl by the time the first European colonist arrived (Krieger 1956).

THE FORESHAFT

Almost everyone in this field of study concedes that many of the shafted weapons were fitted with foreshafts, that on wooden shafts the foreshafts were tapered down nearly to points on the proximal ends (Figure 1, A), and that the main shafts had cone-shaped sockets drilled into their distal ends to accept that pointed foreshaft (Figure 2, A, B).

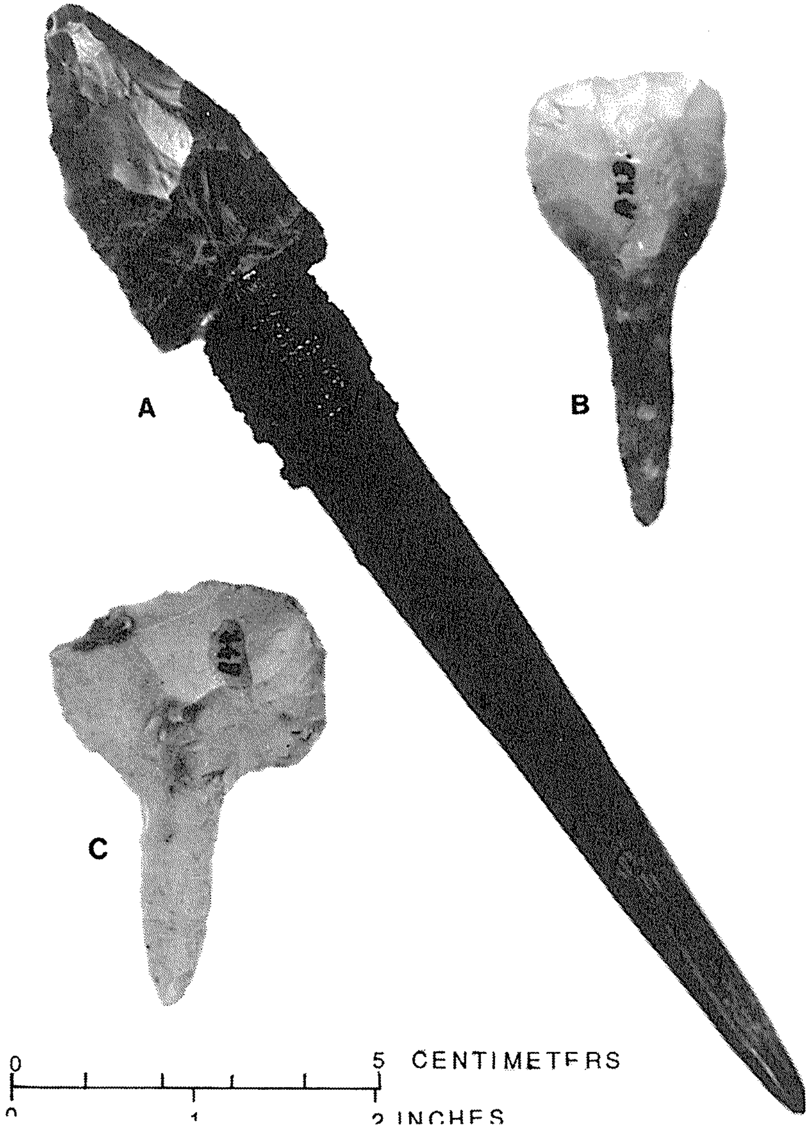


Figure 1. Photographs of replica foreshaft (A), and typical foreshaft socket drills (B and C).

Note that this system would work just as well if it were reversed by drilling the socket in the proximal end of the foreshaft, but the problem here is that the foreshafts were considered expendable whereas there was hope that the main shafts would be reusable. Socketed foreshafts would involve drilling each one produced.

The main shaft, at this juncture, would be tightly wrapped with fresh sinew, which, on drying, would shrink and harden, becoming nearly as strong as a metal ferrule. This would prevent splitting, either while drilling or upon later impact.

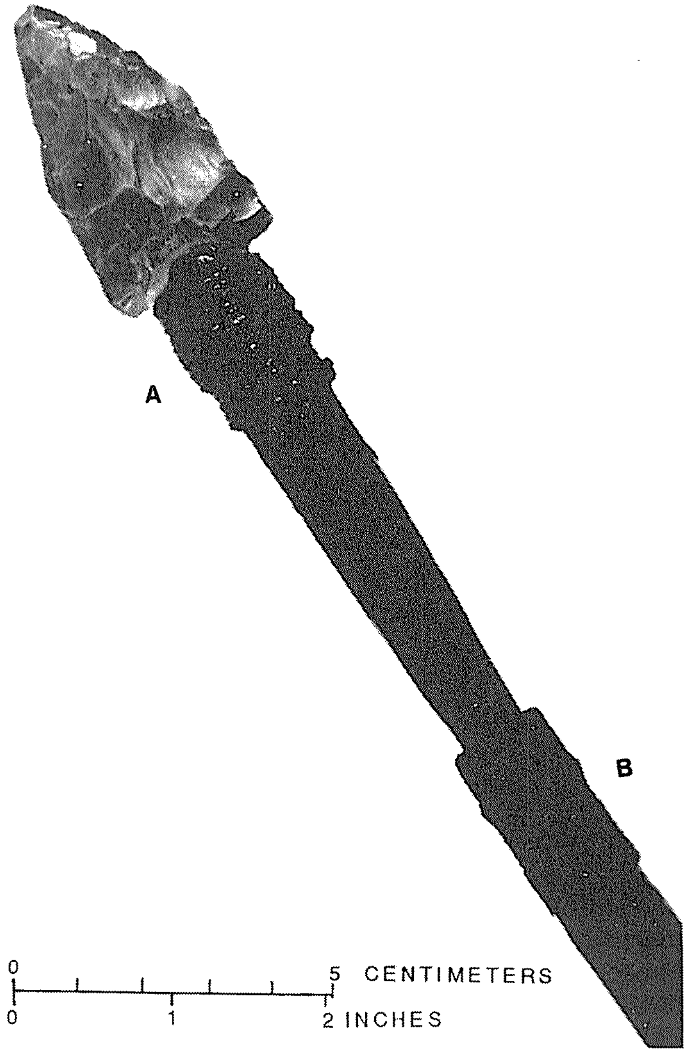


Figure 2. Replica foreshaft (A) fitted into main shaft socket (B).

The foreshaft could be easily whittled or scraped to proper taper by trial and error and made to fit the socket as snugly as desired (Figure 1, A). Of prime importance to this arrangement is the fact that the main shaft of an atlatl dart was much more valuable to the user than the throwing stick, the foreshaft, or the projectile point.

If you would test this, try to find a perfectly straight sapling or tree limb without flaws that could be made into a first-rate main shaft. Or better yet, cut down a tree with stone tools and from that log split out a section that could be dressed down into a good shaft.

Conifers grow straight and tall, but in the sapling stage they have many small branches that fall away, leaving knots in the mature trees. Other trees tend to grow gnarly or bushy, and limbs are seldom straight for the 1.5 to 2.5 meters (5 to 8 feet) needed for a good atlatl shaft. In areas where good wood material was scarce or absent, cane shafts were used.

The assumption that most atlatl darts did not use foreshafts would most likely be true in areas where choices in shaft material were easily available. And not all dart shafts were necessarily fletched. A shaft that has a center of gravity two-thirds to three-fourths of the way down from the proximal end will fly nearly as true as if it were fletched (Evans 1959).

The development and use of the foreshaft was prompted by the following needs and reasons.

1. Main shafts were highly valued—some were so prized that they were even decorated (Schuetz 1960).
2. The advantages of the fall-away foreshaft.
3. Interchangeability of points from large to small or even to the bunt (Barnett 1973).
4. Easy replacement of a damaged foreshaft.
5. Hafting of points to hollow cane main shafts (Schuetz 1960).

The foreshafts of wooden main shafts without a fall-away foreshaft could be cemented into the socket for a more or less hard, firm joint or later loosened by soaking or by using a little force. The cement could be the same as that used to haft the dart point or other hafted tools.

Mentioned in many reports are mastic materials such as tar, pitch, asphaltum, gum, resin, or even blood. It would not be surprising to find that the Indians had developed the procedure for reducing the hooves of ungulates to a glue that would equal the best that Stradivarius used on his violins.

Cane main shafts present an entirely different approach. Hafting a stone point to the hollow part of cane almost required the use of a foreshaft. Two principal methods were devised: one was to cut the cane off square, leaving 40 to 50 mm (1.5 to 2 inches) of the hollow part beyond the last segment. This hollow cylinder was tightly wrapped with sinew or fiber to prevent splitting, and the proximal end of the foreshaft was carved into a round dowel that would fit snugly inside the hollow cane tube. A shoulder could have been left on the foreshaft, which would fit hard against the end of the cane and would transmit the force of impact to the main shaft. This assembly, called the mortise and tenon method (Schuetz 1960), could be cemented to a firm connection.

The other approach is the Plug method. Here, each end of the cane main shaft would have been filled with a tightly fitted and glued-in wooden plug. Both ends would be tightly reinforced externally with sinew or fiber to prevent splitting. The proximal end would be notched or hollowed to fit the hook of the atlatl. The distal end could be drilled to a cone-shaped socket to fit the proximal end of a tapered, glued-in or fall-away foreshaft (Schuetz 1960).

A great many site reports have been published in which the authors made noble efforts to describe or classify flint artifacts that are roughly grouped as drills. I stand on the shoulders of giants who have dug deeper and come up wiser, and, dodging controversy, I abstain here from naming references as I list some of the good and some not so good descriptions of perforators.

The distal end is properly called the bit. It has been termed the stem, pointed end, shaft, blade, or shank. Cross sections of bits have been called oval, diamond, elliptical, beveled, propeller, or nothing at all. The proximal end is properly called the base, and here the wildest forms and shapes can be found and so too can a great many good descriptions. Base ends have been described as square, rounded, worked, unworked, eared, notched, T-shaped, reworked projectile point base, flake, etc. Some have tried to group a few of those that are nearly alike into types: Type I, Type II, Type III, etc.

We need all of those good descriptions, but we should not blindly put form over function. If we are to study the artifacts of prehistoric Indians, it is to try to learn the how and *why* of this lifestyle, otherwise, we miss the main objective of archeology and may as well stack up a pile of stream-washed gravel. The blanket term *perforator* should supersede the term drill in all descriptions unless the artifact has a defined use as in socket drill, bead drill, pipe drill, fire drill, etc., or other if unknown (R. E. Forrester, in press).

The perforators I describe as socket drills are, in general, like the wooden thumb-turn pegs that are used on violins to adjust the tuning (Figure 3, A–F). With eager permission, Mr. Robert E. Forrester has extended me the privilege of quoting a full page and a table from a soon-to-be published final report, "Horn Shelter Number 2, North End." This report, a sequel to the preliminary report (Forrester 1985), is an exhaustive study of a deep stratified occupation site with deposits extending from about 8000 B.C. to about A.D. 1400.

FLINT PERFORATORS

> Drill is a word used to describe a flint tool apparently made to drill holes in wood, soft stone, horn, antler, pottery and similar materials. The term embraces too many forms and styles and some of those tools commonly named "drills" were undoubtedly used as awls in leatherworking and for yet other purposes.
>
> Since it is usually impossible to demonstrate the precise use to which any specific tool was put, it may be better to use the term *perforator*, which covers any tool intended to make a hole.
>
> To rule out perforators made of bone, often called "bone needles" one should specify the type of material from which they are made. This is normally flint, again often a misnomer,

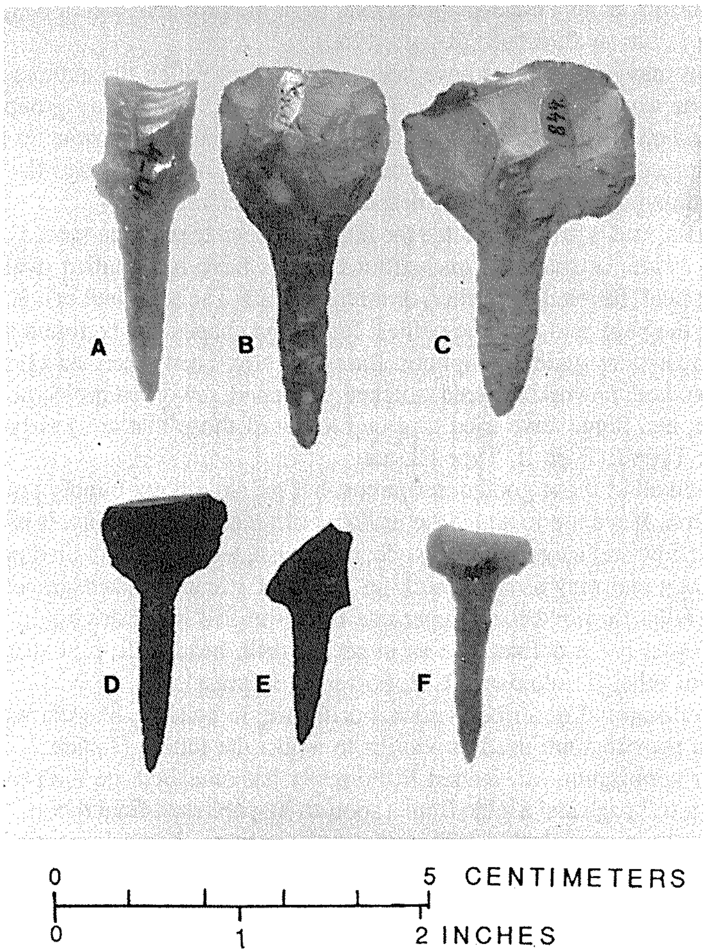


Figure 3. Atlatl foreshaft socket drills, A–C; Arrow foreshaft socket drills, D–F.

There are four basic forms of flint perforators. One form is made from original intent as a perforator and has no stem or tang. Its shape when well finished is similar to a wooden violin-peg. On occasion it consists only of a slender bit on an unfinished flake. When made onto an existing blade, it is difficult to determine if that was the case or if it was made onto a flake which was then carefully dressed down all around the base. The bit may be either slender or short and stubby.

The second form is made onto an existing projectile point. This may be either an arrow point or a dart point. Here too the bit may be either slender or short and stubby. No evidence suggest a stem or tang for a handle was necessary.

In each of those two forms, there is a size distinction. The small size was unknown in the atlatl era. With the advent of the bow and arrow the small size became almost the only form present. **This has connotations which cannot be ignored!** It is believed that the larger, slender form was made specifically to drill out the wooden socket in an atlatl shaft to receive a tapered foreshaft and that the smaller slender form was used similarly in the smaller arrow shaft. This idea was propounded by Mr. Roy Padgett (1967), with whom the author is in full agreement.

The third form, noted here as "acicular," is a slender tool with no basal expansion, having the form of a bit from a large violin-peg perforator. It is doubtful that the acicular form was used as a drill.

The fourth form is a strongly beveled, double- or single-pointed tool. The double-pointed variety is similar to, and in some cases may actually be, the Harahey "knife." The single-pointed variety appears as one-half of a Harahey knife and this variety has no name. Neither variety was recovered here.

Table 1. Summary of Drills: Horn Shelter Number 2, North End

Level	Violin Total Number	Onto Peg Shape	Projec-tiles	For Other Forms	For Arrow Socket	For Dart Socket	Other Use
27	1	1			1		
23	2	1	1		1	1	
21	2	1	1		2		1
20	4		2	2	2	1	1
19	12	4	5	3	1	9	2
18	3	2	1			2	1
17	7	4	3			7	
16	2	2			1	1	
15	3	1	2			1	2
10	4	2	2			2	2
?	2	1	1			1	1
TOTALS	42	19	18	5	8	25	9

NOTES: Table by courtesy of Robert E. Forrester.
Levels are numbered from bottom to top.
Tips and fragments are omitted.

Table 2. Bit Lengths

Type of Bit	Number	Range (mm)	Average (mm)
Violin-peg bits for dart shafts	(n =10)	40–51	44.3
Projectile-based bits or darts	(n =7)	21–50	38.3
Violin-peg bits for arrow shafts	(n =3)	17–27	20.7
Projectile-based bits for arrows	(n =1)		32.0

NOTE: Table by courtesy of Robert E. Forrester.

> Examination of the summaries above reinforce the theory that the slender forms of both the projectile-based and the violin-peg shaped flint perforators, in both the large and small sizes, were used as drills to form the sockets of atlatl dart shafts and arrow shafts. One specimen, B15-62, was a tiny violin-peg shaped drill and was clearly out of context in Level 16. Another specimen, B12-17, was a large violin-peg shaped drill in Level 23 (an arrow point level). All the others were in their expected positions. It is easier to explain the dart socket drill in the arrow point level than the arrow socket drill in the dart point level [R. E. Forrester, in press].

The above commentary and tables by Forrester put firm credibility to the use of socket drills in the Paleoindian period and to the use and shift to the arrow shaft size right through time to the Late Prehistoric period.

The base of a socket drill could be any size or shape as long as it was wider than the bit, to provide mechanical leverage for turning the bit into the work. The base could be a thumb-and-finger grip twist or it could be hafted for whole hand use.

Often, the base is no more than the remainder of the flake from which the drill was made, and may indicate an anticipated one-time use only. Again, the base may be carefully bifacially chipped and have smoothed sharp edges. The bases of a good percentage of socket drills are the bases of reworked projectile points (Figure 3, A; Table 1). These could have been hafted or they could have been complete foreshafts hafted with their stone points before being reworked into drills. The flintknapper here may have needed the flint in the point for a drill bit more than he needed the point. Where it is possible to identify such a socket drill base as a named projectile point type, we need to consider whether the type was contemporaneous with the culture in which it was found. It could be a point that was picked up somewhere, whose chronology predates by hundreds or even thousands of years the culture in which it was made into a drill. We need this further insight to the man behind the tool (Suhm et al. 1954).

The configuration of the base was actually of small consequence to the function of the tool. When the Indian put his hands to a piece of flint to make a drill for a socket in a shaft, he would not have been concerned much about a pattern for the base. His concern, instead, would have been directed to the optimum size and shape of the bit for its expected performance.

On examination of the drills, it is apparent that the size of the bit is a very good indication of the size of the shaft to be drilled. As bow and arrow weaponry came onto the scene, the socket drills suddenly dropped down in size to accommodate the smaller arrow shafts (Figure 3, D–F). Although the atlatl and spear certainly carried over into the Historic period, the small arrow shaft drills did not appear until the introduction of the bow and arrow (Table 1). The drill bit was precisely engineered, and meticulously designed and worked. A typical atlatl drill bit might be 38 mm (1.5 inch) long, 14 mm (7/16 inch) wide near the base, tapering to 8 mm (5/16 inch) near the lower end and then tapering sharply to the point. The degree of taper was critical, for if the angle was too great, the shaft could fall away too easily. Conversely, without enough taper, the foreshaft could seize in the socket and not fall away at all. The degree of taper can vary slightly from one drill to the next, but a general average on several that were measured comes to about 4° (Figure 3, A–C).

The bit, while maintaining its taper, has edges that are sharp and straight, or very slightly convex. The flaking is very fine with minimal serration on the sharp edges.

Fundamental to the design is the thickness in the center of its cross section, which is needed for strength but should never equal the width of the cutting edges. This gives the edges what is known in machining terms as *tool relief* to do the cutting. This has led to descriptive terms in published reports such as oval, ridged, diamond, etc. Drills reported with steep beveling on opposite sides have what is called a propeller-shaped cross section; the beveling gives a better angle to the cutting edges. This beveling can also indicate left or right twist action.

None of the hafted weapons of stone age man had the explosive effect of expanding bullets as provided by the modern day rifle, and whether used on game or on enemies, his weapons depended solely on penetrating, cutting, and internal bleeding for their lethal effects.

Even the modern day bow-hunter using a 32 kg (70 pound) pull compound bow and a razor-sharp, three-bladed, broad-head arrowpoint knows he must depend on internal bleeding to effect a kill. After making a perfect chest cavity hit on a deer, he knows he will need to track his quarry from 45 meters (50 yards) to perhaps 100 to 300 meters (110 to 330 yards) or more. I have referred above to a fall-away foreshaft, and more needs to be said about its advantages. Consider now, a primitive hunter using an atlatl dart *without* a foreshaft. Let's say he makes a perfect chest cavity hit on a deer. As the animal struggles in panic and crashes away through brush or cover, the shaft is quite likely to be broken off. Or, say his shot was less than perfect, and the animal is wounded, but not fatally, as the projectile has penetrated a nonvital area. Again, the shaft is apt to be broken or carried away for some distance. In the event that the hunter had a clean miss, the projectile could have struck a tree or rock, shattering the point and splitting the shaft on the impact.

Now consider the same scene with the hunter using a dart *with* a foreshaft with the perfect or even the imperfect shot. The first few sideways strains on the socket connection loosen it, and the main shaft falls free. If a tree or rock is hit, the shattering of the point and/or the splitting of the foreshaft might absorb the impact and the main shaft might be left undamaged.

If the main shaft should fall away, the hunter could retrieve it quickly and, from a pouch or belt, select another pointed foreshaft—one of several he might carry—and reload. This situation would give the hunter the advantages of a repeating rifle as compared with those of a muzzleloader; this hunter would not be disarmed by just one shot.

Any woodworker can tell you that the most difficult hole to bore into wood is one straight into the end of the grain. The wood auger bit will not work at all, and a drill bit for metal tends to "walk" off center. I have been involved in tool design engineering and have had many years of experience with hand tools for wood- and metal-working. I find nothing in this Indian's tool kit of bone, horn, wood, and stone with which he could have bored out such sockets except for the classic flint socket drill.

It is certain that these drills could be and were used to drill other materials such as bone, horn, and teeth. Also, there were drills of other sizes and designs. Still, I ask readers to think in terms of the socket drill when you look at a drill, before you relegate it to some other purpose.

My grade-school history books recorded that Eli Whitney was the first to produce interchangeable parts for cotton gins and guns. This concept of socket drills and fall-away foreshafts that could be quickly replaced could push back the role of interchangeable parts as many as 10,000 years with the weapons of the American Indian.

CONCLUSIONS

Many of the shafted weapons were crafted with detachable foreshafts. Sockets for these shafts were made with very carefully designed and shaped flint drills, made specifically for this purpose.

ACKNOWLEDGEMENT

My thanks to Mr. Robert E. Forrester for his collaboration and provision of artifacts for photographs and for the commentary and tables on drills (Tables 1 and 2) quoted herein.

REFERENCES CITED

Barnett, F.
1973 *Dictionary of Prehistoric Indian Artifacts.* Northland Press, Flagstaff.

Blaine, J. C., R. K. Harris, W. W. Crook and J. L. Shiner

1968 The Acton Site: Hood County, Texas. *Bulletin of the Texas Archeological Society* 39:45–94.

Evans, O. F.

1959 The Development of the Atlatl and the Bow. *Bulletin of the Texas Archeological Society* 30:159–162.

Forrester, R. E.

1964 *The Ham Creek Site, an Edwards Plateau Aspect Site in Johnson County, Texas.* Edited by I. R. Lobdell. Tarrant County Archeological Society.

1985 Horn Shelter Number 2, A Preliminary Report. *Central Texas Archeologist* 10:21-35.

In Press Horn Shelter: Final Report.

Krieger, A. D.

1956 Historic Survival of the Atlatl in the Lower Mississippi Region. *Bulletin of the Texas Archeological Society* 27:195–207.

Padgett, R. E.

1967 The Foreshaft Socket Drill. Paper presented at the annual meeting of Oklahoma Anthropological Society. Norman.

Richards, M. K.

1971 The Lee Site, A Late Prehistoric Manifestation in Garvin County, Oklahoma. *Bulletin of the Oklahoma Anthropological Society* 20:1-82.

Schneider, F. E.

1969 The Roy Smith Site, Bv-14, Beaver County, Oklahoma. *Bulletin of the Oklahoma Anthropological Society* 18:119-179.

Schuetz, M. K.

1960 An Analysis of Val Verde County Cave Materials: Part II. *Bulletin of the Texas Archeological Society* 31:167–205.

Suhm, D. A., A. D. Krieger, and E. B. Jelks

1954 Handbook of Texas Archeology. *Bulletin of the Texas Archeological Society* 25.

Wyckoff, D. G.

1973 The Lowrance Site of Murray County, Oklahoma. *Bulletin of the Oklahoma Anthropological Society* 21:1-155.

Getting to the Point: Some Comments on Cox and Smith's Perdiz Point Damage Analysis

John E. Dockall, William A. Dickens, and Harry J. Shafer

ABSTRACT

A recent study by Cox and Smith (1991) used unprovenienced Perdiz arrowpoints in an experimental study of breakage patterns. The use of prehistoric points in this study is ethically wrong and detracts greatly from the intrinsic value of their study. The experimental framework of the study was inadequate to provide support for the problems presented and did not address other areas of breakage such as manufacture and taphonomic processes. An experimental program involving the replication and use of Perdiz points would have avoided the use of prehistoric specimens and would have provided crucial data regarding breakage patterns resulting from both manufacture and use. A functional analysis of stone tools must incorporate data from manufacture, use, retouch, discard, and natural processes in order to eliminate potential sources of bias from the study.

Cox and Smith (1991) most recently provided us with an initially interesting article on the possible behavioral significance of fracture patterns of Perdiz points from 41SP135, the McGloin House site. The aim of the article is admirable in some respects, and their emphasis on the importance of fracture patterns in assessing lithic assemblage variability is well taken.

We, as archeologists and lithic technologists, are very disappointed in the article, since it represents the unethical usage of archeological material in destructive experiments. Obviously, some archeological material must be used in some destructive processes, such as for dating and trace element analysis for raw material sourcing, but in each of these uses the return in information is sufficient to justify the loss, and in these cases information on context and provenience of the destroyed pieces is recorded. Even though the artifacts used in Cox and Smith's experiments were unprovenienced, they did have some potential research value and should not have been destroyed. The kinds of information that can be collected from such artifacts, for instance those in private collections, are

1. Technological information regarding production methods.
2. Raw material variation within types.
3. Geographic variation within formal types.

Schiffer (1987:117–118) indicates that private collections are an important archeological research tool. These collections can provide insights into the occupational history of little-known regions and can indicate areas for further research. The effects of collections on the archeology of a region also can be observed. Legitimate study of these collections will also allow archeologists to begin to reassess generalizations about collecting and pothunting processes and their effects on the archeological record.

With some minor effort or forethought on their part, Cox and Smith could have avoided the use of unprovenienced specimens. First, Perdiz points (both bifacial and unifacial varieties) can be relatively easily replicated by anyone with a knowledge of flintknapping. Second, if the authors lack the ability to knap flint, they could have contacted any of a fair number of practicing flintknappers in the state. Texas is fortunate to have this resource, and more attention should be given to the contributions that practicing flintknappers have made to archeology and experimental archeology as a whole in Texas (consider the efforts of J. B Sollberger). Several flintknappers in Texas would enjoy an opportunity to participate in avocational and professional research projects; their knowledge and experience are excellent resources that have been neglected. Third, the application of an experimental program that involved the manufacture of Perdiz arrowpoints would have yielded significant behavioral data regarding breakage in addition to that associated with use as projectiles or cutting tools.

Aside from the ethical considerations, Cox and Smith (1991) failed to provide satisfactory answers to major questions they attempted to address, and they did not fully explore their alternate hypotheses before they reached their conclusions. We will refute their article, point by point.

First, there are problems with their experimental program. Statements made by Cox and Smith (1991) regarding behavioral inferences based upon their experiments were extremely biased and misguided by the fact that use wear already present on many of the Perdiz points they used was not accounted for prior to the experiments. The first experiment involved the use of a 45-lb compound bow to fire 18 arrows into a recently killed white-tailed deer carcass (Cox and Smith 1991:287). A white-tailed deer was chosen because of its abundance at the archeological sites with which the experimental data were compared. Cox and Smith apparently operated under an unstated assumption that all arrowpoints (whole and fragmentary) found at the archeological sites in question were used for hunting deer, and that the hunters never missed. Archeological interpretation cannot occur within the framework of a "Pompeii Premise," where the archeological record is assumed to represent an unbiased record of the past. They have not considered other possible reasons for fracture damage at these sites, such as trampling, geomorphic processes, manufacturing failures, misses that were shot into the soil or against other hard objects (rocks or trees), or thermal fracture. Many experimental programs have been conducted that could have served as models for this experiment (e.g. Flenniken and Raymond 1986; Odell 1977).

The second experiment involved the butchery and skinning of a white-tailed deer (presumably the same one used in the first experiment) with five hafted Perdiz points (Cox and Smith 1991:287). Presumably, this experiment was designed to examine the possibility that some Perdiz points could have been used as hafted cutting and butchering implements, and the authors entertain the notion from their wear analyses that some projectile points were in fact tools and not projectiles. Cox and Smith provide no discussion of their use-wear analytical methodology, nor do they describe patterns of edge-wear that are interpreted as evidence of butchering and skinning. There is neither discussion nor data concerning other activities that may have led to the development of the wear patterns observed. Edge-wear was automatically assumed to be from the use of arrowpoints as tools rather than as projectiles, and an array of other potential sources of wear such as firing into the ground (misses), quiver wear, haft wear, and impact wear were not considered in the experimental design. Quiver wear would affect the lateral edges of the barbs, where most of the wear was observed, and would even cause some damage leading to broken barbs, tips, and stems. Arrowpoint stems and points with broken tips were found together with complete points bunched together as if they had been in quivers at the George C. Davis site (Shafer 1973:206). Haft wear could cause edge and surface smoothing along the stem and upper part of the blade. Attrition caused by impact misses that did not break the point would appear as lateral edge wear. Manufacturing techniques such as platform or edge preparation during pressure flaking could also cause lateral edge wear. Cox and Smith naively inferred that lateral edge wear was equivalent in all respects to wear associated with cutting. This may have been true for some of the points, but the inferences would have been stronger had alternative explanations been discounted. Again, a well-developed experimental program could have addressed most (if not all) of these factors.

During the third experiment (Cox and Smith 1991:287), three Perdiz points were repeatedly fired from a 15-lb compound bow into a stack of ten deer hides affixed to a plywood backing. The light bow was used to prevent the point from penetrating all ten hides and striking the plywood backing. This experiment was supposedly designed to test both accrual of wear and type of wear on points from their use as hafted projectiles.

This experiment is flawed in several aspects. First, the experiment is biased by the measures taken to insure that points did not break prematurely in the wood or stacked hides. Second, the repeated firing of only three points brings into question the statistical validity of statements based on breakage and wear patterns observed on these specimens. Third, the purpose of stacking deer hides and affixing them to a plywood backing is unclear. In essence, the experiment apparently was designed to simulate the developmental stages of wear and attrition of Perdiz points used in hunting. Little useful information can be gleaned from the discussion of the results of this effort (which are limited to a mere short paragraph in the report). Aspects of developmental wear and attrition would have been better addressed in the first experiment.

Cox and Smith (1991:294) make a blanket statement that all of the dull, broad artifacts that morphologically resemble Perdiz points could not possibly be Perdiz points. This statement was based on their test firing of various Perdiz points into a deer carcass. They essentially conclude that a short stubby point would not have been effective in hunting. The point they refer to (Cox and Smith

1991:288, Figure 2e) looks like a point that has been extensively resharpened, but their claim that this point could not have been used to hunt is unfounded, due to a lack of sufficient experimental data.

Cox and Smith (1991:293) stated that "snaps are not caused by impact," citing Ahler and McMillan (1976:167). But since this statement is much too simplistic, and many other factors are involved, it appears that they may have misinterpreted Ahler and McMillan's work. The fact is that Ahler and McMillan stated that projectile points at Rodgers Shelter exhibited a "relatively high frequency of impact-fractured and complete specimens and relatively few specimens with transverse blade fractures" (Ahler and McMillan 1976:167). Specimens with snap or bending fractures at Rodgers Shelter were interpreted within a more sophisticated analytical framework than the one used by Cox and Smith. Breakage at Rodgers Shelter was conclusively shown to be associated with observed wear patterns, and dart points were the focus of analysis at Rodgers Shelter whereas Perdiz arrowpoints were examined by Cox and Smith. Large hafted bifaces are more amenable than smaller arrowpoints to a wide range of functional variability.

Experimental data contradict the statements of Cox and Smith (1991:293) regarding the origin of snap fractures on projectile points. Cox and Smith indicate that the damage that accrued to their Perdiz point assemblage was in the form of impact fractures restricted to the distal region. Flenniken (1985:270) conducted experiments on live goats with dart points, and found that several of the points had snap fractures as a result of movement of the animal. Flenniken (1985:270) was careful to note that breakage was not due to missed throws and that movement of the animal during the killing process transferred several fragments to places far from the point of entry. Such movement would produce bending forces transverse to the blade, stem, and barbs that Cox and Smith (1991) could have interpreted as breakage from use as a tool. Flenniken (1985:273) noted that 72.7 percent of the fracture damage on experimental points (that had been manufactured for the experiment) were of the bending variety and occurred near the haft area.

Cox and Smith (1991:297) also noted that some Perdiz points with minor impact damage had been later reused as cutting tools. The citation of Ahler and McMillan (1976) is again felt to be out of place here because their work dealt with larger dart points and hafted bifaces, which, due to their larger size, have a greater potential for a more diverse functional role.

As a result of their use of Perdiz points in butchering and skinning experiments, Cox and Smith (1991:295) stated that what were formerly believed to be Perdiz points from 41SP135 were merely hafted cutting tools that had been discarded. We ask why individuals would manufacture small hafted bifaces exclusively for butchery when available flakes might be more handy. The longitudinal wear noted on the Perdiz points at 41SP135 and other sites by Cox and Smith may actually have originated from the many reasons already mentioned. Another reason for wear along the edges of these points could be grinding of the edges during manufacture. This grinding would have been done to prepare the edge for pressure flaking. It could just as easily be from another step in the manufacturing process that Cox and Smith did not control for. These same arguments were echoed by Sheets (1973) and Keeley (1974) in response to the claims by Nance (1971) that "Stockton" points exhibited longitudinal striations indicative of use for purposes other than as projectile points.

The lesson to remember is that although Perdiz points may indeed have been used on occasion for cutting, most were probably used as projectile points, and analysis should attempt to address these possibilities. Development of experimental programs that are designed to yield data to be used in cultural/behavioral reconstructions should be exhaustive. The formation processes that can influence the archeological record, both natural and cultural, should be considered an integral part of the experimental framework, and use-wear studies should also be accompanied by concurrent experimental manufacture studies, for manufacture experiments can be very useful when fracture pattern studies are included. Finally, no archeological material should be destroyed in experimental programs such as these when there are other more useful alternatives.

REFERENCES CITED

Ahler, S. A., and R. B. McMillan

1976 Material Culture at Rodgers Shelter: A Reflection of Past Human Activities. In: *Prehistoric Man and His Environments: A Case Study in the Ozark*, edited by W. R. Wood and R. B. McMillan, pp. 183-199 Academic Press,

Cox, K. A., and H. Smith

1991 Perdiz Point Damage Analysis. *Bulletin of the Texas Archeological Society* 60(for 1989):283–301.

Flenniken, J. J.

1985 Stone Tool Reduction Techniques as Cultural Markers. In: *Stone Tool Analysis: Essays in Honor of Don E. Crabtree*, edited by M. G. Plew, J. C. Woods, and M. G. Pavesic, pp. 265-276 University of New Mexico Press, Albuquerque.

Flenniken, J. J., and A. W. Raymond

1986 Morphological Projectile Point Typology: Replication Experimentation, and Technological Analysis. *American Antiquity* 51(3):603–614.

Keeley, L. H.

1971 Functional Interpretations from Microscopic Analysis. *American Antiquity* 36:361–366.

1974 The Methodology of Microwear Analysis. *American Antiquity* 39:126–128.

Odell, G. H.

1977 The Application of Micro-wear Analysis to the Lithic Component of an Entire Prehistoric Settlement: Methods, Problems, and Functional Reconstructions. Ph.D. dissertation, Department of Anthropology, Harvard University, Cambridge. University Microfilms, Ann Arbor.

Schiffer, M. B.
1987 *Formation Processes of the Archaeological Record.* University of New Mexico Press, Albuquerque.

Shafer, H. J.
1973 Lithic Technology at the George C. Davis Site, Cherokee County, Texas. Unpublished Ph.D. dissertation, Department of Anthropology, The University of Texas, Austin

Sheets, P.
1973 Edge Abrasion During Biface Manufacture. *American Antiquity* 38:215–218.

Missing the Point: A Reply to Dockall, Dickens and Shafer

Kim A. Cox

ABSTRACT

Dockall, Dickens, and Shafer offer criticism of Herman Smith's and my 1991 article on the study of impact damage to Perdiz points. They raise issues on methodology and ethics. I disagree that the methodology was flawed or that there was a breach of ethics in the use of real Perdiz points in destructive experiments.

INTRODUCTION

In their evaluation of Herman Smith's and my 1991 paper, Dockall, Dickens, and Shafer (see article, elswhere in this volume) pursue two major areas of methodology and ethics. Their comments in both of these areas demonstrate a lack of understanding of the experiments and conclusions, as well as philosophical differences on ethical issues.

METHODOLOGY

The two principal conclusions of our paper were that (a) the mere appearance of lithic tools resembling Perdiz points does not necessarily mean that their final use was as tips for arrows, and (b) the study of snap versus impact damage has use in the understanding of site function as well as other general applications (which were enumerated in the article). Dockall, Dickens, and Shafer raise the criticism that our evaluation of the reasons for the appearance of snaps and edgewear was not complete and that, therefore, the results were somehow invalid.

First, in regard to snaps, the focus of our analysis was on the presence of impact damage, not on the presence of snaps. In fact, we actually acknowledged that "there are other easy explanations for snaps on projectile points" (Cox and Smith 1991:293). But the presence of snaps was not the relevant issue; the important point being made was that "[a]ll projectile point types must evidence impact fractures" (Cox and Smith 1991:293).

As an example of the application of this analysis, we concluded that the Fresno "point" that is quite widespread in this area may not be a projectile point type because it does not have anywhere near as many impact fractures as are seen on local Perdiz and Starr arrowpoints. In fact, in the three years since this article was written, these Fresno points have become a persistent source of consternation. We would like them to be projectile points, but the lack of any impact damage on them is extremely bothersome. In any event, the problem poses questions that would not have been raised without this type of damage analysis.

Second, in regard to edgewear, there is no question but that most if not all of the Perdiz points from the sites studied were originally intended to be used as arrowpoints. However, the analysis of edge attrition tends to indicate that the last use of some of the points before they were lost or discarded was not as projectile points. The fact that there was significant edge attrition on the whole points, but much less attrition on the ones with major impact damage, is enough to suggest such an idea.

If, as argued by Dockall, Dickens, and Shafer, any number of other factors could have been responsible for the edge attrition (such as dulling in the manufacturing process), why is there a disparity between the whole points and the ones with impact fractures? And why are there so many dull, poorly shaped arrowpoints?

I suggest that anyone who believes that these are arrowpoints try to survive by using them as such. It is inconceivable to think that skilled bow hunters would even entertain such a notion.

Our experiment was not intended to be a detailed use-wear study, nor was an exhaustive experimental program required for our conclusions; it was simply a matter of perception and common sense. We were simply trying to convey in the article the fact that one cannot necessarily infer site function or intensity of use from the mere presence or number of projectile points.

ETHICS

Over the past five years, I have measured and recorded edge attrition and damage patterns on several thousand Perdiz points from public and private collections. In the course of doing this, I have had donated to me several Perdiz points for which there was no provenience; it was not known even whether they were found locally. We used some of these points in our experiments because they fit within the range of shapes and edge wear of the Perdiz points from 41SP135. Dockall, Dickens, and Shafer raise an ethical issue concerning the use of genuine points in destructive experiments.

We considered using replicated points instead of actual ones, but we saw the failure of the people who used them to salvage these points as the real question. I did not know at the time that shape and edge wear significantly affect the performance of a point, and I believed that the credibility of the experiment depended on the use of points that had been discarded, and not on ones that had been recently manufactured. After all, we were trying to answer the question of what was wrong with the discarded points.

The points that were actually used could not have contributed to the three categories of potential information listed by Dockall, Dickens, and Shafer. However, the use of genuine points provided critical information to the experiments, which were the moral equivalent of using impact tests to study the hardness of pottery. To some extent, the authors must be allowed their discretion in the choice of artifacts to be used in destructive experiments without summoning the ethical police. Even on the offensiveness scale, our breach was minor. To raise it as an issue, I believe, is to overemphasize artifacts as things rather than as potential sources of knowledge, an issue recently broached by Stephen Black (1992) in an address to the Texas Archeological Society.

Essentially, archeology is a process for the acquisition of information leading to the elucidation of the human condition through time. There is much merit in preserving what remains of our heritage, but this is simply one facet of the whole scenario. It seems to me that the Texas archeological hierarchy has misplaced its emphasis in this matter with its anachronistic fixation on things over ideas, a fixation used to justify the mandatory expenditure of huge amounts of both public and private money for negligible results.

It is outrageous that archeologists with new ideas and new approaches have to operate on a shoestring while monstrous sums of money are spent for embarrassingly little new information, a fact recently acknowledged by Michael B. Collins, when he said we should "think long and hard before we dig another burned rock midden" (Collins 1991:1). What a novel idea!

This is all by way of politely saying that, although ethics will always be a legitimate concern, academicians themselves leave too much room for improvement to be pronouncing judgment on others.

REFERENCES CITED

Black, S. L.
1992 Nailing the Coffin Shut on the Traditional Approach to Prehistoric Archaeology in Texas: An Epitaph and Inquiry into the Afterlife. Paper presented at the annual meeting of the Texas Archeological Society, Corpus Christi.

Collins, M. B.
1991 Thoughts on the Future Investigation of Burned Rock Middens. In: The Burned Rock Middens of Texas: An Archeological Symposium, edited by T. R. Hester. Texas Archeological Research Laboratory, The University of Texas at Austin, *Studies in Archeology* 13.

Cox, K. A., and H. A. Smith
1991 Perdiz Point Damage Analysis. *Bulletin of the Texas Archeological Society* 60 (for 1989):283–301.

Dockall, J. E., W. A. Dickens, and H. J. Shafer
1993 Getting to the Point: Some Comments on Cox and Smith's Perdiz Point Damage Analysis (in this volume).

Some Thoughts on Texas Historical Archeology

John W. Clark, Jr.

ABSTRACT

There has been a general lack of interest in historical archeology by many prehistoric archeologists in this important period in our history. The author points out several specific areas of concern and offers some suggestions for techniques and approaches that are important in the study of historic sites and records. Historical archeology has the potential to help us make significant improvements in our understanding of Texas history and anthropology.

INTRODUCTION

The study of historical archeology has been pursued in Texas on a regular basis since the late 1950s, focusing first on historic Indian camp sites, then moving on to the excavation of mainly Anglo-American sites associated with important historical figures. During most of the early years of historical archeology in Texas I was a student and participated in a few excavations, including some volunteer work during the first investigation at Independence Hall at Washington-on-the-Brazos, serving as a crew member of the excavation of the Anson Jones kitchen site, and also visiting several sites. However, at that time I was more interested in prehistoric sites and had opportunities to work on many excellent sites in Texas and other states. It was not until the early 1970s when I was placed in charge of the excavation and publication of three structure foundations at Fort Lancaster that I began to appreciate the possibilities of historical archeology. Since that time, I have continued to see more possibilities as I worked on a variety of historic sites.

HISTORICAL ARCHEOLOGY IN TEXAS

During the 1960s the subdiscipline of historical archeology in the United States began to develop with the founding of the Society for Historical Archaeology. The first volume of *Historical Archaeology* contained articles dealing with questions of the place of historical archeology in relation to history and anthropology. The early issues were concerned with this question and with the typology and dating of certain artifact types. During the 1970s and 1980s the focus shifted to more theoretical and anthropological approaches. During that period, the emphasis on particular artifacts as the subject of study in and of themselves was greatly reduced, and more emphasis was placed on interpretation through sets of analytical models that could be quantified and tested. Several of these models have proven their worth in sites all over the country, and they serve as excellent bases for comparing sites.

However, much of the historical archeology in Texas remains like that of the 1960s, with little emphasis on the anthropological and historical questions that can be discussed profitably in the analysis of historic sites. This is meant not as a criticism of any specific individuals, but rather to suggest that there are more creative analytical techniques and more powerful models in use in other parts of the country than are commonly in use here. A part of the problem is that much of the work has been done by archeologists who were much more interested in prehistoric than historic sites and who did historical archeology unwillingly as part of salvage or Cultural Resource Management (CRM) work. Some who have had a continuing interest in aspects of Texas historical archeology seem to have been kept so busy with CRM projects that they have had little time or inclination to use updated analytical methods. I call attention here to some of the research questions and models I consider important and suggest some of the ways by which they can be implemented. This requires that I state my predilections with regard to the analysis and interpretation of these sites and discuss some of the opportunities and limitations offered by various kinds of sites. It also requires a discussion of the characteristics that make a site significant. These are weighty subjects that have been discussed and continue to be discussed by archeologists throughout the nation.

Historical archeological sites usually are sites that date from the entrance of Europeans or descendants of Europeans into an area to the present. They are usually characterized by two things; artifacts of Euro-American manufacture and some kind of documentation relating to the site or its inhabitants. In some cases, modern descendants of the inhabitants of the site make it possible for archeologists to relate the site to the modern world. Also, the artifacts, or at least a large percentage of them, are much more likely to be identifiable as to function and date than those at prehistoric sites. This frees historical archeologists to concentrate more time and effort on the interpretation of the data, from excavated, archival, or oral sources.

Questions to be Answered

What, then, are some of the questions that can be addressed in the analysis of the material gathered by extensive research on these sites? One of the important questions deals with the establishment of functional distribution patterns that make it possible to create quantified descriptions of component artifact assemblages. This technique, developed by Stanley South (1977) in the early 1970s in South Carolina, has proven successful in his research and that of others working on colonial period sites, and has been used with some success in other areas and for other time periods. The categories of artifact function must be expanded considerably to accommodate the enormous number of artifact categories found in late nineteenth and early twentieth century sites. The technique is not perfect, and its limitations have been discussed in the literature, but it is useful for the definition of patterns, and it provides quantifiable bases for comparing sites. This technique could be very useful in Texas once it has been used on several sites. It is important now to develop an archive of sites that have had this kind of analysis so larger patterns can be derived.

A second question is horizontal patterning. The spatial distribution of artifacts can indicate culturally significant patterns of refuse disposal and activity areas as has been shown in the mid-to-late 1970s and in the 1980s on several sites here in Texas. This technique can be effective when there has been sufficient sampling of the site area. One method used to show artifact frequency is to combine all artifact categories and plot raw numbers on a map of the excavation units of the site, and an alternative method often used is to indicate intensity by different degrees of shading, and still another version of this technique is to use a series of site maps to show the distribution of artifact function categories as defined by South. These approaches are valuable, but the latter may enable archeologists to define special activity areas that might not be readily discernible in the former.

In some respects, these questions can be related to still another question—ethnicity. To understand the cultural dynamics represented in the artifacts and the structural features of a site it is important to determine ethnic affiliation of the occupants of the site. This can sometimes be done by interviewing descendants of inhabitants or their neighbors or by archival research, or it can sometimes be determined by the presence of certain ethnically specific artifacts such as, for example, sherds of Loza Corriente ceramics or perhaps glass or ceramic sherds embossed with non-English lettering. If it is possible to determine the ethnicity of the inhabitants of a site, the previously mentioned pattern definition techniques may make it possible to assign or describe ethnically related patterns quantifiably; that is, ethnically identifiable refuse disposal patterns and function/frequency patterns may be discernible when these techniques are used.

Economic Patterns

Still utilizing artifacts excavated from a site, it may be quite possible to outline aspects of the market system of the inhabitants. Several exchange systems are available to occupants of most sites. The most remote of these markets is the international import market reflected in inventories of foreign makers' marks or product marks that might be found on ceramics or liquor bottles. Another market system available to the inhabitants might be the national market, some examples of which might be artifacts—bottles, ceramics, and bricks—with marks from manufacturers in other areas of the country. Items made in other parts of the state indicate participation in a regional market. The local market is often represented by local pharmacy bottles and tokens. Most artifacts will not provide information on manufacturers, and there may be containers manufactured in one place holding products manufactured at another. Items found on site often provide data on the diet of the inhabitants. When archeologists think of diet, they usually think of animal bones, which are certainly found on most of these sites and can provide not only the traditional information about genus and species and minimum number of animals, but also information on the cuts of meat being eaten and the butchering techniques that were prevalent in the area at a particular time period, subjects to which considerable attention has been given in the literature. Other items of diet are often represented in the remains found at a site. Tin cans often indicate the use of canned vegetables, meats, and spices, and the use of coffee and tea is also often indicated by the embossed lids of tins they were packed in. Lids of baking powder tins and condensed milk cans are often found, and canning jars or lids may well indicate the home production of vegetables and/or fruit. Traditional recovery techniques such as flotation for charred food remains can provide additional information, and the use of certain kinds of foods and condiments can be indicated by certain styles of bottles and jars or by embossing on the sides or panels of bottles. Together, these data can add much detail to the picture of the diet at the site.

Another aspect of the site that can be determined is relative wealth. The inhabitants of sites containing much decorated porcelain and whiteware probably enjoyed a higher economic status than those sites containing mostly plain ceramics. In the literature of historical archeology are several articles on the economic scaling of ceramics. At present, economic status is usually determined by the presence of decorated and nondecorated ceramics, several types of which have established price values. Other kinds of artifacts might be used, but constructing scales for them would require considerable research effort, and ceramics provide a convenient and well-tested approach. The basis for scaling by ceramic types is the fact that decorated ceramics were more costly than plain ceramics and that certain decorative techniques were used on the most costly ceramics.

On some historic sites, the economic pursuits of the occupants may be patently obvious, particularly industrial or manufacturing sites, and other sites, such as town residences, may provide no artifactual information regarding the economic endeavors of their inhabitants. In any event, all excavators should be alert for artifacts that might provide clues, such as tools, raw materials, pieces of equipment used in farming or ranching, ephemeral items such as business cards or tokens, or by many other artifacts that reflect occupational endeavors. However, it is often difficult to determine whether an artifact reflects the occupation of the occupant of the site or is an item acquired by the occupant in the pursuit of other activities. It is particularly useful to consult trade catalogs of the period under study in order to learn the names and functions of many artifact parts related to economic pursuits. Unfortunately it is often difficult to locate appropriate catalogs, but the search can be rewarding.

Family and Social Relationships

Often at residential sites the major outlines of the composition of family groups can be determined from certain artifacts. The presence of men can be indicated by a variety of artifacts usually associated with grooming or clothing, including collar studs, suspender buckles, straight razors, and many others. Artifacts that indicate the presence of women might include decorative dress buttons, corset stays, web belt buckles, face cream jars, canning jars, and sewing equipment. Boys might be represented by marbles, cast-iron toys, or other male-oriented toys, and girls might be represented by doll parts or miniature ceramics. These kinds of data should be considered together with archival and/or informant information.

Oral History

Up to this point, I have considered only some of the possible uses of features and artifacts in the analysis of historic sites. But there are other sources of information for historical archaeologists who wish to maximize the data base for the analysis of a particular site or group of sites. Most archeologists in this country get their degrees in anthropology, and the usual reason for studying archeology is that we are studying the anthropology of past cultures, but at least we should be trying in historical archeology to provide a descriptive ethnography, if not a more in-depth analysis and description of culture history and cultural change. Archeology provides a unique opportunity to consider and study cultural patterning and change. While we are excavating historical sites, we sometimes have visitors who offer personal reminiscences about the site, and sometimes people who are familiar with the site are sought out and interviewed. But the vast majority of informant interviews now in the literature seem to concentrate almost exclusively on acquiring information about the locations and descriptions of structures formerly standing on the site.

If we are, in fact, attempting to do anthropological research on these sites of the past, why do we limit our questions to a small segment of material culture? If one has a series of informants, why not ask questions about a wider variety of data? Oral history need not be confined to historians or to expressly historical topics: we can ask the same questions about social relationships that social anthropologists ask. Nor do we need to be limited to purely historical topics. By questioning informants, we can get information on the feelings and perceptions of former site occupants or their descendants about cultural change. It should be kept in mind, however, that the memory of any individual may be faulty, so we should always have supplementary data—excavated archeological remains, documents, or supporting testimony from other informants.

Sometimes, informants who visit excavations may indicate that they have information, but in other cases it may be necessary to recruit informants, by asking people who have lived near the site for a long time if they knew the site occupants or their descendants or if they have information on the site and the community, or by contacting the media—particularly television stations—who can publicize your request for informants. Interviewing techniques should be as comfortable as possible for the informants. Successful and productive relationships can be fostered at their homes, on the site, or in neutral, but comfortable, settings, but only rarely in the archeologist's office. Bulky tape recorders are intimidating, so it might be better to use an inconspicuous recorder or a notepad. Try to prepare a series of questions beforehand, but be prepared to skip around in the list as questions are answered in the course of the conversation with the informant, for, although the questions may be ordered for the convenience of the archeologist they almost certainly will not be discussed in that order, no matter how logical it may be. Be prepared to skip from question to question.

The name, address, and age of the informant, date and place of the interview, and the project title must be recorded, for it is important to provide readers of the report with this information and with a reasonably detailed summary of this primary descriptive data.

Archival Research

Archival research is a common feature of historical archeological reporting that is often demanded in CRM work. Often, a chain of ownership satisfies the State Historic Preservation Office requirement for archival research. Study of deed records in county courthouses can sometimes provide genealogical data when properties are inherited, sold to other family members, or subject to suits to clear titles, and they can provide some indications of changes in property values over time and the approximate dates of capital improvements. It may even be possible to determine certain aspects about the predevelopment vegetation patterns of original land grants from original survey notes usually found in the archives of the General Land Office.

Other archival sources are tax records that may provide useful data about property improvements and land values: tax sales, foreclosures and other recorded legal actions can provide valuable data on the economic status of the occupants of sites. School censuses, county road books, minutes of meetings of commissioner's courts and other courthouse records can provide clues to activities: most counties have libraries of local history collections—documents, clippings, books and/or photographs—of varying quality and scope, which should be supplemented with information from local county historical commissions, county clerk's offices (find the oldest clerk working there), and local businesses (for early records, company histories, etc.). Among other, nonlocal, sources in Texas are the Archives Division of the State Library, the Barker Texas History Center at The University of Texas at Austin, the Confederate History Research Center at Hillsboro, the Rosenberg Library in Galveston, church records, and several archival holdings in Mexico and some from Spain, which have been microfilmed and are housed in Austin or San Antonio. One should not overlook church records.

Since only cursory examination of records may be possible during the visit to the archive, it is extremely important to make maximum use of archives' copying facilities in order to collect as many documents as possible for detailed examination later, elimination of transcription errors (a significant advantage), and the potential to use the documents as illustrations in a final report.

When archival research materials are in another language (in Texas this is usually Spanish), archeologists are cautioned that many documents containing translation errors have led to the misinterpretation of the information. It is best to have both a transcription and a translation, for the transcription might provide information that may not be in the translation, and it will certainly provide a feel for the nature of the documentation.

Genealogy

Genealogy is one aspect often overlooked in investigations, but it can provide valuable information on family structure (kinship), or patterns of association in family groups, and, among families, information about migration, demographic data, and other kinds of information, and it can also provide a feel for the people. Some generalized information can be gleaned from informant interviews, census data, school censuses, court records, land records, cemetery records, military records, and many others, and the Texas State Library and Archives have many valuable publications and documents in their specialized collections. Fairly intensive genealogical research may well reveal quite important documentation on the activities of the site inhabitants showing their antecedents and revealing the history of their descendants, thereby making the connection between the past and the present in a quite human manner. Several readily available publications explain how to do this kind of research, and standard forms are available for summarizing the data collected and indicating relationships. Family group charts are particularly valuable; examples of these are found in several publications and are available commercially.

One kind of information that can be developed in doing genealogical and other archival research on a site is the pattern of interpersonal and economic relationships (the networking) of the site occupants. These relationships can include friendships, marriage patterns, business relationships and other economic activities. Plotting these on general area maps may reveal the functioning of geographic factors. This approach is relatively new in historical archeology and has the potential to provide much valuable information. These patterns of networking may reveal primary and secondary communication routes, social groups, lodge or club associations, and other potentially valuable information. Since this area of historical archeological investigation is new to the field, the opportunities for creative approaches in this area are wide open.

Work with archival and, especially, genealogical sources often involves references to deaths and funerals in county histories, genealogical source books, and newspaper obituaries. Obituaries can provide the names of survivors, personal history of individuals, and places of burial, and this information leads investigators to cemeteries where they can glean more information, for tombstone inscriptions sometimes provide information about family members and relationships that is not provided in other documentation. The physical relationship of graves also can provide further information about family groups. Graves sometimes provide information on religious affiliation if the individuals are buried in cemeteries associated with particular religions. Taken as a whole, cemeteries can provide much demographic data, including age at death, periods of epidemic, gender-related mortality, infant mortality, and other topics. The study of stylistic changes in headstones and burial practices is also productive, since some tombstones indicate lodge affiliations not indicated in other sources. Considering the plethora of data available in cemeteries, it is worthwhile to search out and examine the cemeteries in the vicinity of the site.

Several archival depositories maintain collections of photographs that provide information about the structures, layout, landscape, dress of the occupants, activities of the site inhabitants, and images of the occupants themselves (I have used historic photographs to provide details of construction when the archeological record was unclear). Photographs can be particularly valuable when there is no structure surviving on the site. An equally important use of historic photographs is to provide investigators and readers with a feel for the living site and occupants. Through the use of these materials, the archeological report becomes more human.

Historical Context

At the present time, much is being made of a concept called historic context. As it seems to be interpreted by the office of the State Historic Preservation Officer (SHPO), this term does not describe what the SHPO is looking for in either reports or plans of investigation, but rather, discussions of a series of historical/economic topics—hog production, folk art, town form, exploration and settlement, military, economic development, and others—in relation to a particular site. These topics are meant to provide guidance in developing research designs or plans of investigation of regional or temporal units, but it seems to me that this scheme neither considers historical context nor provides adequate guidance in the development of designs for the investigation of sites. However, to me, the term historic context means the relationship that the site has to the broad cultural and historical developments in the local area, the region, and the nation. In Texas, these include international developments in France, Spain, and New Spain that led to the exploration and colonization of Texas by the Spanish, developments in the United States and Mexico that led to the Texas Revolution, border friction during the Mexican Revolution, and other similar topics. It must be remembered that the borders of Texas were fixed only recently and even now hardly cut off the flow of people from one area to another. Members of the same Mexican families live on different sides of the border, and a constant flow of people existed in the prehistoric period as it does now. The historic context in this sense would be best discussed in the historical background and conclusion of a report.

The topical approach does not consider truly archeological questions or the cultural anthropology of a site as already discussed. It does not consider cultural process or the interactions of the various components of culture. Essentially, it does not consider ongoing theoretical development of historical archeology but favors piecemeal historic topics. We are still anthropologists and should keep that in mind when excavating and analyzing sites.

The historic period is readily amenable to this approach, and the approaches discussed above are possible with the technology and theoretical development we now have available in the literature. We should allow for the future development of theory and techniques in the field and not limit ourselves to a series of topics that can easily become fossilized and can stifle creative development of theory and analytical technique.

Archeological Significance

The question of significance has bothered archeologists for many years. While working on an early twentieth century rural tenant house, I was asked by local county historical commission members as well as archeologists why I considered such a mundane site important and why were we wasting money digging a site that was not architecturally elegant or related to a historically important person or event. These people were looking at only some of the criteria for the evaluation of site significance in terms of eligibility for inclusion in the National Register of Historic Places. They did not consider the criterion that covers the historical or archeological information a site has produced or may produce. I have worked on sites associated with important historical persons and events. These sites also yield information relatable to historical archeological theory. Except for association with important persons or places, site significance depends solely on its potential to yield information on cultural process and change. Sites of many ages, sizes, locations, and socioeconomic positions can provide much information. Even the meanest hovel in the woods can be significant if it can yield information relating to historical archeological theory, and on the other hand, an elegant architectural confection may have no archeological significance if its context has been destroyed. For example, the Anson Jones house in the Washington-on-the-Brazos State Park is not archeologically significant because it was moved to the park from another location. The critical factor is the potential of the site to answer questions relating to archeological theory and not to the illustrating of historical factors such as structure size and the age of a particular artifact. These are historical particularistic questions that often can be answered through documentation or methodological techniques. Answers to this kind of question are pertinent only to the specific site under investigation, whereas focusing on questions of process relates to broad cultural patterns and forms the basis for the development and analysis of cultural hypotheses.

Significance, then, does not depend on age or, necessarily, the association of the site with a historical personage or event or with craftsmanship. For historical archeologists, it really depends on the potential of the site features, artifacts, and documentation to yield information that can be analyzed with regard to specific theoretical goals and to the development of hypotheses of culture theory. By using a variety of methodological approaches to site analysis, some of which have been discussed above, the hypothetical approaches are quite varied, offering historical archeologists an open field for creative hypothesis formulation and testing. This aspect of historical archeology is something that can, in fact, be done, and the formulation of data recovery plans, research designs, or mitigation plans can consist of approaches that have a reasonable certainty of producing valuable results. One need not formulate hypotheses for testing that go far beyond the capabilities of the data.

Archeological Excavation

I have discussed, in cursory fashion, a variety of areas for the development of theory and techniques to analyze excavated data and data gathered from mainly historical or archival investigations. Still another aspect of historical archeology that should be considered is techniques, or approaches to excavation. Because sites in Texas were generally occupied by people who used only two systems of measurement, these systems should be used when dealing with these sites, and since the Spanish and Mexicans used leagues and varas in most cases during their occupancy of Texas, excavators of Spanish or Mexican sites might consider using varas for measuring site features and for excavation units. If there is a standing structure on the site, it is appropriate to orient the site grid to the structure, perhaps using a corner or other significant part of the site as the point from which measurements and units are taken.

Virtually all post-Mexican-era sites were laid out in the English system of measurements, and, even now, most buildings, roads, and other works are in this system, so it makes very little sense to impose the metric system on these sites. The metric system is appropriate for sites in which there is a strong suspicion that the occupants had no formal system of measurement or that were built using the metric system.

Most historic sites were not deposited or laid out in random patterns. In most sites there are demonstrable concentrations, or at least patterned distributions, of features and patterns of artifact disposal that can be used by archeologists to maximize recovery of data. Metal detectors, magnetometers, aerial photos, probes, mechanical removal of deposits, and other techniques can help identify the areas of artifact disposal before excavation. This recognition of disposal patterns may, in some cases, help archeologists to determine excavation plans. But archeologists must be flexible and let the circumstances at the site guide the excavation program. Data recovery plans are all too often retained long after they are found to be inappropriate.

The very definition of site boundaries and designation can become a problem under some conditions. In a rural area where one may be working on a farmstead, is the site boundary the perimeter of the entire farm or is it the concentration of farm structures? In a small town, perhaps the whole community should be given a single site number, or perhaps each residence and commercial unit in the community should have its own site number. This is even more of a problem in cities, where there are dense concentrations of potential archeological features. Is the whole town one site, or is each unit a site?

For towns and cities, there is a better system that avoids having a plethora of site numbers. Because land transactions require precise reference systems, most towns and cities were surveyed when they were laid out and have streets and alleys, blocks, and lots that have been measured and given legal designations that are readily traceable in county deed records. They are convenient mapping and cultural units, and they have real meaning to the culture and history of the community.

Reporting Results

Finally, there is the question of reporting the results of the project work. What should one report and in how much detail? This depends on the objectives of the archeologist and on the nature of the site, for in certain situations the geographic setting—soils, climate, flora, and fauna—is important, whereas in another the hardrock geology may be important, and in some cases, the environment may have had little effect on the location or occupation of the site. It may not be efficient to provide the reader with extraneous data that do not pertain to the occupation of the site or to the understanding of its history and archeology, but the broad patterns of regional and national history should always be discussed in order to place the site in relation to that history. This is the historical context of the site; i.e., how it relates to the history and archeological developments of the area should be a fairly extensive part of the report. As an extension of this historical context, a more detailed site history should be provided, including the events that occurred at the site: the oral history, genealogy, and other social/cultural information. The excavation techniques and features should be described in some detail, and one section should deal with the artifacts, and since they provide important cultural information necessary for the development of the archeological questions to be answered, they should be described. When artifacts are not in primary context, certain kinds of well-known artifact classes should be listed, but other artifacts may require more description and analysis, such as the listing of maker's marks, patterns, and other special characteristics.

Following the artifact descriptions—which may vary from merely listing some classes to extensive description and analysis of others—there should be a discussion of the significance of the artifacts to the research questions usually defined in the introduction of the report. This may include information regarding market systems, ethnicity, class, consumer preference, or any of a number of other purely archeological questions. Finally, the conclusions should draw the historical, oral history, environmental, archival, and genealogical data together with the artifact data to data to provide a broad view—an anthropological view—of the occupation of the site. For small sites with relatively few artifacts, these items usually should not result in a very large report, but, for large sites or multisite projects, it is inevitable that the resulting report should also be large and time-consuming to write. However, if the research questions are developed and if the information in the report can be used by other researchers, the end product will be worth the effort.

SUMMARY

Historical archeology is an open field of opportunity for the development of techniques for enhancing the development of archeological culture theory and new analytical techniques. Many valid research questions, already defined, can take researchers many years to examine, and many more questions will develop as we refine our understanding of cultural-historical process. Unfortunately, it is not possible to get formal training in historical archeology in Texas, so Texas historical archeologists must train themselves by reading the literature produced in other states and in the national journals. They must also read history, both interpretive and descriptive. First-person accounts can be quite valuable, but archeologists must also become familiar with the literature on collections and with architectural history and construction techniques. They should pursue the broadest possible reading program, and, although it may not be necessary to be knowledgeable about all aspects of the artifacts, it is important to know where to find the information.

REFERENCE CITED

South, Stanley
1977 *Method and Theory in Historical Archeology*. Academic Press, New York.

AUTHORS

Leland C. Bement recently completed his doctorate in anthropology at The University of Texas at Austin, where he also served as a staff archeologist with the Texas Archeological Research Laboratory (TARL). He is the author of a variety of technical reports and other publications involving his interests in Texas Archaic hunters and gatherers. Dr. Bement has also assisted in a variety of salvage projects with TARL in the Lower Pecos and other areas around the state. Since 1991 he has been with the Oklahoma Archeological Survey, in Norman, Oklahoma.

John W. Clark, Jr. graduated from The University of Texas at Austin and has worked with the Texas Archeological Salvage Project, the Texas Historical Commission, and on several projects with Prewitt and Associates. He is now an archeologist with the State Department of Highways and Public Transportation. His publications include reports in the Texas Archeological Salvage Project series, Texas Historical Commission report series, the *Bulletin of the Texas Archeological Society*, and *La Tierra* (Journal of the Southern Texas Archaeological Association). He has a particular interest in the historic Spanish mission structures in San Antonio and has worked on several significant historic sites in Texas and other states.

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.

Michael W. Davis became a member of the Texas Archeological Society in 1989 in order to participate in the TAS Field School at the Devils River State Natural Area. As an employee of the Texas Parks and Wildlife Department, he assisted the Field School Committee in logistical planning for the field school. Under the supervision of Dr. Solveig Turpin, he was one of the many individuals who participated in the archeological survey of the State Natural Area. He now has a very close personal attachment to the TAS, its activities, and its members.

William A. Dickens is a graduate student at Texas A&M University (TAMU), specializing in lithic technology. His thesis topic centers on material-sourcing and the technological strategies surrounding quarrying activities at Fort Hood, Texas. Other studies of interest include the technological analysis of lithic tool manufacture in the Lower and Middle Paleolithic of the Middle East. All his studies utilize experimental replication and tool use as a means of better understanding prehistoric strategies. Mr. Dickens is the lithic analyst for the TAMU Archaeological Research Laboratory.

John E. Dockall is a doctoral candidate and lithic analyst for the Anthropology Research Laboratory, Department of Anthropology, Texas A&M University.

His research interests include lithic technology of hunter-gatherer, formative, and chiefdom/state-level societies. His current research includes technological and functional studies of Middle Paleolithic pointed tools from the sites of Shanidar Cave, Iraq, and Nahr Ibrahim, Lebanon. Other research has included functional variability and consumption of Maya stone tool assemblages.

W. Sue Gross is a Shipping Coordinator with Dow Chemical U.S.A., and holds a M.S. degree in Finance from the University of Houston-Clear Lake. She has been an active member of the Brazosport Archaeological Society since 1984, and her first archeological site work was on the Eagle Island project. Since that time, she has worked with a variety of other organizations, including The University of Texas at San Antonio, where she did field work in Belize, and at a historic site for Earthwatch in Nashville, Tennessee. Her main interests are in nineteenth century transfer printed earthenwares.

Brett A. Houk received his B.A. in Anthropology from Trinity University and holds an M.A. degree from The University of Texas at Austin in 1990. He has worked for the past five summers on various projects in Belize, Central America. He is associated with The University of Texas at San Antonio's Ixcanrío Regional Project in the Maya lowlands of Belize and Guatemala. His interests include Maya lithic technology, architecture, long-range trade, and settlement patterns. Although his current focus is directed toward the Maya lowlands, he remains active in Texas archeology through UT and the Texas Archeological Research Laboratory. Address: Department of Anthropology, The University of Texas at Austin, Austin, TX 78712.

Cris Kneupper is an avocational archeologist, a 10-year member of the TAS, and a charter member and secretary (for 1992) of the Brazosport Archaeological Society. A native of the San Antonio area, he makes his living as a chemical engineer, but frequently participates in TAS field schools and local archeological projects. Chris now lives in Lake Jackson, Texas.

Emery C. Lehnert is a commercial artist specializing in the replication of southwestern Indian rock art and ethnic Indian art. He is a member of the Val Verde County Historical Commission and the TAS, and was recently appointed an Archeological Steward with the Office of the State Archeologist. He has been interested in rock art studies in Arizona, New Mexico, Utah, Colorado, and Texas, and in parts of Mexico. He has served as an archeological interpreter for the National Park Service (NPS) at Navajo National Monument and at Aztec Ruins National Monument; he has also done archeological salvage work in the NPS Amistad Recreation area near Del Rio. He is now retired from the NPS after 34 years of service, and lives with his wife at 101 King Richards, Del Rio, TX 78840.

Jon C. Lohse received his B.A. in anthropology from Trinity University in 1990, and holds an M.A. degree from The University of Texas at Austin. He has worked

Jon C. Lohse received his B.A. in anthropology from Trinity University in 1990, and holds an M.A. degree from The University of Texas at Austin. He has worked in northern Belize with various projects since 1989. He is interested in Mesoamerican archeology and is writing his M.A. thesis on preceramic lithics in northern Belize. He is a Graduate Research Assistant at the Texas Archeological Research Laboratory where he continues to pursue his interest in Texas archeology. Address: Department of Anthropology, The University of Texas at Austin, Austin, TX 78712.

William L. McClure is a Registered Professional Engineer who retired from the Texas Highway Department in 1983. Since that time he has been Assistant Director of the Harris County Toll Road Authority. Since 1965 he has written technical papers in a variety of topics, including Pleistocene fossils, endangered species, archeological site reports, and faunal analyses of prehistoric and historic sites. Through his efforts, the Houston Archeological Society now has a respectable comparative bone collection. He has served as a Research Associate with the Strecker Museum at Baylor University and as an Adjunct Research Associate of the Institute for Applied Sciences at North Texas State University. In 1989, he received the Southeast Texas Archeological Research Award, which is conferred by the Houston Archeological Society.

Roy E. Padgett is an avocational archeologist who lived for many years in Fort Worth. He has been a member of the TAS since 1958 and helped charter the Tarrant County Archeological Society (TCAS) the same year. From 1962 to 1968 he was President of the TCAS. In 1964 he became a member of the Oklahoma Anthropological Society and in 1966 was elected as what was then called the Active Vice-President of TAS. In 1968, he was President of the Society. Roy now lives at Route 1, Box 6B, Santo, TX 76472.

Leland W. Patterson has been an active avocational for many years in several areas of archeological research. Current interests include general lithic technology, the archeology of the southeastern and south-central regions of Texas, and patterns of cultural change. He has published more than 250 papers and articles in a variety of local, regional, state, and national publications, including *American Antiquity, Plains Anthropologist, Journal of Field Archaeology*, and the *Bulletin of the Texas Archeological Society*. He is now Associate Editor for Avocational Archeology for the Society of American Archaeology *Bulletin*. He is past Chairman of the Houston Archeological Society, and he recently compiled and published a comprehensive archeological bibliography of southeastern Texas for that society. Lee was also honored by the TAS with its Golden Pen Award in recognition for his extensive publications. Mr. Patterson is a retired chemical engineer and was Manager of Environmental Affairs for Tenneco, Inc. He recently retired from his second career as a cultural resources consultant, and acquired a new computer system to expand and enhance quantitative analysis and word processing. He is a member of the Society for American Archaeology, the Texas Archeological Society, the Houston Archeological Society, and the Southern Texas Archaeological Association (and societies in several other states as well). Lee lives at 413 Wycliffe, Houston, TX 77079.

Timothy K. Perttula, a member of the Texas Archeological Society since 1975, is a staff archeologist with the Archeological Planning and Review Staff of the Texas Historical Commission. Before coming to Austin, Tim worked as a historic preservation specialist with the Western Office of the Advisory Council on Historic Preservation in Golden, Colorado. For six years he was a Research Scientist at the University of North Texas, Institute of Applied Sciences. He has also worked for several universities and the National Park Service, doing archeology in the Midwest, Northwest, Oklahoma, and Texas. He completed his Ph.D. in 1989 at the University of Washington with a dissertation on Caddoan archeology and ethnohistory. Tim is also the Editor of the *Caddoan Archeology Newsletter*, and Editor Elect of this *Bulletin*.

Johnney Pollan is a Process Control Engineer for Dow Chemical U.S.A. He graduated from Trinity University (San Antonio) in 1969 with a B.S. degree in Engineering Science. He has been an active avocational archeologist with the Brazosport Archaeological Society and the TAS for more than 10 years, and has served in a variety of offices and on committees in both organizations. He has been co-author of several articles in the regional archeological literature. He is also a State Archeological Steward with the office of the State Archeologist. Johnney and his family live in Lake Jackson, Texas.

Harry J. Shafer is professor of anthropology at Texas A&M University and a Fellow of the TAS. He received his Ph.D. from The University of Texas at Austin. Shafer has conducted archeological research in many parts of Texas and is involved in a long-term research program in the Mimbres Mogollon area of New Mexico. He has also been codirector of the Coha Project in Belize. Dr. Shafer has published a variety of reports resulting from his research activities and has also produced with the Witte Museum an extremely well received book on Lower Pecos archeology titled *Ancient Texans*. His address is: Department of Anthropology, Texas A&M University, College Station, TX 77843.

Bob D. Skiles is an Assistant Forest Archeologist with the U.S. Forest Service for the National Forests and Grasslands in Texas. For five years before joining the Forest Service, he was a Research Associate in the Institute of Applied Sciences at the University of North Texas, where he supervised excavations at the Aubrey Clovis site. Bob, a native of Wood County, Texas, developed a serious interest in the archeology and history of the area at an early age. Pursuing that interest, he organized the Wood County Archeological Survey and worked for six years with the Archaeology Research Program at

Southern Methodist University. He has been a Life Member of the Texas Archeological Society since 1972.

James Smith is a Shipping Supervisor for Dow Chemical U.S.A. He graduated from Southwestern University in Georgetown with a B.S. degree in biology. He is a member of the Brazosport Archaeological Society and the Texas Archeological Society and has participated in several TAS field schools.

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.

Bonnie Yates is Assistant Director of the Center for Environmental Archaeology at the Institute of Applied Sciences, University of North Texas (UNT), where she has supervised the Zooarchaeology Lab for 11 years. Bonnie has been a member of TAS since 1978 and has presented programs on faunal analysis at many annual field schools. She earned her Master's degree in Land and Resource Management from UNT (formerly North Texas State University) in 1982. Her research interests include bone technology, taphonomy, and paleoenvironments.

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.

Manuscripts must be typed, double-spaced throughout, on 8-1/2-by-11-inch white paper with a margin of at least one inch all around. Footnotes should be avoided. References to published literature (by author, date, and page or figure numbers) should be placed within parentheses in the body of the text, with full bibliographic citations at the end. Personal communications should be fully identified in text citations but not included in the reference list. See this issue of the *Bulletin* for examples. Authors also should consult "Style Guide for Authors," which is available from the editor on request. Manuscripts that do not conform to the style guide will be returned to be put into compliance.

The proportions of full-page illustrations (photographs or drawings plus captions) should be suitable for reduction to effective *Bulletin* page size of 4-1/2 by 7-1/2 inches. Illustrations can be printed horizontally or vertically; allowance must be made for the captions to be printed in the same direction.

A complete manuscript is one with a title, abstract, main body with subdivisions, completed (camera-ready) photographic or drafted illustrations, and author's biographical note. Submit *three* copies of the typed manuscript. Manuscripts are subject to peer review; final decision rests with the editor.

Papers published in the *Bulletin* are abstracted and indexed in *Abstracts in Anthropology*.

Manuscripts should be addressed to Timothy K. Perttula, Texas Historical Commission, P.O. Box 12276, Austin, TX 78711.

COVERS

The vessel pictured on the front cover is from "The Goldsmith Site (41WD208): Investigations at the Titus Phase in the Upper Sabine River Basin, Wood County, Texas," by Perttula, Skiles, and Yates, in this volume, Figure 15, D, Burial 2, Vessel 8.

The pipe pictured on the back cover is from Figure 18, Burial 2, in the same paper.